

# DB2 Version 7 - Migration Considerations from V5 or V6

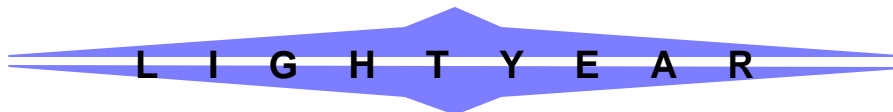
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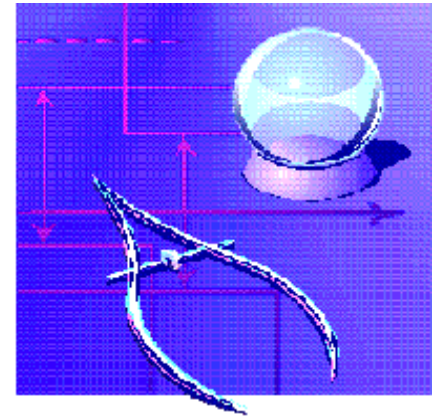
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# Presentation Topics

- **Who's Lightyear**
- **What's new in DB2 UDB V6 and V7 - Brief Overview**
- **General Considerations**
  - ▶ Releases & Migration Paths
  - ▶ Helpful Hints
- **IBM DB2 for OS/390 Version 7**
  - ▶ New functions affecting migration
  - ▶ Migration Specifics
- **Information Sources**



## • Services we offer

- Technical Education
  - E-Business on OS/390
  - DB2 V5+ / V6 / V7
  - IMS / CICS / MQ / OS/390
- Teleconference Series
  - DB2 Migration
  - IMS V7
  - DB2 V5+, V6, V7
  - DB2 Stored Procedure
  - WebSphere / VA JAVA
  - DB2 and JAVA, DB2 Connect, ...
- Onsite Install Services
- Remote (Telephone) Consulting
- Certified by IBM in OS/390, CICS, IMS, DB2 (both MVS and NT/UNIX) and JAVA / Host-on-Demand
- Application / Web / JAVA Development
- Web Enabling Legacy Applications
- Most for FREE !!
- More complex ones for a fee ...



## • Where do we work

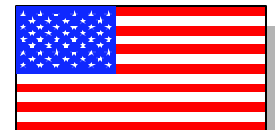
- W-Canada - Office in Calgary
- W-US (WA, OR, CA, CO, AZ) - Office in Berkeley, Los Angeles and Phoenix
- Mid-West - Office near Chicago

# Who is

L I G H T Y E A R

## • Sample Projects

- Web Enable State Courts Scheduling System
- Insurance - Agent Access System from the Web - to replace manual procedure and re-use legacy applications
- Web Enable a large City's Legacy System
- Insurance - Claim Management System - Web Front End for IMS Legacy System
- Telephone Company: Yellow Page Sub-System in JAVA
- Credit Card Corp. - Y2K Database Assessment / Replacement
- Research Institute - Clinical Research Center Record System (DB2 UDB+ Web + JAVA)
- Datawarehouse Project at large trucking manufacturer, incl. web and DB2, IMS access



# DB2 UDB for OS/390 Strategic Direction



## **Continue to Evolve as The Enterprise Server for Network Computing Solutions**

Centralized Processing of Massive Quantities of Data

DB2 Family Compatibility

Business Intelligence, Enterprise Resource Planning and e-business

Vendor Enabling and Portability

## **Premier Use of Parallel Technology and System/390 Integration**

Data Sharing

Continuous Availability

Incremental Growth

Work Load Balancing

## **Improved Application Enablement Through Extensive SQL Functionality**

Object-Oriented Extensions

Rules Driven Integrity

## **Continual Performance Improvement**

Optimizer Technology

Transaction, Query, Batch, Utility Concurrency

Utilities and Tools Focus

# DB2 Universal Database for OS/390

## Version 6

- **Universal application: e-business**
  - ▶ SAP, PeopleSoft, Business Intelligence, QMF, DataPropagator
  - ▶ Stored Procedure Builder, Language and Definitions
- **Universal scalability:**
  - ▶ 16 terabyte tables, Faster, more parallel utilities and SQL
  - ▶ Data spaces for buffers, more page sizes
- **Universal availability:**
  - ▶ ALTER partition range and varchar length
  - ▶ Group Buffer Pool duplexing
  - ▶ Faster, more consistent restart and recovery
- **Universal management: more integrated**
  - ▶ Enhanced visual tools, more features, Control Center
  - ▶ Predictive governor
- **Universal access:**
  - ▶ Java static SQL (SQLJ), DRDA 3 part names, Net.Data
- **Universal extensibility:**
  - ▶ Triggers, User-defined functions & types, Large Objects

**GA June 1999**

# Version 6 Function Refresh

## DB2 Version 6 New Function added in APARs

- SQL Procedures Language & Builder
- REXX Language and Stored Procedures
- Java Enhancements: SQLJ & Java Stored Procedures
- Star join optimization enhancements
- Declared Temporary Tables
- External Savepoints
- Identity Columns
- Defer define
- Select as source of UPDATE SET
- IFI consolidation for Data Sharing
- DDF suspend / resume
- Log suspend / resume for external copy
- Cancel thread outside of DB2

## Get the DB2 Version 6 Technical Update, SG24-6108

- from [www.lightyr.com](http://www.lightyr.com) website

## Available now on Linux for S/390 !

- DB2 UDB V7 Enterprise Edition ("the other DB2")
- DB2 Connect Enterprise Edition V7



# DB2 for OS/390 Version 7 Highlights

- ✓ **Application: Scrollable cursors, Union everywhere, Row Expressions, Limited Fetch, Unicode, XML**
- ✓ **Scalability: Unload utility, Improved optimization & parallelism**
- ✓ **Availability: Online utility improvements, Online parameters, more consistent restart, data sharing enhancements**
- ✓ **Management: Utility lists, patterns & dynamic allocation, Skip release migration**
- ✓ **Access: Improved DB2 Connect, JDBC & ODBC, stored procedure COMMIT & ROLLBACK**

**GA unannounced -  
expected for 3/2001  
(an opinion by  
Lightyear not  
necessarily by IBM  
!)**



# IBM server zSeries

What's improved for DB2 Customers?

