

OpenSpirit[®]

Version 3.2

User's Guide



December, 2009

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Preface

About this User's Guide

This guide describes the recommended procedures for the installation, configuration, troubleshooting, and support of OpenSpirit. This covers OpenSpirit runtime use. This guide also presents a tutorial in the use of the OpenSpirit runtime utilities and viewers.

Material in this guide pertains to the OpenSpirit version specified on the Cover page of this document and is included on the OpenSpirit CD or downloaded image and installed in the top level directory of every OpenSpirit installation.

Intended Audience

The Getting Started and Tutorial sections should be of interest to end users of OpenSpirit enabled applications, developers of OpenSpirit enabled applications, and administration and support staff involved with supporting OpenSpirit.

The Installation, Configuration, Support and Troubleshooting sections will mainly be of interest to administration and support staff involved with supporting OpenSpirit.

Additional Sources of Information

An extensive Developer's Guide, including data model summaries, architectural overview, reference documentation, and sample applications is included in the OpenSpirit developer packages. The developer packages can be found online at the OpenSpirit Developer Forum web site, devnet.openspirit.com.

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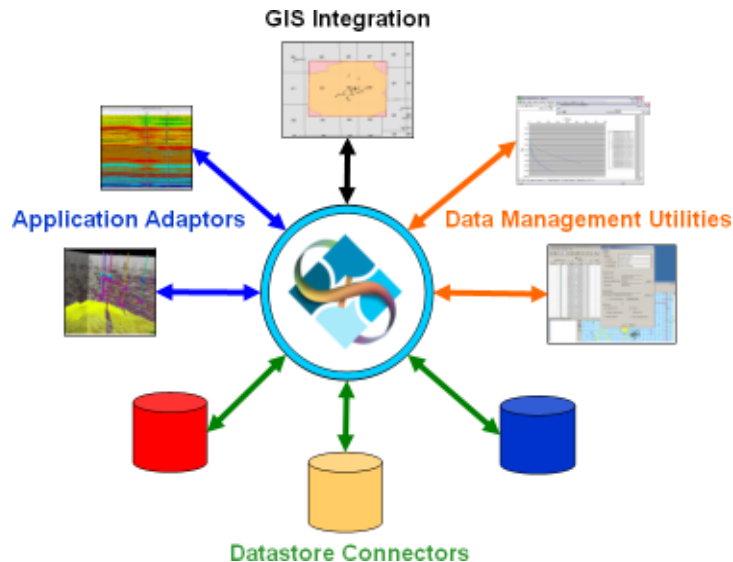
For support or other technical assistance
Email: support@openspirit.com or call 281 295-1400 and ask for support.
Web based support information: www.openspirit.com/support

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1 Introduction

Through OpenSpirit's Application Integration Framework, you'll see new opportunities made possible. OpenSpirit will give you the ability to bring together the tools you already use in ways that were never before possible. OpenSpirit works with applications from multiple sources that are able to run on the most appropriate platforms, already integrated with the applications you use today. All this is made possible through the OpenSpirit Framework - *a better way to work!*



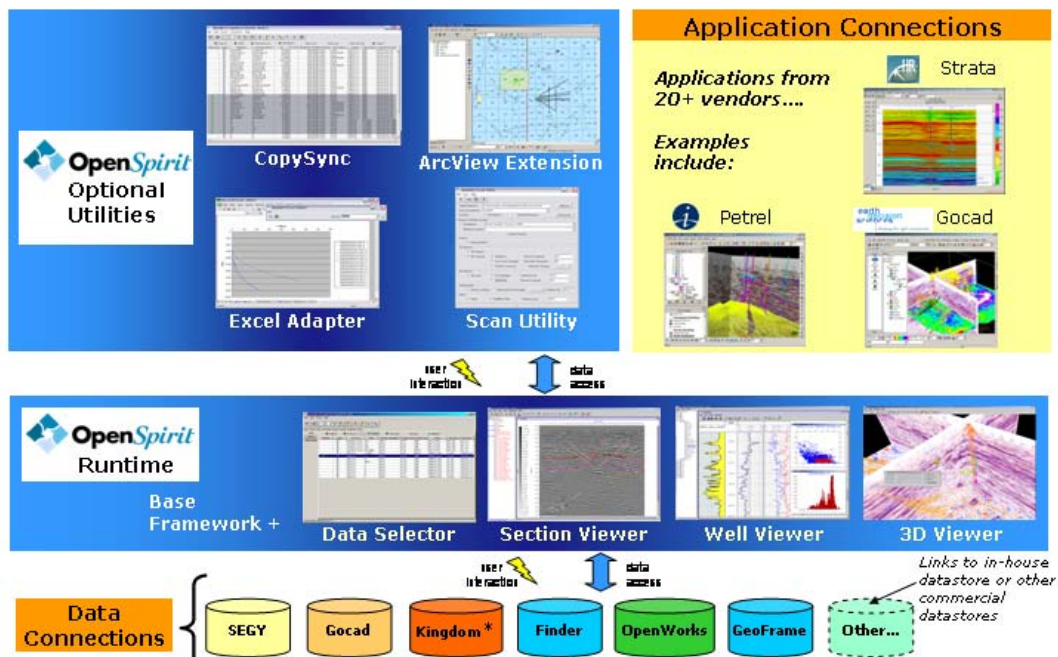
To take advantage of this framework, there are a few key elements that you need to learn about OpenSpirit and how it works. Chapter 2 of this guide contains a Basic Tutorial that will familiarize you with the most common runtime features.

If you run into problems, refer to the *Support and Troubleshooting Guide* that contains information on common problems and their solutions. If you can't solve your problem and need to contact someone immediately, see the *Contact OpenSpirit Corporation* page at the beginning of this document.

If you are a developer, visit the OpenSpirit Developer's Forum at devnet.openspirit.com that will show you how to utilize the OpenSpirit toolkit for developing OpenSpirit applications.

For additional information on OpenSpirit Corporation, future product plans, and additional services, visit our web site at www.openspirit.com. Thank you for choosing to learn more about OpenSpirit!

Integration Framework



A basic OpenSpirit installation consists of the OpenSpirit Runtime plus one or more data connections and optional utilities.

OpenSpirit Runtime

The OpenSpirit Runtime consists of the following components:

- Base Framework - includes basic shared services required for any OpenSpirit application or data connection
- Launcher - allows you to create and edit OpenSpirit sessions and to launch OpenSpirit viewers and utilities
- DataSelector - a universal data selector that may be used to find data by attribute value from any project connected via OpenSpirit
- Well Viewer - view well log and well picks in a multi-track view
- Section Viewer - view 2D or 3D seismic sections with intersecting horizon and fault data
- 3D Viewer - view wellbore paths, picks, logs, horizons and horizon properties, faults, drilling targets, and 2D and 3D seismic data

Chapter 2 describes the use of these tools in more detail.

CHAPTER 1 Introduction

OpenSpirit Data Connections (Data Modules)

In order to allow OpenSpirit enabled utilities and third party applications to access your data, you'll need the appropriate OpenSpirit data connection. Each data connection type is separately licensed and the current OpenSpirit version supports the following data access functionality:

F = full support (create, read, update and delete)

RO = read only

	OW/SW	GF IESX/CH	EPOS	Finder	Kingdom	Petra	PPDM	SEGY	Recall	ArcSDE
Well	F	F	RO	F	F	F	RO		F ¹	
Well Bore	F	F	RO	F	F	F	RO		F	
Well Bore List	F	F	RO	F		RO	RO ²		F	
Well Log	F	F	RO	F	F	F	RO		F	
Well Pick	F	F	RO	F	F	F	RO		RO	
Well Velocity	F	F	RO	F	F					
Well Attribute									F	
Well Bore Attribute									F	
Well Log Trace Attribute									F	
Logging Pass									F	
3D Survey	F	F			F			F		
3D Dataset	F	F			F			F		
2D Survey	F	F			F			F		
2D Line	F	F			F			F		
2D Dataset	F	F			F			F		
Horizon Grid 2D (3D seismic)	F	F			F					
Horizon Grid 2D (non seismic)	F	F			F					
Horizon Fault Boundaries	F									
Horizon PointSet	RO									

	OW/SW	GF IESX/CH	EPOS	Finder	Kingdom	Petra	PPDM	SEGY	Recall	ArcSDE
Horizon Grid 1D (2D Seismic)	F	F			F					
Fault Polyline Set (3D)	F	F			F					
Fault Polyline Set (2D)	F	F			F					
Fault PointSet	RO									
Culture Point Feature										RO
Culture Polyline Feature										RO
Culture Polygon Feature										RO

** - Linux only

1 - Recall Wellbore does not support deviation surveys

2 - Synthesized from fields

Note: Please refer to our web site to learn of new or enhanced data connectors.

OpenSpirit Optional Utilities

OpenSpirit optional utilities include:

- Scan Utility - scans all your OpenSpirit enabled data stores to create and keep up to date shape files or ArcSDE layers that may be used in GIS systems
- ArcMap extension - allows ArcMap to be used as an OpenSpirit enabled data selector for well, seismic, and horizon data
- Excel Adapter - receive OpenSpirit data selection events and paste desired well, seismic, interpretation and SDE culture attributes into Excel
- Copy Manager- perform a one-step data transfer or well, seismic, and interpretation between OpenSpirit enabled data stores

The use of these utilities require a separate license feature to be purchased and are described in more detail in Chapter 2 of this User Guide.

CHAPTER 1 Introduction

Below is a matrix of what OpenSpirit data types are supported by the various OpenSpirit tools and utilities:

	Copy Manager	Data Selector	Scan Utility	Excel Adapter	ArcMap Extension	3D Viewer	Well Viewer	Section Viewer
Well	x	x	x			x		
Well Bore	x	x	x	x	x	x		
Well Bore List	x	x						
Well Log	x	x		x		x	x	
Well Pick	x	x		x	x	x	x	
Well Velocity	x	x		x				
Logging Pass		x		x				
3D Survey	x	x	x	x	x			
3D Dataset	x	x	x	x	x	x		x
2D Survey	x	x	x	x				
2D Line	x	x	x	x	x			
2D Dataset	x	x	x	x	x	x		x
Horizon Grid 2D (3D seismic)	x	x	x	x	x	x		x
Horizon Grid 2D (non seismic)	x	x	x	x	x	x		
Horizon Fault Boundaries		x		x	x	x		
Horizon PointSet		x		x	x	x		
Horizon Grid 1D (2D Seismic)	x	x		x	x	x		x
Fault Polyline Set (3D)	x	x		x	x	x		x
Fault Polyline Set (2D)	x	x		x	x	x		x
Fault PointSet		x		x	x	x		
Culture Point Feature		x		x	x	x		
Culture Polyline Feature		x		x	x	x		
Culture Polygon Feature		x		x	x	x		

Licensing

All OpenSpirit products (the Runtime, the Data Connections, and Optional Utilities) are controlled by FLEXIm feature keys and are licensed on a per concurrent user session basis, independent of operating system. This means, for example, that a user may be using a Well Viewer running on Windows concurrently with a 3D Viewer running on Solaris where both are accessing data from one or more data connectors. In this case only one OpenSpirit Runtime and one data connector license per data connector type will be checked out.

Please refer to the OpenSpirit web site (www.openspirit.com) for up-to-date information and details of supported platforms and operating system versions.

2 OpenSpirit Tutorial

This chapter shows you how to begin using OpenSpirit in a runtime environment. OpenSpirit must be installed, configured, and running before starting this tutorial.

The tutorial will show you how to use the various OpenSpirit tools so that you can take full advantage of OpenSpirit functionality. It starts by showing you how to create OpenSpirit Sessions and then demonstrates how to retrieve and view data using some of the OpenSpirit utilities and viewers. Some features that are not used as often are briefly referenced in the *Basic Tutorial* but covered more specifically in the *Advanced Tutorial*.

Basic Tutorial

The main entry point to begin using OpenSpirit is the **Launcher**. The OpenSpirit Launcher is used to select data that will be used during OpenSpirit Sessions and to launch OpenSpirit tools and OpenSpirit enabled applications from various third party vendors. Data can be combined into an OpenSpirit Session, which creates a multi-vendor, multi-version collection of projects. The Session acts just as a single project would be used in vendor systems such as GeoFrame and OpenWorks. An OpenSpirit Session provides the ability to use data within any number of projects without requiring the data to be moved or copied.

Basic Tutorial Lessons	Advanced Tutorial Lessons
<ul style="list-style-type: none">Using the Launcher	<ul style="list-style-type: none">Active ServersMonitoring Server EventsCustomizing Menu Items
<ul style="list-style-type: none">Working with Sessions	<ul style="list-style-type: none">Setting UnitsSetting Coordinate SystemEditing or DeletingExiting a Launcher Session
<ul style="list-style-type: none">Using OpenSpirit Tools	<ul style="list-style-type: none">DataSelectorCopySyncExcel AdapterWell ViewerSection Viewer3D ViewerEvent GatewaysScan UtilityArcMap Extension

Using the Launcher - Basic

The OpenSpirit Launcher is the main user interface. From the Launcher you can manage your OpenSpirit sessions, launch OpenSpirit applications, and monitor OpenSpirit data connectors.

The OpenSpirit Launcher is started by typing `./openspirit` in the bin directory of a Unix installation, or on a Windows machine from a short cut on your desktop or the Start>Programs menu. When you start OpenSpirit for the first time, you will automatically start the OpenSpirit User Setup Wizard.

User Setup Wizard

The User Setup Wizard will walk you through creating a new OpenSpirit user account, and configuring your data server activation settings. You can also use the User Setup Wizard any time after the initial setup to modify your settings.

Starting the User Setup Wizard. The User Setup Wizard will be presented to you the first time you run the OpenSpirit Launcher or DataSelector as a new OpenSpirit user. You can also access it through the OpenSpirit Launcher's Configuration menu.



Using the Session Wizard. Navigation through the setup steps is accomplished by clicking on the *Next* and *Back* buttons found at the bottom of each of the User Setup Wizard panels. The *Next* button takes you to the next panel. The *Back* button takes you to the previously displayed panel. Navigating backward using the *Back* button will not cause you to lose any entries already made.

A *Cancel* button is available on all of the wizard panels. Click *Cancel* to close the wizard discarding any changes.

The User Setup Wizard walks you through the following panels.

Create an OpenSpirit user. When you start OpenSpirit for the first time, the OpenSpirit User Setup Wizard automatically starts. This will register your current Windows or UNIX userid as your OpenSpirit primary desktop account. OpenSpirit enters this userid in its internal database and uses this area to keep track of your OpenSpirit preferences. These preferences are then available

from any host computer that you log onto as long as you log in under the same userid. The *New User Account Setup* will only run the first time you start OpenSpirit.

Secondary Desktop Account Setup. The *Secondary Desktop Account Setup* panel is presented after your OpenSpirit primary desktop account is created. A secondary account may be needed if you want to run OpenSpirit applications on Windows and UNIX (i.e. Linux or Solaris) using different userids. If your UNIX and Windows userids are the same, then leave the field blank, you do not need to configure a secondary desktop account.

When you have different UNIX and Windows userids and you register one of them as a secondary desktop account, your OpenSpirit user preferences will appear the same from both accounts. The secondary desktop account also allows you to share OpenSpirit interaction events, like data selection events and cursor tracking events, between applications running under different userids. Normally user interaction events are only shared between processes running under the same userid, potentially on different host computers.

For example, if you are running an OpenSpirit enabled application on Windows and your userid is "ms-user" and you are also running an OpenSpirit enabled application on Linux using a userid "ln-user", you should register one of the userids as your primary account and the other as a secondary account. It is best to use the userid you use most often to run OpenSpirit applications as your primary account.

A userid cannot be registered as both a primary account and a secondary account. You will need to have your OpenSpirit installation administrator use the OpenSpirit User Manager tool to delete one of the primary accounts if you mistakenly register both of your userids as primary accounts. The userid associated with the deleted primary account will then become available for use as a secondary account.

You can un-register a secondary desktop account by blanking out the field and continuing with the wizard to a successful finish.

Setup a data server. OpenSpirit has the capability to remotely start application data connectors (GeoFrame, OpenWorks, Finder, etc.) across different operating systems such as Solaris and Linux. This capability is commonly used when running applications on Windows that need access to data that is only available on Solaris or Linux (see Chapter 3). The data connector setup panels are used to provide OpenSpirit with the host, account, and password information needed to run data connector processes to service requests for data made by OpenSpirit enabled applications. The information is encrypted and stored as part of your user preference data in the OpenSpirit proprietary database.

Windows data connectors can only be run on a Windows host that is running your OpenSpirit Launcher or DataSelector. No data connector setup is needed for Windows data connectors (Kingdom, Petra, etc.).

The *Data Server Setup* allows you to enter a SunOS (Solaris), or Linux host, user account and password. This will become the default host for any OpenSpirit data connector that runs on the associated platform. The *Host* entry field contains a *Test* button on the right of each row that



Usage Note:

This feature requires that the rexecd daemon or SSH be running on the target host. The rexecd daemon may be disabled at some sites or some computers.

CHAPTER 2 OpenSpirit Tutorial

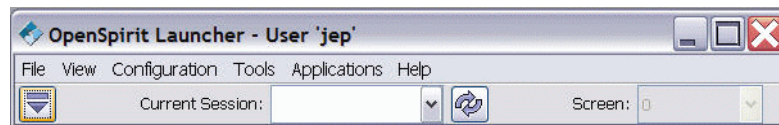
can be used to validate the host, account, and password entered for the platform default.

If you always want to use this host for every OpenSpirit data store, then check the *Use default values for all Data Servers* radio button. If you leave the default *Allow Data Servers to be independently configured* checked, then when you select *Next*, you will be presented with a list to choose a host for every data store. OpenSpirit data connectors must be able to run in their native operating system environment. The host, account, and password should be able to run the application outside of OpenSpirit. If you want to change a few of the data connectors use Alt and Ctl function keys and click on the Data Sources you want to change and then click on *Edit selected rows*.


Set user passwords. The last step in the OpenSpirit Setup Wizard is an area to set your project passwords. This will give you the opportunity to enter project passwords for all the relevant projects. OpenSpirit utilizes the access control mechanism of the underlying data source so project passwords are only needed if the native application requires them. If you elect not to enter project passwords at this time you will be prompted to do so later when you use a project that requires one.

- OpenWorks, Recall, Managed Segy and Petra - no account or password is required.
- GeoFrame - a project password is required. You may click, using the right mouse button, on the *Password* column header to set the passwords of all the GeoFrame projects to the project name. The *Password* field will automatically be filled out with the project name. You can then edit the password of any GeoFrame project that does not match the project name.
- Finder - Oracle account and password. Externally authenticated Finder accounts cannot be used.
- PPD - Oracle account and password.
- Kingdom - Entering Kingdom passwords depends upon the type of Kingdom project database your project uses. If the Kingdom project database is MS Access, enter the Kingdom author for both the account and password field. If the Kingdom project database is Oracle, the account should be the Oracle database login user followed by a semi-colon and then the Kingdom project author name. The password should be the Oracle database login user password.
- SDE - Oracle SDE user and associated Oracle password.

After you have gone through the User Setup Wizard, the OpenSpirit Launcher will open:



The main Launcher window can be expanded to show the full set of features by clicking the *Session*

Manager icon  or selecting the *View > Session Manager* menu item.

Working with Sessions

An OpenSpirit Session is used to define a subset of data source projects that are used to select data. Sessions are also used to express a preference of units and coordinate system to be used when displaying values obtained from projects in the Session. Applications are not required to honor the unit and coordinate system preferences, they are only there to indicate a preference. Some applications make use of these preferences and some applications ignore them.

Session Wizard

Sessions are created using the Session Wizard. The Session Wizard is also used to make changes to an existing Session. The Session Wizard guides you through the steps of creating a Session, including selecting the data source projects and unit and coordinate system preferences. Interpreter and source priority preferences are also captured for Sessions that contain one or more OpenWorks projects.

Navigation through the Session creation steps is accomplished by clicking on the *Next* and *Back* buttons found at the bottom of each of the Session Wizard panels. The *Next* button takes you to the next panel. The *Back* button takes you to the previously displayed panel. Navigating backward using the *Back* button will not cause you to lose any entries already made.

A *Cancel* button is available on all of the wizard panels. Click *Cancel* to close the wizard discarding any changes.


A *Finish* button is available on all of the wizard panels if the wizard is being used to edit an existing Session. The *Finish* button only appears on the last panel if the wizard is being used to create a new Session. Click *Finish* to close the wizard saving any changes that have been made. No changes are saved until the *Finish* button is pressed.

