



System i  
System i Access for Linux

*Version 6 Release 1*







System i

System i Access for Linux

*Version 6 Release 1*

**Note**

Before using this information and the product it supports, read the information in "Notices," on page 45.

This edition applies to version 6, release 1, modification 0 of System i Access for Linux (product number 5761-XL1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

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## System i Access for Linux

The System i<sup>®</sup> Access for Linux<sup>®</sup> (5761-XL1) offering is the latest in the System i Access (5761-XW1) family of products. It offers Linux-based access to your i5/OS<sup>®</sup> operating environment.

The System i Access for Linux product can leverage business information, applications, and resources across an enterprise by extending the system's resources to the Linux client. The product allows you to establish a 5250 display emulation session or to access the IBM<sup>®</sup> DB2<sup>®</sup> for i5/OS database, using an ODBC driver, all from a Linux client.

System i Access for Linux is shipped with the System i Access for Web (5761-XH2) product and is available as a download by accessing the System i Access for Linux homepage (<http://www.ibm.com/systems/i/software/access/linux/>).

**Note:** By using the code examples, you agree to the terms of the Code license and disclaimer information.

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### What's new

This topic highlights changes to the System i Access for Linux product.

Information on V6R1 functions and enhancements for the System i Access for Linux product is documented at the following Web site: <http://www.ibm.com/systems/i/software/access/linux/>.

To find other information about what's new or changed this release, see the Memo to Users.

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### Printable PDFs

Use this to view and print a PDF of this information.

To view or download the PDF version of this document, select System i Access for Linux (about 540 KB).

You can view or download these related topics:

- System i Access for Windows<sup>®</sup> ODBC
- IBM DB2 for i5/OS SQL Reference

### Web sites

- IBM System i Access for Linux  ([www.ibm.com/systems/i/software/access/linux/](http://www.ibm.com/systems/i/software/access/linux/)) Visit this site to learn more about the System i Access for Linux product.
- IBM System i Access  ([www.ibm.com/systems/i/software/access/](http://www.ibm.com/systems/i/software/access/)) This Web site has online System i Access product information
- System i Linux  ([www.ibm.com/systems/i/os/linux/](http://www.ibm.com/systems/i/os/linux/)) Visit this site to learn more about System i Linux.
- ODBC and the unixODBC project  ([www.unixodbc.org/](http://www.unixodbc.org/)) This site provides information on the unixODBC Driver Manager. Among other things, there are links here to see what is fixed in a particular release and a spot to download the latest version of the unixODBC Driver Manager.
- Microsoft<sup>®</sup> Data Access and Storage Developer Center  ([msdn.microsoft.com/data/default.aspx](http://msdn.microsoft.com/data/default.aspx)) This site gets you to information about the ODBC specification and examples on how to use it.

- IBM System i support  ([www.ibm.com/systems/support/i/](http://www.ibm.com/systems/support/i/)) System i and i5/OS Technical support and resources.

## Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF in your browser (right-click the link above).
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

## Downloading Adobe® Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site ([www.adobe.com/products/acrobat/readstep.html](http://www.adobe.com/products/acrobat/readstep.html)) .

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## IBM System i Access for Linux license information

The IBM System i Access for Linux (5761-XL1) product is a licensed program product.

The 5250 Display Emulation component requires an IBM System i Access Family (5761-XW1) license. For more information about System i Access Family license requirements, refer to the IBM International Program License Agreement.

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## Prerequisites for using the System i Access for Linux product

Identify the System i and the Linux requirements for using the System i Access for Linux product.

These are the System i requirements:

- System i connections running i5/OS V5R3, V5R4 or V6R1, are supported. Unexpected results are produced when using the product with earlier releases.
- The QUSER user profile must be enabled. From a System i command line type the following:  
DSPUSRPRF USRPRF(QUSER)  
Press ENTER to display the status for QUSER.  
Use the CHGUSRPRF command to change the profile if necessary.
- The host servers must be started. Type STRH0STSVR and press ENTER to start the i5/OS host servers.
- TCP/IP must be started. To start TCP/IP, you must have the TCP/IP Connectivity Utilities (i5/OS licensed program 5761-TC1) installed on the system. For more information on host server options and TCP/IP, see the TCP/IP topic in the i5/OS Information Center.

These are the Linux requirements:

- GNU C Library (GLibc 2.2)
- Red Hat package manager (RPM 3.0)
- Runtime environment (OpenMotif 2.0 or later for the 5250 emulator)
- unixODBC driver manager version 2.0.11 or later must be installed on the client. See the unixODBC Project web site for more information on the driver manager and to download the latest level of the driver manager.

**Note:** If you recompile the unixODBC driver manager, the `./configure --prefix` default is `/usr/local`. If you use this default, update your shared library (`/etc/ld.so.conf`) and executable paths to include it.

Recommended Linux Distributions are listed below.

- SUSE LINUX Enterprise Server 9 and later
- Red Hat Enterprise Linux 4 and later

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## Install System i Access for Linux

Follow these steps to install the System i Access for Linux product.

1. Download the System i Access for Linux RPM package **iSeriesAccess-5.4.0-xx.xx.zzz.rpm**,
  - where *xx.xx* and *zzz* indicate the version level and platform that is available for download.
2. Enter the following command on the Linux client
  - `rpm -ivh iSeriesAccess-5.4.0-xx.xx.zzz.rpm`
3. Enter the actual name of the file that is downloaded in step 1.
  - For example, `iSeriesAccess-5.4.0-1.2.ppc.rpm`

## Results

### Note:

1. Files are installed in the `/opt/ibm/iSeriesAccess` directory on your Linux client.
2. When the System i Access for Linux product is installed, the ODBC driver that was previously installed with the product is uninstalled.
3. The System i Access for Linux RPM package adds the ODBC driver to the list of ODBC drivers available through unixODBC.
4. The RPM package uses the following to complete the install task:
  - the unixODBC driver install program `odbcinst`
  - the System i Access for Linux ODBC Driver file `unixodbcregistration`
5. You can use the unixODBC `ODBCConfig` program to configure additional features for the System i Access for Linux ODBC Driver.
6. If the installation fails because of a dependency on `libodbcinst.so`, make sure you have the unixODBC driver manager installed. If the problem persists, run the installation command with the `--nodeps` parameter to stop dependency checking.
7. For most 64-bit platforms, you can also install the 32-bit version. The last one installed becomes the default ODBC driver. See the unixODBC configuration file, `odbcinst.ini`, for more information.

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## Update the System i Access for Linux product

There is a command to update the System i Access for Linux product.

### About this task

To update the System i Access for Linux product after an initial installation, enter the command below.

```
rpm -Uvh iSeriesAccess-5.4.0-xx.xx.zzz.rpm,  
  where xx.xx and zzz indicate the version level and platform.
```

---

## Uninstall the System i Access for Linux product

There is a command to uninstall the System i Access for Linux product.

## About this task

To uninstall the System i Access for Linux product, enter the following command:

```
rpm -ev iSeriesAccess
```

**Note:** If the `/opt/ibm/iSeriesAccess/conv_tables` directory is not removed during uninstall, because of downloaded conversion tables, you must manually remove the directory.

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## System i Access for Linux security

You can use Kerberos, single signon, and secure sockets layer (SSL) with the System i Access for Linux product.

### Kerberos

The System i Access for Linux product supports System i authentication using Kerberos. To install and configure the System i platform for Kerberos, see the Single signon topic, in the Security topic collection in the i5/OS Information Center.

To install and configure Linux for Kerberos, see one of the many **HOWTOs** available from the Linux Web site. For an example, choose **How to Kerberos** from the related links listed below.

**Note:** Most Linux distributions include at least one version of Kerberos 5, either Heimdal or MIT. However, some distributions do not create a symbolic link for the Kerberos shared library for Heimdal (`/usr/lib/libgssapi.so`) or MIT (`/usr/lib/libgssapi_krb5.so`). The System i Access for Linux product dynamically loads the Kerberos shared library, using the associated `.so` name. If a symbolic link is not available, you get the following error: CWBSY1015 - Kerberos not available on this version of the operating system.

To use Kerberos with the System i Access for Linux product, you must first authenticate to your Kerberos domain using the `kinit` command or by setting up your initial Linux login to authenticate with the pluggable authentication module (PAM) Kerberos plugin. After successful authentication, you should be able to do a `klist -f` to see the status of your Kerberos tickets.

For any System i Access function, you can use `*kerberos` in place of the System i user profile to use your Kerberos tickets. Any password is ignored in this case. For example: `/opt/ibm/iSeriesAccess/bin/rmtcmd CRTLIB Test /system:iSeriesSystemName /user:*kerberos`.

The Kerberos principle name is based upon the fully qualified TCP/IP name received from the reverse lookup of the TCP/IP address. If you use a host file to resolve TCP/IP addresses, be sure to include the fully qualified TCP/IP system name. For example: `1.2.3.4 MyiSeries.MyDomain.com MyiSeries`.

### Single signon

The `ibm5250` emulator supports Kerberos and single signon. Using either command line options or the `setup5250` configuration utility you can enable this security support.

### Secure sockets layer

For enabling the System i Access for Linux product to use secure sockets layer (SSL) support, OpenSSL and stunnel must be installed and configured. An example stunnel configuration file is provided to get you started: `/opt/ibm/iSeriesAccess/doc/iSeriesAccess.stunnel.config`.

#### Related reference

“Command line emulator options” on page 6

There are command line options for System i Access for Linux 5250 emulator.

## Related information

Single signon

 [Howto Kerberos](#)

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## System i Access for Linux 5250 emulation

The 5250 emulator provides function equivalent to an IBM 5250 terminal. The emulator also provides extended 5250 terminal functions similar to those provided by the PC/5250 emulator.

The emulator supports the following functions:

- Customizable multi-session support (up to 99)
- Customizable menu bar/pull downs
- Scalable fonts
- Maximize window support
- Remember initial window placement and font
- Saving a desktop file for window placement and font if initial geometry is not defined.
- On-line help
- Keyboard remapping
- Session level color mapping
- Record/playback
- User-customizable pop-up and pull down keypads
- Auto-start of playback file
- Auto-logon
- Copy/cut/paste
- 24x80 and 27x132 screen size support
- Dynamic window management for screen size changes (27x132)
- Settable 5250 display names
- Kerberos/Single Signon support
- Screen print to PostScript<sup>®</sup> printers (parallel, serial, remote)
- Monochrome, grey scale, and color image/fax viewing and printing; 3489 emulation
- DP mode (normal 5250 mode) support of primary and foreground color extended attributes
- Easily changed Enter/Field Exit key locations
- Customizable automatic Help key on operator error
- Fixed hot spots
- Hot spot highlighting option
- Cursor style options: block/underscore and blink/no blink
- Rule line
- Row/column indicator
- Shift and Caps Lock indicators
- Customizable window title
- Column separator customization
- Type-ahead customization
- Session ID to identify a session (similar to PCOMM session short name)
- Automatic, customizable, communication error recovery
- Auto-disconnect option after specified inactivity time

**Note:** By default, the System i Access for Linux 5250 emulator shares the same process for multiple sessions used on a Linux client, defined as a system with a single Linux user, using one Linux userid. To enable multiple users or thin clients, use the `ibm5250 -STAND_ALONE` command line option. This option allows multiple thin clients, Virtual Network Computing (VNC), and Linux Terminal Server Project (LSTP) users to easily use the 5250 emulator.

For information on using the 5250 emulator with the System i Access for Linux product, see the following topics:

## Prerequisites for using 5250 emulation

You must meet the following prerequisite requirements to use the System i Access for Linux 5250 emulator.