- ✓ 64 bit real memory
- ✓ Performance: scalability, parallel, compression, connectivity
- ✓ Application flexibility
- ✓ Availability & automation



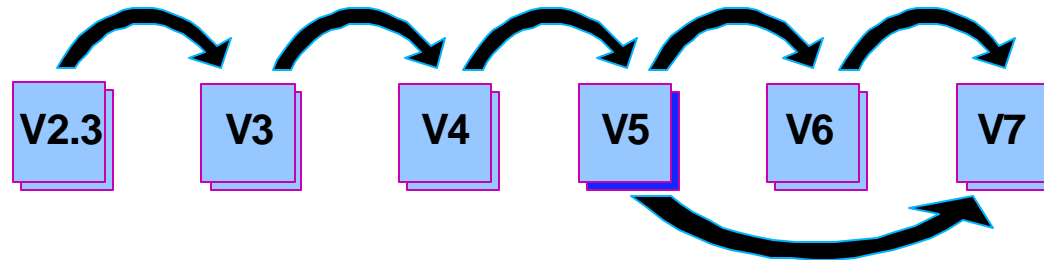
# DB2 for OS/390 Version Availability Summary

Version	PID	Generally Available	Marketing Withdrawal	End of Service
V3	5685-DB2	December 1993	February 2000	March 2001
V4	5695-DB2	November 1995	December 1, 2000	December 2001
V5	5655-DB2	June 1997		
V6	5645-DB2	June 1999		
V7	5675-DB2	To be announced		

# DB2 for OS/390 Messages

Ver sion	Message
V3	Too late to order V4, move ASAP.
V4	Move to V5 soon.
V5	Decide on V6 or V7.
V6	You are current, if you have refresh level. 34% US, 24% WW Oct.
V7	Early customers now.

# Migration Paths



Most customers expected to go to V6

Migration direct from V5 to V7 possible

Primarily for later migrations (e.g. 2002)

Includes fallback & Data Sharing Coexistence

Maximum of two releases

V7 SPE PQ34467 required for fallback, data sharing, and strongly recommended for all

What function do you need?

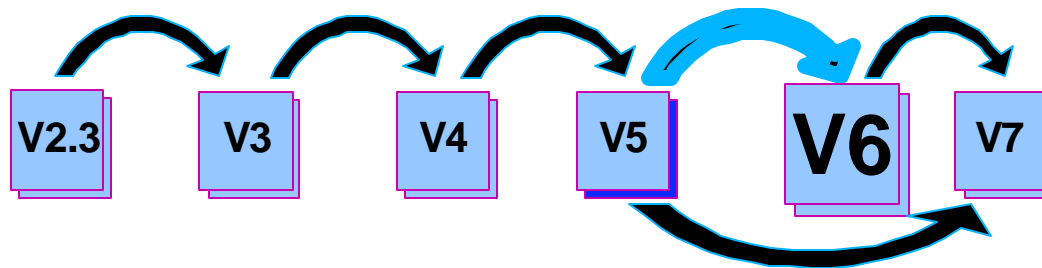
When do you need it?

When can you consider migration?

How much can you test?

IDUG Solutions Journal [www.idug.org](http://www.idug.org)

