Upgrade to IBM DB2 10 for z/OS

CPU savings … right out of the box

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Upgrading to DB2 10

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DB2 V8 **DB2 9** **DB2 10**

Is your current fish bowl getting tight? What is limiting you? Is it CPU cycles, real or virtual memory, disk storage or I/O, network access or time, object access times, locking, latching waiting, application throughput, elapsed times, transactions per unit time, catalog or directory limits, utilities or something else? Are you currently running DB2 9? V8? V7? Upgrading to a bigger fish bowl may be just what you need. This paper tries to explain your options and offers some information about when and how to migrate.

Should you upgrade to DB2 10? Yes.

To 10, or not to 10, when and how are the questions. Whether 'tis nobler in the mind to suffer the slings and arrows of outrageous limits, Or to take arms against a sea of troubles, And by upgrading, end them? To die: to sleep; No more; and by a sleep to say we end the heart-aches and the thousand natural shocks that old versions are heir to. 'tis a consummation devoutly to be wished. To die, to sleep. To sleep: perchance to dream: ay, there's the rub; For in that sleep of death what dreams may come when versions have shuffled off this mortal coil, must give us pause: There's the respect that makes calamity of too long life for old versions. [With abject apologies to the Bard and to Hamlet act 3 scene 1]

The answer to upgrading to DB2 10 is a definite Yes. The question is not so much whether to upgrade as when and how to upgrade. If you are running DB2 9 today, then DB2 10 is in your near future, giving you more room to grow, with higher limits, lower CPU, and more for less. If you are running DB2 V8 today, then need to migrate soon, as V8 end of service is near. You have a choice of upgrading to DB2 9 or jumping directly to DB2 10. Both choices are fully supported with migration and fallback.

This paper discusses the key decisions, planning, options, and guidance for the upgrade. DB2 10 became generally available October 22, 2010. The guidance will change over the life of the product, and so this paper has an expiration date of December 2011, although it will be updated before that.

Justify the upgrade

Two of the initial tasks for an upgrade are to make some primary choices and to justify the value for the work. For some, the strategic value is the key. Others need more detail, with descriptions and value assessment. Still others need to understand the detailed costs, the work and the return on that investment. I suggest starting by reading the white paper by Julian Stuhler, Triton Consulting: DB2 10 for z/OS Business Value Whitepaper - A Smarter Database for a Smarter Planet. http://www.ibm.com/software/data/db2/zos/db2-10/

As usual, DB2 10 has a price increase, but generally saves CPU. If the CPU saving is enough to reduce the capacity, then you may be able to save more on the full hardware and software stack. The costs and values for individual enterprises are often very different. The pricing options and agreements differ substantially. The value delivered depends upon the constraints and limits, which differ widely.

Here is a brief summary of the two versions

DB2 9: Robust, Scalable, Available and Easily Manageable

DB2 9 delivers CPU reductions for utilities that are generally up to 20%. Customers report saving terabytes of disk space using index compression. More CPU time is shifted to zIIP processors, reducing costs. Security is improved with more flexible trusted contexts and roles. Resilience is improved as more changes can be made while applications keep running. One

table can be replaced quickly with a clone. Indexes and columns can be renamed. Many more utilities can be online.

DB2 9 delivers seamless integration of XML and relational data with pureXML and makes big strides in SQL for productivity and portability of applications. A new storage structure is introduced for large tables. Today's complex applications include both transactions and reporting, so performing both well is required. The key improvements for reporting are optimization enhancements to improve query and reporting performance and ease of use. More queries can be expressed in SQL with new SQL enhancements. Improved statistics are provided for the optimizer, and algorithms are also improved. Reduced CPU and elapsed times can be achieved with the FETCH FIRST clause specified on a subquery. The INTERSECT and EXCEPT clauses make SQL easier to write.

DB2 10: Cut CPU and improve performance

DB2 10 for z/OS provides the best reduction in CPU for transactions and batch in over 20 years. We expect most customers to reduce transaction and batch CPU times between 5% and 10% initially, with the opportunity for more, depending upon tuning and workloads. The initial improvements in CPU and memory generally depend upon REBIND. Thread reuse with the release deallocate option is able to be used more widely, reducing CPU for high volume, short transactions and batch with frequent commits. Use of the z10 and z196 hardware large page size can be significant for some customers. The utility performance expectation is equivalence with DB2 9, but much better than V8.

Applications can have larger CPU and memory reductions if they can take advantage of additional benefits, such as constraint relief or insert performance. Scalability is the second major benefit, with the ability to run five to ten times as many threads in a single subsystem by moving 80% to 90% of the virtual storage above the bar. Online schema evolution or data definition on demand enhancements improve availability. SQL and pureXML improvements extend usability and application portability for this platform. Productivity improvements for application developers and for database administrators are very important as data grows in scale and complexity. More description is provided in the overview section at the end of this paper, and many other resources are noted below.

When and how should I upgrade to DB2 10?

The choice of migration target and timing are crucial decisions for the success of a migration project. The answers depend upon your current situation, the value delivered to your enterprise, and resources available. The guidance will change over the life of the version. This version is discussing the first year after general availability. First let's outline some of the dates which have been set and options.