- System i Access: The 5250 Emulator is designed to be Linux distribution independent. The dependencies on the Linux distribution are glibc 2.2 and openmotif 2.\*. The distribution must also support installing an rpm created with rpm 3.0.
- For version 1.10, monospaced fixed width 75 dpi fonts are required and should be included by default when you install X. To get more font choices, install 100 dpi fonts. For prior versions, 75 and 100 dpi fonts are required to be installed and configured for scalability.
- Using the System i Access for Linux 5250 emulator requires the System i Access Family (5761- XW1) license. One 5761-XW1 user license is used for each unique client or userid on the System i connection. One userid might start multiple emulator sessions to the same system, with only one 5761-XW1 license. You can use either the command line option or a global preference (`setup5250`) to configure the userid and password on a connection. The configuration values, from the one that you choose, are used to obtain the 5761-XW1 license. If both global values and connection command line values are configured, command line values take precedence.

### Related tasks

“Install System i Access for Linux” on page 3

Follow these steps to install the System i Access for Linux product.

## Configure 5250 emulation

You can configure the 5250 emulator installed with System i Access for Linux RPM.

You can configure the 5250 emulator in several ways. The `setup5250` program is a graphical interface to create, edit, save, and launch 5250 emulator sessions. Select from the following for additional information on configuring your emulator:

### Command line emulator options

There are command line options for System i Access for Linux 5250 emulator.

The format of the command line to invoke a 5250 emulator session is:

```
ibm5250 System_i_name optional_parameters
```

where:

- `ibm5250` is the application name and is case sensitive.
- `System_i_name` specifies the name of the system with which the 5250 emulation session communicates. The name is a host name or an IP address. The user is prompted when this field is not specified.
- `optional_parameters` specifies optional parameters.

The two main command line entries for configuring the System i Access for Linux emulator are:

1. **ibm5250** - This application invokes the 5250 emulator and displays a graphical user interface (GUI) for entering the system name, userid, and password. This information is used to obtain a 5761-XW1 license and initiate a 5250 session. Type **ibm5250 --help** to see command line options.

2. **setup5250** - This is the setup program that is used to configure global values that are applied to all 5250 sessions, userid's, and multiple connections. Once the initial 5250 program is started, reference the online help text for additional configuration options. The setup5250 program also allows for the creation and launching of customized ibm5250 sessions.

You can use the following case sensitive, optional parameters on the 5250 command line:

- **-title** Case sensitive title text follows this parameter. If the title text contains a space, the title text must be within double quotes. The title text is displayed in the 5250 session window overriding the 5250 window title text resource value. Title text is truncated if longer than thirty characters. When the 5250 session dialogue (menu pull down) is used to start another 5250 session, the same title is used.
- **-TITLE\_OPTION** is followed by one of the following: **TEXT\_AND\_SESSION\_ID** (default), **TEXT\_ONLY**, **SESSION\_ID\_ONLY**, **TEXT\_HOST\_AND\_SESSIONID**, or **TEXT\_AND\_HOST**.
- **-wide** Either *enable* or *disable* should follow and are case sensitive. This parameter enables or disables 27x132 support. The default is *enable*.
- **-image** Either *enable* or *disable* should follow and are case sensitive. This parameter enables or disables image/fax viewing. The default is *enable*.
- **-LARGEST\_IMAGE** A 3 or 4 digit numeric parameter follows which indicates the maximum source image/fax size which is displayed. The parameter indicates the number of thousands of bytes that are accepted. The 5250 emulator has a default value of 400, displaying an image or fax up to 400,000 bytes in size. This parameter is undocumented in help text.
- **-LANGID** A 5 digit parameter follows which contains the locale that is used. The **-LANGID** overrides the Linux environment variable **\$LANG** and determines the conversions that are used on the i5/OS data stream. The emulator window decorations are determined by the **\$LANG** or **-LANGID** value of the first emulator session that is started.
- **-geometry** Window width, window height, x offset, and y offset follow (**WWxWH+Xoffset+Yoffset**). The 5250 window is placed according to these values. The window size parameters are adjusted as necessary to fit the font that fills the window. **-geometry 9999x9999+0+0** provides the maximized window, using the largest font that fits a particular monitor resolution.
- **-p Playback** or **-PLAYBACK** A case sensitive file name of a 5250 playback file follows. This function enables autologon so users are not required to reenter their userid's and passwords. This function also enables starting a playback file, which allows users to display a specific System i screen. The playback file is from the user's playback directory or a default playback file.
- **-keypad** or **-KEYPAD** Use this parameter to start a popup keypad window when the 5250 emulator session starts. A case sensitive popup keypad file name follows. Specify multiple **-keypad** command line options to start multiple popup keypad windows. The keypad file is from your keypad directory or from the default keypad file.
- **-KEYFILE** Use this parameter to specify a user-named keyboard remapping file that is used for the 5250 emulator session. A case sensitive keyboard remapping file name follows, including the keyboard type file extension.
- **-DISPLAY\_NAME** is followed by one parameter. The following rules apply to i5/OS 5250 session names:
  - Each active 5250 session must have a unique session name.
  - The first character must be an alpha character.
  - All characters must be alpha, numeric, a period, or an underscore.
  - All alpha characters must be upper case.
  - Session names must be 2 to 10 characters in length.
- **-SESSION\_ID** is followed by an ID for the 5250 session. The session ID text is upper or lower case and up to 20 characters in length. If there is a space in the session ID text, the session ID text must be enclosed within double quotes.

**Note:** **+n** is also supported where **n** is a numeric digit between 1 and 99. No spaces are allowed between the text and **+n**.

- -EURO, -Euro, -euro, and -NOEURO specify whether or not the European monetary symbol is used. This command line option is ignored for languages that do not support the Euro symbol.
- -port or -PORT allows a 5250 session to use a port number other than the default. For non-SSL telnet, the default port number is 23. A 1 to 4 digit port number follows the command line option.
- -INACTIVITY is followed by a numeric parameter from 0 to 9999. This option specifies whether the telnet connection is disconnected or reconnected, after a specified time of inactivity. The default value is 0 which indicates that inactivity is not monitored.
- -BLOCK\_COPY specifies that the 5250 emulator defaults to block copy, as opposed to linear copy, when marking an area for copy or cut. Block copy occurs by a double click of the mouse button while linear copy means pressing and dragging the primary mouse button to mark the desired area. If this option is not specified, linear copy is the default.
- -NO\_COPY\_PASTE specifies that the emulator does not allow copy, cut, or paste into or out of the emulator session.
- -SESSION\_COPY\_PASTE\_ONLY specifies that the 5250 emulator only allows copy, cut, and paste within the emulator session.
- -COPY\_PASTE specifies the emulator allows copy, cut, and paste into and out of the emulator session.
- -BROWSER\_START specifies that the emulator code recognize a URL hot spot. This option defaults to unavailable because not all users have browser access. If this option is specified and the user clicks on a valid URL hot spot, the command specified in the system environment variable \$BROWSER is called with the URL passed as an option. The user must define the system variable \$BROWSER as the browser name that is used. A fully qualified name or a name found in the system path is specified. If the environment variable is not found or is not valid, a browser is not started.
- -RETRY\_COUNT specifies whether to try to reconnect if a communication error occurs and the 5250 session is disconnected. A numeric parameter follows with a value between 0 and 9999. Zero indicates that any reconnect is attempted manually. One to 9999 indicates the number of automatic retries that are attempted. The default is 144.
- -RETRY\_INTERVAL specifies the automatic retry count in seconds. A numeric parameter follows with a value from 1 to 9999; the default value is 300 (5 minutes).
- -NO\_DESKTOP\_FILE The emulator supports reading and writing a desktop file to remember the user's last window location and font size. This option disables the ability to read and write the desktop file.
- -debug or -DEBUG displays verbose messaging while the emulator runs.
- -trace or -TRACE traces Telnet activity between the emulator and i5/OS host.
- -sso or -SSO bypasses the signon screen.
- -kerberos authentication used for getting a license and bypassing signon when used with the -sso parameter.
- -IBMCURLIB specifies the current library when used with the -sso parameter.
- -IBMIMENU specifies the initial menu when used with the -sso parameter.
- -IBMPROGRAM specifies the initial program when used with the -sso parameter.

## **X resources for the System i Access for Linux emulator**

Use X resources to configure System i Access for Linux 5250 emulation.

The primary method to configure the Emulator is with X resources. There is command line support for a subset of the X resources. Values passed in on the command line take precedence over values set as X resources. For information on using the emulator X resources, see the following:

### **Color mapping:**

The color mapping program supports 8, 16, and 24 bit color systems.

The basic color mapping program defines up to 10 different colors for each of the five default basic color schemes; all but two of the basic scheme colors (wheat background and light blue background) come

from the WEB color palette. The advanced color mapping program can define up to 22 unique colors for each session. Access to the color mapping program is controlled with a resource. See the following for valid resource values:

**advanced**

The user is allowed to remap their colors for 5250 emulation sessions. The user can use either basic color mapping or use advanced color mapping.

**basic** The user is allowed to use the basic portion of the colormapper program. Basic is the default resource setting. Basic color mapping allows the user to choose between five basic background and foreground color schemes.

**disable**

The user is not allowed to change the colors of the emulation sessions. The color map menu item in the Option menu is grayed out and can not be selected.

**disable\_and\_hide**

The user is not allowed to change the colors of their emulation sessions. The pull down menu is not displayed in the Option menu.

Each emulation session has a session name, determined at 5250 session initialization. The session name contains the name of the host that the session is connected to and a session number into that host (1-99). The session name enables the user to use multiple color maps for multiple 5250 emulation sessions.

Basic color mapping allows you to choose from the following default color schemes:

- black background
- light grey background
- dark grey background
- light background
- light blue background

Advanced color mapping allows the user to control the color of the following individual components of an emulator session (default color listed in parentheses):

1. 5250 menu bar foreground (black)
2. 5250 menu bar background (grey)
3. 5250 window background (black)
4. 5250 pushbutton background (dark grey)
5. 5250 blue text (blue)
6. 5250 green text (green)
7. 5250 pink text (pink)
8. 5250 red text (red)
9. 5250 turquoise text (turquoise)
10. 5250 white text (white)
11. 5250 yellow text (yellow)
12. 5250 cursor color (white)
13. 5250 mouse color (white)
14. 5250 rule line color (blue)
15. 5250 status line foreground (turquoise)
16. 5250 status line background (black)
17. 5250 monochrome image foreground (black)
18. 5250 monochrome image background (white)
19. Assist programs window background (grey)

20. Assist programs group box background (light grey)
21. Assist programs scrollable list/entry field background (off white)
22. Assist programs foreground (black)

If you create a new advanced color scheme and want to save the changes, the you will be prompted for a name of the color scheme. The color scheme name will be displayed when using basic color mapping. Blanks are allowed in the color map name.

A saved color map file immediately applies to the 5250 session the color mapping program was started from. Other emulator sessions must be exited and restarted to pick up the new colors.

### **Image/fax (3849 emulation):**

5250 monochrome image/fax viewing and printing to PostScript printers is supported. 5250 color and grey scale JPEG and TIFF image viewing and printing is supported. Color PCX is supported.

A resource entry controls 5250 image/fax; the resource values are:

**enable** Allows you to display image/fax. Enable is the default resource value.

#### **disable**

Does not allow you to display image and fax.

