

SunXTL 1.1 Administrator's Guide



The Network Is the Computer™

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Preface

The SunXTL 1.1 Administrator's Guide describes how to use the SunXTL administrative tools to configure the SunXTL Teleservices for Solaris software on your host. This book also describes how to configure third-party providers that allow your SunXTL applications to communicate over various telephony devices. Note that all references to Solaris in this book apply only to the SPARC version of Solaris.

Who Should Use This Book

This book and the SunXTL provider configuration process were designed for system administrators with a solid understanding of UNIX systems and file structures. This book explains the role of providers and describes two interactive configuration tools: `xteltool` and `config.xtl`. These tools enable you, the system administrator, to configure SunXTL providers. You should also have some understanding of basic telephony concepts.

How This Book is Organized

Chapter 1, "Introduction to SunXTL Administration," is an overview of the SunXTL configuration files and directory structure.

Chapter 2, "Using the Provider Configuration Database," explains the SunXTL directory structure and gives detailed information on the SunXTL database, providers, and host configuration files.

Chapter 3, “Using the Configuration Tools,” describes how to use the `xtltool` and `config.xtl` configuration tools.

Chapter 4, “Controlling User Access,” explains how to set up user permissions for access to the SunXTL server.

Related Documentation

- *Sun XTL 1.1 Architecture Guide*
- *Sun XTL 1.1 Application Programmer’s Guide*
- *Sun XTL 1.1 Provider Programmer’s Guide*
- *Sun XTL 1.1 Remote Client Mgr Guide*

What the Typographic Changes and Symbols Mean

The following table describes the type changes and symbols used in this book.

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. system% You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	<div>system% su</div>
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To delete a file, type rm filename .
<i>AaBbCc123</i>	Book titles, new words or terms, or words to be emphasized	Read Chapter 6 in <i>User’s Guide</i> . These are called <i>class</i> options. You <i>must</i> be root to do this.

Code samples are included in boxes and may display the following:

Table P-1 Typographic Conventions (Continued)

Typeface or Symbol	Meaning	Example
%	UNIX C shell prompt	system%
\$	UNIX Bourne and Korn shell prompt	system\$
#	Superuser prompt, all shells	system#

Introduction to SunXTL Administration



SunXTL Teleservices for Solaris provides hardware-independent telephone call control and voice services for end users. The SunXTL platform provides a framework to integrate call control, messaging, and specific technologies such as fax, video, and ISDN communications. This document explains how to configure SunXTL resources, such as *providers* and the *configuration database*, after you install your packages.

Overview

The SunXTL teleservices software platform is based on a client-server architecture and includes the following components: SunXTL-based applications; an application programming interface (API); a server; a media platform interface (MPI) library for providers; and technology-specific providers. See Figure 1-1.

The SunXTL API is implemented as a high-level, object-oriented C++ library. It enables application programmers to design applications that place and receive telephone calls, and to perform basic telephone functions such as to hold, transfer, drop, and conference calls. An SunXTL application links to the SunXTL library to use a workstation's Solaris Teleservices resources.

The server, which resides within the SunXTL Teleservices cloud in the figure, offers multi-client and multi-device support to SunXTL applications. It also provides resource management and maintains security. It is the central point of contact for all SunXTL processes.

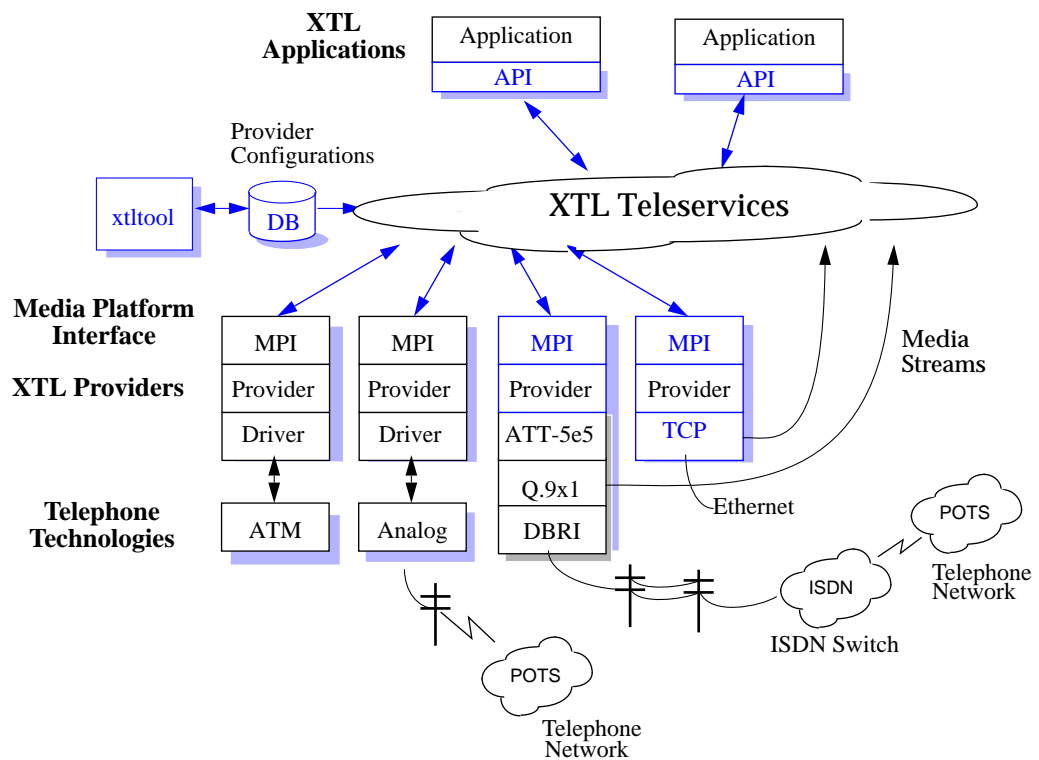


Figure 1-1 Teleservices Architecture

Each telecommunication device connected to a workstation is managed by an SunXTL *provider*. The providers and SunXTL applications operate by passing and receiving messages. All messages are sent to and received by the server. The server evaluates and administers these messages.

Providers are essential to SunXTL applications. Applications must use a provider in order to create connections with a telephone device. At installation, the provider and its *template file* are installed, but not configured. The template file contains key and value information specific to the provider. Using the configuration tools explained in “Using the Configuration Tools” on page 13 of this guide, you can copy the template and create this file. Once you edit and

save a template file to the database, it is referred to as this provider's *information file*. This file should contain all of the information that a server needs to evaluate and use the provider.

The information file is stored in the database, where the server can access it for information on the provider. This configuration process registers a provider with the Solaris Teleservices server.

The database also contains the *host configuration file*. The *host configuration file* lists the configured providers on a given host. It is updated every time a provider is configured using the Solaris Teleservices configuration tools. The server can query these database files for lists of the configured providers and for startup and shutdown information on each provider.

You can add or load additional provider software and hardware devices at any time. The server cannot find or use these providers until you properly register their information files in the database.

For more detailed information on the Solaris Teleservices architecture, see the *Sun XTL 1.1 Architecture Guide*.

Directory Structure

The Solaris Teleservices runtime hierarchy is installed under the `XTLDIR` directory; and the host-specific configuration hierarchy is installed under the `XTLCONFDIR` directory. Because the Teleservices packages are relocatable, the terms `XTLDIR` and `XTLCONFDIR` are used throughout this document as placeholders for specifying the path name to the directory trees where Teleservices has been installed. The values for these placeholders are:

- The absolute path for `XTLDIR` is:
 `/opt/SUNWxtl`
- The absolute path for `XTLCONFDIR` is:
 `/etc/xtl`

When you see these directories referenced in the text, substitute their respective path names. Figure 1-2 shows the SunXTL directory structure that is created for you at installation time.