DB2 V8 end of service is announced as April 30, 2012, 18 months from October 2010. Most customers depend upon tools or other software. Having that software work with DB2 is a prerequisite which may extend the schedules. DB2 V8 customers may need to purchase Extended Service if they don't migrate before end of service. When you upgrade DB2 V8 directly to DB2 10, single version charging may be offered for up to 18 months. Upgrade projects tend to be lengthy, so enterprises need to begin planning the needed upgrade very

soon. DB2 9 does not yet have an end of service announcement, thus upgrade timing is not so constrained.

Most customers avoid running software which is out of service. Some customer policies target the second most current release. As we have a new version in service and an old version going out of service, many customers will need to move to DB2 9 or DB2 10.

While DB2 10 is expected to be better than prior versions, it will have maturity, stability, and service delivery similar to other software and versions. Normal maturity means more potential defects at first, then fewer as the software matures. Determining when the software is ready for a specific customer and when the customer is ready for the software depends upon the specific customer resources, prior experience, the ability to create and implement an appropriate upgrade plan, and the value for the improvements versus the need for stability.

Most DB2 for z/OS customers are large and have unique attributes. Testing the unique characteristics is challenging, and customers who upgrade to a new version soon after general availability need to have more comprehensive testing. Early users also need to use best practices for service.

Questions for you

The right answer is not “One size fits all.” If we know the key factors for you, we can help you make a better choice. Here are some of the key objectives. Which ones are most important for you?

- Performance improves in both DB2 9 and 10, with larger CPU reductions in DB2 10 for transactions and batch, CPU reductions for utilities in DB2 9 and DB2 Sort. Insert and query improvements are in both DB2 9 and 10. See performance presentations and books for detail.
- Scalability is primarily constrained by memory below the bar, which is improved by about 10% to 15% in DB2 9 and improved by 80% to 90% or a factor of 5 to 10 in DB2 10.
- Availability is enhanced in both, with more online changes in both. Online utilities are a key strength DB2 9, with several more online facilities in DB2 10.
- Security is made stronger and more flexible with roles in DB2 9 and with more options, new audit capabilities, and row and column access controls in DB2 10.
- Productivity is helped in both releases, with more improvements in DB2 10. Upgrading a single version at a time is shorter and easier than skipping two versions ahead, but skipping from V8 to DB2 10 delivers faster results with less work than two separate migrations.
- Stability is better in more mature versions. If avoiding risk is the primary driver, you should avoid being out of service so migration from V8 to DB2 9 would be the most solid, known, tested, and safe path. DB2 9 at four years versus DB2 10 at half a year will show differences. If that stability is important and can’t be covered with best practices for service and testing, then DB2 9 is the safer path.
- Skills: What skill set is available within your organization? Do you have people with the right skills and time to plan and run a project? DB2 migration planning workshops can

help with education. Transition classes provide more education for one or both versions. Services could be used if the skills are not presently available.

- Technology adoption model: Are you using the latest technology that is being shipped, or are the operating system and hardware back-level? Is the technology one level back, two or more? This question tells both how much work will be required and the comfort level of your organization for running the latest version.
- Platform management practices: What are your platform management practices? What type of change management practices are in place? How robust is your testing for new software? What is the inventory of software and tools? How many vendors are involved? Which ones? Almost every vendor has software ready for DB2 9. Many vendors will be ready for DB2 10 immediately, but specific tools and new function may take some time after general availability. Discuss the timeline for your tools and function you want with your vendors during your early planning.
- Numbers of servers: How many LPARs and subsystems does the organization have? An organization that has 100 subsystems has a different set of challenges than does one that has 5 subsystems. If each subsystem is unique, then the process is more complex.
- Service process: How often do you apply preventive maintenance? Best practice is using a Consolidated Service Test or RSU three or four times a year for preventive service with additional service to correct specific problems. Customers who migrate early in a version need to use the best practice.
- Capability to test: Do you have a strong testing structure? Can you run close to production volumes outside of production? Best practice is having a set of applications which cover 95% of the production. Have you identified a set of applications which reflect your workloads? Do you have separate quality assurance subsystems? Unless the development organization is engaged and involved, just staging from sandbox to development to production does not cover the unique attributes of your work that could cause problems. Early migrations require best practices for testing.
- Organizational considerations: What additional organizational factors, such as politics, policies, process and vacations must be considered?

What version are you running?

Here is a starting point for customers who are running various DB2 versions.

- DB2 9: If you are on DB2 9 today, then you are a good candidate for an early upgrade to DB2 10, especially if your custom is to move in the first year or two after general availability. Listen to reports from early customers and upgrade for the value. Early customers have presented at 2010 conferences, and will at 2011 conferences.
- V8 If you are on DB2 V8 today, then the next questions are on timing for you and readiness for the new version. How soon after general availability do you normally upgrade?
    - If you have the resources and can work with a new version, then you are more likely to be successful skipping to DB2 10. Some customers have usually upgraded quickly to new versions, but did not move to DB2 9. If customers usually start working with new versions in the first year, they have tests and processes for dealing with the normal maturity pattern. These customers may be able to skip DB2 9 and deliver more value in a shorter timescale.
    - Some customers who do not migrate early will be attracted to the reduced CPU time or scalability improvements and will want to skip to DB2 10. The challenge

will be the need to do more robust testing and service while working with a version that is less mature. The time frame is helped if they commit early, getting additional extended service for V8 and the extended single version charging. The time frame will still be a challenge, so the team needs to be larger with more careful project management, compared to the usual single version upgrade.