5250 emulator image/fax supports the following:

- image/fax formats
- scrolling
- scaling
- rotation
- reverse
- trim magnify scaling

The maximum image/fax size is dynamic based on the following:

- The default size is 400,000 bytes of source (compressed) image/fax. The command line parameter `LARGEST_IMAGE` can increase or decrease the size of the maximum image/fax.
- The available memory of the system.
- The largest image/fax that the 3489 can display is 128K bytes. Applications may not send more than that to the emulator.

Image/fax printing is supported to PostScript printers.

### **Keyboard remapping:**

The 5250 emulator includes a GUI keyboard remapping program for 5250 sessions.

Each 5250 session has a session name determined at 5250 session startup time. The session name contains the name of the System i partition for the session and a 5250 session number (1-99). The session name enables the user to use multiple keyboard maps for multiple 5250 emulation sessions.

The maximum file name length for a keyboard map file is 32 characters. Blanks are allowed in the name.

The saved keyboard map immediately applies to the 5250 session that was used to start the keyboard mapping program. Other emulator sessions must be exited and restarted to pick up the new keyboard map.

The keyboard map may be printed.

### **Miscellaneous preferences:**

Launch the miscellaneous preferences menu through a pull down menu item under the Option menu. A resource entry controls the availability or unavailability of the miscellaneous preferences menu item.

Valid values for the reference are as follows:

**enable** Allows you to use 5250 miscellaneous preferences. Enable is the default value.

#### **disable\_and\_hide**

Does not allow you to use the 5250 miscellaneous preferences program and the menu item is not displayed.

At 5250 session initialization, the emulator checks to see if there is a Miscellaneous file in the user's directory (\$HOME/.iSeriesAccess/ibm\_5250 ). If the file is not found, the internal defaults are used. The 5250 miscellaneous preferences are as follows:

- Cursor Style
- Cursor Blink
- Enter/Field Exit key locations
- Print key location
- Destructive Backspace key
- Hot spots
- Hot spots highlighting
- Paste start location
- Auto Help for operator error
- Operator error reset
- Keyboard buffering
- Large screen behavior
- Row column indicator
- Rule line key
- Rule line style
- Blue underscore

When a preference is modified, the change is temporarily applied to all 5250 sessions.

### **Popup/pull down keypads:**

You can create keypads.

Valid resource values for the keypad resource entry are as follows:

**enable** Allows you to create, change, and user keypads. The default resource value is enable.

#### **keypad\_only**

Allows you to use, but not create or change keypads. The keypad customization pull down choice is not displayed.

#### **disable\_and\_hide**

Does not allow you to use keypads. The two pull down keypad choices are not displayed.

The default keypad resource IBM5250\*KeyPadPath: is typically followed by one or more full paths (directory and file name) to default keypad files. Multiple paths are separated by a comma. If the resource is followed by the character "0", there is no default keypad file for the user.

Each popup window has the following:

- A title that is a portion of the 5250 session title: the OS400 partition name or IP address and the session number. The window title is useful to tie the popup keypad window to the launching 5250 session window.
- Customized buttons that perform a keyboard action or playback file. You control the size and layout of the keypad buttons: for example, 1x4, 6x1, or 4x4. All keypad buttons are the same size.

The Customize Keypad program allows you to specify that the keypad functions should be available through a keypad pull down instead of a popup keypad window. If you select this choice, a Keypad menu bar choice is included in the main 5250 window. If you have:

- one pull down keypad file, selecting Keypad lists the buttons text as pull down choices.
- multiple pull down keypad files, selecting Keypad lists the pull down keypad files; select a keypad file displays a drop-down list with the button text as drop-down list choices.
- no pull down keypad files, the Keypad menu bar choice is not displayed.

If you have a keypad file, a dialogue box asks the user to select an existing keypad to change or create a new keypad. The customize keypad window allows you to do the following:

- Define keypad buttons: including button text and keypad actions or a playback file associated with the button. You can edit the keypad action areas. A list of keyboard actions and playback files are available for you to select.
- Change an Existing keypad button.
- Delete an existing keypad button.
- Move keypad buttons.
- Specify if the keypad is a popup keypad or pull down keypad.
- Set the row/column dimensions of a popup keypad window.
- Set the size of each button in a popup keypad window.
- A save pushbutton that allows the user to save this popup keypad. The user gives the keypad a file name. The maximum length of the file name is 32 characters and can contain blanks.
- A cancel pushbutton that cancels the customize window.
- A help pushbutton that launches popup keypad help text.
- Also, a separate keypad window shows the keypad under construction. For a pull down keypad, the keypad window is shown as one column wide.

Popup keypad windows will use the same foreground/background colors as the 5250 emulator menu bar of the session that launched the keypad window.

### **Record/playback:**

The emulator supports record/playback capability (sometimes called keyboard macros) for 5250 sessions. Any recorded sequences are stored in a file in the user's directory.

You can start recording in one of the following two ways:

- Select the Record choice from the pull down menu.
- Press the Record key

Playback sequences are the same for all 5250 emulation sessions for a given user:

- Default playback files: Each playback sequence is stored in a separate file. The default playback resource IBM5250\*PlayBackPath: is typically followed by one full path (directory and file name) or more to default playback files. Multiple paths are separated by a comma. If the resource is followed by a "0", there is no default playback file.

- When the user requests a playback, check if the playback file is in the user's playback directory:  
iSeriesAccess: \$HOME/.iSeriesAccess/ibm\_5250/P/

User accelerator keys take priority over default accelerator keys (if a match occurs).

An auto-logon playback file is specified on the startup file (-playback). The playback file is automatically started as soon as the first 5250 screen is received.

The 5250 emulator automatically pauses when the user presses a data key in a non-display entry field.

The maximum playback file size is 8K bytes.

The playback file name may contain blanks. If an accelerator key is specified, the accelerator key becomes an extension on the file name. For example if F4 is configured as an accelerator key the playback file name could be "playback file name".F4. If no accelerator key is specified, the playback file name does not have an extension.

An existing playback file can not be edited. To make changes to an existing file, a new recording needs to be done and then saved as the existing file name. The new recording will replace the previous recording.

A playback window is normally presented when playback is started. If the user selected Playback from the pull down menu or pressed the Playback key, the user selects a playback file to play. The playback window has two scrollable lists of playback files: the user's playback files and default playback files.

The record and playback program detects the following:

- Matching name found in the user's directory; user is asked to verify that this recording should overwrite the previous playback file.
- Playback requested but the default playback file not longer exists
- Accelerator key playback attempted, but no matching playback file

### Screen print:

Screen print uses the default printer environment variable. If a printer other than the default printer is desired, that printer's name needs to be typed into the displayed lpr command.

Valid resource values are as follows:

**enable** Allows you to screen print. The Print menu bar choice is displayed on the menu bar. The default value is enable.

#### **keyboard\_only\_local\_print**

The user is allowed to screen print using the Screen Print key on the keyboard. The Printer menu bar choice is not displayed to the user.

#### **disable\_and\_hide**

The user is not allowed to screen print. The Print menu bar choice is not displayed to the user and the Print Screen key is disabled.

The emulator creates a PostScript level 2 printer data stream.

User preference items include the following:

- Target printer will be the configured default system printer or the user may type another printer name.
- Portrait or landscape
- Image/fax or text print if image/ fax is on the screen
- Printer page size for image/fax printing

When the user selects the screen print, the following text formatting is done:

- Non-display date changes to blanks
- Attributes change to blanks
- Text assist characters (OV/editor) change to blanks
- ENPTUI characters change to their character equivalents
- DUP character is changed to an asterisk
- Underscore is printed:
  - Underscore is used for ASCII for underscored nulls.
  - Begin/end underscore commands are used for PostScript.
- Color, intensify (bold), reverse image, and column separators are not printed.

### **Session ID:**

The session ID can be defined by a command line option or a resource.

The session ID can be a single value; for example "Smith". A set of session IDs can be defined; for example, Smith+n where n is 3 would make 3 session IDs available, "Smith1", "Smith2", and "Smith3".

Each 5250 session has a unique session ID. If a session ID is defined, it is used. If a session ID is not defined, default session IDs are defined, "A", "B", ..., "Z", "AA", "AB", ... If a user has one or more session IDs defined and already has 5250 sessions active using those session IDs, default session IDs are defined for subsequent 5250 sessions, starting with "A".

The 5250 session ID will be used by the following:

- 5250 window title: the default window title is the window title text, a colon, and the defined session ID. If a 5250 session has a default session ID, the target host system and session number continue to be used in the 5250 window title.
- The DeskTop file stores the user's last 5250 window locations and font size. If a 5250 session has a defined session ID, this is used in the DeskTop file. If a 5250 session has a default session ID, the target host system and session number are used in the DeskTop file instead.
- The 5250 jump key can jump between all 5250 windows. The jump action can also have a session number as a parameter; for example, if jump(3) is defined as the action for a key sequence, this key sequence jumps to the third 5250 window. The jump action also allows a session ID as a parameter, for example, jump("Smith").
- Color mapping allows a color map file to be stored for a specific 5250 session. If a 5250 session has a defined session ID, the session specific color mapping file applies to that session ID.
- Keyboard mapping allows a keyboard map file to be stored for a specific 5250 session. If a 5250 session has a defined session ID, the session specific keyboard map file applies to that session ID.

## **Languages for your emulator**

Set emulator language variables for the System i Access for Linux product.

The labels and help applications in the main emulator are translated and displayed based on the \$LANG system environment variable. The command line value -LANGID is also used to set the language.

The System i Access for Linux text is stored in /opt/ibm/iSeriesAccess/mri/%locale%.

The System i Access for Linux product uses one of the locales listed in the table below to identify the language version of the system. It searches for a directory matching the entire locale, then searches for the first two characters of the locale. It defaults to the en\_US directory when a match is not found.

The setup5250 program and associated help are not translated so they always display as English text. The On-line Help and GUI are translation enabled and translated unless otherwise noted in the following table.

**Note:** Choose the link below to the Emulator Ideographic (DBCS) configuration topic collection for information specific to the ideographic language support that is provided for your System i Access for Linux emulator.

Language	Locale	Server language	Notes
Albanian	sq_SQ	2995	English only GUI and on-line help.
Bulgarian	bg_BG	2974	English only GUI and on-line help. Requires iconv patch to support Codepage 1025.
Chinese (Simplified) DBCS	zh_CN	2989	
Chinese (Traditional) DBCS	zh_TW	2987	
Croatian	sh_SH	2912	English only GUI and on-line help.
Czech	cs_CZ	2975	
Danish 2926	da_DA	2926	Partial GUI translation and English only on-line help.
Dutch (Belgium)	nl_BE	2963	
Dutch (Netherlands)	nl_NL	2923	
English	en_US	2924	
English (Belgium)	en_BE	2909	
Estonian	et_ET	2902	English only GUI and on-line help.
Finnish	fi_FI	2925	Partial GUI translation and English only on-line help.
French	fr_FR	2928	
French (Belgium)	fr_BE	2966	
French (Canada)	fr_CA	2981	
French (Switzerland)	fr_CH	2940	
German	de_DE	2929	
German (Switzerland)	de_CH	2939	
Greek	el_EL	2957	
Hungarian	hu_HU	2976	
Italian	it_IT	2932	
Italian (Switzerland)	it_CH	2942	
Japanese (Katakana) DBCS	ja_JP	2962	
Korean DBCS	ka_KR	2986	
Lao	lo_LO	2906	English only GUI and on-line help.
Latvian	lv_LV	2904	English only GUI and on-line help.
Lithuanian	lt_LT	2903	English only GUI and on-line help.
Macedonian	mk_MK	2913	English only GUI and on-line help.
Norwegian	no_NO	2933	Partial GUI translation and English only on-line help.
Polish	pl_PL	2978	English only GUI and on-line help.