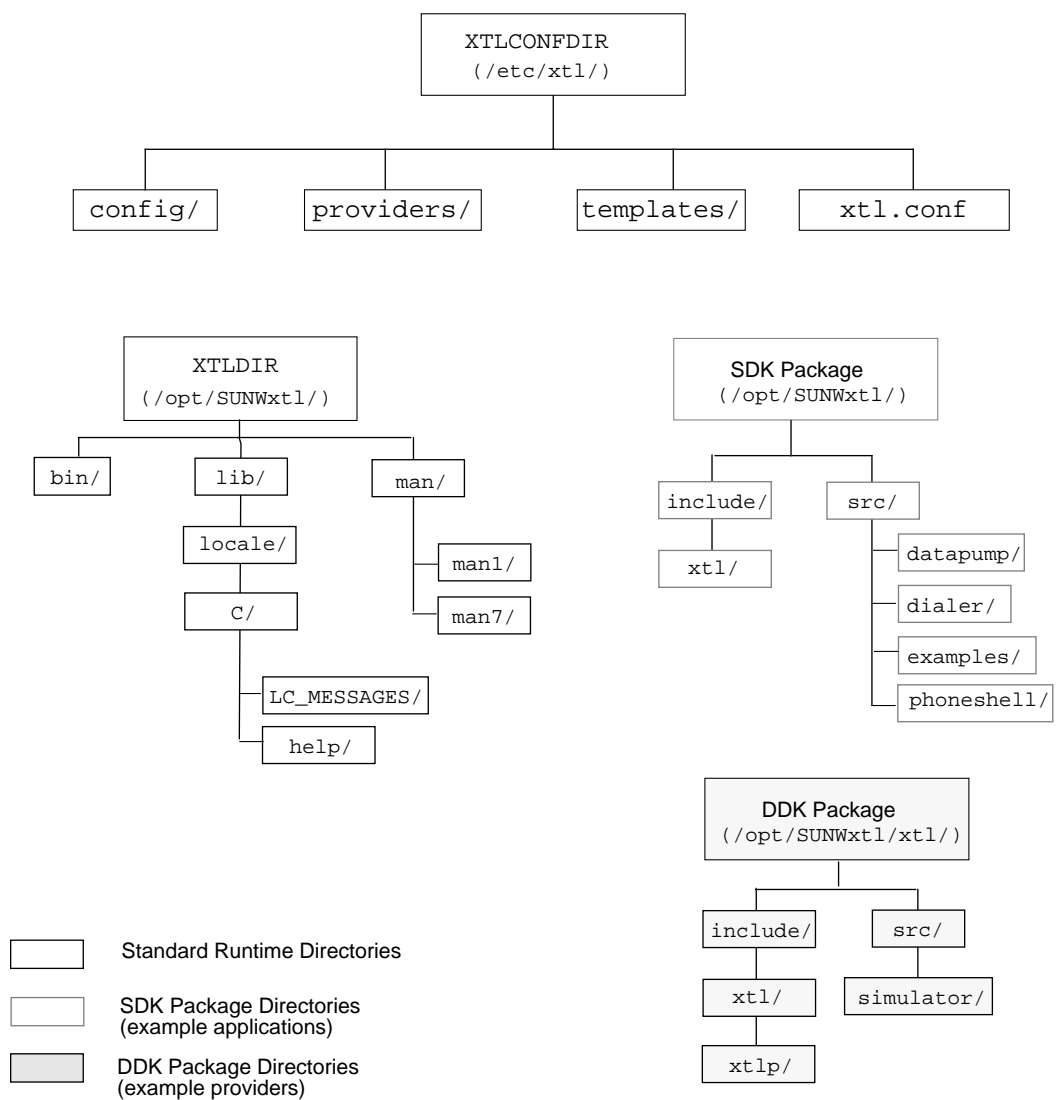


Figure 1-2 The SunXTL Directory Hierarchies

The SunXTL package contains the following directories:

- `XTLDIR/lib`

This directory contains all of the Solaris Teleservices libraries, including the SunXTL application programming interface and the XTLP service provider interface. It also contains a `locale` subdirectory with localization and help files.

- `XTLDIR/bin`

This directory contains the `xtltool` and `config.xtl` configuration tools, the `change_group` and `cnx_perm` security tools, the SunXTL server, and the `xtlp_sun_ip` provider for use over Ethernet networks.

- `XTLCONFDIR/config`

This directory contains the provider information files. This directory is writable by the root user and by a specified group ID. The group ID is set by running the program `change_group`. For more information on the `change_group` program, see “Setting Configuration File Permissions” on page 30.

- `XTLCONFDIR/providers`

This directory is available for provider programs to use as desired.

- `XTLCONFDIR/templates`

This directory contains the provider template files listed as `*.template`. The Solaris Teleservices configuration tools access this directory. When a new template is added to this directory, the tools will add it to their available providers list. The content of each of these template files must include pointers to valid startup scripts or executables so that the server can start up the new provider successfully.

Note – The `XTLCONFDIR/templates` directory is reserved for template files only. The word “template” cannot appear in any provider alias.

All of a host’s Solaris Teleservices configuration information is filed under `XTLCONFDIR` in either the host configuration file or the `config` subdirectory. The host configuration file is `xtl.conf` in the `XTLCONFDIR` directory. This file is created by the Solaris Teleservices configuration tools and may vary from host to host.

Setting Up User and Group Access

At installation, the provider included with your Solaris Teleservices package is automatically installed and the group `sys` has full read and write permissions. To change the group and user access, you can use the tools described in Chapter 4, “Controlling User Access.”

Supported Switch and Telephone Configurations

The Solaris Teleservices platform supports the following switch and telephone configurations:

- Voice provider on IP Ethernet
- ISDN protocol stacks
This configuration includes a provider interface that works with a DBRI driver interface.

Using the Provider Configuration Database



This chapter describes the provider configuration database and how it is configured. The configuration process registers provider information with the SunXTL server. Without this process, the server cannot identify any installed providers.

Role of Providers

Providers represent an application's connection to telephone hardware. The SunXTL platform enables applications to interact only with the provider, never directly with the telephone hardware that the provider controls. Each provider can be configured in a number of ways. Each configuration is specified in an information file identified by a *primary alias* or name. This alias is listed in the host configuration file.

Read the documentation delivered with your provider for the installation location of the provider's binaries, startup scripts, and any additional files. Once you configure a provider, the server can invoke that provider.

Understanding the Provider Configuration Database

The *provider configuration database* stores information about the names, aliases, capabilities, and configurations of the providers installed on your system. The server uses this information whenever it starts a new provider. The provider configuration database comprises of a *host configuration file* and a collection of *provider information files*.

How Provider Aliases and Attributes Are Maintained

Each provider must have a *primary alias* or name. It may also have other secondary aliases, which refer to the same provider. Secondary aliases are useful when referring to a single provider that offers several services. For example, a provider whose primary alias is *teldev* provides telephone and fax services. Since the name *teldev* is not very indicative of what it is capable of doing, you can create more descriptive secondary aliases such as *phone* and *fax*. Figure 2-1 shows the relationship between aliases, host configuration files, and provider information files.

Notice that aliases are not tied to the name of the provider executable file *xtp_sun_tel*; and the name of the provider information file is the same as the primary alias. The server always invokes a provider and maintains its status using the provider's primary alias. Any client that requests information or wants to invoke a provider may do so by using its primary or any of its secondary aliases. All aliases, which are kept in the host configuration file, must be unique.

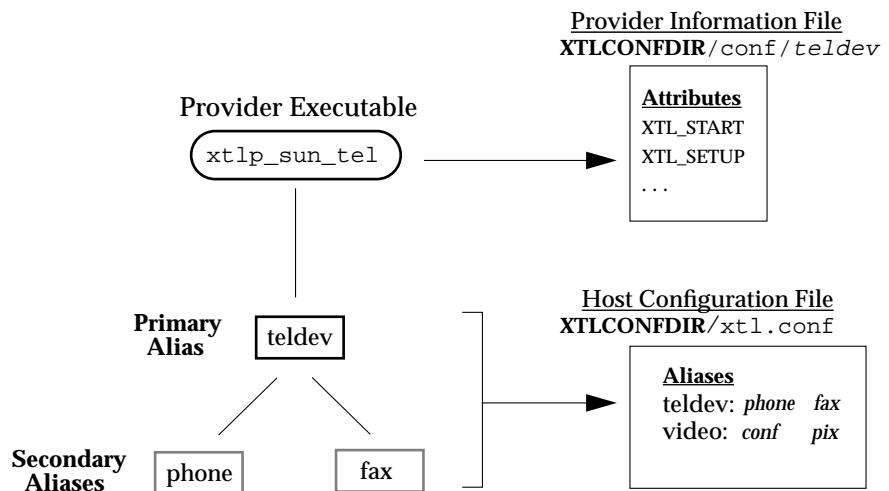


Figure 2-1 Provider Aliases and Attributes

The Host Configuration File

The host configuration file contains a list of primary aliases and any corresponding secondary aliases for the providers available on a host. The primary alias name is also the file name for the provider's information file; see "Provider Information Files" on page 9 for a description. The SunXTL server accesses the host configuration file to determine the available providers and uses that information to start each provider.