  - V8 recent: Are you still in the process of moving to NFM or have you recently finished V8 upgrade? If you just finished, then you probably will wait for some time and use the skip. If you have resources for an upgrade, but DB2 10 is too new for you, then DB2 9 is probably your next move.

- V7: If you are currently on DB2 V7, then upgrade to DB2 V8. Then you can use the skip version upgrade to DB2 10 when you are ready for the next upgrade.

DB2 has several new versions and upgrade paths for you to consider. This story will be changing, but you can hear the latest at IDUG, IOD, and Share conferences and on the web. DB2 9 is ready for you now. DB2 10 became generally available in October 2010, but is delivering higher limits, lower costs, and more for less.
http://www.ibm.com/software/data/db2/zos/db2-10/
http://www.ibm.com/data/db2/zos.

When should I upgrade to DB2 for z/OS Version 8? DB2 9? DB2 10?

DB2 V7 has been out of service for almost 3 years, since June 30, 2008. DB2 V8 has been in the field for 7 years, DB2 9 for 4 years, and DB2 10 has been generally available for about half a year. End of service for DB2 V8 is April 2012. If you have not upgraded to Version 8 already, now is the time. If you are on DB2 V8 now, then this is a good time for migration. Many customers have moved to DB2 9 in the past four years. Experience from thousands of customers has mapped out the bumps and helped us to smooth the road. If you generally upgrade to a new version two years or more after general availability and don't want to go out of service, then DB2 9 is an effective, safe, smooth and relatively easy upgrade.

Each customer has unique business requirements that drive the need to move to new versions. Some customers upgrade due to the delivery of needed function. Others upgrade when they find that many others have upgraded successfully. Some enterprises plan to be on the second most current release. Still others upgrade only when the prior version is going out of service. Each of these groups has new reasons for an upgrade.

Upgrade for value: Evaluate what DB2 functions you need for your business. Determine the value of those DB2 functions for your business. Weigh the costs. Ensure that you have all prerequisite hardware and software and the time to plan and execute the migration. If you want to upgrade to DB2 9 or DB2 10, then first you need to upgrade to Version 8 and to New Function Mode.

Upgrade when others have: The largest work loads and the largest customers are generally running on DB2 9 today. The key field experience measures such as the rate for PTFs in error, the number of severity 1 APARs, the problem rate and the APAR closure time are better than Version 8 and Version 7 at the same point.

Upgrade for end of service: The end of service date for Version 7 was June 2008. The end of service for V8 is April 2012. So plan your migration if your version is lower than 9. Customer budgeting, planning, ordering and migration often takes more than a year, and you need to start

now, if you have not already. As you upgrade, you should be looking at the function which is removed or deprecated in later versions as well. Adjusting the applications is easier with more time. As applications are changed and tested, adjustments should be made for the functions being removed or deprecated in DB2 9 and DB2 10.

If you have been unable to upgrade because you depend upon old COBOL or PL/I compilers, that reason was avoided in DB2 V8, 9 and 10. A DSNHPC7 precompiler that is almost the same as the Version 7 precompiler is being delivered with DB2 Version 8, 9 and 10. DSNHPC7 is included in V8 with APAR PK46170, DB2 9 with APAR PK91610, and in the base for DB2 10. This technique works if you are not changing the program to use DB2 improvements. DSNHPC7 is deprecated, so applications should be changed to not depend upon products that have been out of service for a decade or more.

Experience from V5 to V7 skip release migration may help with some customer choices. Customers who used skip version migration generally found that the project was roughly 50% longer and 50% more work than a single version migration. Education for two versions needs twice the amount of time. Remediation for the items removed is twice as much work for a skip release. The prerequisites for skipping take more time, as customers will need to be more current. I'd estimate saving 20% to 25% of the work compared to two separate migrations. The primary negative for a skip version migration is getting the value of DB2 9 improvements later. One key value is getting to DB2 10 earlier.

Customers who are on DB2 V7 or earlier should upgrade to DB2 V8 as soon as possible to be on a solid, supported version of DB2. They can use the skip version migration process directly to DB2 10, when they are ready for the upgrade. This may be the best choice for customers who have just finished or are not yet finished migrating to DB2 V8 NFM. If you are planning on migrating to DB2 9 in 2010 or 2011, that may still be your best option.

