Supporting Distributed Computing with DB2 Connect

Philip K. Gunning
Performance Consultant
DGI
Planning Steps

- Use a methodology
- Build project plan to support application development project or separate plan if stand-alone project
- Set-up kickoff meeting with all team players
- Coordinate the plan
- Agree on target dates
DB2 Connect Outline

• Planning
• Architecture
• Types of DB2 connect
• Installation and configuration
• Performance
• Distribution
• What’s new in v7.1
• Problem determination
• Workload manager and stored procedures
DB2 Connect

• DB2 Connect implements Distributed Relational Database Architecture (DRDA)
• DB2 Connect provides access as an Application Requester (AR) to DRDA Application Servers (AS) on OS/390, MVS, AS/400, VM, and VSE platforms
• Supports distributed computing with access from Visual Basic, PowerBuilder, Excel, MS Access, and other applications via ODBC and CLI interfaces
DB2 Connect APIs

- ODBC
- DB2 CLI
- JDBC
- SQLJ
- OLE DB

Hmm… How do I do this?
DB2 Connect Options

• DB2 Connect Personal Edition (PE)
  – Single user
  – TCP/IP or SNA
  – As of v7.1, no integrated SNA stack

• DB2 Connect Enterprise Edition
  – Concurrent users
  – TCP/IP or SNA
  – Need SNA stack
DB2 Connect Platforms

- Windows 95/98/ME / NT/2000/XP (FP5)
- OS/2 Warp
- LINUX
- HP-UX
- Solaris
- AIX (-DB2 Connect PE)
DB2 Connect
Typical Environment

• Client
  – System Database Directory
  – Node Directory

• Server (Gateway)
  – System Database Directory
  – DCS Directory
  – Node Directory
DB2 Connect

Typical Environment

• DB2 Connect EE and on Windows NT/2000
  – Prod and test servers
  – Hundreds to thousands of users

• DB2 Connect PE (For PeopleSoft) on Windows workstation
  – Hundreds to thousands of workstations
DB2 Connect Components

- **Client Application Enabler (CAE)**
  - Runtime Client in v6.1 and above
  - Provides ODBC driver and some utilities on client machine

- **Control Center**
  - Administration client in v6.1
  - Monitoring of DB2 Connect performance and users
DB2 Connect Components (EE)

• Communication to host database requires either TCP/IP or SNA stack
  – IBM Communication Server for Windows NT
  – MS SNA Server
  – Etc.
DB2 Connect
Setup

• Install EE on server
  – Installer is SYSADM and must have an ID that meets DB2 requirements, EE installed as a service
  – Enable communications protocols that you want to use
  – DB2SET DB2COMM=TCPIP, NPIPE, APPC, IPXSPX, NETBIOS
DB2 Connect Setup

• Next step is to catalog the OS/390 database using the command line:
  – CATALOG TCPIP NODE DB2DSNP REMOTE hera SERVER 446
  – CATALOG DB DSNP AS DB2DSNP AT NODE DB2DSNP AUTHENTICATION DCS
  – CATALOG DCS DB DSNP AS BOSCOV_BOSDSNP

• Create a configuration checklist to use to aid in setting up servers/clients
• Can use Client Configuration Assistant (CCA)
DB2 Connect Setup

• Make sure your SNA stack starts up automatically

• Change default TCP/IP stack settings

• Generate client profile
DB2 Connect
Client Setup

• If Windows NT/2000/XP must be local administrator

• Windows 95/98/ME user ID not needed

• Install CAE (Runtime Client)
DB2 Connect
Client Setup

• Can customize the install
• Can configure several different ways:
  – CCA (manually or discover)
  – Import client profile
  – Through the command line
• Lightweight Directory Access Protocol (LDAP)
  – IBM Secure Way Directory Services
  – Microsoft Active Directory
DB2 Connect
Client Setup