The host configuration file is modified with the configuration tools described in Chapter 3, "Using the Configuration Tools." You should not modify the configuration file directly.

Provider Information Files

The provider information files contain specific attribute values for each provider such as how many different switches a provider can connect to, what types of supplementary services it can support, its primary alias, and any additional information given by the provider's manufacturer. A client can use this information to determine which provider it should use.

A provider *template file* should be available and loaded with each provider package. This file includes most or all of the information you need to configure the provider. The SunXTL configuration tools enable you to view a template file and edit a copy of its contents. When you apply changes to your edits, you create information files for each new provider.

Each provider instance requires an individual information file, which is created for you when you configure the provider using `xtltool`. Even providers that identify similar devices connected to the same switch need their own information files.

Provider Attribute Values

Each provider information file must include a minimum set of attributes. Table 2-1 shows the attributes required for any provider and examples of their values.

Note – The examples provided in this section are not part of the SunXTL distribution. The value of the attributes specified are just given as typical values.

Table 2-1 Attribute Values for the Provider Configuration File

Attribute	Example	Description
XTL_FAMILY_NAME	<i>sun_teldev</i>	When a provider executable is run, its process is associated with a provider family name. Multiple providers running in this process are considered part of the same provider family.
XTL_PROVIDER_NAME	<i>sun_teldev</i>	This is the name of the provider; it is the same as its primary alias.

Table 2-1 Attribute Values for the Provider Configuration File

Attribute	Example	Description
XTL_START	<code>/opt/SUNWx5e5p/scripts/\ xtlp_sun_5e5.start -p \ xtlp_sun_5e5.0</code>	<p>The value of XTL_START is a fully qualified path name to your provider startup script with any necessary parameters; the XTL_START value cannot be empty.</p> <p>The server uses the command specified by XTL_START to start the provider. The script may be blocking or non-blocking. At any given time, only one instance of the provider executable will be executing. Consequently, the XTL_START value must be the same for all providers of the same family.</p> <p>The process started when the XTL_START command is run lasts for the lifetime of the provider. This is important, because the server uses the fact that the process has exited in helping to determine when a provider is done. The server records the process identification (PID) of the XTL_START process and will be informed when this PID finishes execution. Note that the server does not perform block waiting for the XTL_START command to return, but continues running. It will “reap” the process associated with the XTL_START command.</p> <p>If the SunXTL platform cannot communicate with your provider process, it invokes the XTL_START script again. When the SunXTL platform starts your provider, it does so with the following environment:</p> <pre>XTL_FAMILY_NAME= <family name from configuration file></pre> <p>This means that any additional environment variables such as PATH, LD_LIBRARY_PATH must be set within the provider script before it executes the provider executable.</p>

Table 2-1 Attribute Values for the Provider Configuration File

Attribute	Example	Description
XTL_CLEANUP	<code>/opt/SUNWx5e5p/scripts/\ xtlp_sun_5e5.shutdown \ -p xtlp_sun_5e5.0</code>	<p>This defines the cleanup script for when the provider is killed. The value for the <code>XTL_CLEANUP</code> attribute can be either null or a full path name, plus any needed command line arguments. If non-null, the value specifies a blocking script that the server will run to perform cleanup tasks. The server will run this command and wait until it finishes before continuing. This is the last operation associated with this provider.</p> <p>The server process retains the process ID of each process it starts up with the <code>XTL_START</code> value. If it receives a <code>SIGCHLD</code> signal for that provider, it knows that the provider process has exited. On the other hand, if the file descriptor through which the server communicates with the provider fails, the server will kill the provider process. Either way, once the provider process has exited, the SunXTL server executes the script defined by the <code>XTL_CLEANUP</code> attribute.</p>
XTL_DOCUMENTATION	<code>pageview \ /opt/SUNWx5e5p/\ xtlp_sun_5e5.ps</code>	<p>This attribute executes a process that displays any on-line documentation that is available for the provider. The value is a fully qualified path to an executable along with parameters for the executable; <code>xtltool</code> provides an "Execute Document Command..." button. When the button is pressed, the value of the <code>XTL_DOCUMENTATION</code> key is executed. The documentation command is executed with the same environment as <code>xtltool</code>.</p>
XTL_VERSION	<code>1.0</code>	<p>This attribute states the release version of SunXTL Teleservices with which the provider is compatible.</p>

Using the Configuration Tools



Two tools are available to help you configure the providers that are installed on your system: `xtltool`, a window-based program; and `config.xtl`, a TTY-based shell script. You can install providers at any time. To install providers, see the documentation shipped with the provider software.

Using `xtltool`

The `xtltool` program is a window-based program that enables you to interactively configure providers and provider attributes; with `xtltool`, you can change the primary alias, add secondary aliases, unconfigure providers, and edit a provider's attributes. Provider attributes are given in template files that come with each provider. For more information on template and information files, and the attributes they contain, see "Provider Information Files" on page 9.

Provider Templates and Information Files

The provider template file is installed with the provider and includes attributes that define the provider. Using `xtltool`, you can load this template into a window, and edit it to match your provider specifications. Once you apply your edits, the tool creates an information file for this provider; the file name corresponds to the provider's primary alias. Each provider attribute is explained in greater detail in "Provider Attribute Values" on page 10.

▼ Configuring a New Provider

You can use the provider template that was installed with a provider to configure that provider. A template should contain most or all of the information you will need to configure the provider. You can add or delete information using `xtltool`. Note that `xtlp_sun_5e5.0` is shown only as an example. It is not shipped as part of the SunXTL distribution.

1. To start `xtltool`, type `xtltool` at the system prompt and press Return. The Configured Providers window, as shown in Figure 3-1 is displayed.

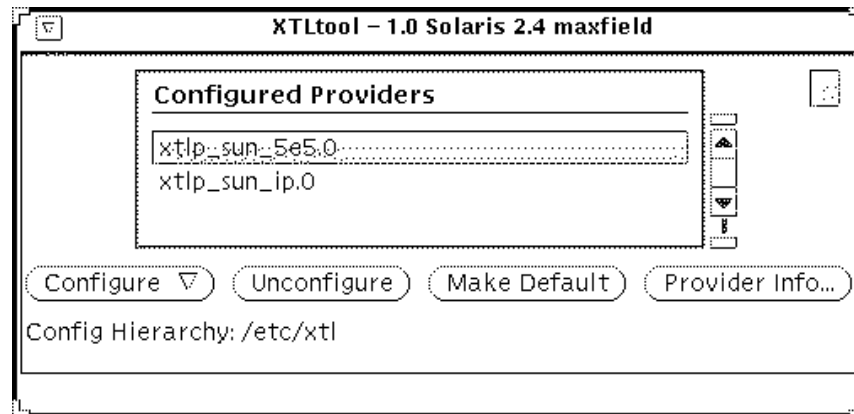


Figure 3-1 An Example of a Configured Providers Window

2. To display a provider's template file, do either one of the following:

- Click SELECT on the Configure button.

When you choose the Configure button, the Provider Info window is displayed; it contains the template script of the first template in the `XTLCONFDIR/templates` directory. This directory is displayed in Figure 1-2 on page 4.

- Choose a specific provider template from the Use Templates menu under the Configure button menu.

To display the Use Templates button menu, choose a template from the Use Templates submenu of the Configure menu as shown in Figure 3-2.

