Using System Administration Tools

Today you learn how to use several DB2 tools that simplify administering your database. The following tools will be examined:

- Task Center, which enables you to create and run scripts. You can run scripts immediately or schedule them to run later.
- Journal, which enables you to view the results of the scripts you have run, and keeps history, alert, and message logs that you can review.
- Tools Setting dialog box, which enables you to customize the various DB2 tools.
- License Center, which enables you to check the license information, statistics, registered users, and current users for each of the installed products.

Today you also learn how to perform other important system administration tasks that may not be performed on a day-to-day basis. These tasks include creating indexes on your tables, viewing the directories that store configuration information, and managing a list of contact names.
Using the Task Center

Use the Task Center to schedule tasks, run tasks, and notify people about the status of completed tasks. Tasks are actions performed by the types of scripts shown in Table 15.1.

<table>
<thead>
<tr>
<th>Type of Script</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2 command script</td>
<td>The script contains DB2 commands.</td>
</tr>
<tr>
<td>OS command system script</td>
<td>The script contains operating system commands.</td>
</tr>
<tr>
<td>Grouping task</td>
<td>The script is part of a group of tasks. This setup enables you to initiate other scripts based on the success of other scripts in the group.</td>
</tr>
</tbody>
</table>

Creating a DB2 Command Script

A mini-application known as a script is a set of one or more commands created through the Command Center or the Task Center. Storing commonly used queries and DB2 commands in DB2 command scripts is a way for you to simplify and organize your work.

You create groupings for multiple tasks that can be scheduled to run regularly or to be run if another task succeeds or fails. You can have the results emailed to you or to someone else.

Follow these steps to create a DB2 command script:

1. Start the Task Center. Click the Task Center icon on the toolbar of the Control Center, or choose Start|Programs|IBM DB2|General Administration Tools|Task Center.
2. In the Scheduler System box, select a system name that the Task Center will use to determine when to start tasks.
3. Create a task for each script that you want to run. Choose Task|New from the menu. The Task Properties dialog box opens. Figure 15.1 shows the Task page with all the values entered.
4. In the Name field, type a descriptive name for your script. This example uses CDLIB Report A.
5. In the Type field, choose the type of task to create. For this example, choose DB2 Command Script.
6. In the Description field, type a description of the purpose of the script.
7. In the Task Category field, click the button on the right side of the field to open the Select Task Categories window. Here, you can organize your list of tasks. The first
time you use this feature, the dialog box will be empty and you will need to create new categories. In the New Task Category field, enter a useful task category name such as Backups. Click the arrow button to move the category into the Selected Task Categories box (see Figure 15.2). Click OK to return to the Task page and continue.

8. In the Run System field, select the system on which the task will run. A default system is provided. If you want to change the default, click the button on the right side of the field to open the Select Run System window. From this dialog box, you can choose a system or search for a system (see Figure 15.3). Click OK to return to the Task page and continue.

9. In the DB2 Instance and Partition field, select an instance name to associate with the command script. Click the button on the right side of the field to open the
Select Partitions window. Choose an instance by clicking the arrow next to the instance field. In the Available Partitions box, click the partition to which you want to associate the script and click the right arrow to move the selection into the Selected Partitions box (see Figure 15.4). Click OK to continue.

FIGURE 15.3
The Task Center's Select Run System window.

FIGURE 15.4
The Task Center's Select Partitions window.

10. Click the Command Script tab of the Task Properties dialog box. Type in the commands that will make up your script. For example, to connect to the CDLIB database, list the tables of the database, and view the contents of the CATEGORY and ALBUM tables, enter the following commands:

```plaintext
connect to cdlib;
list tables;
select * from category;
select * from album;
```

11. Ensure the termination character is set to a semicolon (;) to match the commands. Enter a working directory path where the script results can be saved (see Figure 15.5).
12. On the Run Properties page, shown in Figure 15.6, you can select a success code set or create a success code set to specify conditions required for the task to be successful. If you do not specify a success code set, only a return code of 0 is considered successful. For purposes of this example, keep the default settings.

Click the Stop Execution at the First Return Code That Is a Failure check box to stop the task immediately after receiving a failing return code.

13. On the Schedule page, you provide scheduling options. Setting a schedule is covered in the next section.
14. On the Notification page, you can have the results of the script emailed to you or someone else. (See “Managing Contacts” later today for details on adding people to your contact list.) Or you can have the results sent to the Journal as a message. Click the Notification Type and select Create Journal Message, as shown in Figure 15.7. Click Add to move the option to the List of Notifications.