# Migration to V6



Most of the considerations are similar to V5 to V7 migration

Very few, minor function changes since May 2000

Service level recommendation

- Start as current as possible

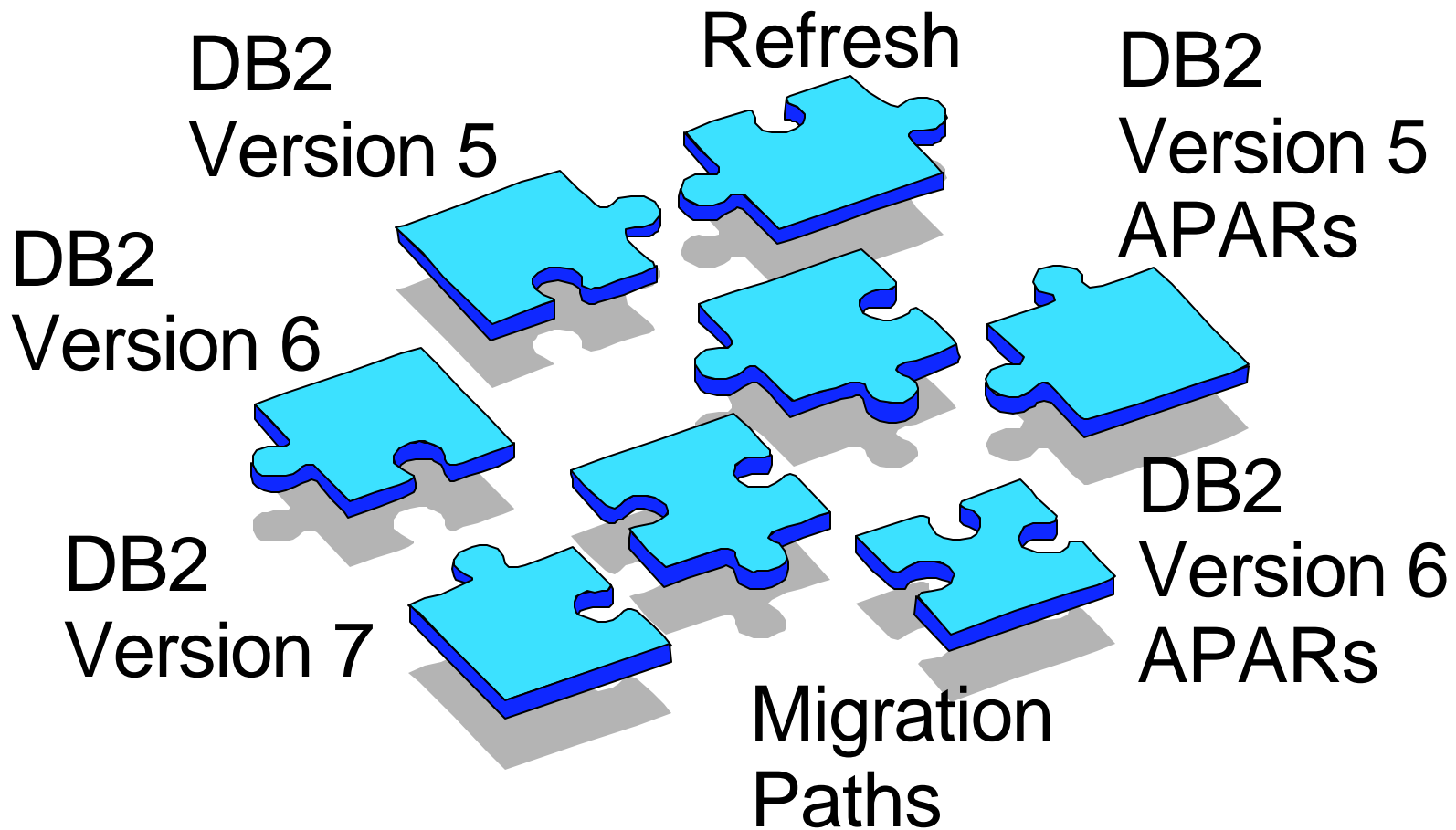
- Apply all PE fixes and hipers available

- Test with your workloads

- Plan to stay current

# Helpful Hints

Here is some information to help fit the pieces together

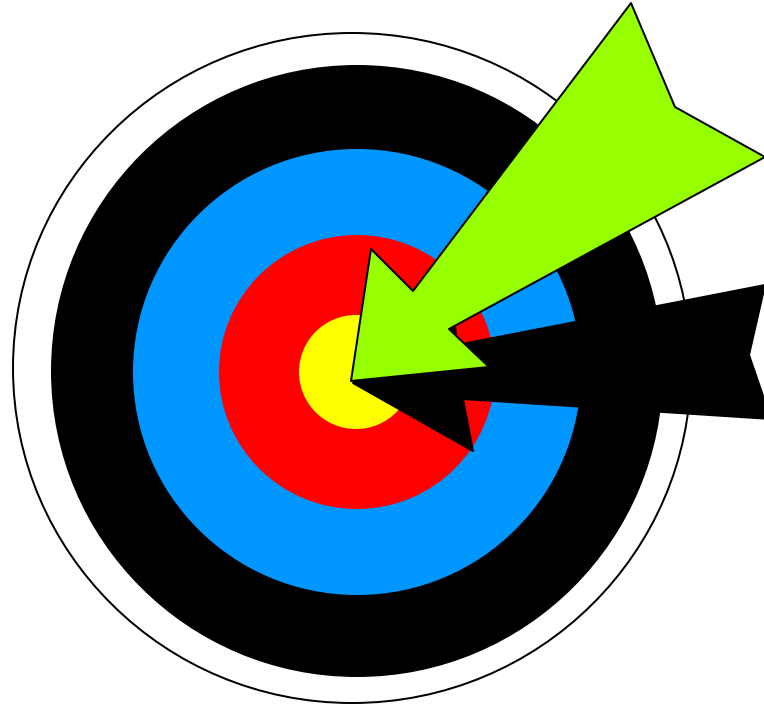


# Danger Signs for Migration

- ✓ 1. I don't have time ... Skipping saves half the time (One or two months from receipt to production)
- ✓ 2. Our DBAs & programmers want to use everything now. We have no test suite.
- ✓ 3. I know how to do this. I don't need education. I don't need to read the book.
- ✓ 4. What is a good month to use as a level?  
Plan to be very current with hipers & PE fixes. Test your environment. Apply more PTFs.
- ✓ 5. I can't put all the service on. Skip the SPE.
- ✓ 6. I've never done this before and must do it right the first time (e.g. first migration within x months of general availability).

# DB2 V7 - Features

**Let's understand V7 features and its impact on migration on the next few pages ...**



# DB2 V6 to V7 - Functions with migration considerations

Remove incomplete table definitions  
Drop constraints before enforcing index  
Unicode  
Precompiler Services  
Windows Kerberos Security  
CATMAINT much faster + messages

# DB2 considerations for any migration

SQLCODE -101 possible  
new SQLCODES

Check new reserved words

Manage increases in sizes

Check all use of non general use API

More catalog tables, indexes

# DB2 V5 to V7 - Functions with migration considerations

Earlier lists plus almost all V6 items:

Colons in host variables

Type 1 Indexes

Shared read only data

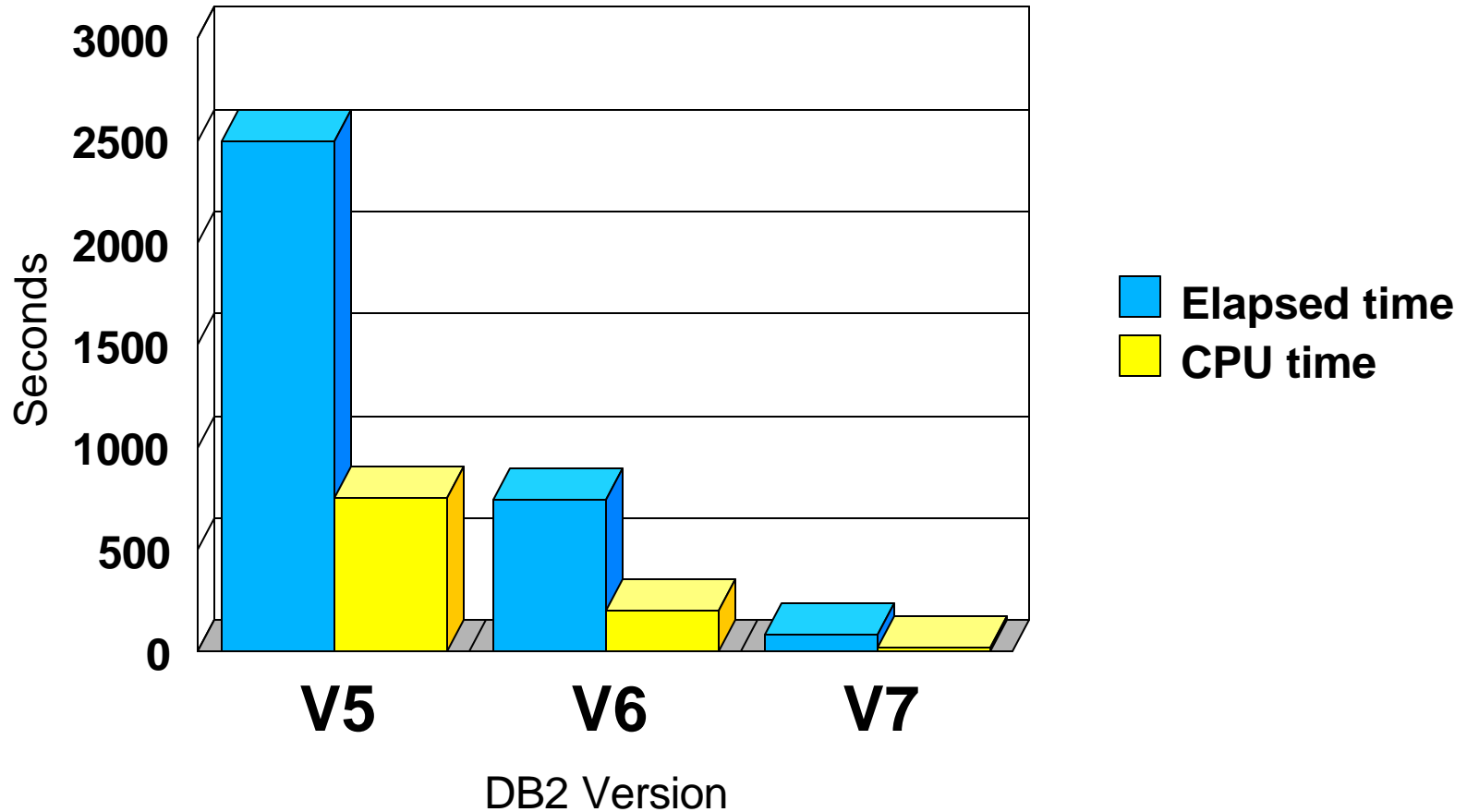
Data set passwords

Catalog Table Views

...