• Client footprint was 35MB to 100 MB in v5.2

• Runtime Client is now 25MB in v7.1

• Administration Client in v7.1 is 125MB
DB2 Connect
Directory Structure

Windows Workstation
- SQLNODIR
- SQLDBDIR

EE
- RUNTIME CLIENT
- ADMIN CLIENT
- DB2 PRIVATE PROTOCOL

z/OS
- DB2 UDB for OS/390 & z/OS
- TCP/IP
- SNA

z/OS
- DB2 UDB for OS/390 & z/OS
DB2 Connect Flow

- SQL
- Directories
- Authentication
- DB2 Connect
- Communication Component

- Communications Component
- OS/390
- RACF

- OEMVS
- DB2 for OS/390
  - DDF
  - DBAS
  - IRLM
  - SSAS
  - BSDS
  - A/P
DB2 Connect
Last Step

• Bind utilities using either the command line or CCA
  – CONNECT TO DSNP USER TSODPKG USING PW
  – BIND DDSCMVSLST BLOCKING ALL
    SQLERROR CONTINUE MESSAGES MVS.MSG
    GRANT PUBLIC
  – CONNECT RESET

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DB2 Connect
Last Step

• Must have BINDADD and CREATIN authority
• Must bind from each type of platform
  – NT/XP SERVER
  – NT/XP WORKSTATION
  – Windows 95, 98, 2000
• Have different packages
• Security aspects need to be considered
DB2 Connect
Notes

• Can install more than one release in a subsystem as all releases use different package names
DB2 Connect
TCP/IP

• CDB is not used for inbound requests
• STEP 1
  – Define port and resport to TCP/IP on OS/390 in profile dataset
  – Procedure name must be OMVS
  – Define service name and port in services dataset on OS/390
DB2 Connect
TCP/IP

• STEP 2
  – Update bootstrap dataset using DSNTIJUZ with new port numbers (Note: specify 0 if not using TCP/IP to prevent messages)
  – Optionally enable extended security to allow users to change passwords
DB2 Connect
TCP/IP

• STEP 3
  – Define DDF user ID for open edition as a super user
  – Setup DDF
  – Setup RACF
  – Test in a checkout or tech subsystem
  – Can use SNA and TCP/IP access to a subsystem concurrently
DB2 Connect TCP/IP

• Look for tuning opportunities

• Cancel DDF threads

• Test applications
DB2 Connect
TCP/IP

• TCP tuning on Windows
  – Send/receive space
  – Get Microsoft Technical Support article Q120642 for NT and Q158474 for Win 95/98
  – Default only 8192K

• Set it to 64K for both

• MTU
  – Ethernet range is from 60 to 1500
DB2 Connect Tuning

- Blocking All
- Deferred Prepare
- RQRIIOBLK
- Pacing
- DSESSLIM, DMINWNL and DMINWNR ON VBUILD TYPE=APPL
- Commit On Return
- Don’t forget the TCP/IP stack
- Network cards
DB2 Connect
Problems

• CODEPAGE with DB2 v4.1
  – Might have to set manually on client
  – Might have to change on host

• Read the readme doc with each release or Fix Pack

• DB2COMM variable not set properly
DB2 Connect
Distribution Challenges

• Code server install
  – Possible performance issues
  – CCA files still need to be on the workstation
  – Ease of installing new releases

• Systems management package to build a push package

• Response file

• Need a strategy with 100’s - 1,000’s of users
Testing Methodology

FIXPACK?

README DOC!

APPLICATION

TEST SERVER

DB2 CONNECT EE

DB2 FOR OS/390 DBA/TECH SUBSYSTEM

PTFs?

9672-XX
DB2 Connect v7.1
What’s New

• Connection Pooling*
• Connection Concentration
• Native OLE DB Provider
• Integrated Data Joiner
• ODBC File DSN AND Windows 2000 Active Directory Support
• Static SQL Profiling
• Single Sign-on Using Kerberos
DB2 Connect v7.1
What’s New

• Improved Administration For DB2 OS/390
• Support For Tightly-coupled X/OPEN XA Transactions
DB2 Connect v7.1
Connection Pooling

DB2 CONNECT EE
NUM_INITAGENTS
NUM_POOLAGENTS
MAX_COORDAGENTS

Idle Agent Pool

DB2CONNECT_IN_AP_PROCESS
DB2 CONNECT V7.1
CONNECTION POOLING

• WHAT HAS TO BE DONE IN DB2 FOR OS/390?