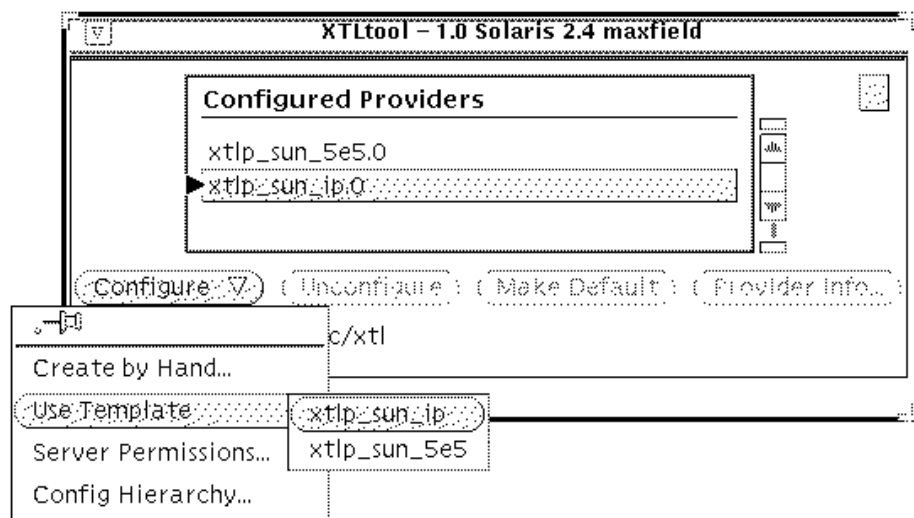


Figure 3-2 Configure Button Menu

The Provider Info window (see Figure 3-3 on page 16) is displayed. From the Provider Info window, you can:

- Add and edit provider aliases
- Add and edit provider attribute and value information
- Execute provider setup and special documentation scripts

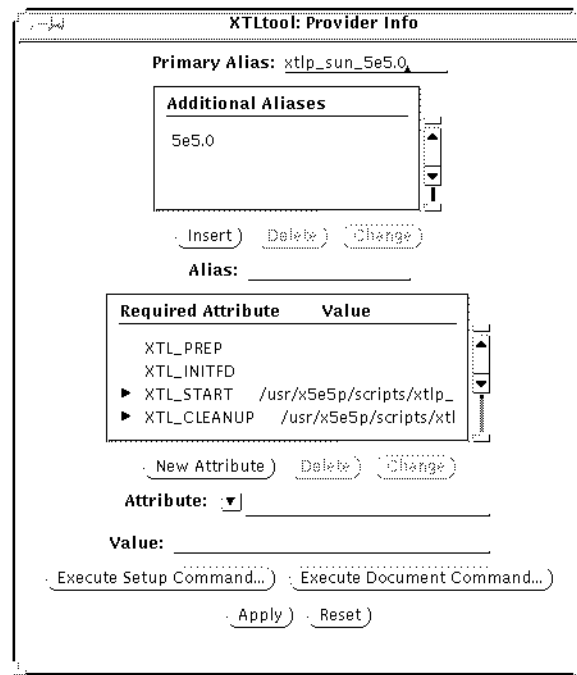


Figure 3-3 Provider Info Window

3. Edit the provider information.

To add and edit aliases, see “Adding and Editing Provider Aliases” on page 17. To add attribute and value information to the provider, see “Adding a New Attribute” on page 18.

4. Optional: Click the Reset button to delete any changes you made to the provider information.

Any information that was added since this provider was configured (or Apply was clicked) is cleared. The panel displays the current configuration database information for this provider.

5. Click Apply to configure this provider.

The provider is configured, and the new provider information file is loaded into the configuration database. This provider alias is added to the list in the `xtltool` main window.

Provider Aliases

The name you enter in the Primary Alias field in the Provider Info window (shown in Figure 3-3 on page 16) is the primary alias for this provider. For more information on this provider, see “Role of Providers” on page 7.

The Additional Aliases window is directly below the Primary Alias field in the Provider Info window (shown in Figure 3-3 on page 16). You can use this window and the Alias field below it to insert new secondary aliases and edit or change any alias in this list. The sequential order of the secondary aliases is not important.

All the aliases assigned to providers must be unique across a particular host configuration file. `xtltool` will not accept an alias that is already in use.

SunXTL clients can refer to the primary alias or any secondary alias. However, the server will always use the provider’s primary alias as an identifier.

▼ Adding and Editing Provider Aliases

1. To start `xtltool`, type `xtltool` at the system prompt and press Return.

The Configured Providers window, as shown in Figure 3-1 on page 14 is displayed.

2. To display a provider’s template file, do either one of the following:

- Click SELECT on the Configure button.

When you choose the Configure button, the Provider Info window is displayed: it contains the template script of the first template in the `XTLCONFDIR/templates` directory. This directory is shown in Figure 1-2 on page 4.

- Choose a specific provider template from the Use Templates menu under the Configure button menu (shown in Figure 3-2 on page 15).

3. You can now do any of the following:

- a. To add or change the primary alias, select any text in the **Primary Alias** field, and type the new name.
- b. To insert a new alias, do the following:
 - i. Type the new name in the **Alias** field.
 - ii. Click **Insert**.
- c. To change a secondary alias, do the following:
 - i. Select an alias in the **Additional Aliases** window.
The alias is displayed in the **Alias** text field.
 - ii. Type the new alias name over the one displayed in the text field.
 - iii. Click **Change**.
- d. To delete a secondary alias, select the alias and click **Delete**.

4. To save your changes, click **Apply.**

▼ **Adding a New Attribute**

Use this procedure to add new attributes and values to a provider's information file. Only two provider attributes, `XTL_DOCUMENTATION` and `XTL_START`, have executable values; `xtltool` offers buttons that invoke each of these values.

1. To start `xtltool`, type `xtltool` at the system prompt and press return.
The **Configured Providers** window, as shown in Figure 3-1 on page 14 is displayed.

2. To display a provider's template file, do either of the following:

- Click **SELECT** on the **Configure** button.

When you choose the **Configure** button, the **Provider Info** window is displayed; it contains the information from the first template in the `XTLCONFDIR/templates` directory. Figure 1-2 on page 4 shows the template directory.

- Choose a specific provider template from the menu under the **Configure** button menu (shown in Figure 3-2 on page 15).

3. Choose a new attribute value from the Attribute menu.

Figure 3-4 shows the Attribute menu. This menu lists the required attributes. All other attributes have default values. You can change the default values or add completely new attributes that the provider understands.

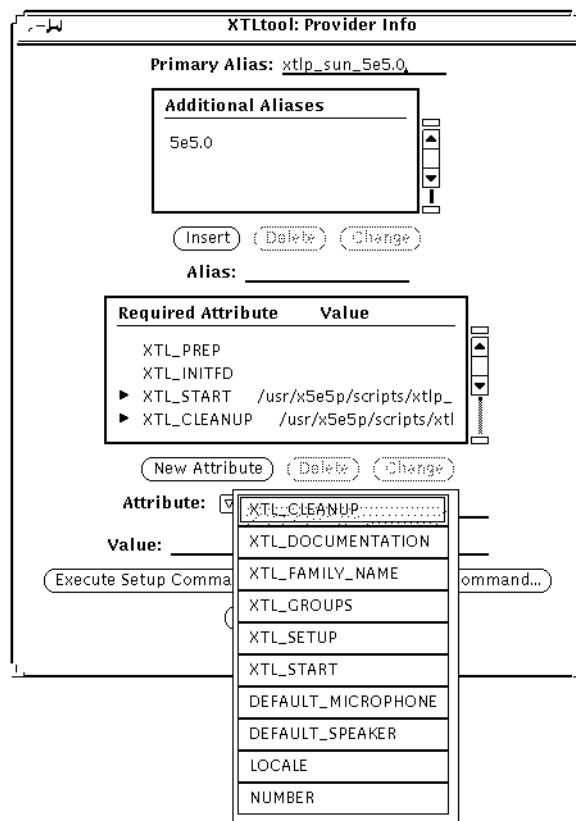


Figure 3-4 Attribute Menu

4. Type a value in the Value field.

5. Click the New Attribute button in the Provider Info window to add new attributes to the provider. To change an existing attribute, click Change.