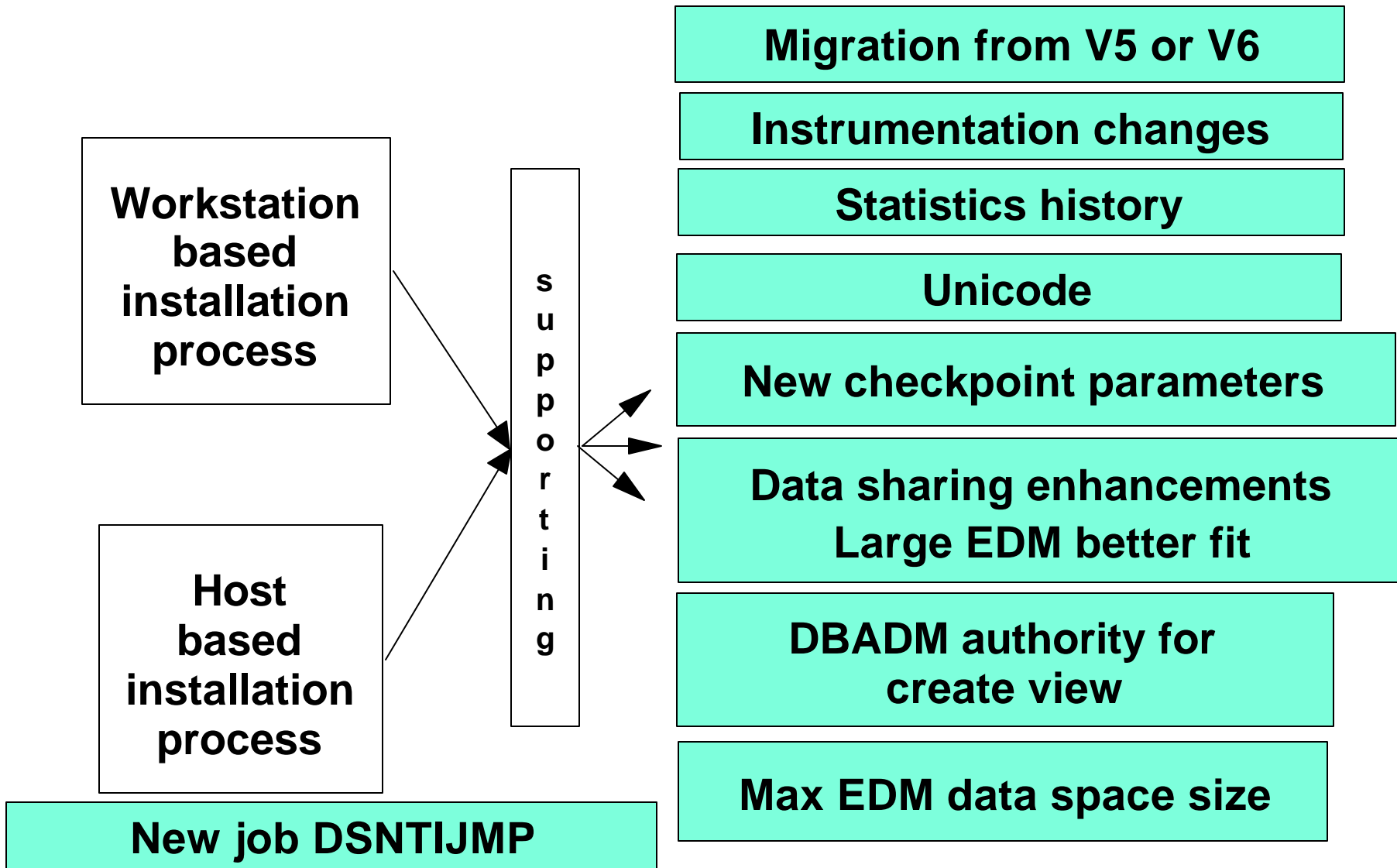
# Migration performance enhancements

## V5 - V7 CATMAINT Performance



Laboratory Measurements for V6 and V7

# Installation process & parameters



# DB2 V7 - process changes

Online subsystem parameter changes

Fastswitch data set management

Change to use UNLOAD utility

Change from inserts to loads

SQL scrollable cursors, union everywhere,  
row expressions, limited fetch,

...



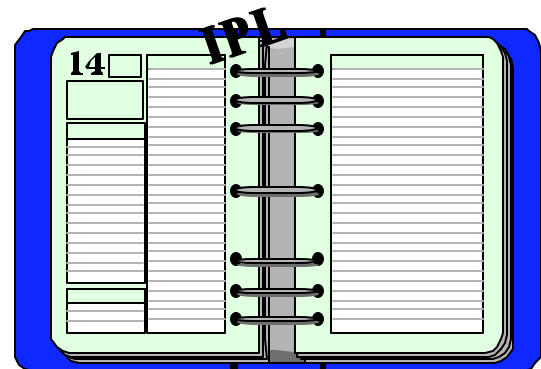
# DB2 V7 - Migration

Now let's talk about specifics of migrating to DB2 Version 7



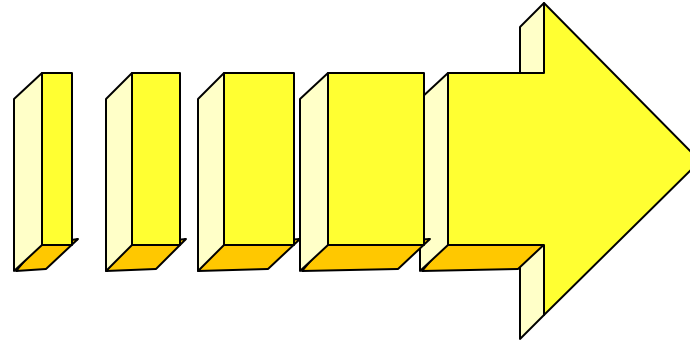
# Have a Migration Plan!

- Get education on DB2 Version 7 (and V6 if migrating from V5)
- Determine new functions to be used
- Install prerequisite hardware and software
- Convert, eliminate incompatibilities
- Migrate DB2 for System Programmer test
  - ▶ Check incompatible change impact
  - ▶ Application programming changes
  - ▶ Database administration changes
  - ▶ System administration changes
  - ▶ Performance changes
- Migrate Test System to new version
  - ▶ Test new and existing applications, test new DB2 functions
- Migrate Production System to new version
  - ▶ Run Version 7 code for some time before using new functions



Your short cut may be the longest way.

# Premigration Activity

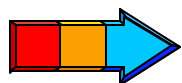
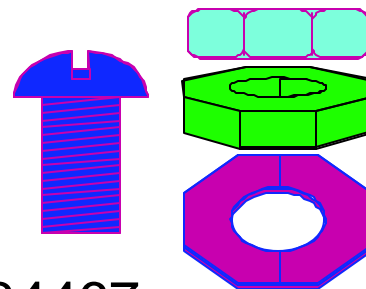


- Install prerequisite software
- Adjust for release incompatibilities
- Identify unsupported objects
- Save critical access paths
- Consider DRDA three-part names

# Install Prerequisite Software

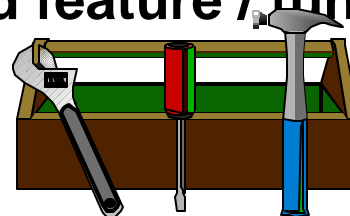
## ● Prerequisites and Functional Needs

- ✓ All related products need to be at proper maintenance level (prior DB2 release too)
- ◆ All fallback and preconditioning PTFs PQ34467
- ◆ Ensure that you apply all the hiper APARS and recommended maintenance levels
- ◆ Obtain PSP (preventative service planning) Buckets
- ◆ Use the DB2 Program Directory, the Installation Guide and Info APARs **II06683 is index II11442 is V5 ==> V6**  
**II12653 is V6 ==> V7 II12652 is V5 ==> V7**
- ◆ Other software ...Vendor OS/390 V2R7 CICS V4



