# DB2 Guidelines for DTS

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### Introduction

This document contains guidelines for setting up and maintaining a DB2 database for use as a DTS knowledgebase.

#### **Installing DB2**

DTS requires DB2 version 9.7. The Workgroup version is sufficient for DTS knowledgebase needs. Follow the instructions from IBM on installing DB2. During the install make sure you configure DB2 to listen on TCP port 50000. This is the default TCP port setting for Windows, but not for Linux (50001). Be sure to change the TCP port to 50000 when installing DB2 on Linux. For this document the user "dts" is used as the DB2 Instance Owner User ID.

#### **Oracle Compatibility Setup**

DTS requires DB2 to run in Oracle Compatibility mode. Before creating a new database, you need to perform the following steps to ensure Oracle compatibility.

- 1. Open a DB2 command window.
- 2. Start the DB2 database manager.

db2start

3. Set the DB2\_COMPATIBILITY\_VECTOR registry variable to the hexadecimal value that enables the compatibility features that you want to use. To take full advantage of these DB2 compatibility features, set the value to ORA. This is the recommended setting.

db2set DB2\_COMPATIBILITY\_VECTOR=ORA

4. Set the DB2\_DEFERRED\_PREPARE\_SEMANTICS registry variable to YES to enable deferred prepare support. If the DB2\_COMPATIBILITY\_VECTOR registry variable is set to ORA, and the DB2\_DEFERRED\_PREPARE\_SEMANTICS registry variable is not set, a default value of YES is used. However, it is recommended that the DB2\_DEFERRED\_PREPARE\_SEMANTICS registry variable be explicitly set to YES.

db2set DB2\_DEFERRED\_PREPARE\_SEMANTICS=YES

5. Issue the db2stop command and the db2start command to stop and then restart the database manager.

db2stop db2start

#### **Local User for DTS**

Before creating a database on DB2, make sure you have your corresponding Windows user accounts set up correctly. When you installed DB2, you probably set up the required user information that your DB2 instance will use to log on to your system. In this example the user account is "db2admin" for DAS User Id (set up during installation) and "dts" for Instance Owner User Id. Note, if you use "dts" as the Instance Owner User ID then this user will be the same user name used in apelonserverprops.xml (and other XML config files used for your JDBC connections). You are limited to one DTS DB2 user for any given DTS DB2 database. This "dts" user name will also be used as the Schema name for the corresponding DTS DB2 database.



You should also have two groups set up, DB2ADMNS and DB2USERS:



The "db2admin" user should be a member of DB2ADMINS group:

db2admin Properties	? 🗙		
General Member Of Profile			
Member of:			
S Administrators S DB2ADMNS			
Add Remove			
OK Cancel	Apply		

The "dts" user should be a member of DB2USERS group:

dts Properties	?×
General Member Of Profile	
Member of:	
DB2USERS SUbsers	
Add Remove	
OK Cancel A	pply

#### **DB2 Database for DTS**

Launch DB2 Control Center and start Create Database Wizard that creates new database. The following screen is what you would see for the wizard for DB2 Enterprise Edition.

On Wizard Step #1, make sure you set default bufferpool and table space page size to 8K. You should also keep the database name and alias identical (e.g. "dts").

🏪 Create Da	itabase Wizard		
1. Name	Specify a name for your new database		
2. Storage 3. Region	This wizard help: want to tailor th	s you create and tailor a new database. To create a basic database, type a new name, select a drive, and click Finish. If you e database to your requirements, click Next to continue. <u>Task Overview.</u>	
4. Summary	Database name	dts	
	Default path	C:\	
	Alias	dts	
	Comment		
Comment  Restrict access to system catalogs  Let DB2 manage my storage (automatic storage)  I want to manage my storage manually  Default bufferpool and table space page size SK			
		Next  Finish Cancel	

On Wizard step #2 you can choose the default "Use the database path as a storage path" checkbox.

<mark>%</mark> Create Da	itabase Wizard			
1. Name	Specify where to store your data			
2. Storage 3. Region 4. Summary	In an <u>automatic storage database</u> , the data is stored in one or more storage paths. If you do not specify additional storage paths, the database path specified on the Name page is used as the single storage path. If you clear the checkbox, the database path will not be used as a storage path. In this case, you must specify one or more storage paths in the storage paths list.			
	If you do not want to create an automatic storage database, return to the Name page and click the radio button: I want to manage my storage manually.			
	✓ Use the database path as a storage path: C:			
	Storage Path			
	Change			
	Remove			
	Ť.			
	0 of 0 items displayed ↓ Z スト d Default View View			

# Next, ensure the codeset for Wizard Step #3 is set to UTF-8 and the Collating Sequence is set to System. Click FINISH button.