6. Click Apply to save your changes.

▼ Editing Attribute and Value Information

Use this procedure to change or delete attribute values in a template or information file.

1. **To start `xtltool`, type `xtltool` at the system prompt and press return.**
The Configured Providers window, as shown in Figure 3-1 on page 14 is displayed.
2. **To display a provider's template file, do either one of the following:**
 - Click SELECT on the Configure button.

When you choose the Configure button, the Provider Info window is displayed: it contains the template script of the first template in the `XTLCONFDIR/templates` directory. This directory is shown in Figure 1-2 on page 4.
 - Choose a specific provider template from the Use Templates menu under the Configure button menu (shown in Figure 3-2 on page 15).
3. **Select the attribute and value you want to change or delete from the list in the Attribute window.**
The attribute and values are displayed in the Attribute and Value fields.
4. **Do one of the following:**
 - To change the value, type a new value in the Value field and click Change.
 - To delete the attribute and value, click Delete.

▼ Executing Setup and Documentation Scripts

You can add setup (`XTL_SETUP`) and documentation (`XTL_DOCUMENTATION`) attribute values to provider information files at any time. These values are scripts that initiate commands specific to each attribute. The `XTL_SETUP` value is an executable command to handle any special setup or configuration operations for a given provider; the `XTL_DOCUMENTATION` value starts tools that display specific on-line documents.

For information on adding attributes and values to a provider file, see “Editing Attribute and Value Information” on page 20.” Use the following procedure to activate these executables.

1. **Display a provider information file in the Provider Info window.**

See “Accessing the Configured Provider Information Files” on page 21 for information on displaying provider information files.

2. **Do one of the following:**

- Select **Execute Setup Command** to invoke the executable specified in the `XTL_SETUP` value field.
- Select **Execute Document Command** to invoke the executable specified in the `XTL_DOCUMENTATION` value field.

▼ Unconfiguring a Provider

Using the Unconfigure menu, you can remove a configured provider from the database completely (which deletes the provider’s information file).

Note – The Unconfigure button becomes active only when you select a configured provider from the list.

1. **Display the Configured Providers window.**

This window appears when you start `xtltool`. For instructions on starting `xtltool`, see “Configuring a New Provider” on page 14.

2. **If you have not already selected the provider you wish to remove or unconfigure, select it from the Configured Providers list.**

3. **To remove this information file completely, click the Unconfigure button.**

▼ Accessing the Configured Provider Information Files

Use this procedure to quickly display the information file for any provider in the Configured Providers list.

1. **Display the Configured Providers window.**

This window appears when you start `xtltool`. For instructions on starting `xtltool`, see “Configuring a New Provider” on page 14.

2. **Select a provider in the Configured Providers list.**

3. **If no provider info window is displayed, double-click the provider name in the list.**

Using the `config.xtl` Script to Edit Provider Templates

The `config.xtl` script is a TTY-based program that offers you all the functionality of `xtltool`. It enables you to configure providers using the standard templates that were installed with your system and to list currently configured provider information.

▼ Starting `config.xtl`

You can use the provider template that was installed with a provider to configure that provider. A template should provide most or all of the information you will need to configure the provider. You can add or delete information using `config.xtl`.

1. **To start the script, type `config.xtl` at a system prompt and press Return.**
The SunXTL Configuration Main Menu is displayed as shown in Figure 3-5.

```

XTL CONFIGURATION MAIN MENU

1: Configure Provider
2: Unconfigure Provider
3: Set Default Provider
4: Update Configured Provider's Alias List
5: List Configured Provider's Information
6: Invoke Configured Provider's Documentation Command
7: Invoke Configured Provider's Setup Command
8: Add Key to Configured Provider's Information
9: Remove Key From Configured Provider's Information
10: List Current Provider Configuration on Host "maxfield"
11: Exit

Choose an option:

```

Figure 3-5 Main Menu for `config.xtl`

2. **You can perform any of the listed tasks by keying in the number of the task.**
For information on:

- Configuring providers, see “Configuring a Provider” on page 23.

- Unconfiguring providers, see “Unconfiguring a Provider” on page 24.
- Setting a default provider, see “Setting a Default Provider” on page 24.
- Updating configured provider’s alias list, see “Updating a Configured Provider’s Alias List” on page 25.
- Listing configured provider’s information, see “Listing a Configured Provider’s Information File” on page 25.
- Invoking configured provider’s documentation command, see “Reading a Provider’s Documentation” on page 25.
- Invoking configured provider’s setup command, see “Invoking a Provider’s Setup Command” on page 26.
- Adding attributes to configured provider’s information, see “Adding a Key to a Configured Provider’s Information File” on page 26.
- Removing attributes from configured provider’s information, see “Removing a Key” on page 26.
- Listing current provider configurations on your host, see “Listing the Currently Configured Providers” on page 27.

3. To exit or quit the tool, type 11 and press Return.

▼ Configuring a Provider

- 1. Type `config.xtl` and press Return to display the SunXTL Configuration Main Menu.**

If you are already using the `config.xtl` tool, return to the main menu. The main menu is shown in Figure 3-5 on page 22.

- 2. Type 1 at the main menu.**

The provider templates installed with your Solaris Teleservices software are listed. You can use one of these templates to create your provider information file or you can choose to create one from scratch.

- 3. Type the name of the template you want to use, or press Return to use no template.**

You are prompted for the name of the provider that you want to configure. A default provider name based on the template is available.

- 4. Type a new provider name, or press Return to accept the default value.**

You are prompted to enter any additional, subsidiary aliases to apply to this provider.

5. Type an alias name, or press Return to continue.

You can continue to enter alias names until you enter a blank alias. If you are not using one of the installed provider templates, no attribute and value information is listed.

You are prompted to enter new attribute and value information.

6. Optional: To configure this provider with the current data, type n.

The provider is configured and this procedure is complete. The SunXTL Configuration Main Menu is displayed.

7. To add attribute key and value information to the table, type y.

You are prompted to enter additional attribute and value information.

8. Type the attribute key in capital letters, followed by a space, and the value.

The data table is updated with this information. If you have entered a attribute that has already been assigned a value, you are informed that your new entry has overwritten the old information.

You will be prompted to enter more attribute and value information. You may repeat this step or continue to the next.

9. To stop entering new attributes and values, enter a blank line.

This provider is configured and added to the host configuration file.

▼ **Unconfiguring a Provider**

1. Type 2 at the main menu.

The current provider configuration is displayed. If no providers are configured, this procedure is concluded. Press Return to display the main menu.

2. Type the name of the provider to delete.

3. Press Return to display the main menu.

▼ **Setting a Default Provider**

1. Type 3 at the main menu.

The current provider configuration (if any) is displayed. If no providers are configured, the main menu is displayed, and this procedure is concluded.

2. **Type the name of one of the providers.**
This provider is now the default provider.
3. **Press Return to display the main menu.**

▼ Updating a Configured Provider's Alias List

1. **Type 4 at the main menu.**
The current provider configuration (if any) is displayed. If no providers are configured, the main menu is displayed, and this procedure is concluded.
2. **Type the name of the provider.**
The alias list for this provider is displayed. You can add or remove any of these aliases.
3. **Type a to add an alias or type r to remove an alias.**
4. **Type the name of the alias that you want to add or remove.**
5. **Press Return to return to the main menu.**

▼ Listing a Configured Provider's Information File

1. **Type 5 at the main menu.**
The current provider configuration (if any) is displayed. If no providers are configured, the main menu is displayed, and this procedure is concluded.
2. **Type the name of a provider.**
The information for this provider is displayed; the information includes the provider's aliases, if any have been defined, and its attributes and values.
3. **Press Return to display the main menu.**

▼ Reading a Provider's Documentation

1. **Type 6 at the main menu.**
The current provider configuration (if any) is displayed. If no providers are configured, this procedure is concluded.
2. **Type the name of a provider.**
This displays any documentation specified for the provider.

3. Press Return to display the main menu.

▼ Invoking a Provider's Setup Command

1. **Type 7 at the main menu.**

A list of currently configured providers is displayed.