## ● Functional Requirements for identified feature / functions

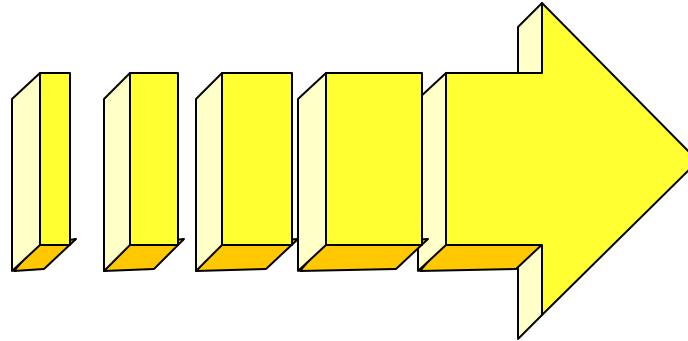
- ✓ See What's New in DB2? and
- ✓ Release Guide for Details



## ● Plan for more frequent service

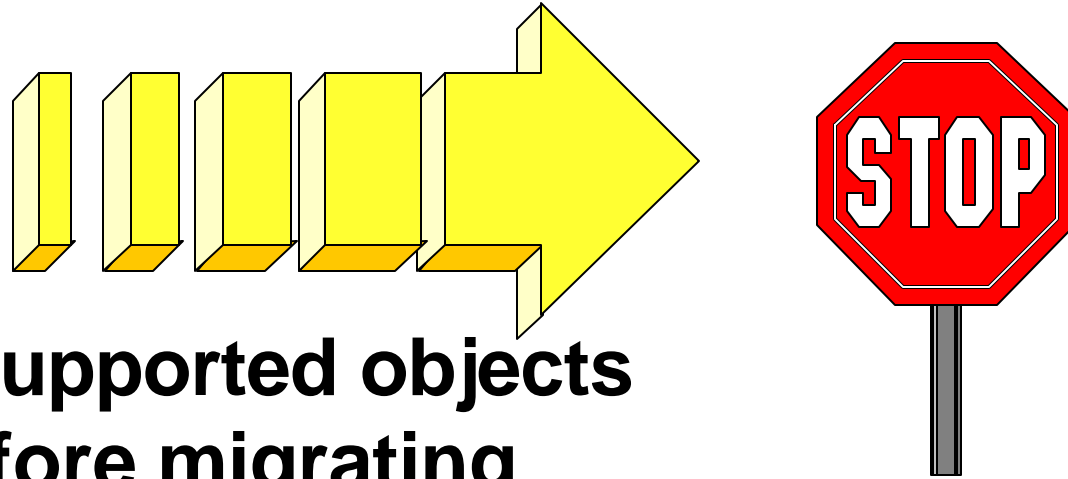
- ✓ More current releases = more frequent

# Premigration Activity *(continued)*



- Release incompatibilities
  - ▶ It is important to look at these now because many have actions that you must address before migrating.
  - ▶ Get the complete list from the Installation Guide (Get the latest from the web).

# Premigration Activity *(continued)*



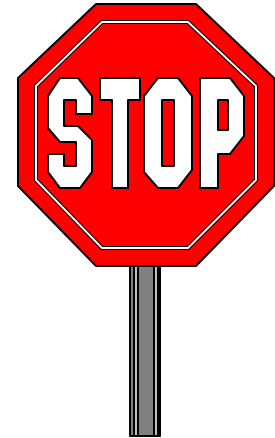
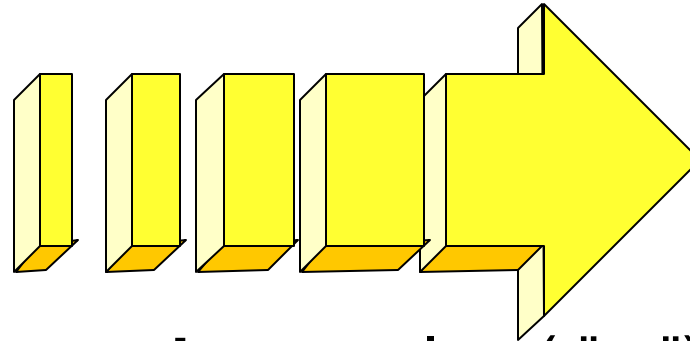
- **Identify unsupported objects & adjust before migrating**
  - V5 ▶ Type 2 indexes **required**
  - V5 ▶ Data set password protection is **removed**
  - V5 ▶ Shared read-only data is **removed**
  - V5 ▶ Host variables **require** a colon ( " : " )
  - V5 ▶ May need to **remove** two catalog table views
    - ▶ Private protocol function **not enhanced**
    - ▶ **V7 requires no incomplete** table definitions

# Other Version 7 Incompatible Changes

- Must drop constraints before enforcing index
- Remove incomplete table definitions for migration
- V6 ● Create function default is no final call
- V6 ● Changed default for identity column start value
  - Fastswitch means different data set names
  - Changing encoding affects applications
  - DCE Security is removed
  - Many more details, read book carefully
  - After Version 7: tighter migration process?  
migration and fallback SPE required?