Language	Locale	Server language	Notes
Portuguese	pt_PT	2922	Partial GUI translation and English only on-line help.
Portuguese (Brazil)	pt_BR	2980	
Romanian	ro_RO	2992	English only GUI and on-line help.
Russian	ru_RU	2979	Requires iconv patch to support Codepage 1025.
Serbian	sr_SR	2914	English only GUI and on-line help.
Slovakian	sk_SK	2994	
Slovenian	sl_SL	2911	English only GUI and on-line help.
Spanish	es_ES	2931	
Swedish	sv_SE	2937	Partial GUI translation and English only on-line help.
Turkish	tr_TR	2956	English only GUI and on-line help.

### Related reference

“Emulator Ideographic (DBCS) configuration”

Requirements are identified for Double-Byte Character Set (DBCS) language support when using the System i Access for Linux emulator.

## Emulator Ideographic (DBCS) configuration

Requirements are identified for Double-Byte Character Set (DBCS) language support when using the System i Access for Linux emulator.

Input methods are used to input characters that are not found on the keyboard. Languages that require more characters than the keyboard contains must use an Input Method Editor (IME) to compose characters. The X Input Method protocol was developed to allow the X Input Method Editors (XIME) to compose and send characters to X applications. Ideographic languages, formerly referred to as Double Byte Character Set (DBCS) languages, require an IME that is XIM compliant when using ibm5250 to connect to ideographic locale i5/OS sessions. For more technical information on IME, XIM or XIME, choose from the list of related links below.

## IBM 5250 ideographic language (DBCS) requirements

- LANG environment variable is set to the proper locale.
- Input Method editor (IME), that is X Input Method (XIM) compliant, is installed and configured for the ideographic language (DBCS) language.
- Monospaced fonts have the proper Single Byte and Double Byte encodings for the language.
- IBM5250\*inputMethod resource is correct for the X Input Method Editor (XIME).
- The environment variable XMODIFIERS is set for the XIME.
- The IME is started before launching ibm5250.

### Related reference

“Languages for your emulator” on page 14

Set emulator language variables for the System i Access for Linux product.

### Related information

[XIM Overview](#)

[S.u.S.E. Documentation on XIM](#)

[SCIM: Smart Common Input Method](#)

[Simplified and Traditional Chinese](#)

 Japanese

 Korean

### IBM 5250 DBCS settings, values, and fonts:

Information for setting up Double-Byte Character Set (DBCS) languages in the System i Access for Linux emulator are provided.

#### The default IBM5250 XIME setting, values, and required fonts are:

- IBM5250\*inputmethod: XIME
- XMODIFIERS=@im=XIME

#### The following monospaced font sets are required:

**Note:** See the X Input Method (XIM) and Input Method Editors (IME) topic for related encodings.

- For 8x16 and 16x16 FontSet
  - (Single byte) `-*-medium-r-normal--*-*-*-*c-80`
  - (Double byte) `-*-medium-r-normal--*-*-*-*c-160`
- For 12x24 and 24x24 FontSet
  - (Single byte) `-*-medium-r-normal--*-*-*-*c-120`
  - (Double byte) `-*-medium-r-normal--*-*-*-*c-240`
- To display the available fonts: `xlsfonts -fn "FontPattern"`  
For example, use the following to display the available jisx0201.1976-0 fonts:  
`xlsfonts -fn "-*-*medium-r-normal--*-*-*-*c--jisx0201.1976-0"`

### X Input Method (XIM) and Input Method Editors (IME) and encodings:

Identify input editors that are supported for the System i Access for Linux emulator. Identify their encodings.

*Table 1. IBM 5250 is tested for only the default XIM compliant Input Method Editors listed in this table.*

Language	Simplified Chinese	Traditional Chinese	Japanese	Korean
XIME	xcin-zh_CN	xcin-zh_TW	kinput2	nabi
xx (MRI dir /opt/ibm/ iSeriesAccess/mri/xx)	zh	zh_TW	ja	ko
LANG	zh_CN	zh_TW	ja_JP	ko_KR
Font Encoding SB	iso8859-1	iso8859-1	jisx0201.1976-0	iso8859-1
Font Encoding DB	gb2312.1980-0	big5-0	jisx0208.1983-0	ksc5601.1987-0
National Lanugage Version (NLV)	2989	2987	2962	2986

### Use alternate X Input Method (XIME) with System i Access for Linux:

Follow these steps to use an alternate XIME method with the System i Access for Linux emulator.

#### Before you begin

- Follow the installation and setup instructions provided with the XIME project.
- Save for later use, the following two values from the XIME project documentation:

**Note:** Sometimes value1 and value2 are the same.

1. Value 1 - **IBM5250\*inputMethod**, the resource value
  2. Value 2 - **XMODIFIERS=@im**, the environment variable
1. Change the resource.
    - a. As root, edit `/opt/ibm/iSeriesAccess/mri/xx/ NS3270Tx.rc`, changing the default value to value1.
    - b. `IBM5250*inputmethod: value1`
  2. Change or set the environment variables using `xterm`, `kterm`, or another X terminal: (Also see Notes below.)
    - a. `export LANG=xx_XX`
    - b. `export XMODIFIERS=@im=value2`
  3. Follow the XIME project documentation to start the IME. (Also see Notes below.)
    - a. path to `XIM/Alternative_XIM`

### What to do next

#### Notes:

1. Check or edit your user files (`~/.xinitrc`, `~/.bashrc` and `~/.profile`) and global files (`/etc/X11/xinitrc`, `/etc/barshrc`, and `/etc/profile`).
2. Some distributions source `~/xim` or `~/i18n` to set the `LANG` and `XMODIFIERS` environment variables and also start the XIME.

### Example: Change X Input Method (XIME) for the Japanese language version:

Follow these steps to change XIME to use `my_IME` when using the System i Access for Linux emulator.

#### Before you begin

**Note:** The IME executable name is `/newpath/my_ime`, if the documentation for the `my_IME` project provided the following:

- `XMODIFIERS=@im=MY_IME`
- `*inputMethod: my_IME`

1. Change the resource
  - a. Switch to root. (`su -l`)
  - b. Edit this path: `/opt/ibm/iSeriesAccess/mri/ja/NS3270Tx.rc`
  - c. Change this line from `IBM5250*inputmethod: kinput2` to this `IBM5250*inputmethod: my_IME`
2. Test, from an X terminal as a regular (non-root) user:
  - a. `export LANG=ja_JP` (This command sets the `LANG` variable, if it is not already set.)
  - b. `export XMODIFIERS=@im=MY_IME` (This command sets `XMODIFIERS` to the new `MY_IME` name.)
3. Start the IME and the emulator.
  - a. `/newpath/my_ime &` (This command launches the IME GUI as a background process.)
  - b. `ibm5250 JAPANESE_HOST` (This command launches the emulator connecting to the System i hostname that is represented by `JAPANESE_HOST`.)

### Troubleshooting the X Input Method (XIME):

Follow these steps to troubleshoot XIME when using the System i Access for Linux emulator.

1. Check the XIME documentation first.
2. Test the XIME with another X application that is XIM aware or compliant.
3. Verify the required fonts are installed.

4. Verify that IBM5250\*inputmethod resource, LANG and XMODIFIERS are correct.
5. Verify the IME is started before launching ibm5250.

## Emulator resources

Find information on resources for the 5250 emulator when using the System i Access for Linux product.

Resource	Function
IBM5250*27x132: enable or disable	27x132 enable/disable
IBM5250*ColumnSeparator: enable or disable	Column separators enable/disable
IBM5250*ImageView: enable or disable	Image/fax viewing enable/disable
IBM5250*Keymap: enable, disable, or disable_and_hide	Is user allowed to remap keyboard
IBM5250*Keymap101Path	Default 101 key map file
IBM5250*Keymap102Path	Default 102 key map file
IBM5250*KeymapPath	Default key map file
IBM5250*ColorMap: advanced, basic, disable, or disable_and_hide	Is user allowed to change colors
IBM5250*DefaultColorMapPath:	Default color map file
IBM5250*ColorMapPath:	Default color schemes
IBM5250*KeyPad: enable, disable, or disable_and_hide	Is the keypad function available
IBM5250*KeyPadPath	Default keypad files
IBM5250*PlayBack: enable, disable, or disable_and_hide	Are record and playback available
IBM5250*MiscPref: enable, disable, or disable_and_hide	Is Miscellaneous preferences available
IBM5250*LocalPrint: enable, disable, or keyboard_only_local_print	Is screen print available
IBM5250*Control: enable or disable	Is control menu displayed
IBM5250*Edit: enable or disable	Is edit menu displayed
IBM5250*Command: enable or disable	Is command menu displayed
IBM5250*Option: enable or disable	Is option menu displayed
IBM5250*Help: enable or disable	Is help menu displayed
IBM5250*FontMenu: enable, disable, or disable_no_resize_or_move	Is font menu list displayed
IBM5250*ChangeIPAddress: enable or disable	Can user change IP address for New 5250 session
IBM5250*BrowserStart: enable or disable	Hot spot browser start allowed
IBM5250*CORSOR_BLINK: ENABLE or DISABLE	Cursor blink
IBM5250*CORSOR_STYLE: BLOCK_INSERT_UNDERSCORE_REPLACE, UNDERSCORE_INSERT_BLOCK_REPLACE, BLOCK, or UNDERSCORE	Cursor style
IBM5250*DESTRUCTIVE_BACKSPACE: ENABLE or DISABLE	Destructive backspace
IBM5250*ENTER_KEY: USE_DEFAULT, ENTER_ENTER_AND_RIGHT_CTRL_NEWLINE, ENTER_NEWLINE_AND_RIGHT_CTRL_ENTER, ENTER_ENTER_AND_RIGHT_CTRL_FIELD_EXIT, or ENTER_FIELD_EXIT_AND_RIGHT_CTRL_ENTER	Enter/New Line/Field Exit
IBM5250*ERROR_RESET_KEYS: RESET, CURSOR_MOVEMENT_ALSO,or MOST_KEYS	Error reset keys

Resource	Function
IBM5250*KEYBOARD_BUFFERING: ENABLE, DISABLE, or USE_AS400_SETTING	Keyboard buffering
IBM5250*HOTSPOTS: DISABLE, ENABLE, SINGLE_CLICK, or DOUBLE_CLICK	Hotspots
IBM5250*HOTSPOT_HIGHLIGHTING: ENABLE or DISABLE	Hot spot highlighting
IBM5250*INPUT_ONLY_CURSOR_MOVEMENT: ENABLE or DISABLE	Input only cursor movement
IBM5250*INSERT_MODE: DEFAULT_OFF_AUTOMATIC RESET, DEFAULT_OFF_NO_AUTOMATIC RESET, or DEFAULT_ON_NO_AUTOMATIC_RESET	Insert mode
IBM5250*PASTE_LOCATION: AT_CURSOR or AT_MOUSE_POINTER	Paste location
IBM5250*PRINT_KEY: USE_DEFAULT, PRINT_IS_SCREEN_PRINT, or SHIFTED_PRINT_IS_SCREEN_PRINT	Print key
IBM5250*ROW_COLUMN_INDICATOR: ENABLE or DISABLE	Row column indicator
IBM5250*RULE_LINE: ENABLE_KEY_FOLLOW_CURSOR, ENABLE_KEY_FIXED, ENABLE_FOLLOW_CURSOR, or DISABLE	Rule Line
IBM5250*RULE_LINE_STYLE: BOTH or VERITCAL	Rule line style
IBM5250*AUTOMATIC_HELP: ENABLE or DISABLE	Automatic help on operator error
IBM5250*BLUE_UNDERSCORE: ENABLE or DISABLE	Blue underscore
IBM5250*LARGE_SCREEN_BEHAVIOR: USE_LAST_FONT, MOVE_WINDOW_AND_REDUCE_FONT_IF_NEEDED, REDUCE_FONT_ONLY, or REDUCE_FONT_AND_MOVE_WINDOW_IF_NEEDED	Large screen (27x132) behavior
IBM5250*COPY_PASTE_ACCESS: ENABLE or DISABLE	Copy paste access
IBM5250*DEFAULT_COPY_TYPE: LINEAR or BLOCK	Default copy type
IBM5250*DESKTOP_FUNCTION: ENABLE or DISABLE	Desktop file write allowed
IBM5250*SESSION_ID: 20 characters within double quotes, or 18 or 19 characters in double quotes with +n	Session ID
IBM5250*STAND_ALONE: True or False, emulator will not attach itself to another emulator session. Default value False.	
IBM5250*BYPASSIGNON: Bypass the signon screen. Default value False	
IBM5250*KERBEROS: True or False, use Kerberos to get a licence and when IBM5250*BYPASSIGNON = True, logon to host using Kerberos.	
IBM5250*IBMCURLIB: STRING, specify current host library. IBM5250*BYPASSIGNON must be True.	
IBM5250*IBMIMENU: STRING, specify initial host menu. IBM5250*BYPASSIGNON must be True.	
IBM5250*IBMCURLIB: STRING, specify initial program to run on the host. IBM5250*BYPASSIGNON must be True.	