![Figure 15.7](image)

**Figure 15.7**
The Task Center’s Notification page.

15. On the Task Actions page, you can specify actions that can take place after this script succeeds, fails, or in either case. The actions you can specify include Run Task, Enable Schedule Of, Disable Schedule Of, or Delete This Task. The next section shows you how to set up such actions. Leave this one at its default setting.

16. On the Security page (see Figure 15.8), you can set the Read, Run, and Write privileges for each user. We have indicated that users ADMINISTRATOR and DB2ADMIN can read, run, or write to this script.

![Figure 15.8](image)

**Figure 15.8**
The Task Center’s Security page.
17. Click OK to save the script and all its settings. If you need to modify anything, right-click the script and select Edit Task Properties to reopen the notebook.

**Importing Scripts**

To create a new command script from an existing file, follow these steps:

1. Choose Task | Import from the menu.
2. In the File Browser window, shown in Figure 15.9, choose the IMPORT.SCR file on the CD that accompanies this book that creates the CDLIB database and its tables. Click OK to open the New Task notebook.

![Figure 15.9](image1.png)

*Figure 15.9*

*The Task Center’s File Browser window.*

3. In the Command Script window, make any required changes to the script such as the drive where the .ixf files are located (see Figure 15.10). (Check the CD-ROM that accompanies this book or the directory where you copied them.)

![Figure 15.10](image2.png)

*Figure 15.10*

*The Command Script window.*
4. On the Task page, enter a new script name, script description, working directory, task category, run system, and instance, and specify that the new script will contain DB2 commands.

5. On the Task Actions page, select the Task Success radio button to indicate that if this script succeeds, the script called CDLIB_ReportA that you created in the previous section should be run (see Figure 15.11). Click Add to include this action in the List of Task Actions.

![Figure 15.11](image)

*The Task Center’s Task Actions window.*


Scripts are also created when you create a backup plan by using the Backup Wizard. You can’t modify these scripts through the Task Center, but you can run them from the Task Center.

**Running Scripts**

You can run a saved script or schedule to run it at a later time or date. To immediately run a saved command script, follow these steps:

1. Right-click the CDLIB_IMPORT script and select Run Now from the pop-up menu.

2. In the Run Now window, choose Initiate Show Progress in the Run Options section to see when the script is finished (see Figure 15.12). Type a valid user ID and password and click OK to run the script.
3. The Show Progress window opens to show the script as Queued or Running (see Figure 15.13). Set the Refresh Options box to change the frequency that the screen is refreshed. This example is set to 10 seconds. Close the Show Progress window when the script is finished. The Last Success column of the Task Center window shows the status of the script that just ran.

**Figure 15.12**
The Task Center's Run Now window.

4. To see the results of the script, right-click the script name and choose Show Results from the pop-up menu. The Show Results window allows you to see the time the script started and finished, duration, return code, completion state, and output (see Figure 15.14).

5. Because the Task Actions page indicates that the CDLIB_Report_A script should be run if the CDLIB_Import script completes successfully, you should see that both scripts ran successfully, as shown in Figure 15.15. Click Close.
Scheduling Scripts

To schedule a saved script to run every Sunday and Wednesday at 5:30 p.m. for the next year, for example, follow these steps:

1. Right-click the saved script that you want to schedule to run and select Schedule|Change from the pop-up menu.

2. On the Schedule page, enter a Start Date and Start Time; then determine the frequency at which the script will run (see Figure 15.16).
3. In the Occurs section, select one of the following radio buttons to indicate how often the job is to run:
   - Run Once—Choose this option to have the script run as a single job.
   - Repeating Schedule—Choose this option to schedule the job to occur every few hours, weeks, or months. Specify the frequency in the appropriate fields.
   For this example, we chose to have the script run every Monday at 7:30 p.m. until the end of November.
4. In the Runtime Authorization section, type a valid user ID and password.
5. Click Add to have the schedule options added to the List of Schedules window.
6. Click the Save List of Schedules option to give the new schedule a name and description.
7. Ensure Enabled Scheduling is checked. Click OK to have the job scheduled. A job ID is assigned to the job.

The state for this task in the Task Center will now show Pending.

Using the Journal

You use the Journal to view all historical information generated within the Control Center and its components. The Journal maintains several views in an attempt to better organize its data. The views include those shown in Table 15.2.
TABLE 15.2  Journal Views to DB2 Historical Data

<table>
<thead>
<tr>
<th>View</th>
<th>Enables You To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task History</td>
<td>View information about the DB2 tasks run on your computer.</td>
</tr>
<tr>
<td>Database History</td>
<td>See a history of the database backups performed on your computer.</td>
</tr>
<tr>
<td>Messages</td>
<td>See a list of all recent messages associated with DB2.</td>
</tr>
<tr>
<td>Notification Log</td>
<td>See notifications generated through the Health Monitor.</td>
</tr>
</tbody>
</table>

The Journal displays historical information about tasks, database actions and operations, Control Center actions, messages, and alerts.