2. **Enter a name from the list of providers and press Return.**

The setup script for that provider will be executed.

▼ Adding a Key to a Configured Provider's Information File

1. **Type 8 at the main menu.**

The current provider configuration (if any) is displayed. If no providers are configured, the main menu is displayed, and this procedure is concluded.

2. **Type the name of a provider.**

The information file for this provider is displayed. This file includes the provider's aliases, if any have been defined, and its attribute and value list.

3. **Type the new attribute followed by a space and the new value.**

The attribute and value pair is added to the database.

4. **Continue typing attributes and values, or press Return to return to the main menu.**

▼ Removing a Key

1. **Type 9 at the main menu.**

The current provider configuration (if any) is displayed.

2. **Type the name of a provider.**

The information file for this provider is displayed. This file shows the provider's attributes and values list.

3. **Type the name of the attribute that you want to remove.**

Enter the full attribute name as it appears in the displayed list.

4. **Press Return to display the main menu.**

▼ Listing the Currently Configured Providers

1. **Type 10 at the main menu.**

The providers that are currently configured on your host server are displayed.

2. **Press Return to display the main menu.**

Controlling User Access



This chapter explains how to set up user permissions for access to the SunXTL server and its configuration hierarchy using the scripts provided with the system. You must be root in order to use these scripts.

Setting Server Access Permissions

You should limit access to the server to users who need to request a connection to a provider. The permissions set on the pipe file (which defaults to `/dev/xtl/cnx`) determine which users have access to the server. A script file, `cnx_perm`, in the `XTLDIR/bin` directory enables you to change the permissions on the provider connection file.

Before using `cnx_perm`, you must make sure that the server is not running. If it is running, any changes you make to the `/dev/xtl/cnx` file will be lost the next time the server is stopped and restarted. When you execute `cnx_perm`, it automatically checks the status of the server and prints an error message if the server is running. If the server is running, stop the server and execute `cnx_perm` again.

The following procedure shows how you can use `cnx_perm` to change the user permissions for the server.

Note – You must be the root user to use the `cnx_perm` script.

▼ Changing User Permissions for the Server

1. In a shell window, become root.
2. Stop the server with the following command:

```
hostname#/etc/init.d/xtl stop
```

3. To add or remove a group, execute the `cnx_perm` command.
The example below shows what you might type to add execute permissions and change group ownership to an existing group called `taps`.

```
hostname#XTLDIR/bin/cnx_perm -ga -wa taps
```

The example below shows what you might type to remove execute permissions and change group ownership to an existing group called `taps`.

```
hostname#XTLDIR/bin/cnx_perm -gr -wr taps
```

4. Use the `ls -l` command to list the current user permissions in the `/dev/xtl/cnx` file. The example below shows executable permissions for the group called `taps`.

```
hostname#ls -l /dev/xtl/cnx
-rw-rw-rw-1 root  taps      0 Apr 8 19:18 /dev/xtl/cnx
```

5. Restart the server with the following command:

```
hostname#/etc/init.d/xtl start
```

Setting Configuration File Permissions

The host configuration file should be accessible only to users who are allowed to configure providers. For any one group, you can use the `change_group` script to enable read and write permissions on the following configuration directories and files:

- `XTLCONFDIR/config`
- `XTLCONFDIR/xtl.conf`
- `XTLCONFDIR/`

Users who do not have write permissions should still be allowed to read the configuration information in the database using `xtltool` or `config.xtl`.

The following example shows how you can use the `change_group` script to enable permissions for a group called `taps`.

```
hostname#XTLDIR/bin/change_group taps
```

Note – You must be the root user to use the `change_group` script.

Error Messages



The SunXTL configuration tool `xtltool` catches many typical errors and inconsistencies that you may have overlooked when configuring one or more providers. The following list contains error messages that you may see and suggests solutions for correcting the problem.

`Cannot modify the master configuration file. Reconfigure command aborted.`

An attempt to open the host's master configuration file for modification has failed. The provider selected for reconfiguration is not reconfigured.

`Internal error: Can't create provider "provider."`

For internal reasons, probably because of memory allocation failure, `xtltool` has not been able to create needed internal data structures for a new provider instance. You may wish to exit the tool and restart it.

`Can't modify provider information file "file name." Unable to save changes. Check with a system administrator.`

`Xtltool` is unable to save attribute or value changes for the selected provider because it cannot access the provider's information file with write permission. (An `access(2)` call with a `W_OK` flag returned with a negative value.)

Can't read provider information file to change attribute "attribute." Check with a system administrator.

Xtltool is unable to save attribute or value changes for the selected provider because it cannot open the provider's information file for reading. (An `fopen(2)` attempt on the indicated information file has returned null, and the error is not `ENOENT`.)

Can't update the provider information file to change attribute "attribute." Check with a system administrator.

Xtltool is unable to open for writing a temporary file to hold attribute/value changes for the selected provider. (An `fopen(2)` on a `tmpnam(2)`-generated file name has returned null.

Can't update the provider information file.

An attempt to move the contents of a temporary file into the information file for this provider has failed. Permissions on the information file may be incorrect.

Unable to create the provider information file for provider "providername." Check with a system administrator.

Xtltool cannot open for writing the information file for this provider. (An `fopen(2)` call with write access permissions has returned null.) Permissions on the "config" directory may be incorrect.

Can't execute command to search for configuration hierarchy.

Xtltool attempts to use the `pkginfo(1)` command to determine the proper location for the Solar Teleservices configuration hierarchy. This attempt has failed.

Verifying configuration database contents...

Xtltool is opening and verifying the contents of the SunXTL configuration database on this host. It will ignore any invalid entries.

Warning: Input buffer line truncated while parsing master configuration file. Continuing as best as possible.

A line in the master configuration file has exceeded the maximum allowable length and has been truncated internally. The maximum line length is 2308 characters.

Permissions wrong on information file for provider "provider."

Xtltool cannot access the information file for the provider indicated. (An access(2) call has failed with F_OK, R_OK and W_OK flags set.)

Can't find information file for provider "provider."
Commenting this entry out in the master configuration file.

An entry in the master configuration file does not appear to have a matching information file in the config directory. Xtltool has commented out this line in the master configuration file. (An access(2) call on the indicated file has failed with ENOENT.)

Can't properly access the information file for provider "provider".

Xtltool cannot open the information file for the indicated provider in the config directory. The problem is not a mode problem, nor that the file does not exist. The permissions on the config directory may be incorrect.

Xtltool: Couldn't update aliases in the host configuration file.

Xtltool is not able to replace the contents of the master configuration file with updated aliases. Permissions on the configuration file, or on the top-level configuration directory, may be set incorrectly.

Configuration directory directory_path doesn't seem to exist.

Xtltool cannot find the SunXTL configuration hierarchy where it should exist. (An access(2) call has failed with an ENOENT value.)

Xtltool: Cannot properly access XTL configuration directory directory_path.

The access permissions on the SunXTL configuration hierarchy are not set to allow proper operations.

Xtltool: Configuration directory directory_path doesn't seem to exist.

The "config" subdirectory of the SunXTL configuration hierarchy is not found where expected. (An access(2) call has failed with an ENOENT value.)

Access to XTL configuration directory "directory" appears to be read only. Setting read-only mode. No verification taking place.

The "config" subdirectory of the SunXTL configuration hierarchy is set with read access only. The tool has set itself to read-only mode.

Xtltool: Cannot properly access XTL configuration directory directory_path.

The config subdirectory of the SunXTL configuration hierarchy does not appear to have the proper access permissions set.

Xtltool: Host configuration file file name doesn't exist.

The master configuration file for this host does not exist where expected. The tool will attempt to create it.

Cannot create a writable host configuration file.

Xtltool has not been able to create a master configuration file with appropriate permissions.

Xtltool: Cannot access host configuration file file name.

The permissions on the master configuration file for this host are set improperly.

Configuration database appears to be read only. Setting read-only mode. No verification taking place.

The master configuration file of the SunXTL configuration hierarchy is set with read access only. The tool has set itself to read-only mode.

Internal error creating default attributes. Memory allocation failed.