Starting the Session Wizard. The Session Wizard is accessed via the *Sessions* tab in the OpenSpirit Launcher and then clicking Edit or Create, or via the OpenSpirit DataSelector's *Session* menu.

Using the Session Wizard. The Session Wizard will create an OpenSpirit Session after it walks you through the following panels. The panels can also be used to edit an existing Session.

Session general properties. Enter a Session name and optionally a description. The name must be 60 characters or less and may not contain spaces or special characters such as \$#'()"%. The description can be up to 256 characters and may contain spaces and special characters. The name cannot be changed after the Session is created. The description can be changed at any time. Click the *Next* button after you have entered your Session name and description.

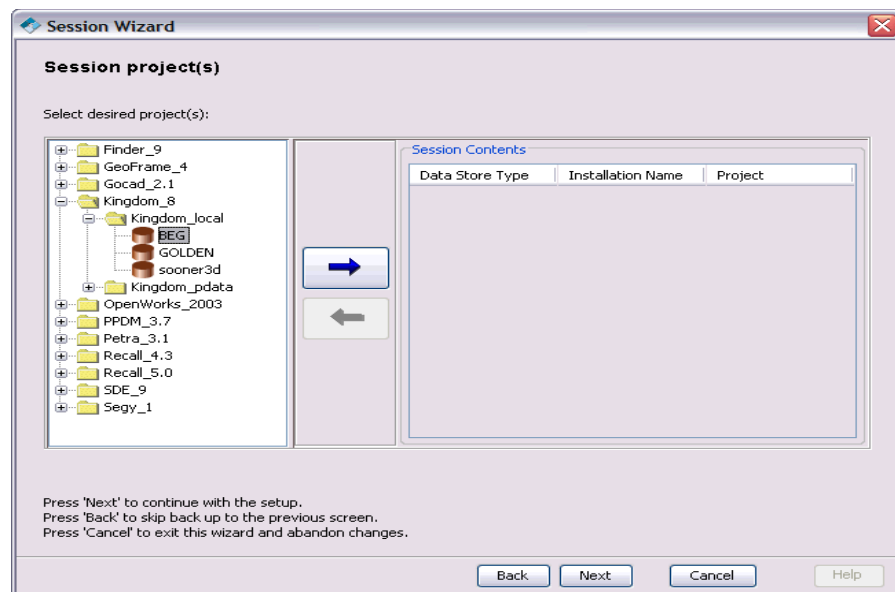
Session project(s). Choose the projects you want to access using this Session. You can combine data from one or several diverse project data sources into a single Session. The tree on the left side

 **Security Note**
You will only see data sources that have been configured at your site and projects to which you have access based on the security mechanism of the underlying vendor system and based on the userid running your Launcher process. The expanded tree will look different depending on what data stores are configured at your site and which projects are available for you to use.

CHAPTER 2 OpenSpirit Tutorial

of the panel organizes all of the available projects in a hierarchy of data store type, data store instance, and project. The tree does not display projects that you do not have permissions to access.

Expand the tree to select a project. The *right arrow* will turn blue when you select a project of interest. Press the *right arrow* to add the project to your Session. Projects that are already in the Session will appear green and will be in the list on the right of the panel. Projects not included in the Session appear brown in the tree. You can remove projects from the Session by selecting them from the list on the right side and clicking on the *left blue arrow*.



It is best not to add unnecessary projects to your Sessions as there is an overhead for each additional project. After you have picked the project(s) you are interested in, click *Next* which will take you to the *Passwords* panel or to the *Units* panel.

Passwords. This panel gives you the opportunity to enter passwords for all projects included in the Session that require an account and/or password to access. The panel will not appear if none of the projects selected for inclusion in the Session require account or password information.

OpenSpirit utilizes the access control mechanism of the underlying data source, so accounts and passwords are only needed if the native application requires them. Projects in the Session that do not require account or password information will not appear on this panel.

- OpenWorks, Recall, Managed Segy and Petra - no account or password is required.
- GeoFrame - a project password is required. You may click using the right mouse button on the Password column header to set the passwords of all the GeoFrame projects to the project name. The *Password* field will automatically be filled out with the project name. You can

then enter information for any non-GeoFrame projects or edit the password of any GeoFrame project that does not match the project name.

- Finder - Oracle account and password. Externally authenticated Finder accounts cannot be used.
- PPDM - Oracle account and password.
- Kingdom - Entering Kingdom passwords depends upon the type of Kingdom project database your project uses. If the Kingdom project database is MS Access, enter the Kingdom author for both the account and password field. If the Kingdom project database is Oracle, the account should be the Oracle database login user followed by a semi-colon and then the Kingdom project author name. The password should be the Oracle database login user password.
- SDE - Oracle SDE user and associated Oracle password.

After your Passwords have been set, click the *Next* button which will take you to the *Units* panel.

Units. You can optionally set preferred units for the Session. Some applications will honor the unit preferences and some will not. It is the individual application's decision. The unit preferences will default to a set of metric units if you do not make any selections on this panel.

Note that most applications use the coordinate system axis units for spatial X, Y, and Z location data. Many applications may only use the horizontal and vertical distance units for offset distance values. Consult with your application vendor if you are uncertain about how they are making use of these unit preferences.

After you have chosen your units, click *Next* which will take you to the *Coordinate System* panel.

Coordinate System. You are required to set a preferred coordinate system for the Session by designating which project coordinate system you want to use. Click on the *check box* in the select column to select the project's coordinate system.

The project data must be accessed to obtain a description of its coordinate system when the project's check box is selected. A data connector process may need to be started at this time. This can take anywhere from a few seconds to a couple of minutes to start depending on the type of data source and the processing speed and load of the computer that is used to run the data connector. The wizard will wait a fixed amount of time for the data connector process to start. An error message will be displayed if the data connector fails to start within the allotted time. It is possible that the data connector startup process will continue after you encounter a time-out error message. A second attempt at enabling the *check box* will usually succeed if the first attempt fails due to slow data connector start time.

Once the data connector is started the name of the selected project's coordinate system will be displayed below the list of projects. You can then click on the *Details* button if you would like to inspect the parameters used to define the project coordinate system.



Usage Note:
OpenSpirit
enabled

applications are responsible for deciding the preferred Session units and coordinates. In many situations, vendor applications may have their own mechanism of setting the application display units and coordinates, and can therefore ignore any OpenSpirit preferences that may already exist.

CHAPTER 2 OpenSpirit Tutorial

Click the *Next* button after you have chosen your coordinate system. This will take you to either the *Interpreters* panel or the *Ready to save* panel which is the last panel displayed by the wizard.

Interpreters. The *Interpreters* panel appears after pressing the *Next* button on the *Coordinate System* panel if your Session includes any OpenWorks projects. This panel is used to optionally establish the OpenWorks interpreter to be used when manipulating data in an OpenWorks project. Setting the Interpreter ensures the proper identification and storage of newly created OpenWorks interpretation data. You are not required to select an interpreter, but are strongly encouraged to do so if you intend to create any OpenWorks interpretation data using this Session.

You can select an interpreter for a subset of the displayed OpenWorks projects by highlighting one or more projects and clicking on the *Select Interpreter* button. OpenSpirit will then query OpenWorks and present you with a list of all the available interpreters common to the selected projects. A data connector process may need to be started at this time. This can take anywhere from a few seconds to a couple of minutes to start depending on the type of data connector and the processing speed and load of the computer that is used to run the data connector.

Select an interpreter from the list that pops up once the OpenWorks data connector has been queried. An error dialog will be displayed if there is not at least one interpreter common to all of the selected projects.

Click the *Select Interpreter For All* button if you want to use a single interpreter for all of the displayed OpenWorks projects. This is merely a convenience feature that saves you the effort of highlighting all of the projects. The interpreter selection list will only contain interpreters that are common to all of the listed projects.

Click the *Next* button after you are finished setting your interpreter preferences. This will take you to the *Source Priority* panel.

Source Priority. The *Source Priority* panel is displayed if your Session includes any OpenWorks projects. The *Source Priority* panel enables you to create and associate a source priority list for each OpenWorks project included in your Session. A source priority list defines an ordered list of preferred interpreters used when retrieving like data. It is taken into consideration by business logic in the OpenWorks data access libraries. It affects decisions used in determining what well pick is used if picks have the same name but different interpreters.

You are not required to enter source priority information and many applications do not make use of this information. Consult your application vendor to determine if they make use of the source priority information when requesting data from OpenSpirit.

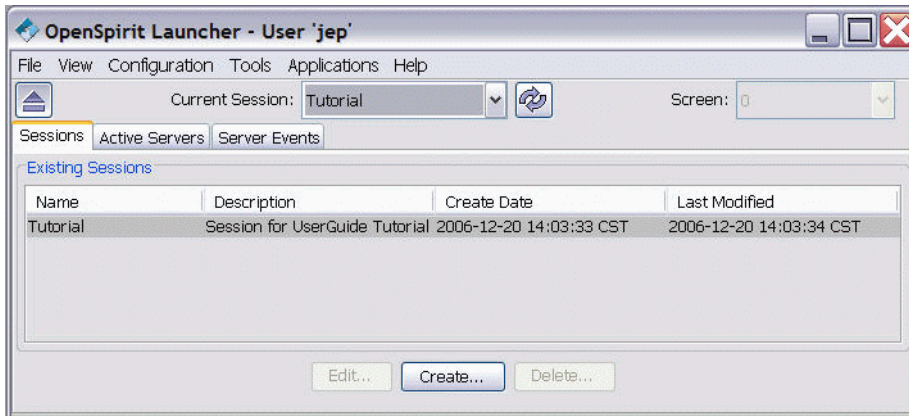
Click the *Next* button after you are finished setting your source priority preferences. This will take you to the *Ready to save* panel which is the last panel displayed by the wizard.

See the Data Selector / General Preferences Section for instructions on how to turn on the Source Priority functionality.

Ready to save. The *Ready to save* panel is the last panel displayed by the Session wizard. It is your

last opportunity to make any changes before the current settings are saved. Press the *Finish* button to save the entries made on the previously displayed panels. Press the *Back* button if you would like to go back to a previous panel to view or change any entries. Pressing *Cancel* will discard any changes made and will exit the wizard.

You have just successfully completed the creation of an OpenSpirit session and it will appear in the Launcher. With this session you can use the OpenSpirit DataSelector or other applications to work with data in the selected projects.



Using the Launcher - Advanced

More Launcher Features

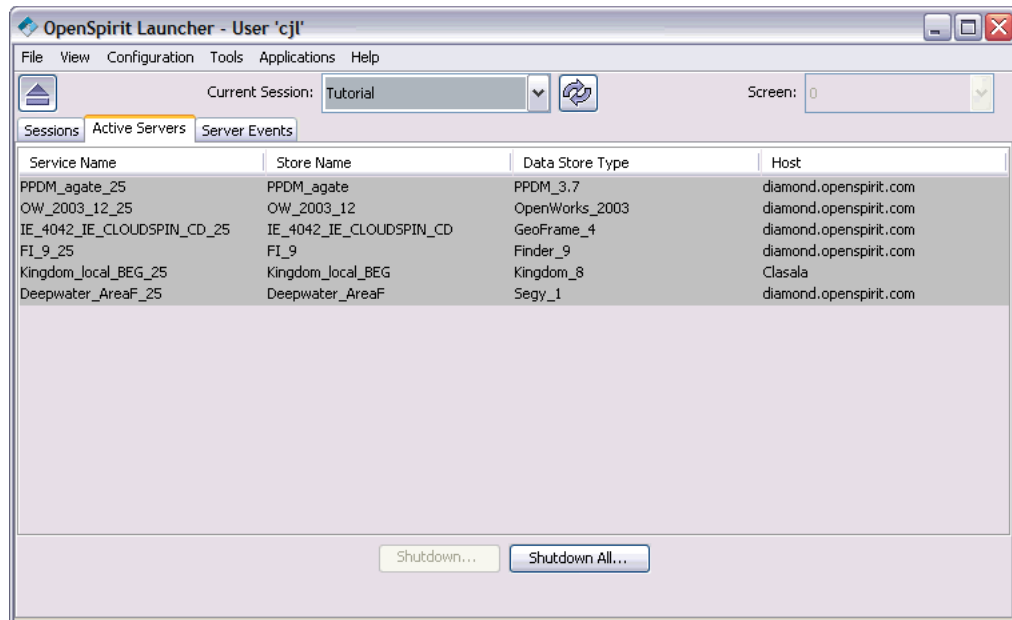
The OpenSpirit Launcher includes some additional features to allow an end user to monitor and control an OpenSpirit session and its associated processes.


Active Servers
Monitoring Server Events
Customizing Menu Items

Active Servers

A series of data connectors are used during an OpenSpirit session. These data connectors are automatically started, as required, and perform the job of serving up the requested data to OpenSpirit enabled applications and user tools. To see which connectors are running at any point in time during a session, you can select the *Active Servers* tab. This tab shows all the active data connectors for the

current user.



 **Usage Note:**
Shutting down connectors that are being used by running applications will likely cause errors in those applications. Close all OpenSpirit applications before shutting down any OpenSpirit data connectors.

The *Active Servers* tab is automatically updated as data connectors are started and stopped. Individual data connectors may be shutdown by selecting the desired row and clicking the *Shutdown...* button.

All data connectors may be shutdown by clicking the *Shutdown All...* button.

Note that even after being manually shutdown, a data connector will be automatically launched again if it is required to deliver data to a requesting application. You also have a chance to shutdown all the data connectors when exiting the Launcher.

Monitoring Server Events

Data Connector events can be monitored in the *Server Events* tab. This tab can be helpful should problems arise when starting a Data Connector.

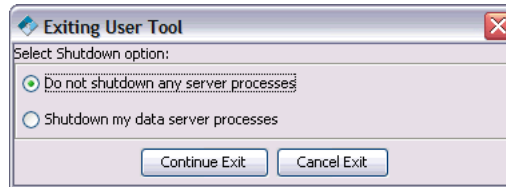
Customizing Menu Items


The *Tools*, *Applications*, and *Help* menus are all customizable on a site or individual basis. The menu entries are controlled by the contents of the \$OSP_HOME/classes/Launcher.properties file. The Launcher.properties.README file, contained in this directory, explains how the Launcher.properties file may be edited in order to change the menu items that appear in the Launcher's menus.

Exiting a Launcher Session

When you are finished with your session, quit the Launcher using the *File > Exit* menu...

If you will not be using any OpenSpirit based application for some period of time, you would normally choose the *Shutdown my data server processes* option. If you are quitting OpenSpirit but plan to start a session soon with the same ProjectSet then *Do not shutdown any server processes* is the recommended choice.



 *Usage Note:*
If your site is application license constrained, it is best to shut down your connectors when you exit the Launcher. Vendor data connector licenses are not freed while connectors are running. Also, some projects might be single user and other users won't be able to access the project if connectors are left running.









Using OpenSpirit Tools



Windows Note:

These tools are written in Java and can run on either Windows, Solaris or Linux

OpenSpirit includes a set of user tools that is intended to provide basic viewing capabilities to verify data quality, help select data for use in other applications, and illustrate the effective use of OpenSpirit. Application vendors may choose to use these tools in workflows involving their own applications. These tools are also useful to verify that an OpenSpirit installation has been correctly configured.

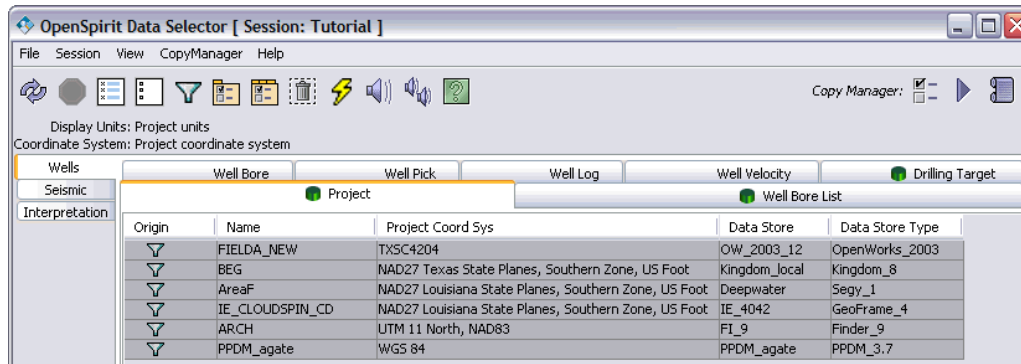
 Using the DataSelector
 Using the CopySync
 Using the Well Viewer
 Using the Section Viewer
 Using the 3D Viewer
 Using the Event Gateways
 Using the Scan Utility
 Using the ArcView Extension

Using the DataSelector

Tool Overview

The DataSelector is a data selection and query utility that presents a tabular summary of selected attributes associated with the data types that are supported by the OpenSpirit Framework. The DataSelector can be used to query for specific information from different data sources. The main functions of the tool are:

Data selection
Data query
Event Sending and Receiving



Title bar
Menu bar
Tool Bar
Work Area

Title Bar







The Title Bar shows the current session. If the DataSelector is connected to a Session it can share events to and from other OpenSpirit applications as well as OpenSpirit enabled vendor applications. If a session is set in the OpenSpirit Launcher prior to starting the DataSelector tool, then all the projects included in the Session will be selected and displayed in the *Project* tab.








Menu and Tool Bar

The Menu and Tool Bar provides various functionality that is needed when you use the DataSelector.

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The commonly used menu items are included in the Tool Bar.

Tool Bar Icon	Menu Item	Function
	File> New...	Create a new file to save the data selections.
	File> Open...	Open an existing file.
	File> Save...	Save changes that have been made.
	File> Save As...	Save changes that have been made with a new filename.
	File> Exit	Exit the DataSelector.
	Session> New	Starts the Session Wizard so a new session can be created.
	Session> Open	Presents a list of sessions so the user can select an existing session for use in the current DataSelector
	Session> Edit	Presents a list of current sessions. When the user selects a current session, the Session Wizard is started with the selected session. When edits are finished, the edited session will be used by the DataSelector.
	Session> Delete	Presents a list of current sessions the user can pick to delete.
	View> Refresh	Refresh the data in the current tab by requerying for data.
	View> Stop Refresh	Cancel the display refresh or the data query that is currently underway.
	View> Remove Received Data Selections	Remove data selections that have been received via an event broadcast
	View> Select All	Mark all rows in current tab as selected.
	View Clear All	De-Select all rows that are selected in the current tab
		Display the Data Scope dialog associated with the current tab

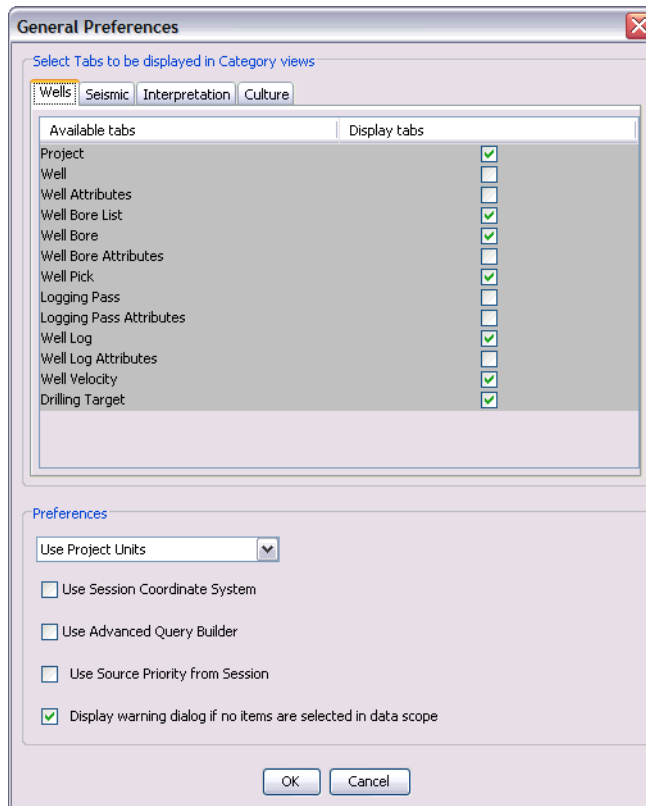
Tool Bar Icon	Menu Item	Function
	View> Tab Preferences	Display the dialog for setting tab preferences. These preferences apply to just the current tab.
	View> General Preferences	Display the dialog for setting global tab preferences. These preferences apply to all tabs.
		Toggle (on/off) listening for selection events for current tab.
	Event> Broadcast Selection Event	Send a selection event for all the selected rows in the current tab.
	Event> Broadcast Selection Event (All tabs)	Send a selection event for all the selected rows in all the tabs.
	Help> DataSelector Help	View this document.
	Help> About	Displays OpenSpirit version information.
		Displays a description of the information in the current selected tab.
	Copy Manager	 These icons control the Copy Manager Utility. A separate section will describe how to use the Copy Manager Utility.