🐾 Create Database Wizard 🛛 🔀				
1. Name	Specify the locale for this database.			
2. Storage 3. Region	The locale (territory a compared.	and code set) determines the set of characters your database uses. It also a	letermines how different character strings are	
4. Summary	Database locale			
	Country/Region de	fault		
		Territory US		
		Code set UTF-8		
	Collating Sequence			
	💽 System	Character strings are sorted according to the code set you specify above.		
	🔘 Identity	Character strings are sorted according to their hexadecimal value.		
	O Identity_16bit	Character strings are sorted using the Compatibility Encoding Scheme for UTF-16: 8-Bit specification (CESU-8)		
	OUCA400_NO	Character strings are sorted using the Unicode Collation Algorithm 4.0.0, with normalization on.		
	O UCA400_LTH	Character strings are sorted as per UCA400_NO, but using the Royal Thai dictionary rules for the Thai characters.		
	Compatibility	Character strings are sorted using the DB2 version 2 collating sequence.		
	🔿 NLSChar	Character strings are sorted using System with additional rules for the specific codeset/territory.		
		■ Bac	k Next Finish Cancel	

#### Setting up DB2 Archive Logging for DTS Database

The default setup for DB2 is that log files are used in a circular manner. If you have 20 log files defined, DB2 cycles through the 20 logs and then re-uses log number 1 when log 20 becomes full. When a log file is reused, its previous contents are overwritten. Therefore, a log can be reused if the transactions it contains have already been committed or rolled back and externalized to the database disk. At the point where the maximum number of secondary logs is reached, if DB2 needs more log space to complete the transaction, a log full error occurs.

Log full error e.g.:

com.ibm.db2.jcc.am.SqlException: The transaction log for the database is full.. SQLCODE=-964, SQLSTATE=57011, DRIVER=4.7.85This means there is not enough room in the logs to complete the transaction.

Log full is an undesirable condition, so we want to change the logging from Circular to Archive. You can do this from Control Center->All Databases->DTS (right click on DTS icon and select Configure Database Logging.). A Wizard popup appears. First choose Archive logging.

🐁 Configure I	Database Logging Wizard 🛛 🛛 🔀
1. Logging Type	Choose your logging type.
2. Log Archiving	This wizard helps you configure database logging for the database named below. The logging type of your database affects the backup and
3. Logging Size	recovery options available to you, as shown below. Task Overview.
4. Logging Lo	Click next to continue.
5. Backup Im	Database : SPLASH - DB2 - DTS
6. Backup Op	Database State : AVAILABLE
7. Enabling S	
8. Summary	Current Logging Type : CIRCULAR
	⊙ Archive Logging
	Online backups are possible:
	Table space backups are possible:
	Can recover to any point in time: 🗸
	Automatic log file management: 🚫
1	
	Next  Finish Cancel

Next specify a location where you want to archive your logs. Use DB2 to automatically archive the log files.

🏪 Configure D	atabase Logging Wizard		
1. Logging Type	Choose how you would like to handle your archived logs.		
2. Log Archiving 3. Logging Size 4. Logging Lo 5. Backup Im	Specify whether you would like to leave your archived logs in place, or use a user provided exit routine to archive the logs, or let DB2 archive your logs. If you choose to use a user provided exit routine to handle the log files, you MUST configure your system to implement the archiving. If you choose to allow DB2 to archive the log files, you must provide the primary location where your archived log files will be stored. Also provide a failure location that will be used if DB2 fails to access the primary location.		
6. Backup Op	O Manual archive log file handling		
7. Enabling S			
8. Summary	○ Use a user exit routine to archive the log files		
	• Use DB2 to automatically archive the log files		
	Primary archive log location		
	Media Type File System		
	Primary archive log path C:\DB2\log-archives		
	Failure archive log location		
	Media Type File System		
	Failure archive log path		
	Back Next      Finish Cancel		

Next, the following settings are recommended:

#### Number of primary log files (LOGPRIMARY) = 13 Number of secondary log files (LOGSECOND) = 100 Log file size (4KB) (LOGFILSIZ) = 20000

This works out to approximately 9 GB of space needed for the database log files.