Before you upgrade, perform the following actions:

- Plan the upgrade process. Make sure that you have the prerequisites and current software that works with the new version. Check with your vendors. See the planning for migration presentations referenced below. Migration planning workshops are available at no charge for DB2 V8, DB2 9, and DB2 10 and can save you time, providing experience from other customers and IBM.
- Check for incompatible changes. As you go through the process, check for the incompatible changes and deprecated function in DB2 10 as well. That way, you can avoid some of these problems and make the changes in the normal course of work, so there is less effort when you upgrade to DB2 9 or DB2 10. Put the APARs on your current version and run the premigration jobs (DSNTIJP9 for DB2 9 or DSNTIJPA for DB2 10) early and often.
- Read the Installation Guide, the Preventive Service Planning (PSP) bucket and Authorized Program Analysis Report (APAR) installation text. The Consolidated Service Test (CST) can provide a much more stable level of service for a broad stack of products. CST has worked for very small customers, very large customers, and those in between.
- Develop a test plan for your unique workload and environment. CST can help for more general processing work. Collect performance information and access path information. DB2 9 package stability can help you get back to the original access paths. If you have any problems with access path changes, use the access path stability function in the migration process.

- Put plans in place to ensure that each step is tested and successful before continuing. Use the checklists below, in the migration planning workshop, and in the books to make sure each step is complete.

To read about the features that are available with each version of DB2 for z/OS®, go to the **DB2 for z/OS homepage** and to the **Support page**.

Best Practices in DB2 10 for z/OS Migration

DB2 10 is the most exciting new version in over 20 years. Migration is a broad topic, so I'll emphasize some keys to success, point to resources, emphasize some important points and provide the latest information. In this article, I'd like to discuss getting ready, rebinding, current service level recommendations, some key changes in access path management, and early customer experiences.

Get educated about DB2 10

Conferences and webcasts have provided some information about this new version, but you will need more depth to avoid learning the hard way. Start with a no charge migration planning workshop by contacting your local IBM team. Then do more reading and have key people take a transition class. If you are upgrading from DB2 V8, then the DB2 9 education is also needed. Education for all of the groups involved will help to avoid problems later.

The upgrade process has been improved in a number of ways. Customization for the stored procedures and user defined functions supplied by IBM is now performed for migration and for maintenance. WLM environments are set up. Documentation for the stored procedures and user defined functions was improved.

Standard parameters for an SAP subsystem can be set with one new option. Checklists are provided that have been very helpful to customers who use them. A new job is included to set the install parameters from an existing subsystem. This is very helpful when the parameter job has been edited many times.

How should I start getting ready for DB2 10? Start now.

Are you ready for DB2 10? Here is a checklist on getting ready to upgrade.

1. Check prerequisite software levels. If you are not yet running in NFM for DB2 9 or V8, then that is the first migration step. Ensure that you are at the required level for z/OS and other software. Use the Program Directories and announcement.
   http://www.ibm.com/support/docview.wss?rs=64&uid=swg27011656
   http://www.ibm.com/common/ssi/rep_ca/0/897/ENUS210-380/ENUS210-380.PDF
2. Attend a migration planning workshop. Get more details on DB2 10 and a project framework. The information, discussion, and project plan framework in the migration planning workshop will be very useful. Contact your local IBM representative.
   ftp://ftp.software.ibm.com/software/data/db2/zos/presentations/migration/db2-10-migration-planning-workshop-trifold.pdf
3. Plan what you expect to gain and process for testing. Plan for memory and performance. Set your objectives and what tests will be made to measure them. What unique workloads do you have and what tests reflect that work? Information from IBM Redbooks publications and other users can help. IDUG DB2 10 Migration Experiences Forum:

http://www.linkedin.com/groups?mostPopular=&gid=3797589 DB2 10 Technical Overview chapter 12 http://www.redbooks.ibm.com/abstracts/sg247892.htm DB2 10 Performance Topics book coming IBM DB2 for z/OS Best Practices Web Page: http://www.ibm.com/developerworks/data/bestpractices/db2zos/

4. Build your detailed migration plan.
5. Contact your key vendors and communicate your plan. Contact your key vendors and communicate your plan to them to understand when they will have the function you need. Start getting the needed upgrades and adjust the schedule if needed. You need to have Omegamon V5 and DB2 Administration Tool V10.1. For many IBM tools, get the needed level and service information on the web.
   http://www.ibm.com/support/docview.wss?uid=swg21409518
   http://ibm.com/support/docview.wss?rs=434&uid=swg21256800
6. 