Work Area

The work area is divided into 4 domains (Wells, Seismic, Interpretation and Culture) each comprised of different tabs for each supported data type. Only one domain and one tab is active at a time. Each tab lists supported attributes for the specific data type in each column. Columns can be added or removed and sorted or moved as desired. Within each tab you can make data selections that may impact other tabs.

 *Usage Note: The Culture domain tab will only display if you have included a SDE project via the SDE Culture data connector.*

General Preferences



The DataSelector preferences can be set in the General Preferences dialog. The General Preferences dialog can be accessed via the General Preferences icon or through the *View > General Preferences* menu item. For each domain you can turn tabs on or off, select the type of selection events to send and receive; and set preferences for the coordinate system, unit system and the Query Builder mode.

The Preferences section controls preferences for all Tabs. The first dialog box controls the units (feet, meters, etc.) you will see in the DataSelector tabs. It defaults to *Use Project Units*. In this mode, the DataSelector will display the units exactly as they are in the native project. You can also choose to display them in Imperial, metric, or translate everything to Session units.

By default the data displayed in the DataSelector uses the project coordinate system. In this mode, if you have data displayed in the Data Selector from multiple projects the original coordinate system from its native project is used. This can result in multiple coordinate systems displayed in the DataSelector at one time. If you want all of the data items displayed in the same coordinate system select the *Use Session Coordinate System* checkbox sets. In this mode all coordinate systems in the DataSelector tab are translated to the Session's coordinate system selected when the Session was created.

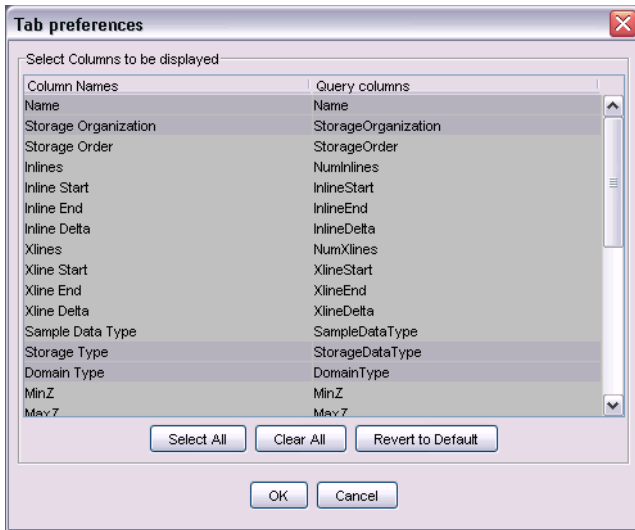
The query capability for the DataSelector is also controlled in the General Preferences. If you wish to use complex queries (and, or, nor) select the *Use Advanced Query Builder* checkbox. By default the query capability uses a basic query builder.


The *Use Source Priority from session* checkbox implements a session's Source Priority List for OpenWorks derived picks only. When checked the Source Priority List is used to determine the Well Picks displayed in the Well Picks tab.

The final checkbox controls the warning dialog that pops up if you have none of the tab's parent

items selected, and you are going to have no data displayed. Check the *Display warning dialog if no items are selected in data scope* box if you do not want this warning displayed.

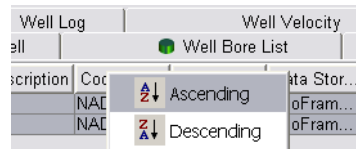
Adding Columns



Each tab will initially display a default set of attributes for the specific tab's data type. You can add additional attributes (columns) or remove existing ones by selecting the Tab Preference  icon or the *View>Tab Preference* menu item. This will display a dialog with all the attributes that can be selected in the active tab. You can use the Ctrl and the Shift key with the mouse to select and deselect multiple columns. The *Revert to Defaults* button will restore the tab's default setting and provide the fastest performance.

Sorting Columns

Columns can be sorted by clicking the right mouse button on the top of the column you want to sort. This will display a menu where you can select ascending or descending order.

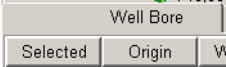
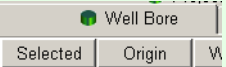
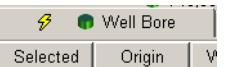



Moving Columns

Move columns by clicking and holding down the left mouse button at the top of a column where the attribute label is displayed, dragging it where you want and then letting up on the left mouse button.

Data Selections

Each tab's label designates the type of queries used within the tab. There are different types of queries.


<p>Select from selected parent</p>	<p>This selection uses the tab's parent tab to determine what is selected. It is the default selection and is designated by no icons in the tab label section.</p> 
<p>Select from selected projects</p>	<p>This selection is set by selecting this option in the Tab Preferences dialog and is made on each tab individually. When this is selected an icon is displayed in the tab label section. This example shows the Well Bore tab using the selections from the Project tab.</p> 
<p>Select from selection events</p>	<p>This selection can be used to listen to other applications sending selection events. This option can be used in conjunction with the previous option to combine selections from the parent tab. Select this option by clicking on the lightning bolt in the Tool Bar. This is an example of the WellBore tab set to listen for selection events and also getting selections from its parent Project tab.</p> 
<p>Add data selection filters</p>	<p>This selection can be used to further filter data. For example, you could make a query to show all the Well Bores with active status or all the Well Bores deeper than 5000 ft. You can also combine any number of filters. This example shows the Well Bore tab set to listen for selection events, get selections from its parent Well tab as well as additional filters being applied to the resulting selection.</p> 

Each tab has a special column named *Origin*. This column will normally be the left most column unless you have moved columns around from their default position. The *Origin* column designates what kind of selection the row came from. The different types of selections are described earlier in the chapter.

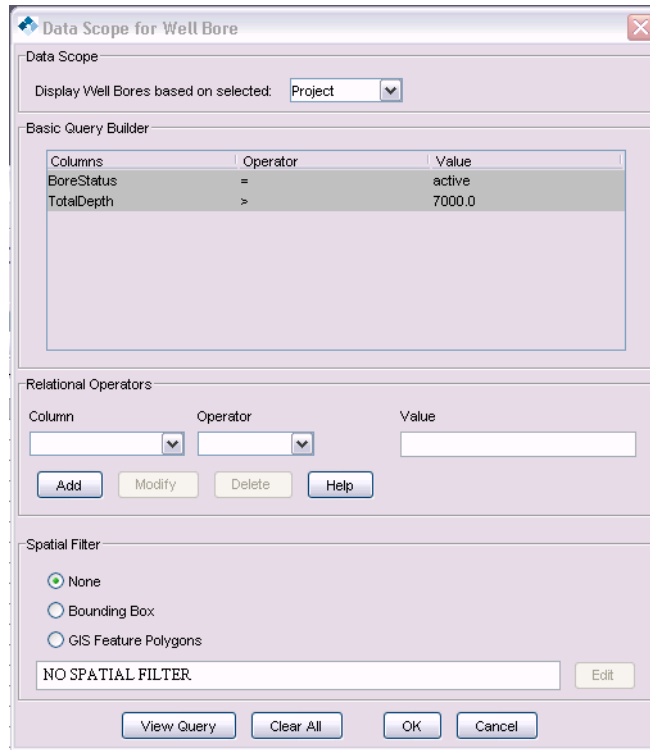
Data Scope

The Data Scope dialog is used to determine the scope of the data seen in each tab of the DataSelector.

The data scope can be a combination of selected parent, user constructed simple or complex queries and spacial filtering. Access to the Data Scope dialog is available on all tabs except the Project tab. (The Project tab is used to select projects and is explained later in the section on the Project tab.)

 *Usage Note:* Clicking the right-mouse button on the tab opens a pop-up menu where you can quickly change the data scope without having to open the Data Scope dialog.

This shows an example of setting the data scope for the WellBore tab. The selected parent is *Project*, there is a simple user constructed query and spacial filter is off. The results of this would be to display all the Well Bores contained in the selected Project(s) in the Project Tab where the status is active and the Total Depth is greater than 7000 feet.

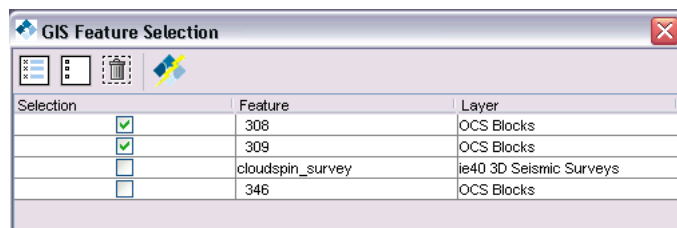


Any number of queries can be joined together using the Basic Query Builder.

The Query Builder is described in more detail later in this chapter.

Spatial Filter

In the Wellbore tab (Well domain) and the Point, Polyline or Polygon Feature (Culture domain), in addition to filtering based on attribute values, you may also query based on surface location and area of interest. For both well and culture data you may type in a simple bounding box (x,y's in the session's preferred coordinate system) to define the area of interest or you may listen for GIS Feature selections.



For wellbores if you chose to listen to GIS Feature selections then you may send any set of polygonal GIS features from ArcView using the OpenSpirit Extension for ArcView. The polygons may be complex multi-part GIS polygons with holes.

You may wish to send polygons that correspond to 3D survey boundaries, OCS lease blocks, company leases, or any other polygonal feature. The names and layer names of received features are

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displayed in the *GIS Feature Selection* dialog. Toggle the checkbox on next to those features that you wish to use in defining your area of interest. Then when the *OK* button is pressed on the wellbore query builder tab a query will be issued to retrieve all wellbores within the specified data scope that are within any of the GIS polygons AND whose attribute values satisfy the indicated attribute constraints (if any).

For culture data when a GIS selection event is sent the bounding box is computed as a bounding box that encloses all received GIS features. Note that sending data selection events for these culture data items is different from the GIS Feature Event that may be sent from the OpenSpirit ArcGIS Extension. A GIS Feature selection event contains the feature name and its geometry whereas a data selection event for a culture feature contains a reference to a feature which allows a receiving application to get any of the feature's attributes - not just its name and spatial location.

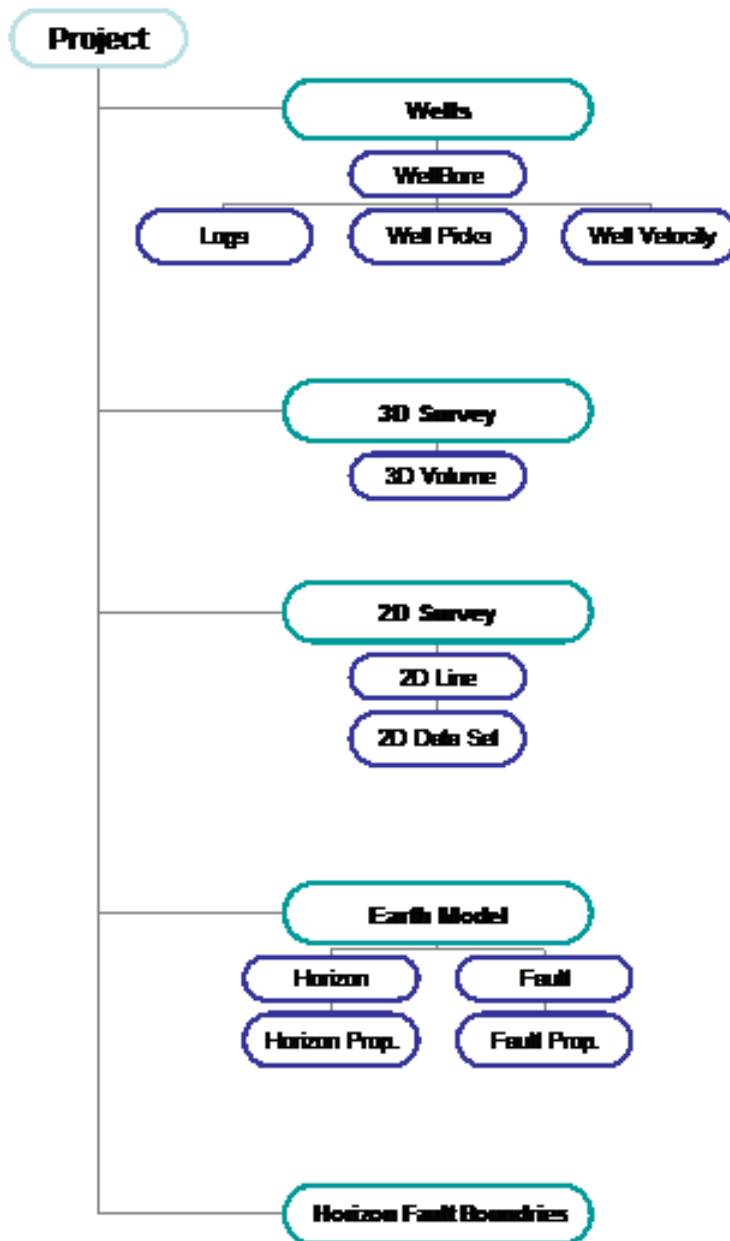
If the DataSelector state is saved (using the *File-> Save* option) then all the points of any selected polygons are also saved so that the full selection criteria may be reapplied any time the save file is re-opened.

Data Hierarchy

The overall data hierarchy that is used by the DataSelector is described by the following flowchart. This hierarchy governs what data will be displayed in each subsequent tab. For example if five wellbores are displayed in the Well Bore tab and you select (highlight) only one of them, going to the Well Log tab you will only see logs from that one wellbore.




Usage Note: In order to do spatial filtering you must first set, in General Preferences, the coordinate system preference to indicate that you wish to use the Session coordinate system (which should be set in the session manager on the Launcher). This will allow spatial filtering to be done across projects that may be using different coordinate systems.

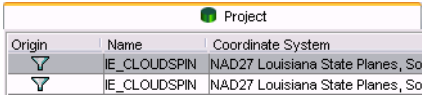



Project Tab

The Project tab allows you to select the projects you want to browse. There are three ways to select or change projects in the Project tab.

Select the projects from selected Session.
Use the Data Scope icon  to add or remove projects from the current session.
Use the Session menu to create a new session, open an existing session, or edit the current session.

If you would like to select individual projects instead of projects within a Session, you can select/highlight just the desired project.

A selected project will look like this  in the Project tab.

If you want to add or remove projects from the existing session, you can select the  icon. This will start the Session Wizard and the *Session project(s)* dialog, where you can add or remove projects, will open. When completed just press the *Finish* button and the DataSelector will be updated.

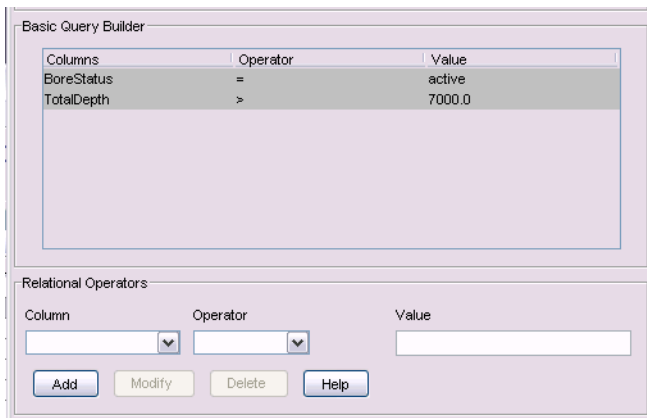
The Session menu in the DataSelector toolbar will allow you to create new sessions, replace the current session with another session and edit a session. The *Session > New* menu item will launch the Session Wizard and you can create a new session with new projects. When finished, the new projects will be in the Project tab. The *Session > Open* menu item, will open an existing session and put its projects in the Project tab. The *Session > Edit* will launch the Session Wizard with the current session. After you have edited the current session, its projects will be presented in the Project tab.

Query Builder

The DataSelector's query function allows you to create queries to specify the criteria for selecting data items in order to constrain the number of data items to be returned. You can query for items based on names, projects, and much more. The Query Builder dialog in the General Preferences dialog allows you to select the type of query builder to use when constructing queries. The difference between the Basic and Advanced Query Builder dialogs is in the way the queries are constructed and displayed.

Basic Query

The Basic Query Builder is used to construct simple queries that are bound by the AND operator. To construct a query you would select the column to query on using the column drop-down menu. The *Column* selection contains all of the queryable columns for the current tab. After selecting the query *Column*, you would next select an *Operator*. These operators will also change depending on what column is selected to query on. Finally you would type-in the value you want to query against. To add a query to the Builder press the *Add* button. Existing queries can be modified by selecting the query in the Builder and pressing the *Modify* button. To delete an existing query select the query and press the *Delete* button.

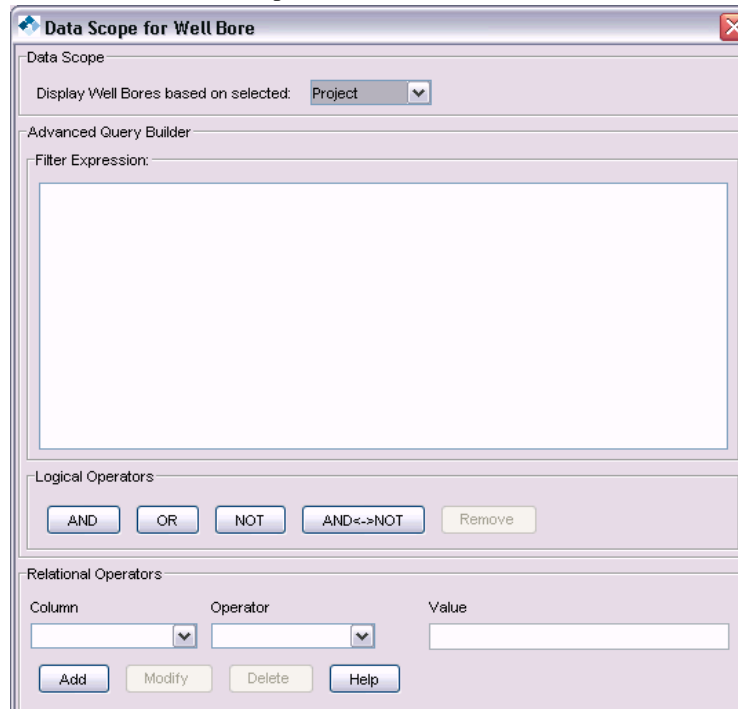


This query would result in displaying all the Well Bores where the BoreStatus is active AND the Total Depth is greater than 7000 feet

Advanced Query

The Advanced Query Builder allows you to build queries without being constrained to the use of the implicit AND operators. You can build arbitrarily complicated query structures using a mixture

of AND, OR and NOT operators.



The Advanced Query Builder is more complicated to use than the Basic Query Builder because of the use of the Query Tree when constructing the query. The Query Tree uses a tree notation to display a constructed query. You can use the *View Query* button to see the generated query at any time.

How to use Relational Operators

The Relational Operators in the Advanced Query Builder are used to create queries. The *Column* selection contains all of the queryable columns for the current tab. You can query for different columns for different tabs. The *Operator* drop down box contains the different operators that can be applied to the selected column. Not all columns offer the same set of operators so you won't see the operators until you have selected the column.

A query is constructed by selecting a column in the *Column* selection, applying an Operator and then giving it a value. To add a column to the Query Tree press the *Add* button after the Operator and values have been selected. The DataSelector will give an error message if any of the fields are missing or if a value has been constructed using an incorrect data type (e.g. a non-number has been added for a depth).

The use of the Relational Operators panel is straight forward. The following table shows the different

operators offered for each supported column type.

Column type	Operators supported
String	=, !=, like, in, IS NULL, IS NOT NULL
Integer and numbers	=, !=, <, <=, >, >=, IS NULL, IS NOT NULL
String arrays	like, in, IS NULL, IS NOT NULL
Boolean	=, !=

like operator

The like operator can be applied to string and string sequence types. It follows the regular expression paradigm and can be very powerful. The table below lists important meta characters that can be used when building regular expressions using the like operator.