An internal memory allocation has failed while `xtltool` was creating the list of default attribute/value pair. The best approach is to exist and restart the tool.

Couldn't move the provider info file to update the primary alias.

`xtltool` is unable to properly rename the information file for the selected provider to a name matching its new primary alias. Permissions on the "config" subdirectory of the SunXTL configuration hierarchy may be set incorrectly.

Can't read provider information file to retrieve attributes. Check with a system administrator.

`xtltool` is unable to read the information file for the selected provider. Permissions may be set incorrectly.

The attribute "attribute" has been truncated.

While reading the contents of the selected provider's information file, `xtltool` has found an attribute which is longer than the specified maximum length (currently 32 characters.) The attribute in question has been truncated to the maximum length.

The value of attribute "attribute" has been truncated.

While reading the contents of the selected provider's information file, `xtltool` has found an attribute whose value is longer than the specified maximum length (currently 256 characters.) The value in question has been truncated to the maximum length.

An input line has been truncated.

`xtltool` has encountered an input line that is longer than its internal data structures can hold. The line has been truncated. The current maximum input line length is 512.

The attribute "attribute" contains invalid characters. It is being discarded.

An attribute token has been read in which contains characters other than an underbar ("_"), numerals or alphabetic characters, or did not begin with an alphabetic character. This attribute and any associated value has been discarded from the provider's internal list of attribute and value pairs.

Internal error recording attribute "attribute." Can't allocate memory for another attribute.

Xtltool has experienced an internal memory allocation failure while trying to record an attribute/value pair. The best thing to do is exit and restart the tool.

Internal error creating a XTL_PROVIDER_NAME attribute. Can't allocate memory for another attribute.

Xtltool has experienced an internal memory allocation failure while trying to create a required attribute/value pair. The best thing to do is exit and restart the tool.

Xtltool: Couldn't update the master configuration file.

While unconfiguring a provider, xtltool has been unable to revise and then replace the contents of the master configuration file. Permissions on the SunXTL configuration hierarchy may be set incorrectly.

Internal error: Not enough memory for provider creation.

An internal memory allocation has failed. Xtltool cannot create a new instance of a provider's data structures. The best thing to do is exit and restart the tool.

Warning: Environment modification for help file failed. On-line help may not be available.

Xtltool has been unable to set the environmental variable HELPPATH to include its on-line help files.

Not enough memory to build list of valid keys.

Xtltool is unable to properly build an internal list of valid attributes for use in the user interface.

Can't build a list of configured providers.

`xtltool` can't properly open the master configuration file to determine which providers are currently configured.

Can't properly list aliases for reconfiguration.

`xtltool` can't build an internal list of information files that do not have corresponding entries in the host master configuration file. It has not been able to properly examine the "config" subdirectory of the SunXTL configuration hierarchy.

Can't read information for provider "provider."

`xtltool` cannot properly open and read the information file for the selected provider. This may be because of failure to allocate internal memory structures, or because of file permissions. Check to see that access is set properly on the information file. Then exit and restart the tool.

You have unsaved changes in the "Provider Info" window. Do you wish to discard them?

You did not save changes made to provider information in the `xtltool` Provider Information popup window.

Error removing provider.

An error has occurred while `xtltool` attempted to deconfigure (whether permanently, or while leaving for reconfiguration) a provider. This may be due to internal memory problems or information file permissions. Try exiting and restarting the `xtltool`.

Error building template menu.

An error has occurred while `xtltool` attempted to build the menu listing template files for use in provider configuration. This may be because the tool was unable to properly access the "templates" subdirectory of the SunXTL configuration hierarchy.

Error building reconfig menu.

An error has occurred while `xtltool` attempted to build the menu listing information files available for reconfiguration. This may be because the tool was unable to properly access the "config" subdirectory of the SunXTL configuration hierarchy.

Primary alias can't be empty.

You attempted to configure a provider with an empty primary alias field. This is not allowed.

The alias "alias" is already in use! Please choose another.

You attempted to create an alias for a provider when the alias in question is already in use by another provider. All aliases must be unique on a given machine.

The alias "alias" belongs to a deconfigured provider. Please choose another.

You attempted to create an alias for a provider when the alias in question is in use by a currently deconfigured provider. All aliases must be unique on a given machine.

Cannot reset to template attributes for this provider.
Can't find the template file.

You selected the Reset button on the Provider Information window while configuring a new provider, but `xtltool` cannot properly find the template file. There could be two reasons for this:

- The provider could be built from scratch, in which case no template file exists.
- The provider was created from a volatile template file involved in a drag-and-drop operation (from mailtool, for example), and the template file no longer exists.

An attribute's text string cannot be empty. Please re-enter the information.

You attempted to create an attribute/value pair with an empty attribute string. This is not allowed.

Error converting attribute "attribute" to proper form. Please re-enter the attribute.

You entered an attribute that has other than alphabetic, numeric, and underscore ('_') characters. (An example might be an attribute string containing punctuation marks.) The standard attribute format does not allow this.

No changes to the "XTL_PROVIDER_NAME" attribute are allowed.

You attempted to create or alter the XTL_PROVIDER_NAME attribute/value pair. The configuration tools use this pair for their own purposes.

The attribute "attribute" already exists!

You selected the New Key button when the attribute text field contains an attribute that already exists. Use the Change button instead.

The value for the "XTL_SETUP" attribute is invalid! The command cannot be executed.

You selected the Execute Setup Command button, but the value associated with the XTL_SETUP attribute is empty and cannot be executed.

The setup command "command" may have failed.

You selected the Execute Setup Command button, but the command may have failed. Verify that it specifies a valid executable.

The value for the "DOCUMENT" attribute is invalid! The command cannot be executed.

You selected the Execute Document Command button, but the value associated with the DOCUMENT attribute is empty and cannot be executed.

The document command "command" may have failed.

You selected the Execute Document Command button, but the command may have failed. Verify that it specifies a valid executable.

Internal error: can't create provider "provider."

An internal error prevents xtltool from properly allocating and creating a new provider instance. Try exiting and restarting the tool.

An alias cannot be empty. Please re-enter the information.

You tried to insert an alias with an empty textfield. Enter the proper text for the alias and try again.

Can't read drop file.

You dropped a file on xtltool's drop target, but the tool cannot properly access the information in the file to read it.

Cannot stat permissions file to determine mode. Contact a system administrator.

Xtltool cannot properly locate the SunXTL server permissions file (by default, /dev/xtl/cnx), or cannot determine its permissions.

Can't match group on permissions file. Contact a system administrator.

Xtltool cannot find a textual match for the UNIX group of the SunXTL permissions file (by default, /dev/xtl/cnx). (A getgrgid(3) call returned a null.)

Can't retrieve permissions on connection file. Contact a system administrator.

Xtltool cannot correctly determine the access permissions on the SunXTL permissions file (by default, /dev/xtl/cnx). (A stat(2) call returned an error.)

Empty group name.

You tried to change the group ownership of the SunXTL server permissions file (by default /dev/xtl/cnx) but specified an empty string for the new group.

Invalid group name. Contact a system administrator.

You tried to change group ownership of the SunXTL server permissions file (by default /dev/xtl/cnx) but specified an apparently invalid UNIX group. (A getgrnam(3) call returned a null.)

Error trying to change group. Contact a system administrator.

Xtltool is unable to change the group ownership of the SunXTL permissions file (by default /dev/xtl/cnx). (A chown(2) call returned an error.)

Error trying to change permissions. Contact a system administrator.

Xtltool is unable to change the permissions on the SunXTL server permissions file (by default /dev/xtl/cnx). (A stat(2) call has returned an error.)

Can't retrieve information on connection file. Contact a system administrator.

Xtltool cannot properly determine the permissions of the SunXTL server permissions file (by default /dev/xtl/cnx). (A stat(2) call returned an error.)

Verification of the "attribute" attribute has failed. This value does not seem to be a valid executable. Please check the information.

You specified an invalid value for one of the attributes XTL_START, XTL_CLEANUP or XTL_SETUP. Xtltool will automatically strip the first textual token off of the value for these attributes and treat it as the absolute path to an executable, to determine whether or not the specified command exists.