**Viewing the Results of a Job**

From the Task History page in the Journal, you can view pending, running, and executed jobs. Follow these steps:

1. Open the Journal by clicking the Journal icon on the Control Center’s toolbar, or by choosing Start|Programs|IBM DB2|Administration Tools|Journal.
2. From the Scheduler System drop-down box, select the system on which to store and run the command scripts. The default is your local system.
3. To see all tasks organized by name, click View|Saved Views|Overview by Name from the menu (see Figure 15.17). You can also set to view all the columns, events that ended in error, or recent events.

**FIGURE 15.17**
The Journal’s Task History page showing tasks organized by name.
4. To work with any of the tasks listed here, right-click the task and choose one of the following functions:

- Show Results—Opens the Show Results window allowing you to see the results, command script, output, and task actions of the selected task.
- Show in Task Center—Opens the Task Center so that you can view the selected task.
- Edit Task Details—Opens the Edit Task Properties notebook for the selected task.
- Show Statistics—Shows detailed information on the number of times the script has been run and the results as well as the length of time to execute.
- Remove—Removes the task from the list in the Journal.

Use the Journal’s Database History page to restore databases, table spaces, or the recovery history of a selected database. You can also view table space information from this page. Figure 15.18 shows an example of the Database History page in the Journal.

**Figure 15.18**
The Journal’s Database History page.

**NOTE**
No entries for a database means that you haven’t yet backed up the data in your database. Entries are posted in this log as soon as a backup is performed.
On the Database History page, choose a system, instance, and database for which you want to view the history. With the entries displayed, you can do the following:

- To restore a selected database from a backup image that has been made from this database, right-click it and select Restore from the pop-up menu. The Restore Database Wizard opens. See Day 16, “Recovery Concepts,” for information on using this wizard.
- To see a list of table spaces associated with this database, right-click it and select View Table Spaces from the pop-up menu. The View Table Spaces window opens.

On the Journal’s Messages page, you can see the messages that are related to your system (see Figure 15.19). Each message (error, warning, or informational) that occurs while operating DB2 is logged in this list. The list indicates the severity of the message, the date and time the message occurred, the message identifier, and the message text.

To prune this log when it becomes full, right-click one or more entries and select Remove to remove only the highlighted messages, or select Remove All to remove all entries in the log.

On the Journal’s Notification Log page, you can select to see all notifications or only those that were generated through the Health Monitor. Figure 15.20 shows a list of the last 50 messages.

Select an instance for which you want to view the messages by using the drop-down box in the Instance field. In the Notification Log Filter, you can choose to see the Health Monitor notifications only or all notifications. You can also select the number of notifications that should appear in the screen. The default shows 50 messages.
To see the details of a message, right-click the message and choose Show Details. Figure 15.21 shows an example of a message that you might see.

**Figure 15.20**
The Journal's Notification Log page.

**Figure 15.21**
The Journal's Details of a Notification message.

---

**Customizing Tools Settings**
You use the Tools Settings notebook to customize settings and set properties for the following:

- Administration tools
- Replication tasks
- OS/390 and z/OS Control Center utility execution options
• Health Center Notification
• The default scheduling schema

On the notebook’s General page (see Figure 15.22), you can enable hover help and infopops, automatically start the local instance, define a statement termination character, and set filtering defaults:

• Select the Automatically Display Hover Help check box to enable the help that appears when you put your mouse pointer over an icon in the administration tools.

• Select the Automatically Display Infopops check box to enable the help that appears when you put your mouse pointer over a field or control in the wizards or in windows and notebooks in the administration tools.

• Select the Automatically Start Local DB2 on Tools Startup check box to have the local DB2 instance started each time an administration tool is started.

• Select the Use Statement Termination Character check box to define a character to use at the end of statements in command scripts in the Command Center and Task Center. If you select this check box, the semicolon (;) is used by default to end statements. Optionally, you can define a different character by typing it in the text box.

**NOTE**
You can’t specify the backslash (\) character to continue statements in command scripts.

• Select the Set Filtering When Number of Rows Exceeds check box to define the number of rows to appear in the Sample Contents window and the Command Center window.

**FIGURE 15.22**
The Tools Settings notebook’s General page.
On the notebook’s Fonts page, you can specify the font’s type, size, and color for menus and text items (see Figure 15.23).