▪	Matches any single character. For example the regular expression r.t would match the strings rat, rut, r t, but not root.
*	Matches zero or more occurrences of the character immediately preceding. For example, the regular expression .* means match any number of any characters.
+	Matches one or more occurrences of the character or regular expression immediately preceding. For example, the regular expression 9+ matches 9, 99, 999.
?	Matches 0 or 1 occurrence of the character or regular expression immediately preceding.
[A-Z]	Matches any single alphabetic character in the range A to Z.
[^D,A-Z]	Matches any single alphabetic character in the range A to Z, except the "D" character.
[0-9]	Matches any single numeric character in the range 0 to 9.
[0,2,3,6]	Matches any single numeric character among the listed ones.
[0-9][0-9]	Matches any two numeric characters in the range 0 to 9.

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Here are some examples.

Example 1) A query that matches all Last Modified dates in 2001, month of January, any day in January and any time at 11 AM.

Column	Operator	Value
Last Modified	like	2001-01-..11.*

Example 2) A query that matches all Operators ending with OIL (e.g. MAJOR OIL):

Column	Operator	Value
Operator	like	.*OIL

Example 3) A query that matches all Operators beginning with MAJOR (e.g. MAJOR OIL).

Column	Operator	Value
Operator	like	MAJOR.*

Example 4) A query that matches all Wells beginning with "WELL UWI" followed by exactly one numeric character (e.g. "WELL UWI 7").

Column	Operator	Value
Well	like	WELL UWI [0-9]

Example 5) A query that matches all Wells beginning with "WELL UWI 15" followed by one or more numeric characters (e.g. "WELL UWI 1515", "WELL UWI 1516").

Column	Operator	Value
Well	like	WELL UWI 15[0-9].+

Example 6) A query that matches all Wells beginning with "WELL UWI 15" followed by zero or more numeric characters (e.g. "WELL UWI 15", "WELL UWI 150", "WELL UWI 1510").

Column	Operator	Value
Well	like	WELL UWI 15[0-9].*

Example 7) A query that matches all Wells beginning with "WELL UWI 15" followed by exactly two numeric characters (e.g. "WELL UWI 1500", "WELL UWI 1501", "WELL UWI 1510").

Column	Operator	Value
Well	like	WELL UWI 15[0-9][0-9]

Example 8) A query that matches all Operators ending with exactly three characters containing any of the characters ".", "I", "N", "C" (e.g. "PASCO INC ", "MAJOR INC.").

Column	Operator	Value
Operator	like	*[.,I,N,C][.,I,N,C]

Example 9) A query that matches all Operators not ending with the "O", "I", "L" characters (e.g. "MAJOR INC.").

Column	Operator	Value
Operator	like	*[^O,I,L]

in operator

The in operator can be applied to strings and string arrays.

A query that returns all data items in the BVILLE and BRACE_N_BIT projects.

Column	Operator	Value
Project	in	BVILLE BRACE_N_BIT

Add Modify Delete Help

How to Build Queries

The Following steps show how to construct a complex query in the Well Bore tab.

Select the TD column, > operator and type in 6000 in the value column. Press Add.

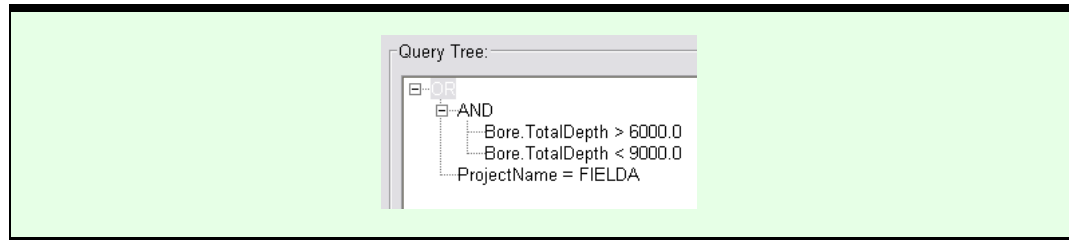
Press the AND button and then select the newly added AND node in the Query Tree.

Select the TD column, < operator and type 9000 in the value column. Press Add.

Press the OR button and then select the newly added OR node in the Query Tree.

Select the ProjectName column, = operator and type FIELDA as the value. Press Add

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Modify a Query

Both the Basic and Advanced Query Builder give you the ability to modify existing search criteria. This is done by first selecting a row in the Basic Query Builder or a node in the Advanced Query Builder, and then go to Relational Operators to modify any of the components in the selected search criteria and then press *Modify* to update the search criteria.




Using the Copy Manger

Tool Overview

The Copy Manager is a utility that copies well, seismic and interpretation data between OpenSpirit enabled data stores. The types of data that can be copied are as follows:

- | | |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Well Data: | <ul style="list-style-type: none"> • wells • well bores • picks • logs • velocity (time/depth) |
| Seismic Data: | <ul style="list-style-type: none"> • 3D surveys • 3D volumes • 2D surveys • 2D lines • 2D datasets |
| Interpretation Data: | <ul style="list-style-type: none"> • 3D seismic horizons • 2D seismic horizons • non-seismic grids • fault polylines |

The Copy Manager moves data to and from OpenSpirit enabled data stores. The Copy Manager interface is started from the DataSelector. The menu and tool bar items include.

Tool Bar Icon	Menu Item	Function
	Copy Manager> Copy Manager Manager...	Display the Copy Manager dialog
	Copy Manager> Submit Copy Job...	Submit created copy jobs
	Copy Manager> Task Controller...	Display the Task Controller dialog

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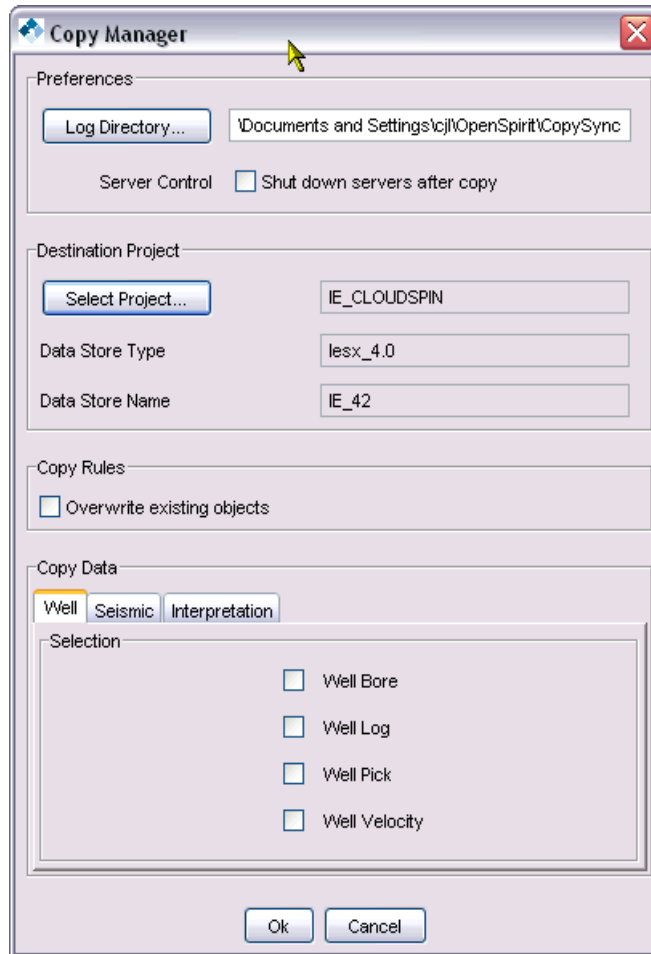
The Copy Manager works in concert with the DataSelector. First select the data you want to copy using the DataSelector and all its query functionality and then setup a copy job to define the target project where you want to copy to.

Copy Manager Dialog

A *Copy Job* is the terminology used to describe what is to be copied, where to copy the data, and how the copying is controlled via *Copy Criteria*. The copy job is a description of what is to be copied. Build a copy job by selecting data in the DataSelector tabs and then use the Copy Manager dialog to:

Select Destination Project.
Select Log File Directory and log file options.
Select Copy Controls

The Copy Manger dialog is split up into four sections: (1) Preferences, (2) Destination Project (3) Copy Rules and (4) Copy Data.



Preferences

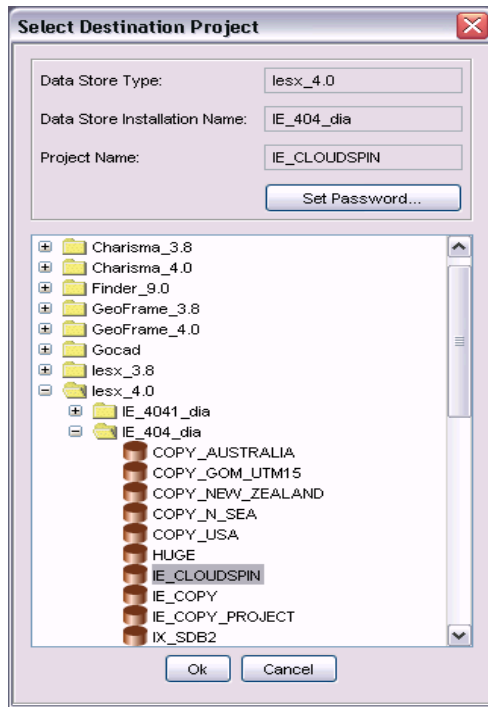
Log Directory: Select the directory where the copy job log files are to be written. By default the logs will be written to your \$HOME/OpenSpirit/CopySync directory on UNIX and C:\Documents and Settings\

Server Control: Tells the copy job whether to shut-down the data connectors after the copy job is completed or leave them running.

Destination Project



Usage Note:
Project access is limited to those projects the current user has access to. If you select a project and have not already entered the password, you will be prompted for the password before proceeding.



Set what project the data will be copied into in the Destination Project section. To select the destination project click on the *Select Project* button.

This will display a dialog that presents a tree view of all the possible data store types configured in your OpenSpirit installation. Drill down into each data store type and expand the folders until you find the destination project. This is where all the selected data will be copied.

Copy Rules

If the *Overwrite existing objects* checkbox is selected then during the copy job if the data item to be copied already exists in the target project, the data item in the target project will be overwritten with the new data item from the source project.

OpenSpirit uses key rules to determine if an object currently exists in the target data store prior to attempting to copy the object. The key rules vary between different data stores. The following table describes the current key rules:

Data Store	Well	Well Bore	Well Pick	Well Velocity
OpenWorks	Identifier	Well Identifier	Bore PickName Interpreter Pick ValueMD	Bore WellVelocityName

Data Store	Well	Well Bore	Well Pick	Well Velocity
GeoFrame	Identifier	Well Identifier	Bore PickName	Bore WellVelocityName
Finder	Identifier	Well Identifier	Bore PickName	Bore WellVelocityName
Kingdom	Identifier	Well Identifier	Bore PickName	Bore WellVelocityName
Petra	Identifier	Well Identifier	Bore PickName	NA

The exception to overwrite existing objects is well logs and well picks. Well logs are never over written. If a log of the same type, depth, and in the same well already exists, then it is still copied and the version is incremented. Well pick updates depend on the source and destination data stores. Some data stores support multiple picks in a well, while others do not, below is a table of the various well pick keys for each supported data store:.

OpenWorks	GeoFrame	Finder	Kingdom	Petra
Bore Interpreter PickName Occurrence		Bore Interpreter PickName PickValue MD	Bore PickName PickValue MD	Bore PickName

For example, in Finder one bore can have two well picks with the same name, same interpreter but at different depths. When you attempt to copy these two picks to OpenWorks the first one will get copied however the second one will fail because the *PickValue MD* key is not part of the OpenWorks well pick key.

Special Interpreter Alias Rule

If OpenWorks is picked as the target project an addition Copy Rule is available; *“Use interpreter alias file:”* The Use interpreter alias file allows you to define a lookup table external to the CopySync tool that will be used to translate source Interpreters to target Interpreters (OW Interpreter roles). This external lookup table is a simple ASCII file that maps a list of source interpreters to corresponding (5 character max) OW interpreters. When CopySync runs it reads this file and writes data to OW using the mapped OW interpreter. If this interpreter does not exist in the target OW project it will be automatically created. Since all new interpreters will be made as PUBLIC, you will need to manually change them to PRIVATE, if required, after the copy.

Following is an example of an interpreter alias file:

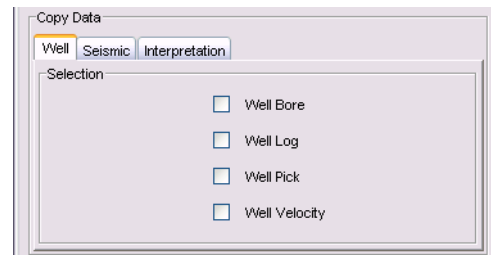
```
Ab123456 cjl  
Ab178998 jep  
Ab189998 mattk
```

Copy Data

The Copy Data section has tabs relating to the different data types that may be copied. There are also Copy Rules associated with each data type that are stated in detail later in this section. The selection of the Destination Project will determine what data type tabs are active. For instance if you select a Finder project for your destination then only the Well tab will be active, if you select an OpenWorks project for the destination project then all three tabs (Well, Seismic, Interpretation) will be active. Each tab provides for selecting the different types of data to be copied. Refer to the beginning of this section for the types of data that can be copied.

Wells

Within the Well tab select to copy Well Bores, Well Logs, Well Picks, and Well Velocity data.



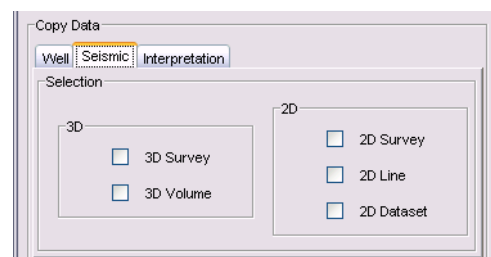
Seismic

Within in the Seismic tab select to copy 3D Surveys, 3D Volumes, 2D Surveys, 2D Lines and 2D Datasets.

Copy rules and known issues associated with Seismic data are:

General

- The source and destination 3D surveys are checked for compatibility before copying 3D volumes. The source survey must be equal or a subset of the destination survey.
- The surveys must have the same inline and crossline increments.
- The survey XY values at the four corner points must be within 100 meters of each other as a sanity check. More than 100 meters different usually indicates an incompatibility problem between the source and destination project's coordinate systems. For example, copying data



from a North Sea coordinate system to a Gulf of Mexico coordinate system doesn't make sense.

- The source and destination 2D lines are checked for compatibility before copying 2D datasets. The 2D lines must have the same number of control points and the XY values along the line must be no more than 100 meters different.
- Business rules are used to honor the copy as closely as possible. For example, BRICK volumes are only supported in OpenWorks/SeisWorks but it is possible to copy a BRICK volume to another vendor format in which case the data will be saved as an inline-optimized TRACE volume. If a data type is not supported then the next available data type will be used which doesn't result in loss of precision. For example, IESX doesn't support 32-bit integer but SeisWorks does. The data will be copied and FLOAT format will be used. Names of surveys, volumes, or lines are sometimes changed to honor limitations in the target data store. We attempt to name the data as close as the target data set will allow.
- Null seismic traces, traces that are all zeros, are not copied to the destination seismic data file to save space.
- Copy will truncate the length of the name if the source project is greater than what is supported in the destination store. In some cases, a sequence number may be appended to the name to maintain uniqueness.

IESX/Charisma

- Cannot create IESX, Charisma, and SEG Y SLICE volumes
- Cannot create IESX or Charisma crossline-optimized volumes
- Charisma CDP and Shotpoint values must be integers and have an increment of one
- Currently do not support writing horizon grids to Charisma if the survey has a negative inline or xline delta

OpenWorks/SeisWorks

- Clients need read/write access to the plist.dat file since the act of creating 2D/3D surveys is equivalent to creating a new SeisWorks project.
- If the client's DISPLAY environment variable isn't set by the .login scripts then a \$HOME/.osp .DISPLAY file needs to be created that has the X display identifier (e.g. 10.10.10.123:0.0). The X display is required by a SeisWorks utility that is used to associate the OpenWorks 2D lines with the SeisWorks project
- SeisWorks CDP values must be integers and have an increment of one
- SeisWorks projects are either 2D or 3D. 2D and 3D datasets are not found in the same project

Special Copy Procedures for OpenWorks/SeisWorks

There are special procedures needed to copy 3D and 2D seismic data to a OpenWorks/SeisWorks project.

For **2D seismic** use the following steps:

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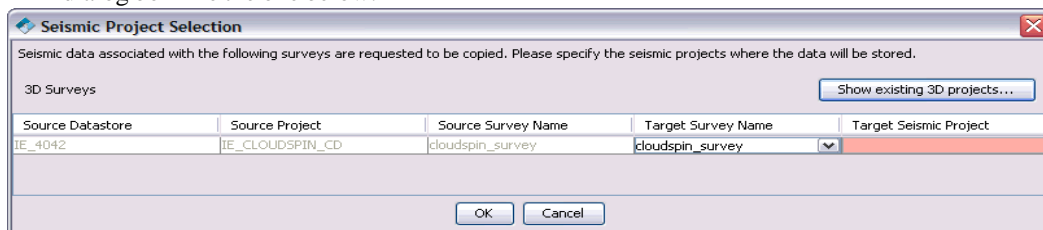
1. In the DataSelector select the Project, 2D survey(s), 2D line(s) and 2D dataset(s) to copy.
2. In the Copy Manager select as destination an **OpenWorks** project. This OpenWorks project will be used to select existing associated SeisWorks projects, or will be associated with newly created SeisWorks projects. All of the 2d lines selected will be copied into this single SeisWorks project. Note that each 2d copy job can be copied to one, and only one 2d SeisWorks project. If you want to go to separate SeisWorks projects, then it will have to be run in a separate copy jobs for each project.
3. After you have selected the OpenWorks project in the CopyManager, and the OpenSpirit OpenWorks data connector has started, click on the *Seismic* tab. Select *2D Survey*, *2D Line*, and *2D Dataset*. At the bottom of the Copy Manager, Seismic tab, you will see a *Select Seismic Projects...* button. Click on the button and this will launch the Seismic Project Selection dialog box like the one below.

Source Datastore	Source Project	Source Survey Name	Target Survey Name
IE_4042	IE_CLOUDSPIN_CD	2d_slb	2d_slb

4. Enter survey information in the Seismic Project Selection dialog (above). This information will be used to create a new SeisWorks project, or write the 2D data into an existing SeisWorks project.
 - a. Select the target SeisWorks project. In the *Target Seismic Project* field, use the pull-down menu to select an existing SeisWorks project. If you want to make a new SeisWorks project, enter an eight character name for the project in the *Target Seismic Project* field.
 - b. Select a SeisWorks 2D master project. In the *Master Project* field, use the pull-down menu to select an existing SeisWorks master project. If you want to make a new SeisWorks master project, enter an eight character name for the project in the *Master Project* field.
 - c. Select a target Survey name. In the *Target Survey Name* column, use the pull-down menu to select a Survey name. If you want to make a new SeisWorks survey, enter an eight character name for the survey in the *Target Survey Name* field. Click *OK* in the Seismic Project selection dialog box to save your 2D SeisWorks target information.
5. Submit the copy job.
6. If you are creating 2D lines and 2D datasets in multiple SeisWorks 2D projects, you must shutdown the OpenWorks data connector after each copy job. To do this, toggle on the *Shutdown dataservers after copy* selection in the Preferences section of the Copy Manager.

For **3D seismic** use the following steps:

1. In the DataSelector select desired Project, 3D Survey(s) and Volume(s) to copy.
2. In the Copy Manger select as destination the target **OpenWorks** project. Please note that due to Landmark's data structure, a new SeisWorks project must be created for every seismic survey.
3. After you have selected the OpenWorks project in the CopyManager, and the OpenSpirit OpenWorks data connector has started, click on the Seismic tab. In the Seismic tab, select *3D Survey* and *3D Volume*. At the bottom of the Copy Manager, Seismic tab, you will see a *Select Seismic Projects* button. Click on the button and this will launch the Seismic Project Selection dialog box like the one below.