🔒 Configure I	Database Logging Wizard				
1. Logging Type	Choose the number and size	Choose the number and size of your log files.			
2. Log Archiving 3. Logging Size	Specify the number of database log files to allo files are allocated as needed.	ocate, and their sizes. Remember that primary log files are pre-allocated, while secondary log			
4. Logging Lo	Increasing these values will increase the disk r	equirements for the logs. If you find that secondary log files are frequently being created,			
5. Schedule	you may be able to improve system performan	nce by increasing the log file size or by increasing the number of primary log files.			
6. Summary	Total Disk Space needed for Log Directory:	9040000 KB			
	Number of Primary Log Files	13 📥			
	Number of Secondary Log Files	100 🗧 Default			
	Size of Each Log File (4K Pages)				
	Use infinite logging				

Next, specify the location of your log files.

🏪 Configure I	Database Logging Wizard
1. Logging Type	Specify the location of your log files.
2. Log Archiving 3. Logging Size	Specify the path where you want your log files stored. Your current location is shown. You can also select to have your logs <u>mirrored.</u> A backup copy of your log files will be kept at a different location. Mirroring is helpful in high availability environments.
4. Logging Lo 5. Backup Im	For increased efficiency, place log files on a physical disk that does not have high I/O. Also, place your mirrored log files on a different disk than your primary database log files. In a partitioned database environment, the database partition number is automatically appended to the path.
6. Backup Op 7. Enabling S	
8. Summary	Active Log Path C:\DB2\NODE00000\SQL00002\SQLOGDIR\
	Mirror Log Files
	Mirror Logs - Keep a backup copy of your database log files at a different location
	Mirror Log Path
	Back Next      Finish Cancel

Next, specify your backup location on your disk. If you haven't created a backup folder do so now.

🏪 Configure I	Database Logging Wizard			
1. Logging Type	Specify where to store your backup image.			
2. Log Archiving	Because you are changing your logging type from circular logging to archive logging, you need to perform a database backup. Specify the			
4. Logging Size	type of media on which your backup image will be stored and the associated options.			
5. Backup Im				
6. Backup Op	Media Type File System 💙			
7. Enabling S				
8. Summary	C:\DB2\backup Add			
	Change			
	Remove			
■ Back Next ► Finish Cancel				

Click Finish and you will see this alert. Click OK.

🟪 DB2 Messa	ge	X
	The database will immediately be taken offline and a full database backup will be performed.	>
DBA1184	Explanation: As part of the execution of this wizard an offline full database backup will now be performed. This operation will remove all current users from the system and make the database unavailable for the duration of the backup. This operation may run for an extended period.	
	OK Car	ncel

### **DB2 Tablespace for DTS**

The default user tablespace in DB2 is USERSPACE1. You may optionally create your own tablespace for the DTS DB2 database. You can do this from Control Center->All Databases->DTS->Table Spaces (right click on Table Spaces icon to create). Name the Table Space DTS.

🏪 Create Tab	le Space Wizard
1. Name	Specify a name for your new table space.
2. Type 3. Buffer Pool 4. Read/Write	This wizard helps you create a table space. Each page helps you to define a different aspect of the table space. On this page, type a name that describes the data that you plan to store. You can also add comments to better describe your new table space. You will be able to change the name and comments after your table space has been created, if required. <u>Task Overview.</u>
5. Drive Speed	Table space name DTS
5. Recovery 7. Summary	Comment
	<ul> <li>Let DB2 manage my storage (automatic storage)</li> </ul>
	◯ I want to manage my storage manually
	Next  Finish Cancel

Make sure you also make the table space Large.

🏪 Create Tab	le Space Wizard		
1. Name	Specify the type of table space you want to create.		
2. Type 3. Buffer Pool	There are four types of table spaces, each designed to store different kinds of data. Select the type of table space that you want to create. You will not be able to change the type after your table space has been created.		
4. Read/Write 5. Drive Speed			
6. Summary	Select Regular for indexes and any kind of data except temporary tables.		
	O Large		
	Select Large to store data from large or LOB table columns (long text, audio, video or images). Indexes can be stored here as well.		
	🔿 System temporary		
	Select System temporary to give the database manager space for sorts, joins and other operations.		
	O User temporary		
	Select User temporary to give user applications space for declared temporary tables.		

It's recommended the extent and prefetch sizes are set to at least between 50 MB and 500 MB. Click Finish.