## Troubleshoot 5250 emulation

Use this information to help you understand, isolate, and resolve problems with your 5250 emulator when using the System i Access for Linux product.

### 5250 problem isolation

Use this information to isolate problems with your 5250 emulator.

### Communications

Use the `cwbping` program to verify the System i connection with the Linux workstations and to verify that the host servers are started.

### Tracing and Logging

Once you verify your connection to the system, see the following trace files for problem isolation:

- **History log.** The history log shows high-level communication, security and data conversion error messages. The History log is activated using the `cwbttrc` program.
- **Detail trace.** The detail trace shows low-level driver information and is intended for use in reporting problems to IBM. Detail trace is activated using the `cwbttrc` program.
- **Service information collection tool.** The service information collection tool is intended for use in reporting problems to IBM. The service information collection tool is activated using the `cwbmedic` program.
- **ibm5250.** Adding the `-debug` flag to the `ibm5250` command line shows detailed information for the emulator.
- **ibm5250.** Adding the `-trace` flag to the `ibm5250` command line traces the telnet activity between the emulator and the System i host.

#### Related reference

“Command line emulator options” on page 6

There are command line options for System i Access for Linux 5250 emulator.

“CWBMEDIC - Service information collection tool” on page 39

Use this command to gather service information for IBM.

“CWBPING - Test the connection to the server” on page 40

Use this command from a console prompt to determine if a System i connection can be successfully established, or to help determine the cause of a connection failure.

“CWBTRC - Trace System i Access for Linux” on page 42

Use this command from a console prompt to configure tracing.

### Font problems

There are some possible resolutions to font problems with the 5250 emulator when using the System i Access for Linux product.

**Note:** Troubleshooting applies to versions 1.8 and earlier.

To troubleshoot font problems use the following XFree86 utilities:

**`xfd -fn fontname`**

Use this utility to display the font.

**`xlsfonts`**

Use this to get a list of all available fonts from the font server.

**`xlsfonts -fn pattern`**

Use this to get a list of pattern available fonts from the font server.

## Emulator will not start, font error indicated.

The emulator uses scalable 75 and 100 dpi fonts. If scalable fonts are not found an attempt to use a fixed font is made. Even if a fixed font is found and used, for proper full screen and size support, the X server should be configured to use scalable fonts.

For version 1.10, the emulator will run with the following:

- 75 dpi only installed (unscaled). An informational message is displayed on the command line screen informing the user that 100 dpi fonts are not installed. More font choices are available by installing the 100 dpi fonts.
- 100 and 75 dpi fonts installed (unscaled). An informational message is displayed on the command line screen informing the user that scalable fonts are not installed. More font choices are available by installing and configuring the scalable fonts.
- 100 and 75 dpi scaled fonts. No message is displayed.

The error returned should look similar to one of the following example messages:

•

```
"*****Check your /etc/X11/XF86Config file*****  
-b&h-lucidiatypewriter-medium-r-normal-sans-0-* scalable fonts are not available.  
*****Using fixed fonts*****.
```

•

```
Check your /etc/X11/XF86Config file.  
-b&h-lucidiatypewriter-medium-r-normal-sans-* fixed and scalable fonts are not available.  
Session not starting.
```

For either of the above messages, 75 and 100 dpi fonts need to be made available. The default font server is configured usually in one of the following two ways:

- The X configuration file

The global XFree86Config or xorg.conf file is located in the /etc or /etc/X11 directories. You may also have .XF86Config or .XF86Config-4 (user config version) in your home directory.

If the following is in the X configuration file, the font server is configured here and is not configured to use 75 and 100 dpi scaled fonts.

```
FontPath "/usr/X11R6/lib/X11/fonts/75dpi:unscaled"  
FontPath "/usr/X11R6/lib/X11/fonts/100dpi:unscaled"
```

To enable 75 and 100 dpi scalable fonts, remove :unscaled from the above two lines.

- Font server (xfs) config file

If the XF86Config file contains a single line similar to the following, then look for the file config in /etc/X11/fs directory:

```
FontPath "unix/:7100"
```

Similar to the steps above find the lines and remove the :unscaled from the lines for 75 and 100 dpi fonts. For example change:

```
catalogue = /usr/X11R6/lib/X11/fonts/korean,  
/usr/X11R6/lib/X11/fonts/misc:unscaled,  
/usr/X11R6/lib/X11/fonts/75dpi:unscaled,  
/usr/X11R6/lib/X11/fonts/100dpi:unscaled,
```

to look like this:

```
catalogue = /usr/X11R6/lib/X11/fonts/korean,  
/usr/X11R6/lib/X11/fonts/misc:unscaled,  
/usr/X11R6/lib/X11/fonts/75dpi,  
/usr/X11R6/lib/X11/fonts/100dpi,
```

## System i Access for Linux 5250 emulation FAQs

Find frequently asked questions about System i Access for Linux 5250 emulation.

### Can I have multiple users on a single Linux client?

By default, the System i Access for Linux 5250 emulator shares the same process for multiple sessions used on a Linux client, defined as a system with a single Linux user, using one Linux userid. To enable multiple users or thin clients, use the **ibm5250 -STAND\_ALONE** command line option. This option allows multiple thin clients, Virtual Network Computing (VNC), and Linux Terminal Server Project (LSTP) users to easily use the 5250 emulator.

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## System i Access for Linux Open Database Connectivity

The following contain information on using Open Database Connectivity (ODBC) with the System i Access for Linux product.

### Related information



System i Access for Windows ODBC

Version and release changes in the ODBC driver behavior

### Prerequisites for using ODBC

You must meet the following prerequisites to use ODBC with the System i Access for Linux product.

There are only two requirements for using the ODBC driver on your Linux client:

- The System i Access for Linux product must be installed.
- unixODBC driver manager must be installed.

### ODBC language considerations

The ODBC Driver included with the System i Access for Linux product handles many types of data conversions.

The character code page conversions involve using conversion tables and the `iconv` interfaces. Some of the conversion tables are shipped with the driver, others are downloaded from the server when needed. `iconv` is a library shipped with Linux that also handles character data conversions.

### Coded Character Set Identifiers (CCSID)

The ODBC Driver included with the System i Access for Linux product uses a pair (to and from) of Coded Character Set Identifiers (CCSID) to convert character data. The conversion uses a conversion table or the `iconv` interfaces.

### Conversion Tables

Conversion tables are stored in `/opt/ibm/iSeriesAccess/conv_tables` and use the following naming convention:

```
<4 byte hex number of FROM CCSID><4 byte hex number of TO CCSID>.tbl
```

For example, the conversation table for 819 to 500 is `033301f4.tbl`.

Many conversion tables are shipped with the iSeries® Access ODBC Driver. Additional conversion tables are downloaded from the server when they are needed. You can also download conversion tables using the `CWBNLTBL` utility.

## ODBC Application Character Set

The ODBC application character set is defined by the current locale's character set. To find out the current locale, use the following command:

```
locale
```

To find out the current mapping between the current locale's character set and the CCSID that is used, use the following command:

```
/opt/ibm/iSeriesAccess/bin/cwbntbl
```

## Overriding the Character Set CCSID Mappings

To change or the add character set CCSID mapping, add the following lines to the \$HOME/.iSeriesAccess/cwb\_userprefs.ini configuration file.

```
[CWB_CURRUSER\Software\IBM\Client Access Express\CurrentVersion\NLS] CCSID-  
CODESET=attr_str:939,IBM939,819,IBM819
```

The above example creates mappings for CCSID 939 to character set "IBM939" and for CCSID 819 to character set "IBM819".

## List of Available Locales

To list the available locales, use the following command:

```
locale -a
```

## List of Available Iconv Character Sets

To list the available iconv character sets, use the following command:

```
iconv -l
```

## How to Investigate Conversion Problems

Most conversion problems are logged in the History Log. To turn on history logging, use the following command:

```
/opt/ibm/iSeriesAccess/bin/cwbtrc /hl:1
```

(Refer to CWBTRC for more about the trace utility.)

The history log output is in \$HOME/.iSeriesAccess/cwbhistory-<application name-"\$HOME/.iSeriesAccess/cwbhistory".csv. Use either a text editor or a spread sheet to view the contents of the history log.

## Restrictions when using ODBC with the System i Access for Linux product

Learn about restrictions for using the ODBC driver with the System i Access for Linux product.

The following table describes the System i Access for Linux restrictions when using ODBC.

*Table 2. ODBC restrictions.*

Restriction	Reason
MTS is not supported.	This depends on Microsoft Windows-specific components which are not available on Linux. <b>Note:</b> Open XA Transaction API's are supported.

Table 2. ODBC restrictions. (continued)

Restriction	Reason
APIs that display a graphical user interface are not supported.	The API call completes but displaying the GUI fails.
Translation DLLs	Translation DLLs are not currently supported. Attempts to use them are ignored.
DSN connection option for user ID /password prompting via a sign-on dialog is not supported.	Graphical user interfaces are not ported to Linux.
DSN option for customizing package settings for an application is not supported.	Only the simple implementation of package settings is ported to Linux.
See Unsupported Connection String Keywords for other DSN options that are not supported in Linux.	These keywords correspond with options that are not supported.
Secure Sockets Layer (SSL) component	The SSL component is not included with the System i Access for Linux product. You can use a common SSL tunnel or Socks server.
Connection Timeout	The connection timeout option is not supported with the Linux driver.

## Configure an ODBC data source

Use this information to configure an ODBC data source.

Choose a method to configure a data source:

### Use GUI to configure an ODBC data source

Use the ODBC data source GUI to create and configure a data source.

#### About this task

The following instructions describe how to set required and frequently used options to create and configure your ODBC data source, using the ODBC data source graphical user interface(GUI).