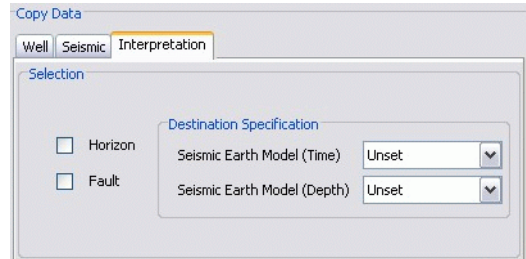
4. Enter survey information in the Seismic Project Selection dialog (above). This information will be used to create a new 3D SeisWorks project, or write the 3d data into an existing 3d SeisWorks project.
 - a. Select the target 3D survey. In the *Target Survey Name* column, use the drop-down menu to select an existing 3D survey associated with the source OpenWorks project selected earlier. If you want to use a different name for the new 3D survey enter a unique name (up to 30 characters) in the *Target Survey Name* field. This will be the name of the 3D survey that is created in the OpenWorks project you chose as the Destination Project earlier.
 - b. Create the target 3D SeisWorks project. In the *Target Seismic Project* column, enter a unique eight character name for the 3D project. Use the *Show existing 3D projects* button to display a list of existing SeisWorks project. Click *OK* in the Seismic Project selection dialog box to save your 3D Seismic target information.
5. Submit the copy job.

Interpretation

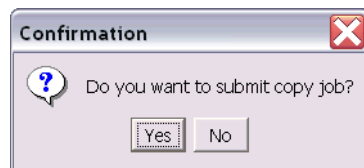
Within the Interpretation tab you can select to copy Horizons and Faults.


Copy rules and known issues associated with Interpretation data are:

- Not possible to copy just the Horizon feature. The DataSelector's Horizon tab is really the HorizonGrid2d representation. Selecting a Horizon row will copy the associated Horizon feature and all properties that exist for the horizon representation.
- Only Fault Polylines can be copied. In the DataSelector's Fault tab, check the Type field. The Type field must say *PolylineSet*, Origin field must say *3d survey*, and the Origin Name field must be a 3D survey. An easier way to filter only Fault Polylines in the DataSelector, is to click on the DataSelector View -> *General Preferences* and in the General Preferences dialog, turn on the Fault Polylines tab.
- It is not possible to copy just the GeologicFault feature. The DataSelector's Fault tab is really the FaultPolylineSet representation. The 3D survey isn't shown in the DataSelector because a FaultPolylineSet can span multiple surveys, it doesn't have to be associated to just one survey. Selecting a Fault row will copy the associated GeologicFault feature and all the polylines associated between compatible source and destination surveys.
- There is no selection of the destination EarthModel and 3D survey if copying to SeisWorks project since there is only one model and one survey.

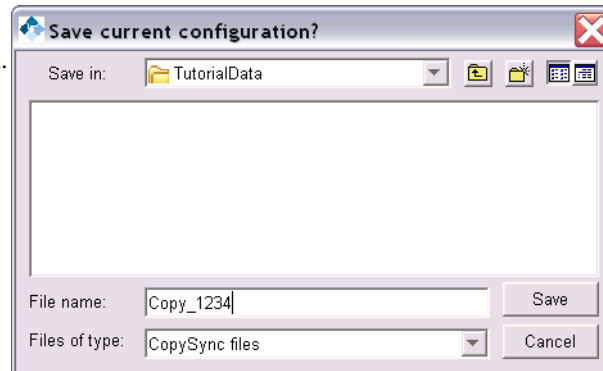


Submit Copy Job



If desired, continue to select the data you want to copy in the DataSelector. Once you are finished selecting data, submit the copy job by selecting the  icon in the tool bar. Select *Yes* to start the copy job. You will then be asked where you want to

save the copy job definition.



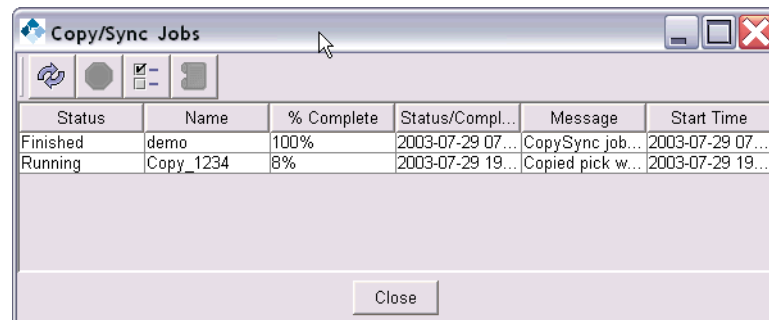
A dialog will be displayed as the DataSelector tabs are scanned for selected data and the copy job criteria is applied.



Task Controller

To monitor the status of the copy job, display the *Task Controller* dialog.

The status of the copy job will update automatically until it is finished. You can also stop the copy job and view the log file.



Open an existing copy job

Open a previously saved copy job by selecting *File -> Open*. This will graphically present the tabs with the same information as when it was saved.

Running From the Command Line

The Copy Manager is capable of running copy jobs directly from the command line, or as part of a scheduled batch process. A parameter file, created with the Data Selector and Copy Manager, controls the copy job.

Using the Data Selector choose the data you want to copy, this procedure is described in an earlier section. Open the Copy Manager and setup the copy job (e.g. target project and desired data types). Save (File>Save As) the Data Selector configuration into an xml file, for instance *mycopy.xml*. Create and/or edit a script to run the copy job in batch.

An example script (copy.sh) on UNIX would look like:

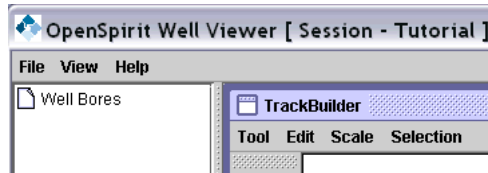
```
#!/usr/bin/sh -x
OSP_HOME=/prod/spirit/v311_86
export OSP_HOME
# copy part
$OSP_HOME/bin/runBatchCopy.sh ./mycopy.xml
$OSP_HOME/bin/runBatchCopy.sh ./mycopy2.xml
exit
```

Note you can have as many copy jobs as you like in the same batch file.

Using the Well Viewer

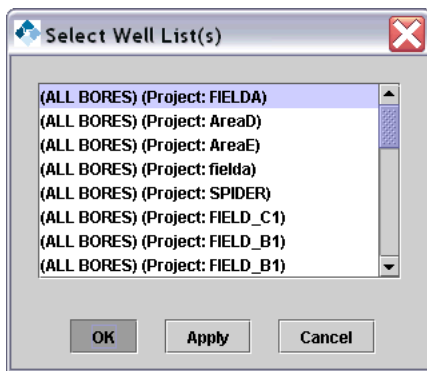
The Well Viewer is a utility that allows users to view selected well logs and well markers in a conventional well track format. The Well Viewer is started from the Tools menu and requires a session to communicate with other applications.

When launched, the Well Viewer shows an empty Well Bore folder.

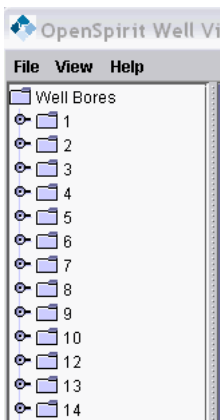


There are two ways to get Well Bores. The first method is to listen for Well Bore selection events, which can be made from the DataSelector, 3D Viewer, Arcview Extension, any native

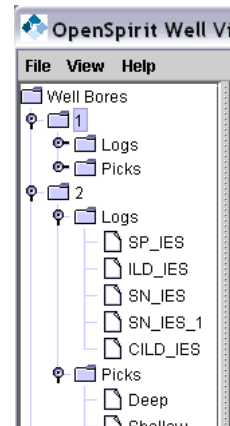
OpenWorks or GeoFrame application via the OpenSpirit Event Gateway or any OpenSpirit enabled application that sends wellbore events.




Or you can select the *File -> Read Bores from Well List(s)* menu item and then select a Well Bore List from the dialog. All well bore lists from the projects in your session will be displayed for you to choose from.




Once you make a selection of the Wells you would like to view, the Well Viewer list shows a listing of the COMMON WELL NAME or the WELL UWI and the associated Logs and Picks. You can drill down into each well and see the Well Logs and Picks within each Well Bore.



Discarding or Committing Data Edits

As markers or logs are being edited, no data changes are stored back to the vendor project(s) unless the save icon is pressed and you have write access to the associated project. 

If you want to restore the data from the data store and discard any uncommitted data then the reload icon may be pressed. 

Listening for Data Change and Object Selection Events

If the same data object (well log or pick) is displayed in more than one track, or any other OpenSpirit enabled application using the same session, then these views may all share dynamic data changes (even between applications running on Windows and UNIX). To enable the Well Viewer to listen for data change events and cause it to automatically re-display any changed data, the *OpenSpirit logo icon* should be pressed. When listening is enabled, a yellow lightning bolt will be displayed. Listening may be toggled on and off by pressing the *OpenSpirit logo icon*.



The *lightening bolt* also controls the WellViewer's response to relevant selection events. If the viewer is enabled for listening and it receives a selection event that contains Well Log or Well Pick selections, the viewer will display the selected objects in the current active track and add, if required, the selected Well Bore List. Note that this allows for the display of objects that may not be in the current Session (e.g. storeless objects created by other applications that may not be stored in GeoFrame or OpenWorks).

Broadcasting Object Selection Events

A selection event may be sent by highlighting a well pick or log and clicking on the selection broadcast icon. Sending a selection event will cause other "listening" applications in the same OpenSpirit session to react and display, or otherwise use, this selected object.




Storing/Restoring Viewer Session Information

When you exit the Well Viewer (*File > Exit*), you are prompted if you wish to store the track layout preferences. If you answer *yes* then the definition of how many tracks and their contents (the logs and picks) are saved. When you run Well Viewer at a later date, with the same OpenSpirit session, you are prompted whether you wish to restore the track layout preferences. If you answer *yes* then the same logs and picks are re-displayed in the designated tracks. The display colors of the logs and markers are also restored. Note that other display settings (e.g. depth scale) are not currently saved.

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Using the Section Viewer

The Section Viewer is a utility that allows users to view selected inlines and crosslines from 3D seismic volumes, 2D seismic datasets, horizons, and faults. Multiple seismic sections representing different seismic attributes can be overlaid. The seismic data can be displayed in a variety of ways that includes variable density with a color map or wiggle variable area. The Section Viewer is started by selecting it from the *Tools* menu.

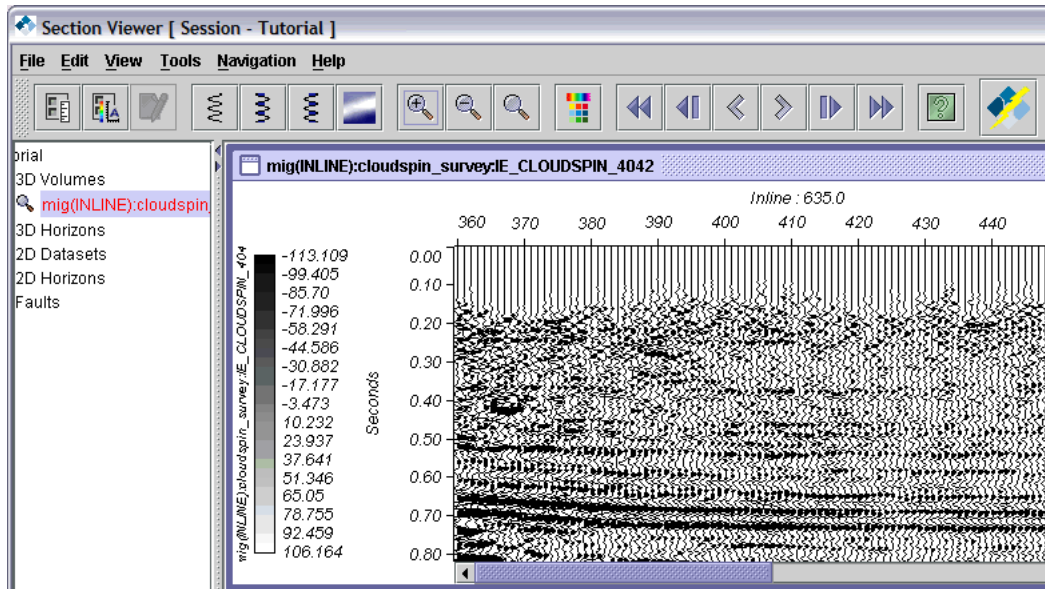
 *Usage Note: The Section Viewer ignores slice volume selection events.*

Listening for 3D Volume & 2D Seismic Selection Events

The Section Viewer has been designed for use in conjunction with another data selection application, such as the DataSelector. Make sure that the Section Viewer is enabled to listen to OpenSpirit events (the *lightening bolt* should be visible on the OpenSpirit logo) and then select one or more seismic volumes from the DataSelector. As soon as the selection event is sent the 2D or 3D volume(s) should appear in the 2D or 3D Volume folder in the Section Viewer.

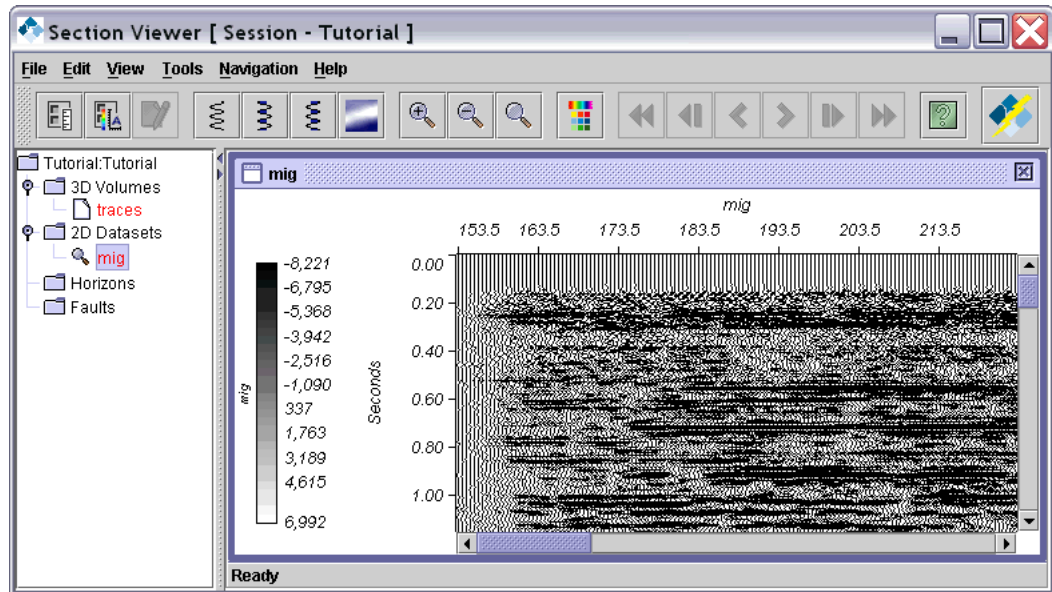
Displaying Seismic Sections

To display an inline or crossline section, double click on the desired volume in the *3D Volume* folder then select, in the section selection dialog window, whether you want an inline or crossline view. Adjust the slider bar or type in the section number to select a particular section.



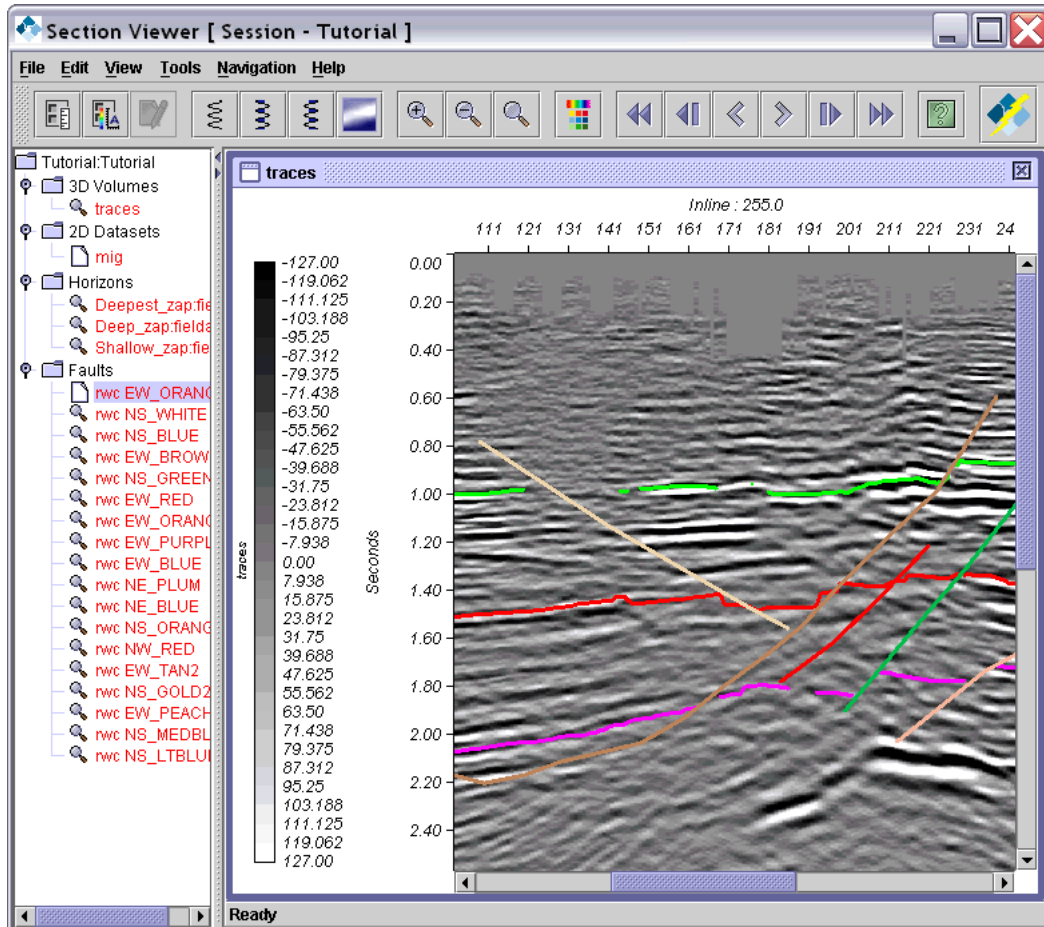
Similarly, to display the 2D dataset, double click and select it. If there is no slider for 2D data, the viewer will display the Seismic data for the whole set.

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Displaying Horizons and Faults

If a seismic section is displayed and the viewer is enabled for listening (the *lightening bolt* is visible on the OpenSpirit logo), then the viewer will respond to any fault or horizon selection event by displaying the selected horizon and fault on the section and adding the name(s) to the display list folder.

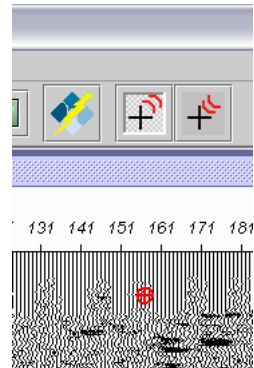


Note that only Horizons that are associated with the same seismic 2D or 3D survey will be displayed; any other selection events will be ignored. Also, the viewer does not display intersecting faults – only those faults drawn in the selected inline/crossline are displayed. If the displayed inline and crossline are advanced to another line (via the toolbar icons, menu item, or by double clicking on the seismic volume in the display list), then the horizon and fault overlays are automatically updated. Display of individual horizons or faults may be toggled on/off by double clicking on the *switch* icon to the left of the horizon/fault name in the display list.

Cursor Tracking

You can send or receive OpenSpirit 3D cursor locations by toggling the *cursor tracking* icons on and off. This sharing of cursor location information will work between any number of OpenSpirit enabled applications, running anywhere on the network that are tied into the same OpenSpirit session. This shared cursor tracking will also work with Landmark applications (e.g. SeisWorks) if an OpenWorks Event Gateway is running that ties the current OpenSpirit session to the OpenWorks session.

This figure illustrates the Section Viewer sending cursor location events.