**Figure 15.23**
*The Tools Settings notebook’s Fonts page.*

On the notebook’s Health Center Status Beacon page, you can select where notifications will take place: through a pop-up menu or through the status line (see Figure 15.25). This topic is beyond the scope of this book.

**Figure 15.24**
*The Tools Settings notebook’s OS/390 and z/OS page.*

On the notebook’s Health Center Status Beacon page, you can select where notifications will take place: through a pop-up menu or through the status line (see Figure 15.25).

**Figure 15.25**
*The Tools Settings notebook’s Health Center Status Beacon page.*
On the notebook’s Scheduler Settings page, you can choose whether the scheduling and storage of tasks is to be done locally or on a central system (see Figure 15.26). If you select to have the scheduling centralized, select the centralized system from the dropdown list. If you need to enable another scheduler, select a system and click Create New to open a window where you can create a database for the DB2 Tools Catalog on a cataloged system. If the system you want is not cataloged, you must catalog it first.

**Making Your Database More Useful**

There are several ways you can make your databases more useful. One way is to create an index on your table that can improve the performance of selecting data from the table.

**Creating Indexes**

An *index* is the key value of a table. It provides pointers to the rows in the table, which allows more efficient access by creating a direct path to the data. Also, you can define index keys as unique, thereby preventing duplicate rows from occurring within the table.

An index is created when you create a unique key, a primary key, or a foreign key. You can create an index at the time the table is defined or at any time afterward.

To view the indexes defined on each table in the CDLIB database, follow these steps:

1. Start the Control Center.
2. Expand the objects until you see the Indexes folder. Click that folder to see a list of the indexes in the contents pane. Each index has a name, schema, table schema, table name, and type associated with it (see Figure 15.27).
3. Right-click an index and select Alter from the pop-up menu. In the Alter Index window, you can see the columns used to make up the index, but you can modify
only the comment (see Figure 15.28). If you need to make changes, you must drop the existing index and re-create it.

**Figure 15.27**
The Control Center showing indexes associated with the CDLIB database.

**Figure 15.28**
The Alter Index window.

The effectiveness of defining an index depends largely on the type of table access required. An index is most effective if it matches the way you access your data. Although the creation of an index usually helps improve performance on large or frequently updated databases, each index must be kept up to date. Therefore, each insert, update, and delete request against a table requires an update for the index, if any of the table columns affected are included in the index definition. Such updates may degrade performance. Thus, you should create indexes carefully, with an understanding of how the data
is stored and used. The simplest recommendation is that you define a key on the table columns you use the most.

To create a new index, follow these steps:

1. Start the Control Center.
2. Expand the objects until you see the Indexes folder.
3. Right-click the Indexes folder and select Create from the pop-up menu.
4. In the Create Index window, complete the following information:
   - **Index Schema**— From this drop-down list, select a schema. The default schema is the username that you used to log in; use a schema appropriate for your system.
   - **Index Name**— a name for the index you're creating. The name can be up to 18 characters long. This name must be unique within the index's schema; no other object in the schema can have the same name.
   - **Table Schema**— From this drop-down list, select the schema that contains the table for which you're creating an index.
   - **Table Name**— From this drop-down list, select the table in this schema for which you’re creating an index.
   - **Selected Columns**— Select the column or columns that you want to define as part of the index key. Click the arrow to move the column from the Available Columns list box to the Selected Columns list box.
   - **Include Columns**— Use the Include Columns list box to select additional columns to be included in the index, but not as part of the unique index key. The Include Columns list box is activated when you select the Unique check box.
   - **Unique**— Select the Unique check box to create a unique index, which prevents the table from containing two or more rows with the same value of the index key. If the table contains rows with duplicate key values, the index is not created.
   - **Cluster**— Select the Cluster check box to specify that the index is the clustering index of the table. A clustering index cannot be created on a table that is defined to use append mode.
   - **Allow Reverse Scans**— Select this check box if you want to support both forward and reverse scans of the index.
   - **Percentage of Free Space to Be Left on Index Pages**— Select a value in this field to specify what percentage of each index page to leave as free space when building an index.
• Percentage of Minimum Amount of Used Space to Be Left on Index Pages—
  Select a value in this field to specify the threshold for the minimum percentage of space used on an index leaf page.

5. Click OK to create the index.

Working with Directories

DB2 uses three directories to record information for accessing databases. These directories are updated through the normal course of using DB2. You can view the contents of the directories as follows:

• To see the contents of the local database directory or the system database directory, issue the `list database directory` command in the Command Center, as shown in Figure 15.29. The local database and system database directories identify the name, alias, and physical location of each cataloged database.