Verification of the "attribute" attribute has failed. There is no permission to execute this command. Is this value correct?

You specified a value that does not appear to have execute permissions set for one of the attributes XTL_START, XTL_CLEANUP or XTL_SETUP. Xtltool will automatically strip the first textual token off of the value for these attributes and treat it as the absolute path to an executable, to determine whether or not the specified command exists.

Verification of the XTL_GROUPS attribute has failed. The group "group" is invalid.

The value for the XTL_GROUPS attribute contains one or more textual tokens that does not specify a valid UNIX group. (A getgrnam(2) call returned an error.)

The mandatory attribute "attribute" is missing. To function properly, the provider must have this information.

The attribute and value list for this provider is missing the noted attribute, which is part of the subset of required information. You must enter this attribute and an appropriate value.

"XTL_START" cannot have a null value. It must supply a valid command for starting this provider.

The attribute XTL_START has a corresponding null value. This is inappropriate because the value for XTL_START is used to start the provider in question; it must be non-null.

Allocation of tempfile name space failed. Out of memory.

Xtltool is unable to create a temporary file to use while verifying the contents of the current SunXTL database. It is possible that there is no space in /tmp.

Cannot open temp file "file" to verify master configuration file.

Xtltool is unable to create a temporary file to use while verifying the contents of the master configuration file in the current SunXTL database. It is possible that there is no space in /tmp, or that the permissions on /tmp are incorrect.

Can't correct version information in master configuration file.

Xtltool has experienced problems modifying the master configuration file in the current SunXTL database. This could be because of the file's permissions, or because of space or permission problems in /tmp.

Can't open provider information file to change attribute "attribute."

Xtltool is unable to open the information file for the current provider and thus cannot make changes. It is possible that the permissions on the file are incorrect.

Can't update the provider information file.

Xtltool has been unable to change the contents of the information file for the current provider. It is probable that permissions on the information file are wrong.

Cannot open temp file "file" to store alias change.

Xtltool is unable to open the indicated file in /tmp for use in recording an alias change for the current provider. Most likely, /tmp is full or its permissions are incorrect.

Cannot modify the host master configuration file.
Reconfigure command aborted.

Xtltool is unable to add a new provider to the host configuration file by appending it. Probably the permissions on the file are incorrect.

Cannot open temp file "file" to change default provider.

Xtltool is unable to open a temporary file for use in changing the contents of the master configuration file for the current SunXTL configuration. Perhaps /tmp is full or its permissions are wrong.

The template file for provider type "type" not in Version 1.0 format. Cannot read the template successfully.

The template file for the indicated provider type does not have the correct XTL_VERSION setting. At this point, xtltool recognizes only one valid version.

Cannot open temp file "file" to unconfigure provider.

Xtltool is unable to open a temporary file for use in changing the contents of the master configuration file for the current SunXTL configuration. Perhaps /tmp is full or its permissions are wrong.

Couldn't update the master configuration file.

Xtltool has been unable to change the contents of the master configuration file for the current SunXTL configuration. It is probable that permissions on the file are wrong.

Ignoring invalid command-line argument.

Xtltool was invoked with an unrecognized command-line argument which it has discarded.

You have unapplied attribute/value changes in the "Provider Info" window. Do you wish to discard them?

The user has typed into the attribute/value textfields in the "Provider Info" window but has neither created a new attribute nor modified an existing one.

You have unapplied alias changes in the "Provider Info" window. Do you wish to discard them?"

The user has typed into the alias textfield in the "Provider Info" window but has neither created a new alias nor modified an existing one.

Can't properly read new configuration hierarchy.

Xtltool has been unable to properly read in the new configuration hierarchy. There are a number of possible causes, generally dealing with missing directories or unreadable files. Mostly likely a previous alert will have indicated the exact nature of the problem.

This read-only configuration appears to have invalid version information. The version must be correct by a user with appropriate permissions.

A configuration which is not modifiable contains one or more files with an incorrect XTL_VERSION setting. Xtltool cannot modify the configuration to set XTL_VERSION correctly.

Cannot build a menu of available provider templates.

Xtltool's attempt to look at the current configuration's set of template files has failed. This message should be seen only one time, though the problem may persist.

Cannot remove used alias.
Cannot find alias "alias."
Cannot verify key is in correct format.
Cannot find key "key."
Cannot remove alias "alias."
Cannot remove key "key."
Cannot set default attributes.
Cannot remove from unconfigured list.
Cannot change primary alias.
Cannot change default provider.

Cannot ensure that XTL_PROVIDER_NAME is set correctly.
Cannot read dropped file properly.
Cannot read dropped file properly: XTL_VERSION is incorrect.
Cannot ensure that minimum keyset exists.
Cannot properly set XTL_PROVIDER_NAME.
Cannot display provider attributes.
Cannot remove from unconfigured list.
Cannot set selected attribute.
Cannot set selected provider.
Cannot remove provider.
Cannot verify value.
Cannot verify provider changes.
Cannot replace in scrolling list.
Cannot select item in list.
Cannot add attribute "attribute" to provider information.
Cannot properly compare alias list.
Cannot properly create menu.
Cannot correctly search list of required keys.

These messages result from an internal memory allocation failure or a string transformation error that caused xtltool to fail on a action. These messages are mainly informational, and help to indicate what process was taking place at the time of the failure.

Glossary



alias

See *primary alias* and *secondary alias*.

attribute

Attributes define how providers are configured. Each attribute has a value associated with it. Attributes are maintained in *provider information files* and are set using the configuration tools: `xtltool` or `config.xtl`.

configuration database

The configuration database comprises of the *host configuration file* and one or more *provider information files*. Together they define the aliases and attributes of each provider configured on your system.

configured provider

A *provider* that is registered with the *server*. A *provider* is registered after using *xtltool* or *config.xtl*.

`config.xtl`

A TTY-based configuration tool used to register new *provider* names with the *server*.

device

The hardware interface between a phone or switch, and a workstation.

host configuration file

Lists the *primary* and *secondary aliases* of the *configured providers* on a given host.



information file	Contains specific information on a configured <i>provider</i> . Identified by a <i>primary alias</i> .
key	A textual value or tag with associated <i>value</i> used to define an <i>attribute</i> .
primary alias	The string name used to refer to a <i>provider</i> configuration. The primary alias is a <i>provider's</i> default and primary name. See <i>secondary alias</i> .
provider	A process that represents an interface between the Teleservices platform and an installed telephone device, such as a telephone line or a fax machine. Multiple instances of a provider can be configured, each based on the same information. Each configuration is identified by a unique <i>primary alias</i> .
secondary alias	Additional string names that refer to a <i>provider</i> configuration. The <i>secondary alias</i> is any name given to a <i>provider</i> that is not its <i>primary alias</i> . See <i>primary alias</i> .
server	The SunXTL server controls communication between XTL-based applications and <i>providers</i> .
template file	Installed with every <i>provider</i> package, this file can be used as a starting point when configuring providers using <i>xtltool</i> or <i>config.xtl</i> .
value	Defines each <i>attribute</i> in a <i>provider's information file</i> .
XTL API	The SunXTL application programming interface
xtltool	A window-based tool used to configure <i>providers</i> ; it performs the same administration functions as the script-based <i>config.xtl</i> tool.

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- The procedures were well documented.

Strongly
Agree

☐

Agree

☐

Disagree

☐

Strongly
Disagree

☐

Not
Applicable

☐

Comments _____

- The tasks were easy to follow.

Strongly
Agree

☐

Agree

☐

Disagree

☐

Strongly
Disagree

☐

Not
Applicable

☐

Comments _____

- The illustrations were clear.

Strongly
Agree

☐

Agree

☐

Disagree

☐

Strongly
Disagree

☐

Not
Applicable

☐

Comments _____

- The information was complete and easy to find.

Strongly
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☐

Agree

☐

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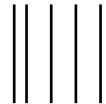
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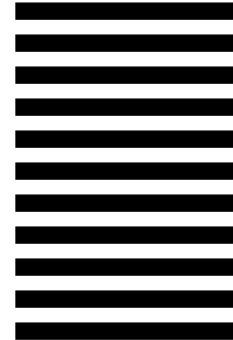
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