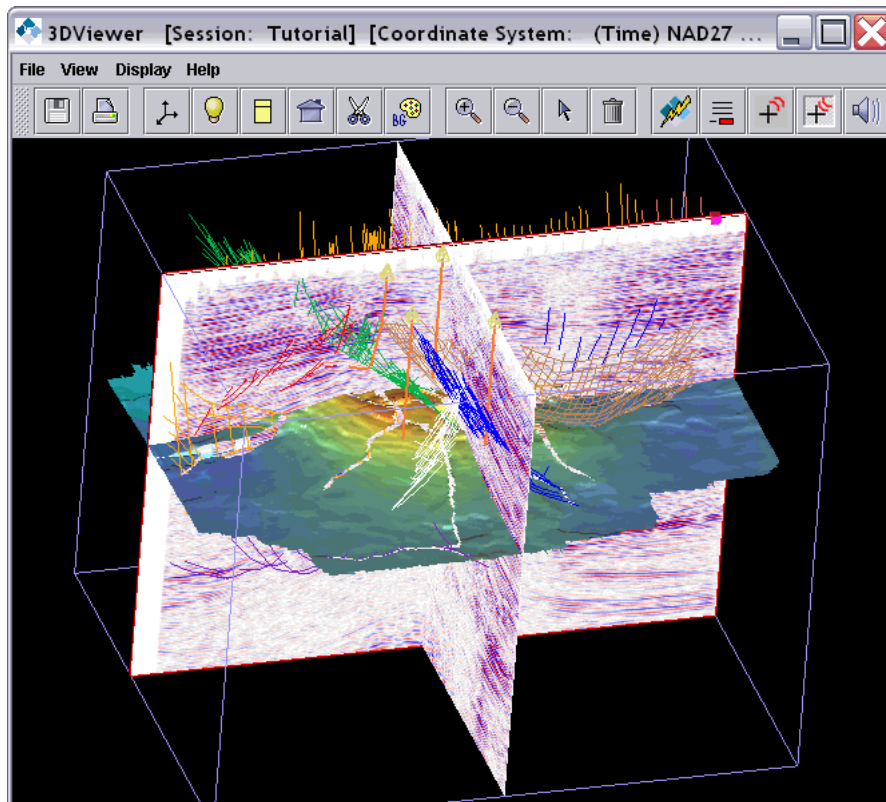



Additional Section Viewer Features

You can change display attributes, display types, change between inline and crossline, change color maps, display section overlays, scroll through the volume, and zoom in and out by selecting the various menus or icons at the top of the section display.

Using the 3D Viewer

The OpenSpirit 3D Viewer provides a basic functionality that allows the user to visualize most of the OpenSpirit Subsurface data objects, which include the following: Wells, Wellbores, Well Logs, Well Picks, 3D Seismic Volumes, 2D Seismic Datasets, Horizons, Horizon Properties, and Faults.



 *Usage Note:*
 The OpenSpirit 3D Viewer can be run on Solaris, Windows, or Linux (provided the desktop computer has the appropriate OpenGL libraries (v1.1 or greater) installed. Windows comes with OpenGL pre-installed but it may be necessary to install OpenGL libraries on your Solaris workstation. The performance of the 3D viewer will be highly dependant on the type of graphics card that you are using.

This viewer also allows the user to send and receive OpenSpirit cursor location events as well as to send object selection events.

The OpenSpirit 3D Viewer is a cross platform viewer that demonstrates interoperability using cursor tracking and selection events. It provides the ability to view all of the different data types that are supported in the OpenSpirit Framework.

Connect to an OpenSpirit Session

The 3D Viewer should be launched from the OpenSpirit Launcher after setting the current session. To connect to the OpenSpirit Session click on the *OpenSpirit* logo on the 3D Viewer toolbar.



A dialog will be displayed allowing you to assert what coordinate system you wish to use for the current 3D Viewer. You can choose whether to display objects in the time or depth domain. The OpenSpirit data connectors will convert the well path, log, and pick information into the time domain as long as there is a preferred time-depth table (check shot) for that well in the source database. OpenSpirit will NOT perform on the fly time-depth conversions for seismic, horizon, or fault data. In addition to specifying the desired domain, you must also specify what coordinate system you wish to use. As data in your OpenSpirit Session can be coming from a variety of vendor projects and can be stored in different coordinate systems, you must specify which common coordinate system OpenSpirit should use. If you have set a preferred coordinate system on the OpenSpirit Session then you can choose to use this (if no preferences were set then these options will be grayed out). You can also choose to use the preferred coordinate system of any project in your session. In this illustration, we chose to use the coordinate system used by the OpenWorks FIELDA project.

After you have successfully selected a coordinate system and connected to the OpenSpirit Session, the current session's name will appear in the title bar and the *OpenSpirit* logo will have the lightning bolt turned on, as illustrated below, indicating that you are ready to receive OpenSpirit events.

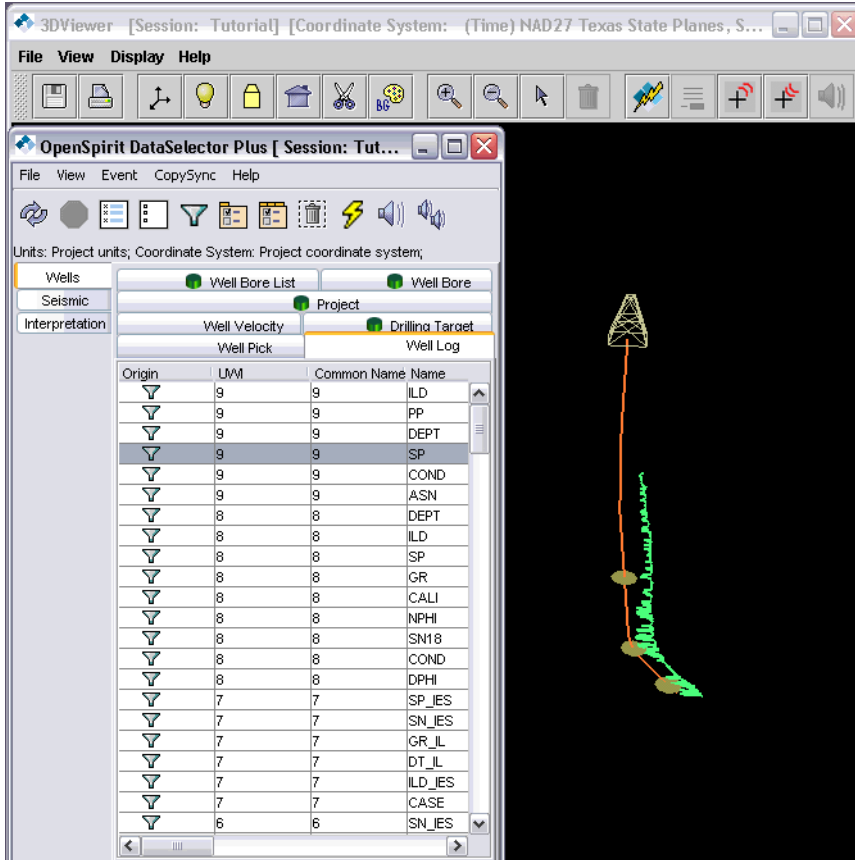


Select Objects for Viewing


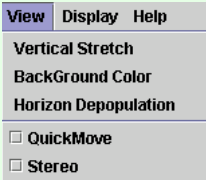




The 3D Viewer can send and listen for OpenSpirit selection events. These events can be generated by other OpenSpirit Viewers, the OpenSpirit DataSelector, or third party OpenSpirit enabled applications. Users can even receive events from native GeoFrame or OpenWorks applications (provided the appropriate OpenSpirit Event Gateway is running). In this illustration, the DataSelector has been used to broadcast a selection events, which are then displayed in the 3D




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viewer.



Manipulate the 3D View

Action	Function
Rotation	Hold the left mouse button down and move the mouse to rotate about the center of the viewing scene.
Zoom 	Hold the middle mouse button (or scrolling wheel) down and move the mouse up and down to zoom in and out.
Translation	Hold down the right mouse button and move the mouse up and down to move the viewing window.
View 	<p>Vertical Stretch - By default, the viewer displays the 3D scene with no vertical exaggeration (horizontal display scale equal to vertical display scale). When a display is in the time domain, a pseudo vertical exaggeration is calculated using a constant velocity of 10,000 ft./sec.</p> <p>Background Color - Changes the background color</p> <p>Horizon Depopulation - Shows a subset of the horizon data. Useful when working with large horizon data sets that take a very long time to load and display.</p> <p>QuickMovie - Select this option to change to a “wire frame” view when rotating or zooming the view. Useful when working with large datasets.</p> <p>Stereo - View in stereo mode if supported by hardware.</p>
Re-Center View 	Use the icon on the Toolbar to re-center the view to its “home” position with all the displayed objects visible and in the center of the view. This is quite helpful when you get “lost” in exploring the 3D scene.
Lighting Model 	Use the icon on the Toolbar to add and remove directional lights. This can be used effectively to accentuate faulting patterns on surfaces.
Axis Display 	Use the icon on the Toolbar to add and remove the 3D axis and labels.
Background Color 	Use the icon on the Toolbar to change the background color.


Action	Function
Clipping Planes 	Use the icon on the Toolbar to set and manipulate clipping planes. This can be helpful to see inside of complicated structures
Perspective View 	Use the icon on the Toolbar to toggle between perspective view (the startup default) and parallel view.
Save/Print Screen Images 	A jpeg image file of the current 3D scene can be saved to disk by clicking the icon or sent to the default printer by pressing the icon.

Performance Trade-offs

The display of shaded horizons takes a lot of graphics processing power and you may find that moving around a 3D scene with horizons is very sluggish. One option is to enable the *QuickView* mode (from the *View* menu), which will convert the 3D scene to a wire frame display while the mouse is moving and then restore the scene to a full display when the desired viewing position is found. The other is to use the *Horizon Depopulation* option, also from the *View* menu, that will thin the horizon data set for display purposes only.


While adding many wellbores and picks to your display in a single selection event, you might prefer to turn off the *Progressive Add* option (from the *Display* menu). When *Progressive Add* is enabled while object selection events are received, each object is individually displayed as its data is received. With *Progressive Add* disabled, the viewer delays display of the objects until all the object data for all objects in the selection has been received. This minimizes the overall elapsed time but does not give you any visible signs of progress.


Use a Selected Object

When the selection icon is in selection mode,  an object can be selected by clicking on it.

When selected, the object's border will turn red and three Toolbar icons will become enabled.

Display/Edit Object Properties

Use the  icon to display properties of the highlighted object. The display preferences can be set through a dialog box, which will be displayed. An alternative means of opening a highlighted object's property dialog is to double click on the selected object.

 *Usage Note:*
All object property dialogs have a "Reload Data" button that will force the data to be re-read from the underlying datastore.

Well

The preferred color and size for the well derrick symbols can be chosen and applied to all wells.

Wellbore

The preferred color and line style for the wellbore path can be chosen and applied to all wellbores.

Well Log

The preferred color, line style, and azimuth can be chosen for the highlighted log.

Note: If multiple logs are displayed for the same wellbore it is quite helpful to display them at different azimuths to avoid overlapping log curves.

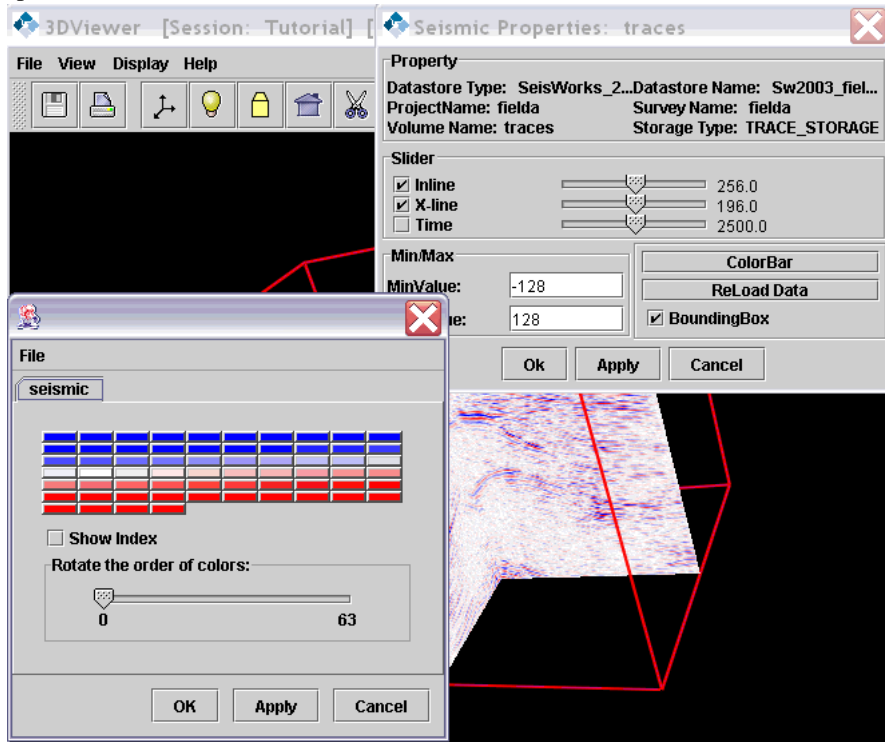
Well Pick


The preferred display size (radius) of the pick can be chosen and applied to all well picks. The color of the pick is determined by the value of an attribute in the datastore.

Seismic 3D Volume

The Seismic property dialog allows the user to select which inline, crossline, or horizontal slice is displayed. The user can also access the color bar editor to change the color map used to display seismic (color maps can also be stored and restored to and from disk). The minimum and maximum seismic amplitude values can also be set to control the amplitude range that is mapped to the chosen

color map.



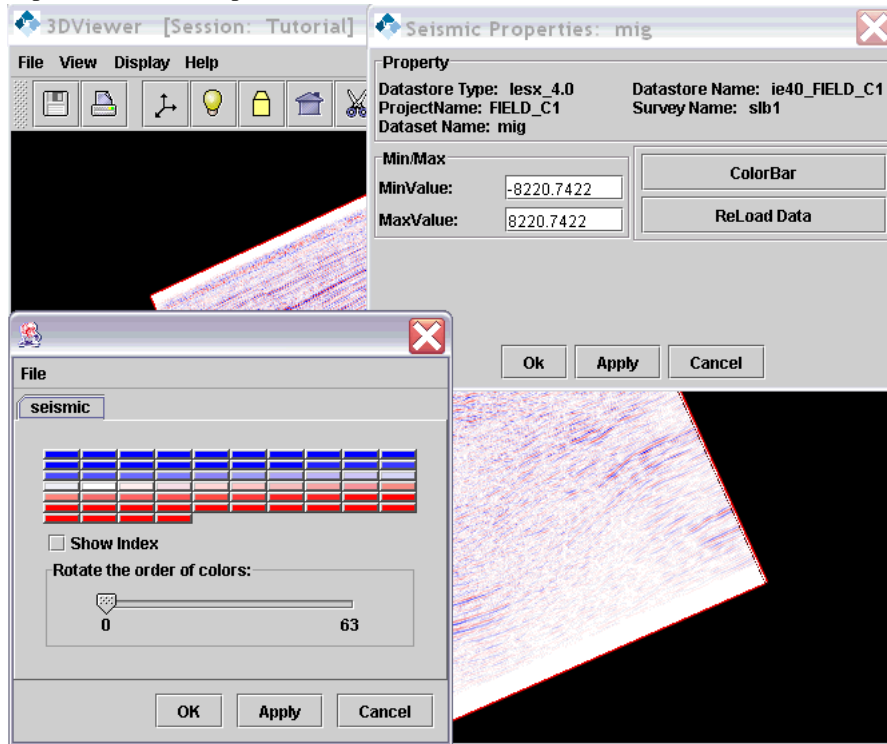
 Usage Note:
It can be very slow to display horizontal slices from trace oriented data and vice versa. If your seismic project has multiple sort orders of the same data, it would be best to select and display multiple seismic volumes in the 3D Viewer and only display the preferred direction from each volume

Seismic 2D Dataset

Seismic 2D datasets are similar to displaying the Seismic 3D volume. However, there is no slider or bounding box because a 2D dataset only resides on a particular line. The property box supports color

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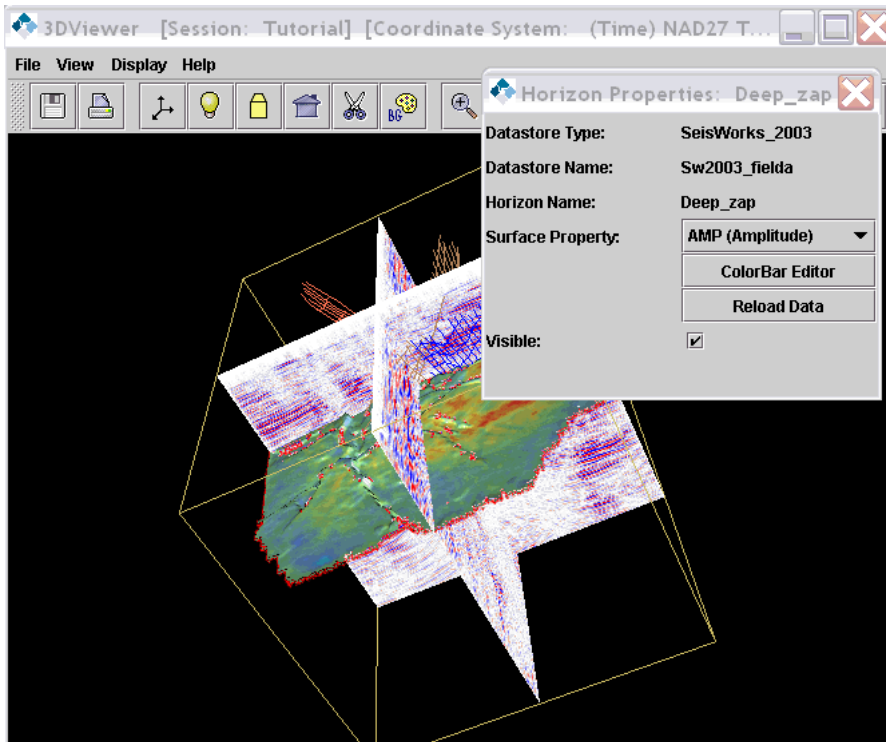
map and min/max amplitude.



Horizon (and Properties)

The *Horizon property* dialog allows the user to select a single horizon property to be draped on the Horizon surface and displayed with a pseudo color map. Users can also access the color bar editor


to change the used color map.



Faults

The preferred color and line style for the fault vectors can be chosen and applied to all faults.


Remove Object from Display

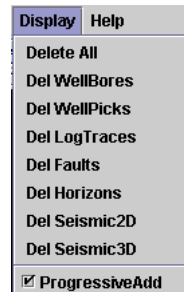
Use the  icon to remove the highlighted object from the 3D Viewer display. Note that the object is not removed from its datastore and can be redisplayed by sending the 3D viewer an OpenSpirit Object Selection event referencing the removed object.

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If you wish to remove all objects of a certain type then it is easier to use the appropriate menu item from the *Display* menu.

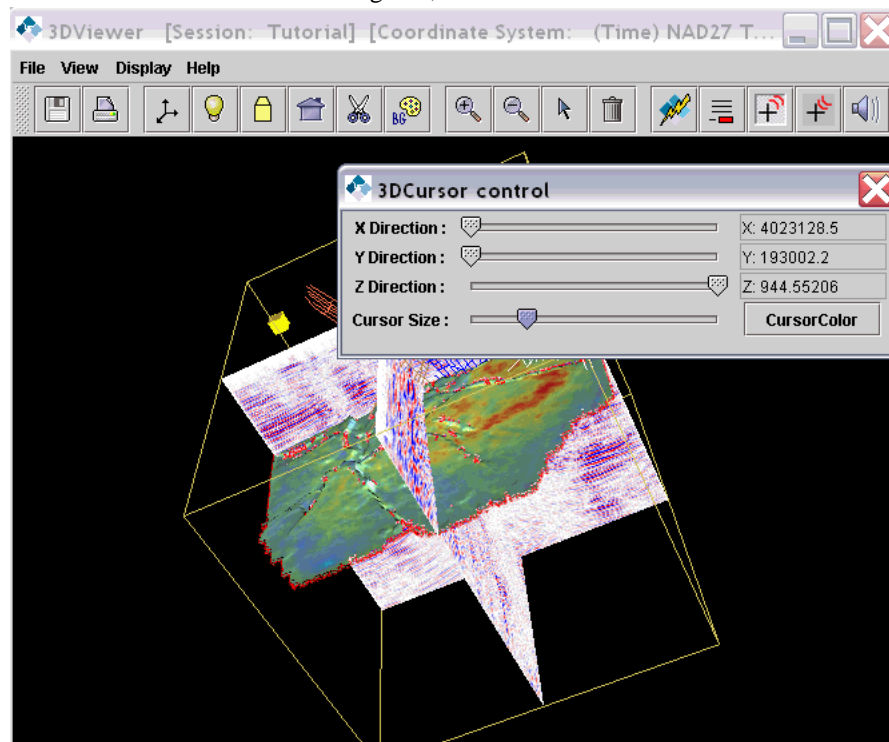
Send Object Selection Event



Use the  icon to send an OpenSpirit Object Selection event containing a reference to the highlighted object.