![Figure 15.29](image)

The Command Center showing the contents of a local database directory.

• To see the contents of the DCS directory, issue the `list dcs directory` command in the Command Center. The DCS directory contains an entry for each distributed relational database that your system can access. You’ll have only a DCS directory if you have DB2 Connect installed.

• To see the contents of the node directory, issue the `list node directory` command in the Command Center. The node directory contains communication information for the client to connect to a remote database server.
Managing Contacts

DB2 allows you to keep an address book of people who can be contacted when tasks are complete. You can set up an email address or pager information for each person. Groups can be created to allow you to send information to more than one person at once. During the installation, you were asked to enter a contact name. If you did, then you have at least one person in the contact list. You can manage the contact list as follows:

1. From the Control Center, click the Contact List icon to open the Contacts window.
2. Click the Add Contact button to add a new name to the list. You are asked to provide a name, email address or pager information, and a description. Click OK to add the name.
3. Click the Add Group button to create a group name. You are asked to provide a name for the group and a description. You can then choose from the list of individuals who will be part of this group. Click OK to add the group.
4. Continue to add groups and individuals as needed. Figure 15.30 shows groups called Managers, DBAs, Programmers, and Users as well as two individuals.

Figure 15.30
Groups and individuals in the contact list.

Managing Licenses

The License Center allows you to display the license status and usage information for the DB2 products installed on your computer. If you installed the DB2 product that is included with this book, the License Center will show that you have a short-term license that will expire on the date shown.
To add a license, use the following steps:

1. Open the License Center by clicking the License Center icon on the Control Center.
2. In the System Name field, select the system for which you want to add a new license.
3. Select License|Add to open the Add License window.
4. Select the From a File radio button to add the information from a .lic file. Select the Manual radio button to enter the license information manually.
5. If you chose to add the license from a file, select the file and click Apply to add the license.
6. If you chose to add the license manually, type the product name and password that appear on your license certificate. Click Apply to add the license. Figure 15.31 shows an example of the License page of the License Center.

![Figure 15.31](image)

The User page of the License Center allows you to maintain a list of registered users.

The Statistics page of the License Center allows you to use the License Center to configure your system for license monitoring.

**Summary**

Today you saw that the Task Center allows you to work with saved scripts. A script is a set of one or more commands and is created through the Command Center or the Task Center.

The Journal allows you to view historical information about any scheduled, running, or completed jobs. You also can view the various logs where DB2 stores information.
You can create many objects to make your database more useful. These objects include indexes, contact lists, and license usage statistics.

**What Comes Next?**
On Day 16, you learn how to develop a backup and recovery plan to protect the data in your database.

**Q&A**

**Q** Can I create a script that contains operating system and DB2 commands?

**A** You can create scripts that contain only operating system commands and scripts that contain only DB2 commands. You can’t combine both types of commands in a single script, however. When you’re creating a script, be sure to select which type of commands your script contains.

**Q** Can a script contain scheduling information?

**A** A script can contain only commands. A script can, however, be scheduled to run at a specified date and time. If you do schedule to run a script, the scheduling information is stored in the properties of the task. Use the Task Center to run the script now, stop the script from running, schedule the script to run, and view the results of the script. If you decide that you need to make changes to the saved script, you can edit it from the Task Center.

**Q** What’s the purpose of the recovery history log?

**A** The recovery history log contains information about when a backup or recovery was performed for a particular database. If you don’t have information in the log, you haven’t yet performed a backup or recovery on the data in the database. If you’ve performed a backup, this information is contained in the log. You can select to restore a backup image while viewing the recovery history log information. This is also the place where you can view the table spaces (if any) associated with the database.

**Workshop**
The purpose of the workshop is to allow you to test your knowledge of the material covered in the lesson. See whether you can successfully answer the questions in the quiz and complete the exercises before you continue with the next lesson. Answers to quiz questions are provided in Appendix B.
Quiz
1. How do you create an index? Why do you want to create an index?
2. What is a unique index?
3. If you don’t see hover help while you’re using the DB2 tools, how can you turn on this feature?
4. Can you modify scripts that are created as a result of using the Backup Database Wizard?
5. What’s the purpose of creating a grouping task?
6. What are the three different types of directories that DB2 uses to record information for accessing databases?
7. What’s the purpose of creating a list of contacts?
8. Where can you see the notifications from the Health Center?

Exercise
The Task Center and Journal were introduced in today’s lesson. Together, these tools help simplify many of the tasks you’ll need to perform as a database administrator. Try out the many options available in these tools to gain an understanding of how you create scripts and what you can do once a script is saved.