Get all of the parts out of the box. DB2 10, DB2 Utilities Suite V10, Accessories Suite V2.1 (spatial, OmniFind and international components for Unicode), Data Studio V2.2.1, client code and DB2 Connect 9.7 fixpack 3a, QMF 10, then add to the stack your performance tools, languages, Java drivers, ODBC, application tools, DBA tools, backup and recovery tools, replication, transaction management, data governance, and applications. Updated code for client and DB2 Connect V9.7 fixpack 3a are needed for a number of DB2 10 new functions: dynamic statement cache enhancements, timestamp with time zone, greater timestamp precision, binary XML format, extended indicator variables, explain mode special register, and Unicode collection and package names. Get it from http://www.ibm.com/support/docview.wss?uid=swg24028306
7. Read information APAR II14477 (DB2 9) or II14474 (V8). Have you looked though the information APAR II14477 (DB2 9) or II14474 (V8) recently? Check the storage information APAR too, II10817.
   http://www.ibm.com/support/docview.wss?uid=isg1II14477
   http://www.ibm.com/support/docview.wss?uid=isg1II14474
   http://www.ibm.com/support/docview.wss?uid=isg1II10817
8. Apply required service to your current system. Do you have the required service applied to your current system? Have you checked the CST level? Check the latest quarterly report and the monthly ones.
   http://www.ibm.com/servers/eserver/zseries/zos/servicetst/mission.html
9. Run premigration jobs on all groups and subsystems. Have you run the premigration jobs on all groups and subsystems? The new premigration job DSNTIJPA is provided in APAR PM04968 and PM15965 on both DB2 V8 and 9. In DB2 10, the job is DSNTIJPM.
   http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_dsntijpm.htm
   http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/index.jsp?topic=/com.ibm.db29.doc.inst/db2z_dsntijpa.htm
10. Resolve incompatible changes. Many are found in the premigration job, but more are noted in the Information Center and books. See the sections on incompatibilities in applications and SQL, utilities, commands, security, other, deprecated functions, and functions that are no longer supported. These changes are larger for V8 than for DB2 9. DB2 V8
    http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_premigr8checklist.htm

DB2 9
http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_premigr9checklist.htm

11. Get rid of private protocol. Have you gotten rid of private protocol? Help to remove private protocol comes in PK92339 and PK64045 and is described in the Distributed book, SG24-6952-01 chapter 5.2. http://www.redbooks.ibm.com/abstracts/sg246952.htm
12. Convert to packages instead of DBRMs directly in plans. Have you converted to packages instead of DBRMs directly in plans? The ability to convert DBRMs in plans into packages comes in PK62876 and PK79925 (V8) and is described in the Packages Revisited book, SG24-7688 chapter 4. http://www.redbooks.ibm.com/abstracts/sg247688.html
13. Upgrade plan table formats to Unicode V8 or DB2 9 level. Have you upgraded plan table formats to Unicode V8 or DB2 9 level? PK85068 finds old plan table formats and helps with conversion. Get ready to upgrade to DB2 10 format.
14. Get ready to use SMS managed DB2 catalogs. Are you ready to use SMS managed DB2 catalogs? All new indexes and new table spaces in the catalog and directory created as SMS-controlled and DB2-managed with extended addressability and extended format. http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_definesmsenvironmentmigr.htm
15. Save information about your current access paths and performance for a baseline. You may want to use tools, like Data Studio or Optim Query Workload Tuner. If you use the older Visual Explain or Optimization Service Center, then you will need to change to newer tools. You might use access path management function. You might just save the prior information explain tables and accounting records or reports.
16. Use DB2 Installation Guide checklists. The DB2 Installation Guide has checklists with more detail for V8 and DB2 9 migration to DB2 10. A premigration and a migration checklist is provided for each. Use the appropriate lists from this point on. For upgrade from V8 use these checklists.

http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_premigr8checklist.htm
http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_migrcm8checklist.htm

For upgrade from DB2 9, use these checklists.

http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_premigr9checklist.htm
http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db2z10.doc.inst/db2z_migrcm9checklist.htm

Do I need to REBIND? When?

REBIND is not required for migration to DB2 10, but REBIND is strongly recommended. Getting the best performance improvements and eliminating regression does depend upon rebind in most situations: getting current structures, better access paths, and reusing threads. Eliminating performance regression may depend upon REBIND. Storage constraint relief depends upon REBIND. Changing to use release deallocate requires a REBIND. The migration process has been smoother when customers REBIND, with fewer problems. All plans containing DBRMs must be rebound. All packages that were last bound on V5 or lower must be rebound. Static SQL with DEGREE(ANY) for parallel processing should be rebound, or it will be sequential. Other REBINDs can be staged over weeks of time, and REBIND is only needed once per package for the migration. Improvements in access paths can be very significant, such as stage 2 predicates that can become stage 1. REBIND in DB2 10 takes more CPU and elapsed time than in prior versions, but more concurrent REBINDs are possible in NFM. So please be kind. REBIND.

Get the right service level

As you upgrade to DB2 10, following the best practices and recommendations can help you have a better experience. The Consolidated Service Test or CST process is being used successfully by very large and small customers. The current service level recommendation is to get to the current quarterly CST level and some specific identified APARs as a minimum level.

The current quarterly RSU is CST 4th Quarter 2010 2nd Addendum (RSU1102) Dated: March 07, 2011 This addendum is based on the CST 4th quarter 2010 recommendation (RSU1012 - all service through end of September 2010 not already marked RSU and PE resolution / HIPER / Security / Integrity / Pervasive PTFs and their associated requisites and supersedes through November 2010). http://www-03.ibm.com/systems/resources/RSU1012.pdf

The contents of this addendum (RSU1102) are PE resolution and HIPER / Security / Integrity / Pervasive PTFs and their associated requisites and supersedes through the end of January 2011. As you start a DB2 10 upgrade project, you may want to be even more current. Here is the upgrade set: http://www.ibm.com/support/docview.wss?uid=isg1_DB2A10_HDBAA10

Additional service is noted in the reports. Enhanced HOLDDATA should be used to find current information.
http://www.ibm.com/servers/eserver/zseries/zos/servicetst/mission.html

Check key information APARs. Check the areas which you use most. System z zIIP processors can make parallel processing less expensive than sequential access, but can cause problems in storage management and parallel processing, so check those areas if you use parallelism.
II14477 and II14474 (V8) note DB2 10 migration and fallback APARs.
II10817 indicates key storage APARs.
II12836 notes APARs for parallelism.
II14219 indicates service for zIIPs.
II14334 shows APARs for large objects or LOBs.
II14426 shows XML APARs.
II14441 notes recent APARs for incorrect output.
II14203 shows key APARs related to distributed processing or DDF.