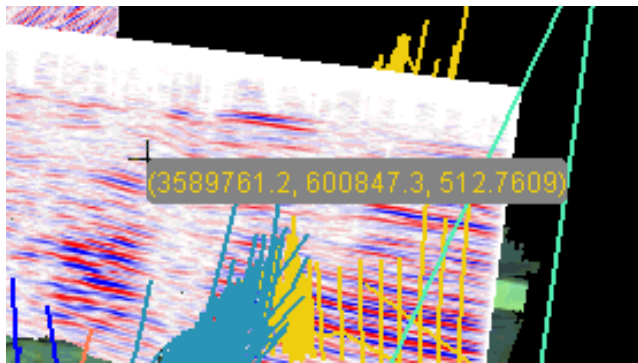



Send and Receive Cursor Location Events

Use the  icon to send the 3D cursor location. The position of the 3D cursor is controlled by the *sliders* in the *3D Cursor control* dialog box, as illustrated below:



To ensure that the cursor location is snapped to a position on an object, toggle the  icon to its Point Broadcast state  and then click on an object, as illustrated below. This x,y,z location on the object will be broadcast as an OpenSpirit Cursor Location event as well as a Point of Interest Event.



To receive OpenSpirit cursor location events click on the  icon. Cursor location events can be generated in another OpenSpirit Viewer, a third party OpenSpirit enabled application, or even native GeoFrame or OpenWorks applications (provided the appropriate OpenSpirit Event Gateway is running).

Using the Scan Utility

Overview

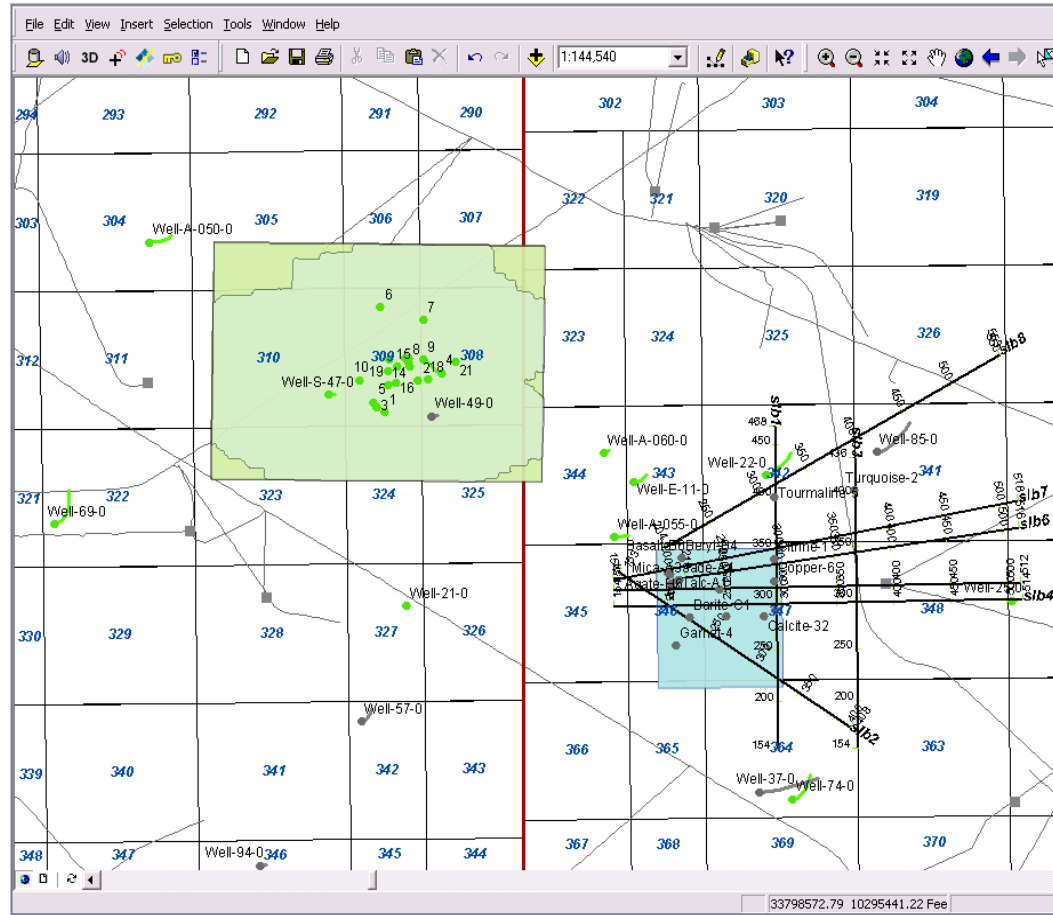
The OpenSpirit Scan Utility is an optional, add-on product to the OpenSpirit Subsurface Data Module that runs from a graphical user interface, or in batch file mode. This utility allows users to scan all or selected projects in an OpenSpirit supported data store and output the following GIS layers in ESRI Shapefile format (.shp, .shx, .prj, .dbf), or optionally to an ESRI ArcSDE 8.x (or newer) database:

Project Data Outlines (Seismic and Well)
Well Surface Locations
Well Bottom Hole Locations
Wellbore Paths
3D Seismic Survey Outlines
3D Seismic Volume Outlines
3D Seismic Live Trace Coverage
2D Seismic Line Locations
2D Seismic Dataset Locations
Horizon and Volume Catalogs - .dbf or SDE table containing a list of all interpreted time or depth horizons and separate .dbf file, or SDE table, for volumes contained in a 3D seismic survey

After these features are generated with the OpenSpirit Scan Utility, they can then be viewed in ESRI's GIS products or any GIS product that can read standard ESRI shapefile formats, or from a SDE database. The Scan Utility can also be used in conjunction with the OpenSpirit ESRI ArcMap Extension to allow ArcMap to be used as an OpenSpirit enabled DataSelector. When used with OpenSpirit's data viewers, or other OpenSpirit enabled vendor applications, these utilities give users a rich set of tools for browsing data from a variety of project data stores.

The Scan Utility can be run on Windows, or UNIX via a simple user interface, or through a command line interface suitable for submission as an automated batch process.

Example of output shapes generated by the OpenSpirit Scan Utility as displayed in ESRI ArcMap:



Usage Note:
 You can also run the Scan Utility from the command line. On Windows run **scanutility.bat** and on UNIX run **scanutility** located in the **\$OSP_HOME/bin** directory. This makes it easy to run multiple jobs in batch mode once you have set all the parameters. See the section **Running from the Command Line** for more details

Installation and Starting the Scan Utility

The OpenSpirit Scan Utility is installed as part of the normal OpenSpirit installations. In order to run this utility, however, you must obtain a valid license. The SDE capability is licensed separately. Evaluation license keys can be obtained by sending an email request to support@openspirit.com.

Running the Scan Utility in Shapefile Mode

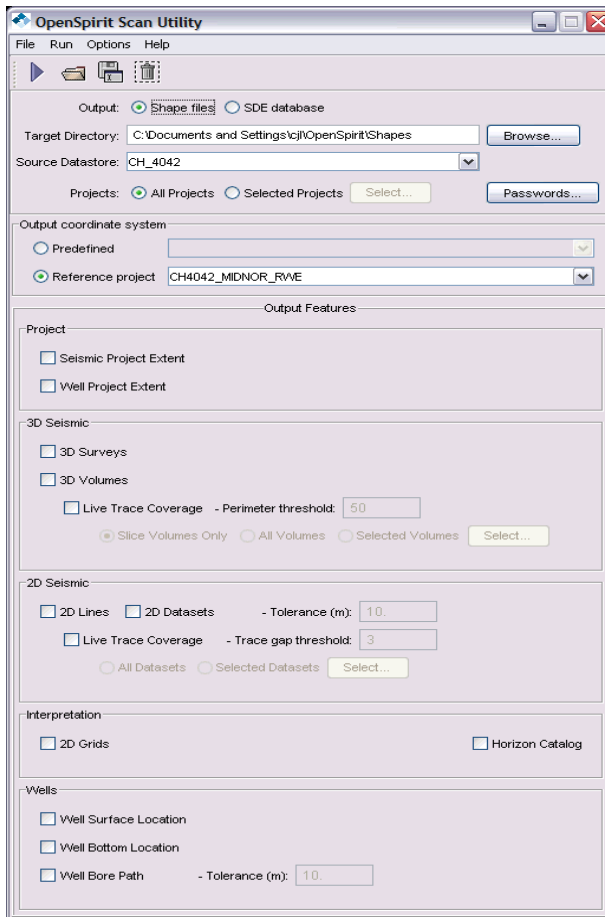
The Scan Utility can be started in GUI (Graphical User Interface) mode from the OpenSpirit Launcher menu under *Tools -> Scan Utility*, or in command line mode. It does not require a session. In GUI mode, the definition of the scan job can be saved as an .xml definition file for later use, or for submission in batch file mode. If the Scan Utility is rerun on the same data store, and into the same target directory, it will incrementally update existing shape files. The SDE enabled ScanUtility has a slightly different appearance, and will be described in the proceeding section Running the Scan Utility in SDE Mode.

Setting General Options

If you have both SDE and Shape file Scan Utility licenses, you will see an Output line with Shape files, and SDE database. Select the *Shape files* radio button. If you only have a Shape files license, then the Output line will not be visible, and you can only scan in shape file mode.

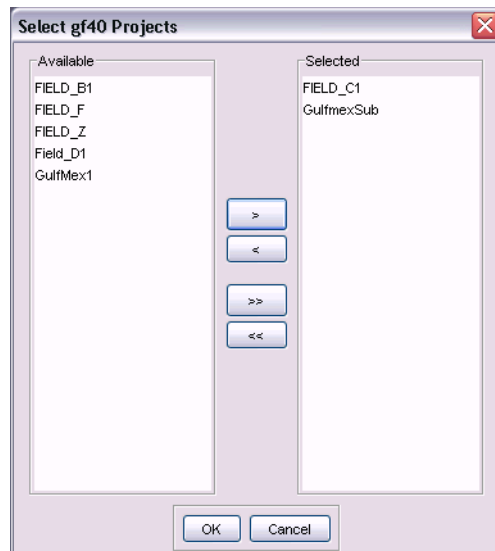
In the *Target Directory* field, select the output directory by using the Browse button and navigating the file hierarchy to select the desired directory. You must insure that you have write permissions to this directory. The target directory you choose will contain all generated shape files, including a log file. A directory is selected by double clicking on its name and then selecting the *OK* button. Select the project for scanning from the *Source Datastore* drop-down menu. The generated shape file names are prefixed by the data store name selected.

Select the projects within the data store to scan. You can scan all projects, or a subset of selected projects. The choice is made on the *Projects* line by clicking on the



corresponding radio button.

If the *Selected Projects* radio button is checked, click on the *Select* button and the select projects dialog is displayed, showing all the projects in the selected data source.

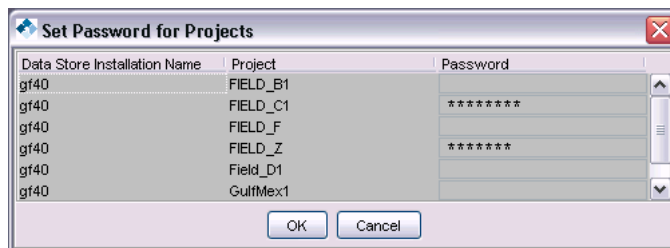


Initially, this dialog will have no projects in the *Selected* list. To move projects from one list to the other, click on the project and then click the *single arrow* button to move it to the desired list. All projects can be moved to, or removed from, the *Selected* side by using the *double arrow* buttons.

Only the projects a user has access to are displayed in the *Available* list. Even if the *All Project* option is selected, OpenSpirit utilizes the access control mechanism of the underlying data store and will only scan those projects the user's ID has access to.

You can check and update passwords by selecting the *Password* button. OpenSpirit utilizes the access control mechanism of the underlying data store and because these vary, OpenSpirit's behavior varies correspondingly. Enter project passwords, if required, if you have not already entered the

passwords elsewhere.



The *Set Password for Projects* dialog box shows the user's project password (shown in asterisks) if the data store type requires password information and it has been entered earlier. If the data store type requires account and password information then account and password columns are shown. If the *Password* field is blank, provide the required password. When all passwords are provided, click *OK*.

In the Scan Utility *Output coordinate system* area, set the desired output geographic coordinate system to *Predefined* or *Reference Project*. All output shapes are converted to a consistent geographic latitude/longitude coordinate system that is defined here. You can choose to use a well-known geographic coordinate system, such as WGS 84, by clicking on the *Predefined* radio button, and then select the datum from the associated pull-down menu. Click on the *Reference Project* radio button if you want to use one of your project's projection system (the project's preferred display

geodetic datum and ellipsoid). The geographic system of this project is used as a reference while writing the shape files. All the objects in different projects are converted to the one preferred geographic system selected here as they are written to the shape file.

The Scan Utility outputs the shape files and SDE layers in the consistent, unprojected, latitude/longitude system chosen in either the *Predefined*, or *Reference Project* field. It is up to the GIS viewer, such as ArcMap, to map the data in a projected system. An ESRI .prj file is produced for each shape file when a well know datum is selected and it is available as an ESRI defined datum. This .prj file contains datum information so ArcGIS 8.2+ can perform on-the-fly datum shifts and map projections.

Select Output Options

Select the desired output by checking the appropriate generation options in the *Output Features* section of the Scan Utility GUI. Each option is described in the table below.


Project Extent
Seismic Project Extent: The four corner points of each project scanned, containing the geographical extent of seismic data in the project.
Well Project Extent: The four corner points of each project scanned, containing the geographical extent of well bore data in the project.
3D Seismic
3D Surveys: The four corner points of scanned 3d surveys along with key attributes.
3D Volumes: The four corner points of scanned volumes with key attributes.
Live Trace Coverage: An irregular multipart-polygon outline of the lines in a volume with trace values other than 0 taken at a time-slice half way through the volume.
Tolerance Threshold: Controls the detail of the line geometry in the Live Trace Coverage polygons. It is a number that represents the perimeter (in traces) of the smallest hole to preserve. A tolerance of less than 10 means the line geometry is represented by the minimum number of traces required to preserve the details of the original line geometry to within a tolerance of 10. A tolerance threshold of 0 produces no decimation.
Slice Volumes Only: All slice-oriented volumes are scanned, and a live trace coverage polygon generated for each slice volume. Generating live trace coverages for slice volumes is very quick and does not take much time. This is the recommended setting for the first pass of the Scan Utility in a new project.



Usage Note: DO NOT select All Volumes in Live Trace Outline unless you know what is in the seismic project! The Live Trace Outline scan process must have a slice volume to generate the polygon representing the live traces. If a large volume (thousands of lines) is trace-oriented, it can take several hours to generate a time-slice for each volume. It is highly recommended to scan all slice volumes and then use the Selected Volumes option to pick the trace volumes you wish to scan in a second run.

<p>All Volumes: This option will generate live trace coverages for all trace and slice volumes in a project. NOTE: Generating live trace coverage from large, trace oriented volumes <u>can be very time consuming</u>. The live trace coverage calculation must extract a horizontal slice from the midpoint of each trace oriented volume, and this will be very slow for large volumes. Use with caution.</p>
<p>Selected Volumes: This option is only available if the Scan Utility is being run a second time to update a set of shape files or SDE scan sets, and a 3D Volume Shape files already exist. You have to scan the project a second time, in the same directory in shape file mode, so the .dbf volume catalog can be read. In this case you can manually select which volumes are to be scanned for live trace coverage by clicking on the Select button. The project must be scanned a second time for the selected volumes to be generated.</p>
<p>2D Seismic</p>
<p>2D Lines: The line geometry, including SP numbering as a shape measure, will be output to a line feature along with key attributes. This option produces a line coverage representing 2D "nav" data.</p>
<p>2D Datasets: The line geometry for the dataset, including SP numbering as a shape measure, will be output to line feature along with key attributes. This produces a line coverage representing a 2D line with "nav" data and trace data. Only header files/data base entries are checked, so this is much faster than LiveTrace Coverage.</p>
<p>Tolerance: Controls the detail of the line geometry that is written out to the shape file. A tolerance of 10m means the line geometry will be represented by the minimum number of points required to preserve the details of the original line geometry (thinned) to within a tolerance of 10m. A tolerance of 0 produces no decimation.</p>
<p>Live Trace Coverage: This option produces a polyline representing areas along a 2D line that have "live" 2D data. OpenSpirit opens each 2D data file and access every trace along a 2D line. A line segment is created when there is no null, or nonzero traces. This option can be time consuming because traces from every 2d data file associated with a line are opened and read.</p>
<p>Tolerance gap threshold: The number of null, or zero value traces that will produce a gap in a 2D line when the Live Trace Coverage option is selected.</p>
<p>All Datasets: This option will generate a Live Trace Coverage for all 2d lines and all 2d datasets. NOTE: Generating live trace coverage for all lines in a project with many datasets can take a large amount of time.</p>
<p>Selected Datasets: This option is only available if the ScanUtility is run a second time to update a set of shapefiles, or SDE scansets, and a 2D Lines and 2D Datasets coverage already exists. In this case you can manually select 2d lines to scan by clicking on the Select button. The project must be scanned a second time to generate a coverage for the selected line.</p>
<p>Interpretation</p>

Horizon Catalog: A dbf file, or SDE table, will be created that contains a catalog listing of all time and depth horizon representations associated with the scanned seismic projects.
Grid 2d: A dbf file, or SDE table, only is created containing a catalog listing of non-seismic two dimensional grid representations.
Wells
Well Surface Location: The surface location of the scanned wells along with key attributes represented as a point feature.
Well Bottom Hole Location: The location of the bottom of the scanned well bore along with key attributes represented as a point feature.
WellBore Path: The 3D wellbore path, along with MD as its measure, represented as a line feature along with key attributes. The deviated survey is used if available. If only the top and bottom hole location is available, then a two point well bore path is made.
Tolerance: This controls the detail of the wellbore geometry that is written out to the shape file. A tolerance of 10m means the wellbore geometry will be represented by the minimum number of points required to preserve the details of the original wellbore geometry to within a tolerance of 10m. A tolerance of 0 produces no decimation.

 *Usage Note:*
 A master .dbf file is created for a data store when it is scanned. Its name is automatically set to `datastorename_master.dbf`. This master .dbf file contains information about the geographic coordinate system used for the OpenSpirit shape files.

Set the run options

Review the settings under the *Options* menu.

There are several run options to consider which are summarized below.

Shutdown Servers After Use: Check this option if you want data connectors to be shutdown after the scan process is complete. Unless you are running other OpenSpirit client applications under the same userid that has launched the Scan Utility, this should be selected. In this case, the selection can be cleared to prevent the Scan Utility from shutting down a data connector that can be in use.
Remove Deleted Projects: Check this option if you are updating existing shape files and are scanning all projects and wish to remove shapes from projects deleted from the data store.
Use Tabs for Features: Makes all Scan Utility output features accessible by tabs. Considerably shortens the Scan Utility window, and lessens the amount of room it takes on screen (see below).

Start the scan job

Click the *Run* button on the toolbar or under the *Run* menu to launch the batch process. The *Progress Window* displays the status and progress of the scan process and progress information will be written

a log file in the Target Directory.

Running from the Command Line

The Scan Utility is capable of running in Shapefile or SDE mode directly from the command line, or as part of a scheduled batch process. A parameter file, created with the Scan Utility GUI, controls the scan job.

Use the Scan Utility GUI as described in the earlier section to define a scan job and save it as an xml control file. The File Menu in the Scan Utility menu bar provides several options to save and edit the xml control file. The table below lists the Options to save a ScanUtility parameter file from the Scan Utility GUI.



Usage Note:

When running in batch mode you should first make sure that the project passwords, if required by the selected data source, are properly set, and your user server is running. Having entered these passwords once for a given userid, OpenSpirit persists these passwords in a secure fashion, so they do not need to be reentered.

Menu Items	Action
File > Save	User is prompted to enter a file name. This option saves the input parameters on the GUI as a text file with an extension.xml
File > Save As	User is prompted to enter a file name. This option saves the current .xml file as a new, different .xml file
File > Open	User is prompted to select a .xml file. The input values from the selected script file are read and the GUI is populated with them.
File > Clear	All the GUI elements are cleared and initialized.

After you have a defined scan job .xml control file, start the ScanUtility directly from a DOS shell or UNIX xterm. Type **scanutility** in Unix, or **scanutility.bat** in Windows, with a quoted ScanUtility parameter file (including its .xml extension). This assumes that these commands are in your path, or you are in the \$OSP_HOME/bin directory. The GUI for the Scan Utility will start if the .xml parameter file is omitted.