# Premigration Activity *(continued)*

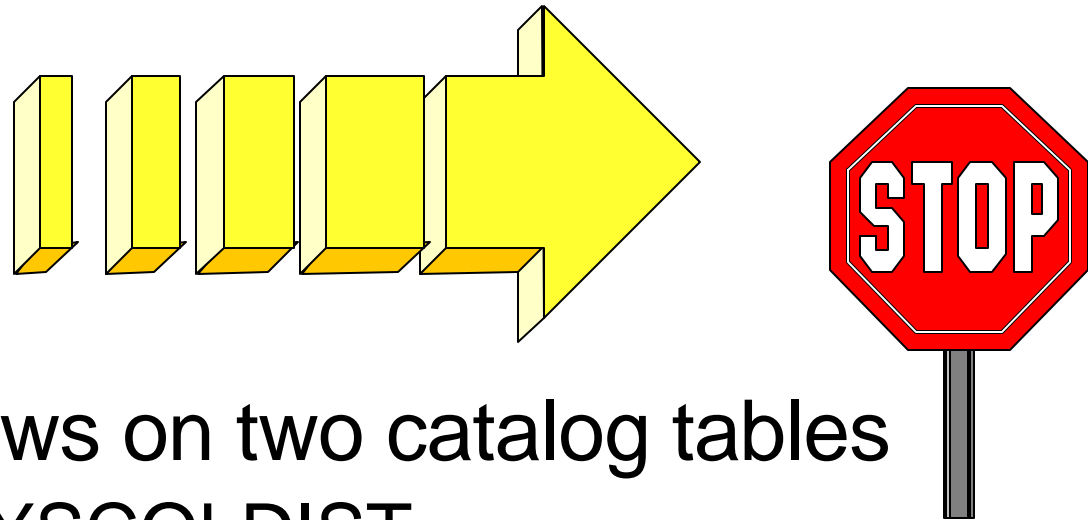
V5



- Host variables **require** a colon ( " : " )
  - ▶ Precompile or bind will fail
    - DSNH315I warning message becomes an error
  - ▶ BIND and REBIND fail for DBRMs prior to V2.3
    - V2.3 & later DBRMs have colon, even if source doesn't
  - ▶ Running precompiler on source is best.
  - ▶ Precompile with V5 is bypass technique.
  - ▶ Best practice is to set standard, remove in applications.
  - ▶ See red book SG24-6108

# Premigration Activity *(continued)*

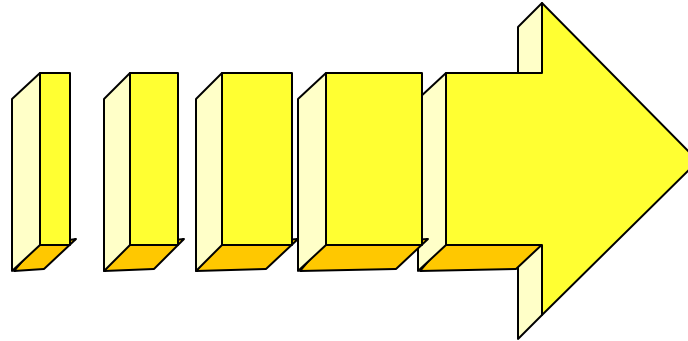
V5



- Remove views on two catalog tables
  - ▶ SYSIBM.SYSCOLDIST
  - ▶ SYSIBM.SYSCOLDISTSTATS
  - ▶ Recreate the views after migration
  - ▶ If you already have 255 character columns in the catalog, then this is not necessary

# Premigration Activity *(continued)*

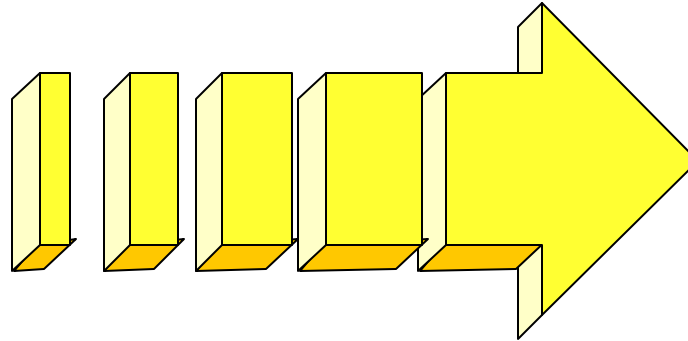
ALL



- Save critical access paths
  - ▶ Ensure you have a `PLAN_TABLE` that contains the access paths for critical queries and programs.
  - ▶ Run `EXPLAIN` on your queries before migrating.
  - ▶ Add new columns to `PLAN_TABLE`
- Also save accounting reports

# Premigration Activity *(continued)*

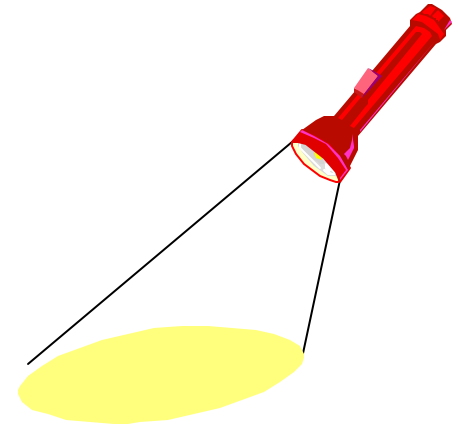
ALL



- Consider DRDA three-part names
  - ▶ New bind parameter - DBPROTOCOL
  - ▶ Convert existing applications from private protocol to DRDA

# Migration Considerations

- These may affect your migration:
  - More than 32K databases supported
  - Log buffer size increased
  - Consider enlarging BSDS
  - Larger generated code & SQLDA
  - Customized DB2I defaults can be migrated
  - Very long SQL statements can get -101 (rare, but possible)
  - Increase maximum number of data sets open
  - Calculate real and virtual storage sizes
    - Are you getting close to 2 GB?
    - See Spring 2000 IDUG Solutions Journal, p. 11