1. Open the Data Source Administrator that comes with the unixODBC driver manager by typing the following at the command prompt:
  - `ODBCConfig`
2. Decide the type of data source name (DSN) to create.
  - A user data source is only accessible by the user who creates it.
  - A system data source is created using root authority but is accessible by any user on server.
3. Choose one of the following:
  - Click **Add...** to create a new data source, then continue with the next step.
  - Click **Configure...** to configure a data source that already exists, then go to step 5.
4. Select an ODBC driver from this screen, exercising caution to avoid the **Add**, **Remove**, and **Configure** buttons, which apply to adding, removing, or configuring a driver. If you accidentally click one of these buttons, close the window and repeat this step.
  - Click **System i Access ODBC Driver**.
  - Click **OK**.
  - Optionally resize the window that is displayed.
5. Set the required and optional fields.
  - Fill in the required Name field with your data source name.
  - Fill in the required System field with your system name.

- Complete other optional fields on the GUI. Manually configure any connection options that are not supported on the GUI, however, see Connection String Keywords and Values and manual configuration information before manually configuring connection options.
6. Click the check mark in the upper-left corner of the window to save the configuration.

## Results

### Manually configure an ODBC data source

Learn how to manually configure data source options that can not be set on the GUI.

#### About this task

The ODBC data source graphical user interface(GUI) contains a subset of the most commonly used connection options. Additional connection options are specified by the connecting application or by editing the `.odbc.ini` file.

It is strongly recommended that you reference the Connection string keywords topic before manually configuring connection options.

Use the following steps to add connection options to the `.odbc.ini` file:

1. Open the `.odbc.ini` file on your workstation using a text editor.
  - For user data sources, this file is in the root directory of the user who created the data source. For example, the file for user `"exampleUser"` is `/home/exampleUser/.odbc.ini`.
  - For system data sources, `.odbc.ini` is located in `/etc/odbc.ini` or `/usr/local/etc/odbc.ini` depending on how you installed the unixODBC driver manager.
2. If there are multiple ODBC data sources in the `.odbc.ini` file, locate the section in the file that contains the data source, that is the target for the additional connection options you are configuring.
3. Add a new row after the last entry in the data source and enter the new connection option and its value.
  - The syntax is `keyword = value`.
  - For example, if you want to change the date format from its default of 5 (yyyy-mm-dd or \*ISO), to 1 (mm/dd/yy or \*MDY), you would add `DFT = 1` in the new row.
4. Repeat step 3 to add additional connection options to the data source.
5. Save the `.odbc.ini` file.

## Results

```
[System i DSN]
Description = System i Access ODBC Driver DSN for i5/OS
Driver = System i Access ODBC Driver
System = SystemiName
UserID =
Password =
Naming = 0
DefaultLibraries = QGPL
Database =
ConnectionType = 0
CommitMode = 2
ExtendedDynamic = 0
DefaultPkgLibrary = QGPL
DefaultPackage = A/DEFAULT(IBM),2,0,1,0,512
AllowDataCompression = 1
LibraryView = 0
AllowUnsupportedChar = 0
ForceTranslation = 0
Trace = 0
```

Figure 1. An example of a .odbc.ini file DSN entry

### Note:

1. Do not add multiple entries for the same connection option to the same section for a specific data source. This can lead to unpredictable behavior.
2. After manually editing the registry you can use ODBCConfig to configure your data source.

**Note:** Older versions of the unixODBC driver manager removed manually added options from the odbc.ini file when ODBCConfig was used to configure the data source. If you experience this problem, a newer version of the unixODBC driver manager is needed.

3. Options specified by the application in the connection string override any options specified in the .odbc.ini file.

### Related information

Connection string keywords

## Connection string keywords and values

The ODBC Driver included in the System i Access for Linux product has many connection string keywords that are used to change the behavior of the ODBC connection.

These same keywords and their values are also stored when an ODBC data source is configured. When an ODBC application makes a connection, any keywords specified in the connection string override the values specified in the ODBC data source.

Use the following links for more information on the different connection string keywords that are recognized by the driver:

### Diagnostic properties:

Describes keywords and descriptions for diagnostics.

Keyword	Description	Choices	Default
QAQQINILIB or QAQQINILibrary	Specifies a query options file library. When a query options file library is specified the driver will issue the command CHGQRYA passing the library name for the QRYOPTLIB parameter. The command is issued immediately after the connection is established. This option should only be used when debugging problems or when recommended by support as enabling it will adversely affect performance.	Query options file library	none
SQDIAGCODE	Specifies DB2 SQL diagnostic options to be set. Use only as directed by your technical support provider.	DB2 SQL diagnostic options	none

### Format properties:

Describes keywords and descriptions for format.

Keyword	Description	Choices	Default
DFT or DateFormat	Specifies the date format used in date literals within SQL statements.	0 = yy/ddd (*JUL) 1 = mm/dd/yy (*MDY) 2 = dd/mm/yy (*DMY) 3 = yy/mm/dd (*YMD) 4 = mm/dd/yyyy (*USA) 5 = yyyy-mm-dd (*ISO) 6 = dd.mm.yyyy (*EUR) 7 = yyyy-mm-dd (*JIS)	5
DSP or DateSeparator	Specifies the date separator used in date literals within SQL statements. This property has no effect unless the DateFormat property is set to 0 (*JUL), 1 (*MDY), 2 (*DMY), or 3 (*YMD).	0 = "/" (forward slash) 1 = "-" (dash) 2 = "." (period) 3 = "," (comma) 4 = " " (blank)	1
DEC or Decimal	Specifies the decimal separator used in numeric literals within SQL statements.	0 = "." (period) 1 = "," (comma)	0
TFT or TimeFormat	Specifies the time format used in time literals within SQL statements.	0 = hh:mm:ss (*HMS) 1 = hh:mm AM/PM (*USA) 2 = hh.mm.ss (*ISO) 3 = hh.mm.ss (*EUR) 4 = hh:mm:ss (*JIS)	0

Keyword	Description	Choices	Default
TSP or TimeSeparator	Specifies the time separator used in time literals within SQL statements. This property has no effect unless the "time format" property is set to "hms".	0 = ":" (colon) 1 = "." (period) 2 = "," (comma) 3 = " " (blank)	0

### General properties:

Describes general keywords and descriptions.

Keyword	Description	Choices	Default
DSN	Specifies the name of the ODBC data source that you want to use for the connection.	Data source (DSN) name	none
DRIVER	Specifies the name of the ODBC driver that you want to use. This should not be used if the DSN property has been specified, though.	"System i Access ODBC Driver"	none
PWD or Password	Specifies the password for a System i connection.	System i password	none
SYSTEM	Specifies the name of the system on a System i connection.	System i name	none
UID or UserID	Specifies the user ID for System i connection.	System i user ID	none

### Other properties:

Describes other keywords and descriptions.

Keyword	Description	Choices	Default
ALLOWPROCCALLS	Specifies whether stored procedures can be called when the connection attribute, SQL_ATTR_ACCESS_MODE, is set to SQL_MODE_READ_ONLY.	0 = Do not allow stored procedures to be called 1 = Allow stored procedures to be called	0
DB2SQLSTATES	Specifies whether or not to return ODBC-defined SQL States or DB2 SQL States. Refer to the DB2 for i5/OS SQL Reference for more details on the DB2 SQL States. This option should be used if you have the ability to change the ODBC application's source code. If not, you should leave this option set to 0 as most applications are coded only to handle only the ODBC-defined SQL States.	0 = Return ODBC-defined SQLStates 1 = Return DB2 SQL States	0

Keyword	Description	Choices	Default
DEBUG	Specifies one or more debug options. To specify multiple debug options, add together the values for the options that you want. In most cases, you will not need to set this option.	Add the following options together that you want:  2 = Return SQL_IC_MIXED for the SQL_IDENTIFIER_CASE option of SQLGetInfo  4 = Store all SELECT statements in the package  8 = Return zero for the (SQL_MAX_QUALIFIER_NAME_LEN) option of SQLGetInfo  16 = Add positioned UPDATES / DELETES into packages  32 = Convert static cursors to dynamic cursors	0
TRUEAUTOCOMMIT	Specifies whether or not to enable a true autocommit. True autocommit means that autocommit is on and is running under a isolation level other than *NONE. By default, the driver handles autocommit by running under the server isolation level of *NONE.	0 = Do not use true autocommit  1 = Use true autocommit	0

### Package properties:

Describes keywords and descriptions for packages.

Keyword	Description	Choices	Default
DFTPKGLIB or DefaultPkgLibrary	Specifies the library for the SQL package. This property has no effect unless the XDYNAMIC property is set to 1.	Library for SQL package	"QGPL"

Keyword	Description	Choices	Default
PKG or DefaultPackage	<p>Specifies how the extended dynamic (package) support will behave. The string for this property must be in the following format: A/DEFAULT(IBM),x,0,y,z,0</p> <p>The x, y, and z are special attributes that need to be replaced with how the package is to be used. If the package does not already exist on the server, a value of 2 must be specified for the x option.</p> <p>x = Specifies whether or not to add statements to an existing SQL package. y = Specifies the action to take when SQL package errors occur. When a SQL package error occurs, the driver will return a return code based on the value of this property. z = Specifies whether or not to cache SQL packages in memory. Caching SQL packages locally reduces the amount of communication to the server in some cases.</p> <p>Note, this property has no effect unless the XDYNAMIC property is set to 1.</p>	<p>"A/DEFAULT(IBM),x,0,y,z,0"</p> <p>Values for x option: 1 = Use (Use the package, but do not put any more SQL statements into the package) 2 = Use/Add (Use the package and add new SQL statements into the package)</p> <p>Values for y option: 0 = Return error (SQL_ERROR) 1 = Return warning (SQL_SUCCESS_WITH_INFO) 2 = Return success (SQL_SUCCESS)</p> <p>Values for z option: 0 = Do not use local package caching 1 = Use PC memory to store package information</p>	"A/DEFAULT(IBM),2,0,1,0,512"
XDYNAMIC or ExtendedDynamic	<p>Specifies whether to use extended dynamic (package) support. Extended dynamic support provides a mechanism for caching dynamic SQL statements on the server. The first time a particular SQL statement is run, it is stored in a SQL package on the server. On subsequent runs of the same SQL statement, the server can skip a significant part of the processing by using information stored in the SQL package.</p>	<p>0 = Disable extended dynamic support</p> <p>1 = Enable extended dynamic support</p>	1

### Performance properties:

Describes keywords and descriptions for performance.

Keyword	Description	Choices	Default
BLOCKFETCH	Specifies whether or not internal blocking will be done on fetches of 1 row. When set, the driver will try to optimize the fetching of records when one record is requested by the application. Multiple records will be retrieved and stored by the driver for later retrieval by the application. When an application requests another row, the driver will not need to send another flow to the host database to get it. If not set, blocking will be used according to the application's ODBC settings for that particular statement.	0 = Use ODBC settings for blocking  1 = Use blocking with a fetch of 1 row	1
BLOCKSIZE or BlockSizeKB	Specifies the block size (in kilobytes) to retrieve from the server and cache on the client. This property has no effect unless the BLOCKFETCH property is 1. Larger block sizes reduce the frequency of communication to the server, and therefore may increase performance. <b>Note:</b> This property has no effect unless the XDYNAMIC property is set to 1.	1 2 4 8 16 32 64 128 256 512	32
COMPRESSION or AllowDataCompression	Specifies whether to compress data sent to and from the server. In most cases, data compression improves performance due to less data being transmitted between the driver and the server.	0 = Disable compression  1 = Enable compression	1
CONCURRENCY	Specifies whether to override the ODBC concurrency settings by opening all cursors as updateable. <b>Note:</b> In the following two cases setting this option has no effect: <ul style="list-style-type: none"> <li>• When building a SELECT SQL statement the FOR FETCH ONLY or FOR UPDATE clause can be added. If either of these clauses are present in an SQL statement the ODBC driver will honor the concurrency that is associated with the clause.</li> <li>• Catalog result sets are always read-only.</li> </ul>	0 = Use ODBC concurrency settings  1 = Open all cursors as updateable	0
LAZYCLOSE	Specifies whether to delay closing cursors until subsequent requests. This will increase overall performance by reducing the total number of requests. This option can cause problems, though, due to the cursors still holding locks on result set rows after the close request.	0 = Do not lazy close cursors  1 = Lazy close cursors	0

Keyword	Description	Choices	Default
MAXFIELDLEN or MaxFieldLength	Specifies the maximum LOB (large object) size (in kilobytes) that can be retrieved as part of a result set. Larger LOB thresholds will reduce the frequency of communication to the server, but will download more LOB data, even if it is not used. Smaller LOB thresholds may increase frequency of communication to the server, but will only download LOB data as it is needed. Note, setting this property to 0 will force locators to always be used.	0 - 2097152	15360
PREFETCH	Specifies whether to prefetch data upon executing a SELECT statement. This will increase performance when accessing the initial rows in the ResultSet.	0 = Do not prefetch data 1 = Prefetch data	0
QUERYTIMEOUT	Specifies whether the driver will disable support for the query timeout attribute, SQL_ATTR_QUERY_TIMEOUT. If disabled, SQL queries will run until they finish.	0 = Disable support for the query timeout attribute 1 = Allow the query timeout attribute to be set	1

### Server properties:

Describes keywords and descriptions for servers.