• DSNZPARMS:
  – POOL THREAD TIMEOUT
    POOLINAC= > 0, (0-1999)
  – DDF THREADS
    CMTSTAT=INACTIVE
  – NEW TYPE 2 INACTIVE THREAD USES LESS STORAGE
  – OLD TYPE 1 FOR PRIVATE PROTOCOL
ENGINE DISPATCHABLE UNIT (EDU)  
USED TO MAP 1 TO 1  
NOW CONNECTION CONCENTRATOR USES M TO 1 RELATIONSHIP BETWEEN CONNECTIONS AND EDUs  
WORKER AGENTS ARE PHYSICAL EDUs THAT EXECUTE APPLICATION REQUESTS BUT NO SPECIAL ATTACHMENT TO ANY GIVEN APPLICATION
DB2 Connect v7.1

DDF Suspend

• New command to suspend DDF so that DDL work can be done
  – STOP DDF MODE (SUSPEND)
Hmm.. What do we have here?

1. db2cli.ini file
   [DSN1]
   STATICMODE=CAPTURE
   STATICPACKAGE=PHIL.MYPACKAGE
   STATICCAPFILE=E:\Shared\MyApp.cpt

2. UPON COMPLETION OF CAPTURE CHANGE STATICMODE TO DISABLED OR JUST REMOVE THE KEYWORD.

3. GENERATE STATIC PACKAGE WITH STATIC PROFILING BIND TOOL, DB2CAP.

4. CHANGE STATICMODE TO MATCH
   STATICMODE=MATCH
   STATICCAPFILE=E:\Shared\MyApp.CPT

www.ibm.com/software/data/db2/udb/staticcli
DB2 Connect
Problem Determination

- What is the error?
- Where is it occurring?
- When did it happen?
- What has changed?
- Can it be recreated?
- What type of problem is it?
DB2 Connect
Problem Determination

• Most often it is either a connection problem or a long-running query

• FIRST STEP
  – Rerun query on host to isolate the problem

• Often overlooked first step but can isolate the problem very quickly
DB2 Connect
Problem Determination

• MSTR LOG
• DB2DIAG.LOG
• DB2.LOG (Install Error Messages)
• DDCS Trace
• SYS1.LOGREC
• ODBC Trace
• CLI Trace
• Application Error Messages
DB2 Connect
Problem Determination

• **DB2DIAG.LOG**
  – First Failure Data Capture (FFDC)

• **DB2ALERT.LOG**
  – Contains serious error information messages identified by a DIAXXXXXX and the location in which they have been reported
  – Matching entries in DB2DIAG.LOG and OS error logging (Event Viewer/SYSLOG)
  – Pointers to dump files
DB2 Connect
Problem Determination

• DB2 for OS/390 MSTR Address Space Log
  – Connection Error Messages
  – Abends
  – DISPLAY THREAD(*) OUTPUT
  – Startup Errors
DB2 Connect
Problem Determination

• CLI Trace

[COMMON]
;Trace=0 sets tracing off
Trace=1
TraceFileName=C:\TRACE\CLI9910.TXT

• ODBC Trace
  – Select control panel icon
  – Define trace output file and start trace
DB2 Connect Problem Determination

• DDCS Trace
  – DDCSTRC ON

• DB2 Connect to HOSTDB2

• Default output file is DDCSTRC.DMP
  – DDCSTRC OFF

• Edit DDCSTRC.DMP
  – EXCSAT Blocks
  – EXCSATRD Blocks
DB2 Connect v7.1
Relational Connect

• Allows native read-only access to Oracle, Sybase, and SQL Server databases

• No need to change SQL as DB2 Relational Connect does it for you under the covers!

• Separate Product
“Let’s control them there enclaves and store procedures”

REDBOOK, SG24-5326-00, OS/390 WORKLOAD MANAGER IMPLEMENTATION AND EXPLOITATION
DB2 Connect Summary

• Migrate to new versions for performance, feature, and manageability improvements
• Plan a distribution strategy before installing
• Monitor => Tune => Monitor => Get It?
• Look for new monitoring tools
• Keep track of the CDs!
• Get network folks involved
• Learn troubleshooting methods
DB2 Connect
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DB2 Connect

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- SG24-4894-00, The Universal Connectivity Guide To DB2
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DB2 Connect

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• SC23-2365, AIX v4 Performance And Tuning Guide
• Download Fixpacks and clients at below URL:
Thank You!

Session: pgunning@breakthroughdb2.com