Most DB2 for z/OS customers are large in some metrics, and unique in a number of ways. After getting all of the recommended service, you need to test with your unique workloads and options to find any other needed service. Staging DB2 service levels through development, QA, and production also helps find situations, applications, and techniques that have unique challenges.

Get ready for access path management

DB2 package stability or access path stability function has been very helpful with customers who have access path regression and want to get back to the old access paths. Read section 10.13 of Packages Revisited for a discussion of the package stability options and techniques. Chapter 4 of Packages Revisited discusses conversion to packages from plans containing DBRMs. DB2 9 for z/OS Packages Revisited, SG24-7688
http://www.redbooks.ibm.com/abstracts/SG247688.html

The best techniques for minimizing potential access path issues are to get needed reorganizations done first, followed by new statistics, and then run rebinds, followed by checking. The DB2 9 updated cluster ratio data, new data repeat factor and histogram statistics provide important information for optimization. Run the statistics adviser to generate the recommended statistics to be collected. Use Optim Data Studio to capture the SQL statements and related information.

The default for access path management has changed in DB2 10 from none to extended. Customers who move from DB2 9 and have used access path management have some improvements. Customers who did not have access path management will note increases in BIND CPU time from this change. If you want to reduce the time for BIND, then change the subsystem parameter.

Get the latest information

This is the latest information today, but more is coming soon. See updates and the latest books in standard publications and IBM Redbooks publications. Most questions can be answered quickly and thoroughly by entering search criteria in the search window for the Information Center. You can also subscribe to RSS feeds or download the books in pdf format. Updated information and books are provided only in softcopy. The current DB2 9 books have as many as 7 revisions in just over 3 years. Not having most books in hardcopy can avoid the problem of looking in an obsolete book. Primary DB2 10 product information is viewable from the Information Center at: http://publib.boulder.ibm.com/infocenter/imzic/

The first IBM Redbooks publications are DB2 10 for z/OS Technical Overview, SG24-7892 and Extremely pureXML in DB2 10 for z/OS, SG24-7915. Watch for the DB2 10 Performance Topics book, for more updates, and for other information on the web.
http://www.ibm.com/software/db2/zos
http://www.ibm.com/support/docview.wss?rs=64&uid=swg27011656
For IBM Redbooks publications, see http://www.redbooks.ibm.com/
http://www.redbooks.ibm.com/cgi-bin/searchsite.cgi?query=db2+AND+z/OS
Check out the new DB2 for z/OS Best Practices site on DeveloperWorks:
http://www.ibm.com/developerworks/data/bestpractices/db2zos/
Conferences have a range of sessions on DB2 10

IDUG	www.idug.org
IOD	www.ibm.com/software/data/2010-conference/
Share	www.share.org
IBM Education	www.ibm.com/training/us/db2zospath
DB2 events	www.ibm.com/software/data/db2/zos/events.html

Introduction to DB2 10 for z/OS

Customers need to reduce costs and adapt quickly to support business growth, without sacrificing the resiliency required for today's demanding business requirements. DB2 10 for z/OS (DB2 10) addresses those needs, building on the capabilities of DB2 9 for z/OS and the System z platform,

DB2 10 for z/OS delivers innovations in these key areas:

Reduce DB2 CPU time for out-of-the-box savings

DB2 10 delivers great value by reducing CPU usage. Most customers can achieve out-of-the-box CPU savings of 5 to 10 percent for traditional workloads and more for some workloads. Improved scalability and constraint relief can add to the savings.

Unsurpassed resiliency for business-critical information

DB2 10 innovations raise the bar on data resiliency through scalability improvements, fewer outages, and improved security. DB2 10 delivers the ability to handle up to five to ten times more active concurrent users in a single DB2 subsystem. Customers can scale-up or scale-out simply, and with less system management. Schema evolution lets you make more changes while business keeps running.

Rapid application and warehouse deployment for business growth

SQL and pureXML enhancements in DB2 10 help productivity, improve performance, and simplify application ports to DB2 for z/OS. DB2 10 adds unique capabilities to support temporal data using business and system time within the database itself, making application development and maintenance simpler and more reliable.

Now let's provide a little more detail to explain the improvements.