Keyword	Description	Choices	Default
CMT or CommitMode	Specifies the default transaction isolation level.	0 = Commit immediate (*NONE) 1 = Read committed (*CS) 2 = Read uncommitted (*CHG) 3 = Repeatable read (*ALL) 4 = Serializable (*RR)	2
CONNTYPE or ConnectionType	Specifies the level of database access for the connection.	0 = Read/Write (all SQL statements allowed) 1 = Read/Call (SELECT and CALL statements allowed) 2 = Read-only (SELECT statements only)	0

Keyword	Description	Choices	Default
DBQ or DefaultLibraries	Specifies the System i libraries to add to the server job's library list. The libraries are delimited by commas or spaces, and "*USRLIBL" may be used as a place holder for the server job's current library list. The library list is used for resolving unqualified stored procedure calls and finding libraries in catalog API calls. If "*USRLIBL" is not specified, then the specified libraries will replace the server job's current library list. <b>Note:</b> The first library listed in this property will also be the default library, which is used to resolve unqualified names in SQL statements. To specify no default library, a comma should be entered before any libraries.	System i libraries	"QGPL"
NAM or Naming	Specifies the naming convention used when referring to tables.	0 = "sql" (as in schema.table) 1 = "system" (as in schema/table)	0
UNICODESQL	Specifies whether or not to send Unicode SQL statements to the server. If set to 0, the driver will send EBCDIC SQL statements to the server. This option is only available when connecting to servers at V5R1 or later.	0 = Send EBCDIC SQL statements to the server 1 = Send Unicode SQL statements to the server	0

### Sort properties:

Describes keywords and descriptions for sort.

Keyword	Description	Choices	Default
LANGUAGEID	Specifies a 3-character language id to use for selection of a sort sequence. This property has no effect unless the SORTTYPE property is set to 2.	"AFR", "ARA", "BEL", "BGR", "CAT", "CHS", "CHT", "CSY", "DAN", "DES", "DEU", "ELL", "ENA", "ENB", "ENG", "ENP", "ENU", "ESP", "EST", "FAR", "FIN", "FRA", "FRB", "FRC", "FRS", "GAE", "HEB", "HRV", "HUN", "ISL", "ITA", "ITS", "JPN", "KOR", "LAO", "LVA", "LTU", "MKD", "NLB", "NLD", "NON", "NOR", "PLK", "PTB", "PTG", "RMS", "ROM", "RUS", "SKY", "SLO", "SQI", "SRB", "SRL", "SVE", "THA", "TRK", "UKR", "URD", "VIE"	"ENU"
SORTTABLE	Specifies the System i library and file name of a sort sequence table stored on the system. This property has no effect unless the SORTTYPE property is set to 3.	Qualified sort table name	none

Keyword	Description	Choices	Default
SORTTYPE or SortSequence	Specifies how the server sorts records before sending them to the client.	0 = Sort based on hexadecimal values 1 = Sort based on the setting for the server job 2 = Sort based on the language set in LANGUAGEID property 3 = Sort based on the sort sequence table set in the SORTTABLE property	0
SORTWEIGHT	Specifies how the server treats case while sorting records. This property has no effect unless the SORTTYPE property is set to 2.	0 = Shared-Weight (uppercase and lowercase characters sort as the same character) 1 = Unique-Weight (uppercase and lowercase characters sort as different characters)	0

### Translation properties:

Describes translation keywords and descriptions.

Keyword	Description	Choices	Default
ALLOWUNSCAR or AllowUnsupportedChar	Specifies whether or not to suppress error messages which occur when characters that can not be translated (because they are unsupported) are detected.	0 = Report error messages when characters can not be translated 1 = Suppress error messages when characters can not be translated	0
CCSID	Specifies a codepage to override the default client codepage setting.	Client codepage setting or 0 (use default client codepage setting)	0
GRAPHIC	This property affects the handling of the graphic (DBCS) data types of GRAPHIC, VARGRAPHIC, LONG VARGRAPHIC, and DBCLOB that have a CCSID other than Unicode (13488). This property affects two different behaviors: <ul style="list-style-type: none"> <li>whether graphic fields have their lengths reported as a character count or byte count through the SQLDescribeCol API and SQLColAttribute API with the SQL_COLUMN_LENGTH option.</li> <li>whether graphic fields are reported as a supported type in the SQLGetTypeInfo result set</li> </ul>	0 = Report character count, report as not supported 1 = Report character count, report as supported 2 = Report byte count, report as not supported 3 = Report byte count, report as supported	0
TRANSLATE or ForceTranslation	Specifies whether or not to convert binary data (CCSID 65535) to text. Setting this property to 1 makes binary fields look like character fields.	0 = Do not convert binary data to text 1 = Convert binary data to text	0

### Unsupported connection string keywords and values:

There are System i Access for Linux unsupported keywords and descriptions.

Connection string keywords are used to change the behavior of the ODBC connection. The following table lists the options that are not supported by the ODBC Driver, included with the System i Access for Linux product, but are valid for the System i Access for Windows ODBC Driver.

Unsupported keyword	Description
SIGNON	Specifies what default user ID to use, if the connection cannot be completed with the current user ID and password information.
SSL	Specifies whether a Secure Sockets Layer (SSL) connection is used to communicate with the server. SSL connections are only available when connecting to servers at V4R4 or later.
XLATEDLL or TranslationDLL	Specifies the full path name of the DLL to be used by the ODBC driver to translate the data that is passed between the ODBC driver and the server. The DLL is loaded when a connection is established.
XLATEOPT or TranslationOption	Specifies a 32-bit integer translation option that is passed to the translation DLL. This parameter is optional. The meaning of this option depends on the translation DLL that is being used. Refer to the documentation provided with the translation DLL for more information. This option is not used unless the XLATEDLL property is set.
TRACEFILENAME	Specifies the full path name to either the file or the directory in which to put the internal driver trace data into. A path name to the file should be specified if MULTTRACEFILES is set to 0. A path name to a directory should be specified if MULTTRACEFILES is set to 1. This property has no effect unless the TRACE property has option 1 set.
MULTTRACEFILES or MultipleTraceFiles	Specifies whether or not trace data from the internal driver trace will be put into multiple files. A new file will be created for each thread that the application is using. This property has no effect unless the TRACE property has option 1 set.
MAXTRACESIZE	Specifies the maximum trace size (in MB) of the internal driver trace. Specifying a value of 0 means no limit. This property has no effect unless the TRACE property has option 1 set.

## ODBC examples

Find examples of using ODBC with the System i Access for Linux product.

**Note:** By using the code examples, you agree to the terms of the “Code license and disclaimer information” on page 44.

### Example: PHP and the ODBC driver

See how the Apache Software Foundation’s web server, PHP, and the ODBC Driver included with the System i Access for Linux product can work together to access System i database data.

Instructions for setting up PHP and Apache are in the Redpiece Linux Integration with OS/400® on the IBM eServer™ iSeries Server, (SG24-6551). Read section 2.6 Three-tier application setup using PHP and Apache. Additional instructions are in index.html or index.php in the download file.

Requirements: a Linux machine running PHP under the Apache web server, the unixODBC driver manager, and the ODBC Driver included with the System i Access for Linux product. PHP must have unixODBC driver manager support compiled in.

<http://www.ibm.com/systems/i/software/access/linux/guide/phpdemo.tar>.

## Troubleshoot an System i Access for Linux ODBC

Use this information to help you understand, isolate, and resolve problems with ODBC.

### ODBC problem isolation

Use this information to isolate problems with ODBC.

## Communications

Use the cwbping program to verify the System i connection with the Linux workstations, and to verify the host servers are started.

## Tracing and Logging

Once you verify your connection to the server, there see the following trace files for problem isolation:

- **SQL log.** The unixODBC sql.log will show the input and output parameters for ODBC API calls made. The sql.log is activated using the unixODBC ODBCConfig program. From the Advanced tab, you can enable sql tracing and configure the location of the log file.
- **History log.** The history log will show high-level communication, security and data conversion error messages. The History log is activated using the cwbtrc program.
- **Detail trace.** The detail trace will show low-level driver information and is intended for use in reporting problems to IBM. Detail trace is activated using the cwbtrc program.
- **Service information collection tool.** The service information collection tool is intended for use in reporting problems to IBM. The service information collection tool is activated using the cwbmedic program.

### Related reference

“CWBMEDIC - Service information collection tool” on page 39

Use this command to gather service information for IBM.

“CWBPING - Test the connection to the server” on page 40

Use this command from a console prompt to determine if a System i connection can be successfully established, or to help determine the cause of a connection failure.

“CWBTRC - Trace System i Access for Linux” on page 42

Use this command from a console prompt to configure tracing.

## Error messages

When an error occurs, the ODBC Driver included with the System i Access for Linux product returns the SQLSTATE (an ODBC error code) and an error message. The driver obtains this information both from errors that are detected by the driver and from System i errors that are returned.

For errors that occur in the data source, the ODBC Driver, included with the System i Access for Linux product, maps the returned native error to the appropriate SQLSTATE. When both the driver and the driver manager detect an error, they generate the appropriate SQLSTATE. The ODBC Driver that is included with System i Access for Linux product, returns an error message based on the System i returned message.

For errors that are detected within the ODBC Driver, the driver returns an error message based on the text associated with the SQLSTATE. These error messages are translated messages. Error message files and the help text for error messages found in the underlying components of the System i Access product are shipped in the /opt/ibm/iSeriesAccess/doc directory.