# Migration Considerations

## ■ These may affect your migration:

- ▶ Stored Procedures (V5)
- ▶ Alter Table changes
- ▶ Work file database size calculations
  - Increase for migration?
- ▶ REORG data set sizes
- ▶ New reserved words
- ▶ Larger size for generated code

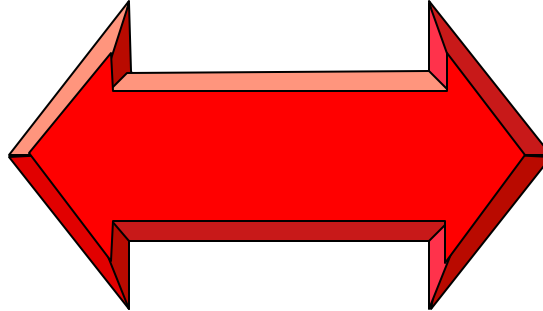


# Migration - data sharing

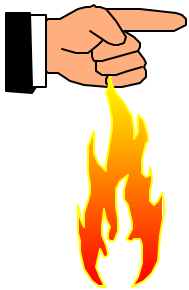


- Migrating a data sharing group
  - ▶ Supports (V5 and V7) OR (V6 and V7) members within a group for a short time
  - ▶ MUST apply the fallback SPE to all members first
  - ▶ The first member migrated must be successful before migrating other members
  - ▶ Migrate one member at a time
  - ▶ Migrate all members before implementing new functions
  - ▶ Restrict execution of packages & plans bound on V7 to migrated members

# Release Coexistence



- IRLM service levels across members
- TSO and CAF logon procedures
- Distributed environment and DRDA
- All data sharing customers should check Coupling Facility microcode service level

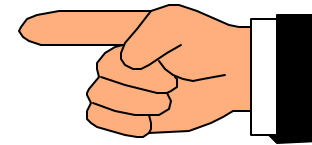


# Customer Experiences

► Based on the experiences of customers, pay attention to:

- Read the web, book, Info APARs, PSP
- Run the premigration job DSNTIJPM
- Check for incomplete table definitions
- Convert Type 1 indexes that still exist (V5)
- Drop Views on catalog tables if needed (V5)
- Eliminate host variables with missing colons (V5)
- Eliminate passwords: on samples, for example (V5)
- Check migration of stored procedures (V5)
- Be aware of new zparm DBPROTOCOL
- Set up proper authorization for schema (V5)

→ **Current maintenance for DB2, OS/390 & Coupling Facility**



# Sources

## ■ **Newest DB2 Information: On the Web**

- ▶ V5, V6 and V7 What's New for overviews (Library)
- ▶ V6 Release Guide and other books, articles
- ▶ V5 & V6 new function APARs
- ▶ Customer application briefs (case studies)
- ▶ News, Downloads, Events, Education, Service ...
- ▶ Information APARs: index: II06683, V6 migration: II11442 & II12343, V5->V7: II12652, V6->V7 II12653
- ▶ V7 Migration and Fallback APAR PQ34467 & 12 others
- ▶ V6 migration process like V7 process PQ38035

**[ibm.com/software/db2os390](http://ibm.com/software/db2os390)**

**useful redbooks also on: [www.lightyr.com](http://www.lightyr.com)**

See second pdf file for pages.

# DB2 V7 Books & Resources:

- DB2 Version 7 Presentation Guide, SG24-6121 Coming Soon to Web
- Introduction to DB2 for OS/390



*Announcing*  
*a new book from IBM and Prentice Hall*  
*designed especially for new DB2 for OS/390 users...*

## *An Introduction to DB2 for OS/390*

**Authors:** Susan Graziano Sloan and Ann Kilty Hernandez  
IBM Silicon Valley Lab

**Publisher:** Prentice Hall

**Availability date:** October 30, 2000

**Content:**

- Overview**  
An overview of DB2
  - DB2 Concepts
  - DB2 for OS/390 architecture

- Working with your data**
  - Designing objects and relationships
  - SQL: The language of DB2

# Latest Red Books



- DB2 for OS/390 V7 Presentation Guide, SG24-6121
- DB2 for OS/390 V6 Technical Update, SG24-6108
- DB2 for OS/390 V6 Management Tools Package, SG24-5759
- DB2 Version 6 Performance Topics, SG24-5351
- DB2 Version 5 Recent Enhancements, SG24-5421
- Storage Management with DB2 for OS/390, SG24-5462
- Developing Cross-Platform DB2 Stored Procedures: SQL Procedures & DB2 Stored Procedure Builder, SG24-5485
- Getting Started with DB2 OLAP Server OS/390, SG24-5665
- DB2 Enterprise Query - QMF For Windows, SG24-5746
- Converting from Oracle AIX to DB2 for OS/390, SG24-5478
- DB2 for OS/390 Continuous Availability, SG24-5486
- How to Build Java Stored Procedures, SG24-5945
- SAP on OS/390: Information Warehouse, SG24-5681

# Sources

- **IBM Service Information** [ibm.com/isource](http://ibm.com/isource)
  - ▶ IBM iSource (email subscription service for IBM SW)
- **Education** [ibm.com/services/learning](http://ibm.com/services/learning)
- **DB2 Family Performance**
  - ▶ [ibm.com/software/db2/performance](http://ibm.com/software/db2/performance)
- **Red Books from International Technical Support**
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- **DB2 Magazine** [www.db2mag.com](http://www.db2mag.com)
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  - ▶ [www.idug.org](http://www.idug.org)
  - ▶ [www.share.org](http://www.share.org)
- **Lightyear Website with useful DB2 information / redbooks**
  - ▶ [www.lightyr.com](http://www.lightyr.com)
- **DeveloperWorks**
  - ▶ [ibm.com/developer](http://ibm.com/developer)