<mark>%</mark> Create Tab	le Space Wizard 🛛 📉
1. Name	Specify the extent and prefetch sizes for this table space.
2. Type 3. Buffer Pool 4. Read/Write 5. Drive Speed 6. Summary	The extent size affects how efficiently your data is stored. The prefetch size affects how quickly data can be read from the table space. Vou can change the prefetch size later, but not the extent size. Determining recommended settings What will be the average size of a table in this table space? Less than 50 MB Between 50 MB and 500 MB Between 500 MB and 500 MB Greater than 5 GB Greater than 5 GB Letent size 16 B KB pages Prefetch size 16 $\cong$ KB pages Prefetch size 16 $\cong$ KB pages
	■ Back Next ► Finish Cancel

Once your tablespace is created verify that it is present in the Table Spaces list.

🐾 Control Center - DB2COPY1						
Control Center Selected Edit View Tools Help						
ዬ 🖗 😫 📼 ኔ፦ 🔯 🗉 🛸 📮	ને 😚 🖧 🖬 🦆 🕼 📮 🖌 🖬 🏣 🖌 🕐					
Dbject View						
	FINISTEIN - DB2 - DTS - Table Spaces					
🖃 🧰 Databases						
🖨 🔲 DTS						
Tables	🐨 DIS Large Database Yes Yes 🗠					
🛅 Views	SYSCATSPACE Regular Database Yes Yes					
🛅 Aliases	SYSTOOLSPACE Large Database Yes Yes					
🛅 Nicknames	TEMP5PACE1 System tempo System Yes No					
🗈 – 🛅 Cache Objects	🗹 USERSPACE1 Large Database Yes Yes					
🛅 Triggers 👘						
🛅 Schemas						
	5 of 5 items displayed 🛛 🎝 🔅 🕁 🛱 🔯 🖓 Default View 📩 View					
🧁 Table Spaces						
🛅 Event Monitors	Tablespace - DTS (?) Help X					
🛅 Buffer Pools	Name : DTS					
🖃 ··· 🧰 Application Objects	Type : Large					
	Managed by : Database					
🖅 🧰 Federated Database Objects	Actions:					
🔤 XML Schema Repository (XSR)	Alter Tablespace					
🖬 🗍 DTSDEV	S Show Related Objects					
TOOLSDB						
II Databases	Create New Tablespace					
] dts 🔍 🗸						

One final step. Right click on DTS in the list of tablespaces to get the following popup to appear. If you see DTS under USER and green checkboxes under USE, you are done. If not, as shown in the screenshot below, proceed to the next step.

🐁 Table Space Priv	rileges - EINSTEIN - DE	32 - DTS - DTS	S	×
EINSTEIN - DB2 - DTS -	DTS			
User Group				1
User	USE		Add User	
TBADURA	4		Grant All	
			Revoke All	
				1
Privileges: USE				
Grant 💙				
	Apply Rese	st Show S	SQL Help	

Click the Add User button to add "DTS" as a User. Select "DTS" and click OK.

🏊 Add User 🛛 🔀
Specify a user name. You can select a user name from the list or type one in. DTS
ADMINISTRATOR DB2ADMIN
DTS DTSDEV GUEST HELPASSISTANT SUPPORT SUPPORT_388945A0
OK Apply Cancel Help

🟪 Table Space Priv	ileges - EINSTEIN - DB2 - DTS	G - DTS 🛛 🔀		
EINSTEIN - DB2 - DTS - I	DTS			
User Group		[		
User	USE	Add User		
TBADURA	4	Grant All		
DTS	<b>N</b>	Develop All		
		Revoke All		
Privileges: USE				
No 💌				
OK Cancel Apply Reset Show SQL Help				

If "DTS" users privileges are set to No, then you have to change them to Yes or GRANT.

Click Apply button to save your change. One checkbox is for USE, two checkboxes is for GRANT.

😼 Table Space Priv	vileges - EINSTEIN - I	DB2 - DTS - DT	s 🛛 🔀	
EINSTEIN - DB2 - DTS -	DTS			
User Group				
User	USE		Add User	
TBADURA	4		Grant All	
DTS	d.		Revoke All	
Det de seu luco				
Privileges: USE				
Yes 💌				
OK Cancel Apply Reset Show SQL Help				

Click OK to close window. Your custom tablespace is done. DB2 is now configured for DTS.