DB2 10 overview

Improved performance and reduced CPU for out-of-the-box savings

DB2 10 delivers by improving performance and reducing CPU usage. Most customers can achieve out-of-the-box CPU savings of 5 to 10 percent for traditional workloads and up to 20 percent for specific workloads described below. Measurements compare to previous releases of DB2 for z/OS. REBIND is needed to obtain the best performance and memory improvements. DB2 reduces CPU usage by optimizing processor times and memory access, leveraging the latest processor improvements, larger amounts of memory, and z/OS enhancements. Improved scalability and constraint relief can add to the savings. Productivity improvements for database and systems administrators can drive even more savings.

In DB2 10, performance improvements focus on reducing CPU processing time without causing significant administration or application changes. Most performance improvements are implemented by simply migrating to DB2 10 and rebinding.
You gain significant performance improvements from distributed data facility (DDF) optimization, buffer pool enhancements, parallelism enhancements, and more.

Early DB2 10 performance benchmarking and customer experience has shown a 5 to 10% CPU reduction in transactions after rebinding. Some customers may get more or some less CPU reduction depending on the workload. Customers who have scalability issues, such as virtual storage constraints or latching can see higher improvements. Opportunities for tuning can take advantage of memory improvements. More high volume, short-running distributed transactions can take advantage of CPU reductions, using release deallocate.

Concurrent sequential insert CPU time can be reduced from 5% - 40%. Queries can be improved as much as 20% without access path change, and more for better access paths. A native SQL procedure workload has shown up to 20% CPU reduction using SET statements, IF statements and SYSDUMMY1. Customers moving from DB2 9 should expect a the same CPU times for utilities, while customers moving from DB2 V8 will see CPU reductions up to 20%.

Productivity improvements

New SQL and XML capabilities improve productivity for those who develop new applications and for those who are porting applications from other platforms. Automating, reducing, or eliminating tasks and avoiding manual actions improve productivity and can help avoid problems. Resiliency improvements for virtual storage and availability increase productivity. DB2 10 improvements make the install, migration, and service processes faster and more reliable. Installation and migration information has been improved, using customer feedback.

Flexibility in migration paths

For this release, you can upgrade to DB2 10 directly from a DB2 Version 8 subsystem in new-function mode without starting the system in DB2 9. This provides customers greater flexibility to meet their business needs and to save time getting to DB2 10. Several process improvements make the upgrade simpler.

Unsurpassed resiliency for business-critical information

Business resiliency is a key component of the value proposition of DB2 for z/OS, System z hardware, the z/OS operating system, and other key System z software, like IMS and CICS. Resiliency helps to keep your business running even during unexpected circumstances. Innovations in DB2 10 drive new value in resiliency through scalability improvements and fewer outages, whether those outages are planned or unplanned. Virtual storage enhancements deliver the ability to handle five to ten times more concurrent active users in a single DB2 subsystem than in previous releases of DB2 (as many as 20,000 concurrent active threads). Improved availability is supported by allowing more changes using schema evolution or data definition on demand. Security improvements also contribute to robust business resiliency.

Continuous availability enhancements

DB2 10 provides online schema enhancements that allow you to make changes to database objects (indexes and table spaces) while maximizing the availability of the altered objects. Through enhancements to ALTER statements, you can now change more attributes of indexes and table spaces without having to unload the data, drop and re-create the objects, regenerate all of the security authorizations, re-create the views, and reload the data. The changes are materialized when the altered objects are reorganized. DB2 10 allows fast changes of table space types, page sizes, data set sizes, and segment sizes. Conversion to universal table spaces is much simpler.

In addition, DB2 10 improves the usability and performance of online reorganization in several key ways. It supports the reorganization of disjoint partition ranges of a partitioned table space (also in DB2 9 now), and improves SWITCH phase performance and diagnostics. Also, DB2 10

removes restrictions related to online reorganization of base table spaces that use LOB columns.

Reduced catalog contention

In DB2 10, the DB2 catalog is restructured to reduce lock contention by removing all links in the catalog and directory. In addition, new functionality improves the lock avoidance techniques of DB2, and improves concurrency by holding acquired locks for less time and preventing writers from blocking the readers of data.

In DB2 10 new-function mode (NFM), you can access currently committed data to minimize transaction suspension. Now, a read transaction can access the currently committed and consistent image of rows that are incompatibly locked by write transactions without being blocked. Using this type of concurrency control can greatly reduce timeout situations between readers and writers who are accessing the same data row.

Virtual storage relief

Enhancements in DB2 10 substantially increase the capacity of a single DB2 subsystem by removing virtual storage and other constraints. This release moves most memory to 64-bit, which provides virtual storage relief and can greatly improve the vertical scalability of your DB2 subsystem while minimizing administration. In addition, a 64-bit ODBC driver is now available on DB2 9 and 10.

Security enhancements

This release of DB2 provides critical enhancements to security and auditing, strengthening DB2 security in the z/OS environment. DB2 10 provides increased granularity for DB2 administrative authority. DB1 10 delivers a new DB2 data security that enables you to manage access to a table at the level of a row, a column, or both. In addition, you can define and create different audit policies to address the various security needs of your business.

Rapid application and warehouse deployment for business growth

SQL, pureXML®, and optimization enhancements in DB2 10 help extend usability, improve performance, and ease application portability to DB2. DB2 10 delivers significant query improvements, with better performance and CPU reductions, allowing you to manage and maintain your data in a single platform infrastructure with single audit and security processes, and, most importantly, providing a single answer based on your core operational data.