## Error message format

Error messages have the following format:

[vendor] [ODBC-component] [data-source]

error-message

The prefixes in brackets ([ ]) identify the source of the error. When the error occurs in the data source, the [vendor] and [ODBC-component] prefixes identify the vendor and name of the ODBC component that received the error from the data source. The following table shows the values of these prefixes returned by the System i ODBC Driver for Linux:

Error Source	Value	
Driver Manager	[unixODBC] [Driver Manager]	
ODBC Driver included with the System i Access for Linux product	unixODBC] [IBM] [System i Access ODBC Driver]	
NLS messages	[unixODBC] [IBM] [System i Access ODBC Driver] Column #: NLS error message number NLS error message text  See the message prefix table below to find second level help text.	
Communication and Security	unixODBC] [IBM] [System i Access ODBC Driver] Communications link failure. comm rc=xxxx - (message text)  xxxx is the error number in decimal, not hexadecimal, format. Message text describing the nature of your error appears with the error number. See the message prefix table below to find second level help text.	
IBM DB2 for i5/OS	[unixODBC] [IBM] [System i Access ODBC Driver] [DB2] Server error message  To view error message text for IBM DB2 for i5/OS errors:	
	<b>For errors that begin with:</b>	<b>Use this OS/400 command</b>
	SQL	DSPMSGD RANGE(SQLxxxx) MSGF(QSQLMSG)
	IWS or PWS	DSPMSGD RANGE(ZZZxxxx) MSGF(QIWS/QIWSMSG) ZZZ is either IWS or PWS

For other prefixes that may be seen through the ODBC Driver included with the System i Access for Linux product, see the following table:

Message Prefix	Message File	Description
CWB####	cwber.html	Base error messages
CWBCO####	cwbcoer.html	Communication error messages
CWBNL####	cwbnlr.html	Conversion error messages
CWBSY####	cwbsyer.html	Security error messages
CWBRC####	cwbrcer.html	Remote Command error messages
CWBLM####	cwblmer.html	License error messages

## ODBC FAQs

Find frequently asked ODBC questions when using the System i Access for Linux product.

## What are the differences between the ODBC driver included with the System i Access for Linux product and the ODBC driver included with the System i Access for Windows product?

Table 3. Differences between the System i Access for Linux ODBC driver and System i Access for Windows ODBC driver.

Function	Linux ODBC	Windows ODBC
The driver	The driver is an ODBC 3.5 ANSI driver with the ability to store and process Unicode data. An ANSI driver does not support Unicode strings passed as arguments to the APIs. Applications passing Unicode strings on APIs will work because the unixODBC driver manager maps calls these calls to the ANSI driver's narrow interfaces.	The driver is an ODBC 3.5 Unicode driver. A Unicode driver accepts Unicode strings as arguments to the APIs.
Signon	To sign on you must specify a user ID and password when calling the connection API or have the user ID and password entered into the DSN. The ODBC driver does not prompt for System i user IDs or passwords. User ID and password updates must be done through a System i telnet session.	The user has sign on options that control which user ID and password to use when connecting. When connecting, cached passwords might be used. If a user's password has expired a dialog is displayed to allow a user to change it.
Binding a parameter or column	When binding a parameter or a column with SQL_C_WCHAR as the C type, wchar_t buffers should not be passed in. The driver manager and driver both handle the SQL_C_WCHAR data type as a 2 byte UCS-2 string.	When binding a parameter or a column with SQL_C_WCHAR as the C type, wchar_t buffers should be passed in. The driver manager and driver both handle the SQL_C_WCHAR data type as a 2 byte UCS-2 string.

---

## System i Access for Linux utilities

The following utilities are included with the System i Access for Linux product and are shipped in /opt/ibm/iSeriesAccess/bin.

Use the following links for more information on the System i Access for Linux utilities:

### **CWBCOPWR - Change advanced communications settings**

Use this command to change the advanced communications settings of the System i Access for Linux product.

See cwbcopwr.html for details

### **CWBMEDIC - Service information collection tool**

Use this command to gather service information for IBM.

#### **Syntax**

cwbmedic

#### **Parameters**

There are no parameters.

This command creates a .tgz file in the user's home directory. If requested, please send this file to IBM Service for analysis.

## Examples

- To run the command, enter `cwbmedic` .
- To view the contents of this file, enter the following commands:

```
tar xvzf /home/username/cwbmedic.tgz
cat cwbmedic.out
```

## CWBNLTBL - Download conversion tables

Use this command from a console prompt to download conversion tables.

### Syntax

```
cwbnltbl [source-code-page] [target-code-page] [system] [userid] [password]
```

### Parameters

- `source-code-page` = source code page for the table
- `target-code-page` = target code page for the table
- `system` = System i name, from which tables are downloaded.

**Note:** If a System i connection is necessary, the user ID and password must also be specified.

- `userid` = System i user ID
- `password` = System i password

The tables share a common location on the workstation `/opt/ibm/iSeriesAccess/conv_tables`. Many conversions tables are already shipped with the product. The product also uses `iconv` conversion where necessary. Use the History Log to look for conversion information.

## Examples

- To download the 819 to 13488 conversion table from the system if necessary, run `cwbnltbl 819 13488 myiSeriesSystem myiSeriesuserid myiSeriesPwd`
- To show the current locale charset and its code-page mapping, run `cwbnltbl`

## CWBPING - Test the connection to the server

Use this command from a console prompt to determine if a System i connection can be successfully established, or to help determine the cause of a connection failure.

CWBPING checks of the status of the System i host servers. The name of the communications provider is shown, as well as the result of connecting to each of the host socket servers. To see detailed messages, use the `(/v)` verbose option.

### Syntax

```
cwbping system [/v] [/pl:#] [/al:#] [/serv:name] [/port:#] [/user:userid] [/password:password]
[/all]
```

### Parameters

- `system` = name of the server
- `/v` = verbose output
- `/pl:#` = port mode (0 = Server services file, 1 = Local services file, 2 = Standard port )

**Note:** If the `/port:#` is specified, the port mode is ignored.

- `/al:#` = address mode

- 0 = Always use gethostbyname
- 1 = Lookup after 1 hour
- 2 = Lookup after 1 day
- 3 = Lookup after 1 week
- 4 = Never use gethostbyname, use configured IP address
- 5 = Lookup once after each PC restart

**Note:** If the system name is specified in IP Address form (x.x.x.x) the address mode will be ignored.

- /serv:name = name of the service to connect to (i.e. /serv:telnet or /serv:ftp)

**Note:** Any TCP/IP service name can be used. For example, see CWBCO1003 or you local services file.

- /port:# = port number to connect to in decimal (i.e. /port:23 or /port:21)

**Note:** Any TCP/IP port number can be used. For example, see CWBCO1003 or your local services file

- /user:userid = System i user ID to use only if the server requires security on startup
- /password:password = System i password to use only if the server requires security on startup
- /all = verify all possible servers, by default only common servers are verified.

## Examples

To check the status of the System i host servers named System1 with address 9.12.103.14:

```
cwbping System1
```

or cwbping

```
9.12.103.14 /v
```

## CWBRUNSQL - Run batch SQL commands and procedures using an ODBC DSN

Use this command to run batch SQL commands and procedures using an ODBC DSN.

### Syntax

```
cwbrunsql [/DSN:<ODBC DSN="">] [/I:<fileName>]
```

### Parameters

- [/DSN:<ODBC DSN="">] = Use the specified ODBC DSN.
- [/I:<fileName>] = Use the specified file name.
- [/SYSTEM:<system>] = Use the specified system name. Can be used in place of (or in addition to) DSN.
- [/USER:<userID>] = Use the specified userid.
- [/PASSWORD:<password>] = Use the specified password.
- [/DFTLIB:<library>] = Use the specified default library.
- [/Z] = No banners.

### Example

A file named myfile.sql contains the following:

```
CREATE TABLE QGPL.MYTABLE (COL1 INT, COL2 CHAR(10));
INSERT INTO QGPL.MYTABLE VALUES ( 1, 'ABC' );
INSERT INTO QGPL.MYTABLE VALUES ( 2, 'DEF' );
INSERT INTO QGPL.MYTABLE SET COL2= 'XXX' WHERE COL1=2;
SELECT * FROM QGPL.MYTABLE;
```

Note that each SQL statement is separated by a semicolon. To run this .sql file, enter the following, where *myODBCDSN* is the name of the ODBC Data Source.

```
cwbrunsql /DSN:myODBCDSN /I:myfile.sql
```

## CWBTRC - Trace System i Access for Linux

Use this command from a console prompt to configure tracing.

### Syntax

```
cwbtrc [/DT:0-1] [/DPATH:path] [/DWRAP:0-4000] [/DFLTR:0-1] [/DTICK:0-1] [DFRMT:0-1] [/HL:0-1]
[/HPATH:path] [/HWRAP:0-4000] [/HFLTR:0-1] [/HTICK:0-1]
```

### Parameters

**Note:** Defaults shown in bold.

- /DT:0-1 = turn detail trace **off/on**
- /DPATH:path = detail trace path, default is \$HOME/.iSeriesODBC
- /DWRAP:0-4000 = detail trace wrap size (MB), default is 1. An <EOF> symbol will be placed after the last record.
- /DFLTR:0-1 = detail trace filter **off/on**
- /DCOMP:abc,abc = filter component list. Where components are: Configuration, Communication, Comm-API, Comm-SPI, Comm-System, Comm-Base, License Management, NLS, ODBC, ODBC-Error, Emulator Remote Command, Service, Security.
- /DTICK:0-1 = **timestamp** or tick count in trace entries
- /DFRMT:0-1 = limit tcp hex data **off/on**
- /HL:0-1 = turn history log **off/on**
- /HPATH:path = history log path, default is \$HOME/.iSeriesODBC /HWRAP:0-4000 = history log wrap size (MB), default is 1. An <EOF> symbol will be placed after the last record.
- /HFLTR:0-1 = history log filter **off/on**
- /HCOMP:abc,abc = filter component list. Where components are: Configuration, Communication, Comm-API, Comm-SPI, Comm-System, Comm-Base, License Management, NLS, ODBC, ODBC-Error, Emulator Remote Command, Service, Security.
- /HTICK:0-1 = **timestamp** or tick count in traces entry

Running CWBTRC without any parameters will show the command syntax and the current status of each parameter.

The output from CWBTRC will have the following naming convention:

```
cwbdetail-<process name>-pid.csv
```

```
cwbhistory-<process name>-pid.csv
```

The output files will be in semicolon separated record format, suitable for input into spreadsheets for viewing.

## Examples

The following command will turn on detail trace and allow it to grow to a 10 mg file before wrapping. It will also turn on history logging.

```
cwbtrc /dt:1 /dwrap:10 /hl:1
```

The following command will turn on history log and change the path to /usr/traces

```
cwbtrc /hl:1 /hpath:/usr/traces
```

## RMTCMD - Run a System i batch/CL command

Use this command from a console prompt to run a single System i command or a group of System i commands.

### Syntax

To run a single command:

```
rmtcmd [command]
```

To run a group of commands

```
rmtcmd [/I:fileName]
```

### Parameters

- /system:systemName = System i name
- /user:userName = System i user profile
- /password:password = System i user profile password
- /Q = no error prompts
- /Z = no banners

### Examples

- To run command foo on system bigblue, run:  

```
rmtcmd foo /system:bigblue /user:UserProfile /password:UserPassword
```
- To run a groups of command listed in a file, run:  

```
rmtcmd /i:foocmds.txt /system:bigblue /user:UserProfile /password:UserPassword
```

## RMTODBC - Run a System i batch/CL command using the ODBC driver

Use this command from a console prompt to run a single System i command or a group of System i commands.

### Syntax

To run a single command:

```
rmtodbc [command]
```

To run a group of commands:

```
rmtodbc [/I:fileName]
```

### Parameters

- /system:systemName = System i name
- /dsn:dsnName = ODBC DataSource name
- /user:userName = System i user profile

- /password:password = System i user profile password
- /Q = no error prompts
- /Z = no banners

## Examples

- To run command foo on system bigblue, run:  
`rmtodbc foo /system:bigblue /user:UserProfile /password:UserPassword`
- To run a groups of command listed in a file, run:  
`rmtodbc /i:foocmds.txt /system:bigblue /user:UserProfile /password:UserPassword`

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