SQL improvements

SQL enhancements deliver new function for improved productivity, DB2 family consistency, and simplify application porting to DB2 for z/OS from other platforms and database management systems. Enhancements are provided for SQL scalar functions and SQL table functions are added. Native SQL procedure language (SQL PL) is easier and faster. Implicit casting makes porting simpler, as DB2 SQL is more consistent with other products and platforms. Allowing more flexibility in the number of digits for fractions of seconds and allowing timestamps with time

zones simplify porting. Moving sums and moving averages help in warehouse queries and in porting.

Temporal tables and versioning

In this release of DB2 for z/OS, you have a lot of flexibility in how you can query data based on periods of time. DB2 supports two types of periods, which are the system time (SYSTEM_TIME) period and the business time (BUSINESS_TIME) period. The SYSTEM_TIME period is a system-maintained period in which DB2 maintains the beginning and ending timestamp values for a row. For the BUSINESS_TIME period, you maintain the beginning and ending values for a row. Support of business time and system time allows for significant simplification of applications, pushing the complicated handling of these concepts down to the database engine itself.

In addition, DB2 10 introduces versioning, which is the process of keeping historical versions of rows for a temporal table that is defined with a SYSTEM_TIME period, or both time periods, allowing for simple retrieval of key historical data.

pureXML improvements

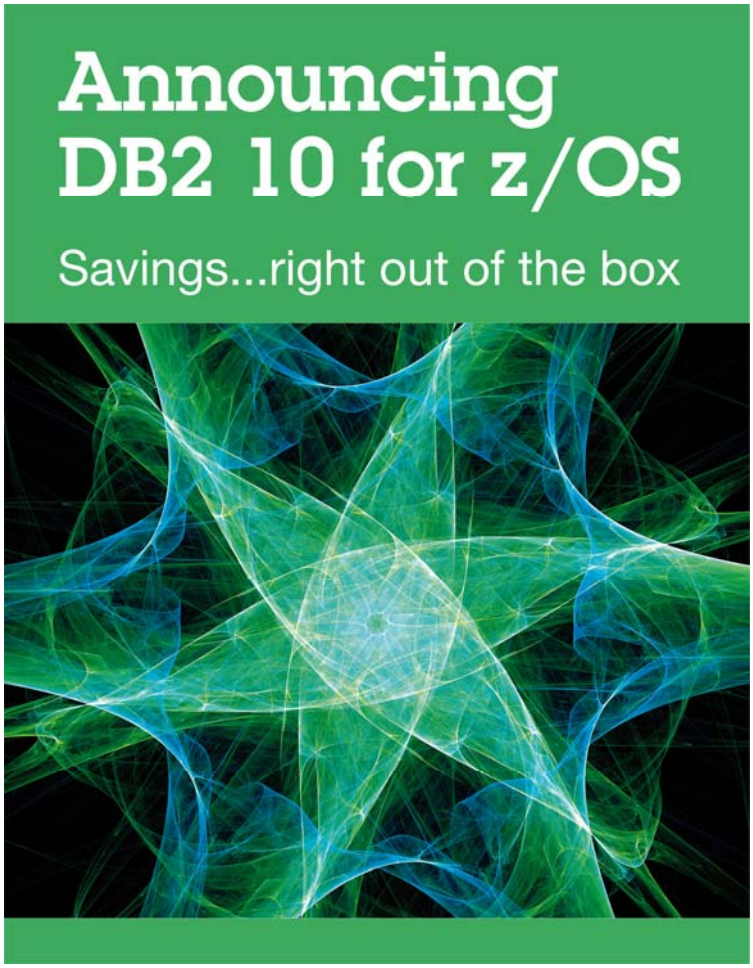
DB2 10 improves DB2 family consistency and productivity for pureXML users. These improvements also deliver excellent performance improvements. DB2 10 delivers binary XML format, XML schema validation as a built-in function, XML date and time data types and functions, XML parameters in routines, and much more.

Enhanced business analytics and mathematical functions with QMF

Query Management Facility (QMF) Version 10 has new analytic and mathematical functions and OLAP support. Providing access to many more data sources via JDBC opens QMF to a wider array of information that can be combined with DB2 within the same report.

DB2 10 resource pointers

DB2 main web page http://www.ibm.com/software/data/db2/zos/
DB2 10 web page http://www.ibm.com/software/data/db2/zos/db2-10/
DB2 books, Information Center
http://www.ibm.com/support/docview.wss?rs=64&uid=swg27011656
http://publib.boulder.ibm.com/infocenter/imzic/
DB2 best practices web page
https://www.ibm.com/developerworks/data/bestpractices/db2zos/
DB2 for z/OS IBM Redbooks publications http://www.redbooks.ibm.com/cgi-bin/searchsite.cgi?query=DB2+AND+z/OS&SearchOrder=4&SearchFuzzy=
DB2 presentations
ftp://ftp.software.ibm.com/software/data/db2/zos/presentations/


Announcing
DB2 10 for z/OS
Savings...right out of the box