The following is an example of starting the ScanUtility from the UNIX command line, in the OpenSpirit installation directory, bin subdirectory, using the xml parameter file scan_all.xml generated earlier with the ScanUtility GUI, in shapefile mode:

scanutility "/users/jep/scan_jobs/scan_all.xml"

If you want to run in SDE mode from the command line, you have to use the -OpenSpiritSDE option. Additionally, all of the SDE parameters described in the "Running the Scan Utility in SDE Mode" section below must be in the .xml control file. Lastly, you must also have an additional OpenSpirit SDE Scan license. The same batch scanjob in SDE mode looks like:


scanutility -OpenSpiritSDE "/users/jep/scan_jobs/scan_all.xml"

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On a Windows system, the same SDE job will look like:

```
scanutility.bat -OpenSpiritSDE "C:\Documents and Settings\jep\scan_jobs\scan_all.xml"
```

Check the logs in the Target Directory when the scan job is complete for job status, and any errors encountered by the Scan Utility.

 *Usage Note:*
 OpenSpirit runs a separate data connector for each seismic project, so it is advisable to shut down connectors if many seismic projects are being scanned to make more efficient use of system resources.

Shapefile File Naming Conventions

The following files can be generated in the selected output directory when scanning in Shapefile mode (italics represent name components that are data dependent):

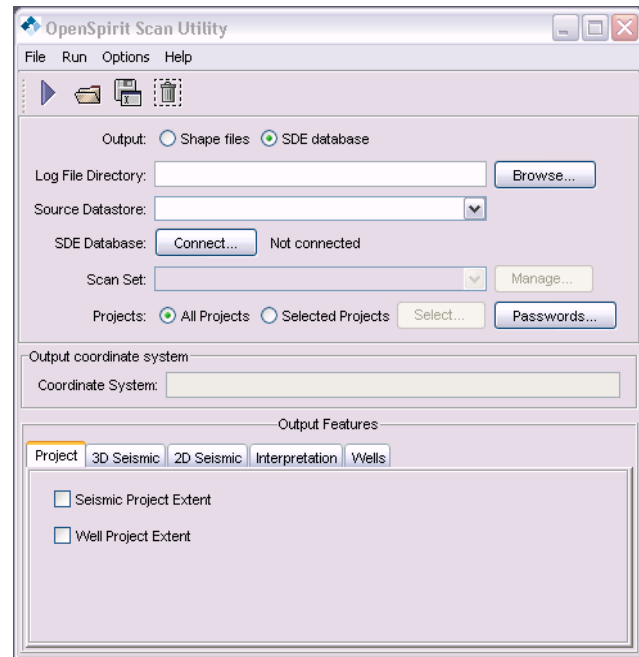
Shapefile Filename	Contents
<i>datastorename</i> .log	log file containing details of run that generated shape files
<i>datastorename</i> _master.dbf <i>datastorename</i> _datastore.dbf	“master” .dbf file that contains information about coordinate system used for OpenSpirit shape file generation, and “datastore” .dbf information on the scanned datastore
<i>datastorename</i> _project.shp <i>datastorename</i> _project.shx <i>datastorename</i> _project.prj <i>datastorename</i> _project.dbf	polygon shapes representing project extents of scanned projects from data store for both wells and seismic
<i>datastorename</i> _well.shp <i>datastorename</i> _well.shx <i>datastorename</i> _well.prj <i>datastorename</i> _well.dbf	point shapes representing surface locations of wells in scanned projects from data store
<i>datastorename</i> _wellBottom.shp <i>datastorename</i> _wellBottom.shx <i>datastorename</i> _wellBottom.prj <i>datastorename</i> _wellBottom.dbf	point shapes representing bottom hole locations of wells in scanned projects from data store
<i>datastorename</i> _wellPath.shp <i>datastorename</i> _wellPath.shx <i>datastorename</i> _wellPath.prj <i>datastorename</i> _wellPath.dbf	polyline 3D shapes representing the wellbore paths of wells in scanned projects from data store
<i>datastorename</i> _sur.shp <i>datastorename</i> _sur.shx <i>datastorename</i> _sur.prj <i>datastorename</i> _sur.dbf	polygon shapes representing outlines of 3D seismic surveys of scanned projects in the data store
<i>datastorename</i> _vol.shp <i>datastorename</i> _vol.shx <i>datastorename</i> _vol.prj <i>datastorename</i> _vol.dbf	polygon shapes representing outlines of 3D seismic volumes from surveys of scanned projects from data store

Shapefile Filename	Contents
<i>datastorename_trccov.shp</i> <i>datastorename_trccov.shx</i> <i>datastorename_trccov.prj</i> <i>datastorename_trccov.dbf</i>	polygon shapes representing outlines of live trace coverage within selected volumes of seismic surveys of scanned projects from data store
<i>datastorename_in2.shp</i> <i>datastorename_in2.shx</i> <i>datastorename_in2.prj</i> <i>datastorename_in2.dbf</i>	polyline shapes representing location of 2d seismic lines of scanned projects from data store. The density of points along the line is determined by the tolerance factor
<i>datastorename_ps2.shp</i> <i>datastorename_ps2.shx</i> <i>datastorename_ps2.prj</i> <i>datastorename_ps2.dbf</i>	Polyline shapes representing location of 2D seismic datasets of scanned projects from data store. The density of points along the line is determined by the tolerance factor
<i>datastorename_horz.dbf</i>	Horizon catalog file containing entries for all time and depth horizons for interpreted horizons from 3D seismic surveys of scanned projects from data store
<i>datastorename_grid2d.dbf</i>	Two dimensional grid catalog file containing entries for all non-seismic two dimensional grids.

Running the Scan Utility in SDE Mode

When an OpenSpirit SDE Scan license feature is available, an Output line is added to the Scan Utility enabling the user to select either *Shape file* mode, or *SDE database* mode giving the ScanUtility a slightly different appearance. If *Shape files* is selected as the output option, then the Scan Utility will behave exactly as described in the previous section, **Running the Scan Utility in Shapefile Mode.**

Selecting *SDE database* on the *Output* line puts the Scan Utility in SDE mode. In SDE mode, the Scan Utility stores the GIS features in an ESRI ArcSDE 8.x or 9.x enabled database, instead of files described earlier. Before you can use the Scan Utility, you must have a SDE account with the proper roles and privileges.



SDE Roles and Privileges

The user must have certain privileges within the SDE database in order to run the Scan Utility in SDE mode. These roles and privileges are defined by the SDE Administrator. Before you start scanning into SDE, you should discuss a strategy with your SDE Administrator. Each Scan Set is a group of tables that maintain attribute information on the GIS objects created by the OpenSpirit Scan Utility and are “owned” by the account that creates them. Permissions and roles for users must be set up correctly inside of SDE for the Scan Utility to function Properly.

See the ESRI documentation, “*ArcSDE Configuration and Tuning Guide for Oracle*” on how to create SDE roles. It is available on your SDE installation disk. Additional information on SDE configuration and tuning can be found at www.esri.com.

OpenSpirit Scan Set Tables

GIS coverages (2d lines, survey polygons, well points, etc.) are stored in tables within the database

running SDE and are organized into Scan Sets. They are owned by the SDE account used to create the Scan Set and stored under the SDE account’s schema, in its default tablespace. Other users will have to be granted at least select on these tables, after they have been created, in order to use them in ArcMap.

OpenSpirit places only one table, SCAN_SET_INFO, in the SDE administrator schema. This table is created the first time the Scan Utility is run and contains a central catalog of scan sets. No other tables are created, or maintained in the SDE account unless the ScanUtility is run using the SDE master account, or it is set up to do so by the SDE administrator. Each SDE user that will create, and manage OpenSpirit SDE scan sets must have DELETE, INSERT, SELECT, and UPDATE privileges on the SCAN_SET_INFO table. Your SDE, or database administrator will have to grant you this access before you SDE account can create OpenSpirit scansets with the ScanUtility.

SDE Scan Set Table Name	Contents
<i>scansetname</i> \$MASTER	“master” table storing information about coordinate system used for OpenSpirit Scan Set generation
<i>scansetname</i> \$DATA_STORE	maintains information about the scan set's datastores
<i>scansetname</i> \$PROJ_EXTENT	polygons representing well and seismic data extents of scanned projects from data store
<i>scansetname</i> \$WELL_BORE	points and attributes representing surface locations of wells in scanned projects from data store
<i>scansetname</i> \$WELL_BOTTOM	points and attributes representing bottom hole locations of wells in scanned projects from data store
<i>scansetname</i> \$WELL_PATH	3D polylines and attributes the wellbore paths of wells in scanned projects from data store
<i>scansetname</i> \$3D_SURVEY	polygons and attributes representing outlines of 3D seismic surveys of scanned projects in the data store
<i>scansetname</i> \$3D_VOLUME	polygons and attributes representing outlines of 3D seismic volumes from surveys of scanned projects in a data store
<i>scansetname</i> \$3D_LIVE_TRACE	polygons and attributes representing outlines of live trace coverage within selected volumes of seismic surveys of scanned projects from data store

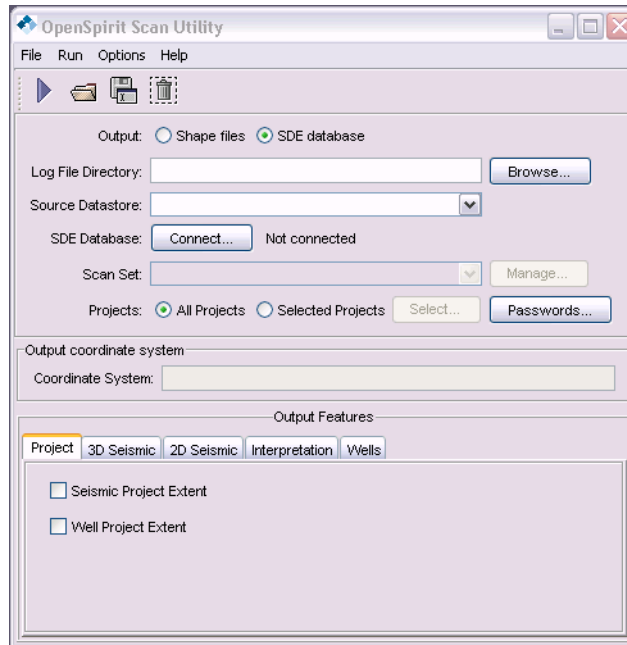
<code>scansetname\$2D_LINE</code>	polylines and attributes representing location of 2d seismic lines of scanned projects from data store.
<code>scansetname\$2D_DATA_SET</code>	polylines and attributes representing location of 2D seismic datasets of scanned projects from data store
<code>scansetname\$3D_HORIZON</code>	table containing attribute entries for all time and depth horizons for interpreted horizons from 3D seismic surveys of scanned projects from data store
<code>scansetname\$GRID_2D</code>	table containing attribute entries for grids created from non-seismic data

Starting the Scan Utility in SDE Mode

The Scan Utility dialog is started from the OpenSpirit Launcher menu under *Tools -> Scan Utility*, or in command line mode with the “-OpenSpiritSDE” option. It does not require a session. In the Scan Utility GUI, the SDE definition of the scan job can be saved for later use, or for submission in batch file mode. If the Scan Utility is rerun on the same data store, and into the same SDE Scan Set, it will incrementally update existing feature layers.

Setting SDE Options

In the Scan Utility GUI, the first step is to toggle the Output to SDE database. This will add two lines to the Scan Utility GUI: SDE Database and Scan Set. This is where the SDE database connection is managed. Selection of the Log File Directory, Source Datastore, and Output Features are exactly the same as described earlier in Running the ScanUtility in Shapefile Mode.



Connecting to SDE

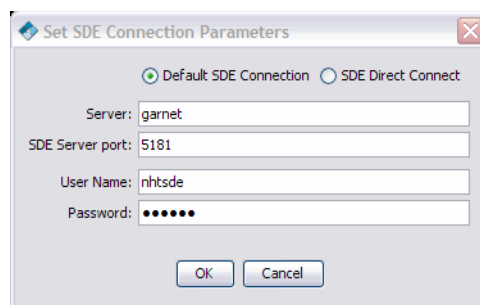
Your SDE database account must have the ability to create data in SDE in order for the ScanUtility to work. Additionally, you must have INSERT, UPDATE, and DELETE access on the table SCAN_SET_INFO, created by OpenSpirit, inside of SDE. Contact your SDE Administrator for this access. Suggested roles are described earlier in the Example SDE Roles table.

On the SDE Database line click on the *Connect* button. This will launch the *Set SDE Connection Parameters* dialog box. You have the option to connect to the SDE Database using either the **Default SDE Connection**, or **SDE Direct Connect**.

Default SDE Connection

The Default SDE Connection connects to the SDE database through the SDE daemon. You must provide SDE connection information for the server SDE is running on. The required parameters are:.

- Server - Oracle server that is running SDE, can be either the server name or IP address.
- SDE Server port - the port SDE is listening on (5151 is default for SDE).
- User Name - SDE user with appropriate permissions to sde.scanset_info



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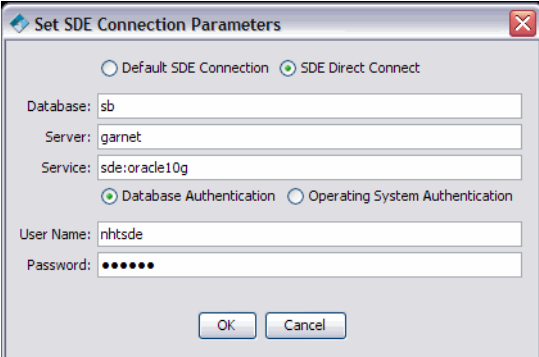
- Password - SDE user's account password for a SDE database user account.
Check with your SDE administrator for this information

After you are connected, the *Connect* button turns into a *Disconnect* button, and provides information to the SDE host and port you are connected to. Just click on the *Disconnect* button to disconnect from SDE.

SDE Direct Connect

The SDE Direct Connect method connects directly to SDE's Oracle database, thus bypassing the SDE daemon. The required parameters are:

- Database - Oracle instance containing the SDE installation
- Server - Oracle server that is running SDE, can be either the server name or IP address
- Service - sde:oracle10g, or sde:oracle9i
- Check Database Authentication or Operating System Authentication as required.
- User Name - SDE user with appropriate permissions to sde.scanset_info. See OpenSpirit User's Guide for details.
- Password - SDE user's password @ Oracle service. For example if the password is pass, and the Oracle service is sb, then enter **pass@sb** in the Password field.



If successful, the Scan Utility will report on the SDE Database button as Connected, and you will be able to manage scan sets.

Creating SDE Scan Sets

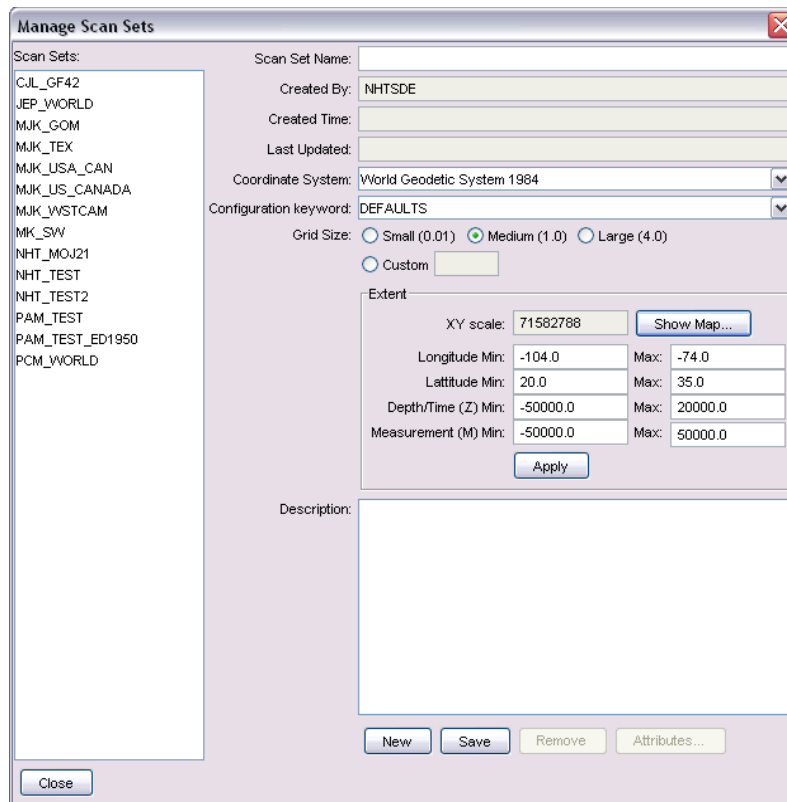
In the OpenSpirit Scan Utility, if the SDE database is connected, a *Manage* button will become active on the Scan Set line. Click on the *Manage* button to launch the *Manage Scan Sets* utility window. Your SDE account must have the proper permissions and roles as described earlier in SDE Roles and Privileges to create and update SDE Scan Sets.

The first step is entering a *Scan Set Name* at the top of the dialog. Once saved, the Scan Set name cannot be changed. A Scan Set name is limited to 15 characters, must start with a letter, and can be made up of characters, numbers, and the symbols # and _.

The *Last Updated*, *Created*, and *Created by* fields are automatically filled in. The *Created by* field shows who's SDE account actually owns the tables that make up the SDE Scan Set.

In the *Coordinate System* field, set the desired output geographic coordinate system to the desired system. This cannot be changed once data is written to the scan set. All output to SDE will be converted to a consistent geographic coordinate system that is defined here. You can choose to use a well-known geographic coordinate system, such as WGS 84, by clicking on the *down arrow*, and then select the datum from the associated pull-down menu.

The Scan Utility outputs the SDE layers in the consistent, unprojected, latitude-longitude system chosen in the *Coordinate System* field. It is up to the GIS viewer, such as ArcMap, to map the data in a projected system.



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If SDE Keywords are used by your SDE administrator, use the pull-down menu in the *Configuration keyword* field and select the appropriate SDE keyword for the scan job. If you do not use SDE keywords, or know what a SDE keyword is, leave it set to *DEFAULTS*.

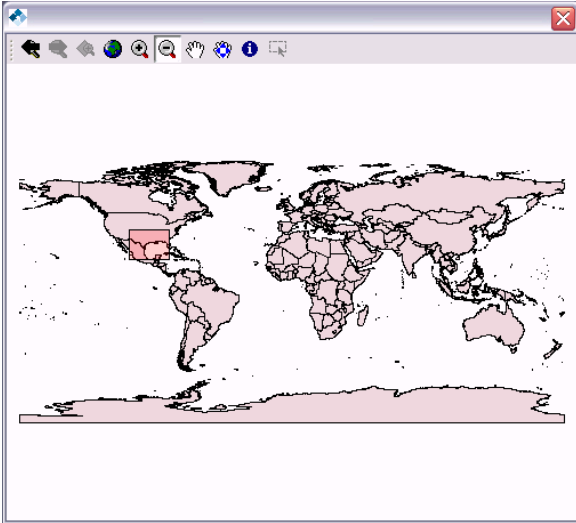
Next, you must choose the SDE *Grid Size*. This is often described as more of an art, rather than a science. You may want to contact your SDE Administrator for advice, or ESRI at www.esri.com to get some ideas on what is best for your installation. Once data is written into the Scan Set, the *Grid Size* cannot be changed. Units for the *Grid Size* are in degrees. Where possible, specify a grid size where a high percentage of features fall wholly within one grid cell.

Three suggested grid sizes are provided, or you can use the *Custom* box to define your own in decimal degrees. The *Small (0.01)* Grid Size may be useful if your Scan Set covers a small area, such as a few counties. The *Medium (1.0)*, or perhaps Custom 2.0, may be useful over a region such as many states, the Gulf of Mexico, or the Persian Gulf. The *Large (4.0)* may be useful for a world wide Scan Set. A grid size set too small will result in some GIS features not being able to make it into SDE, while one too large will make SDE run slower. Further information can be found at www.esri.com in the article **HowTo: Tune the Multi-Level Grid Spatial Index:**

<http://support.esri.com/index.cfm?fa=knowledgebase.techArticles.articleShow&d=23407>

A multiplier is used by SDE to convert decimal values to integers for storage in SDE. Any decimal left after the multiplication will be lost, so a larger xy scale means better precision. The X,Y Scale is calculated for you based upon the other parameters provided. It is for reference only, and cannot be changed by the user.

The *Extent* defines the area that the scan set will cover and cannot be changed once the Scan Set has been created and saved. Care and forethought must be taken to ensure that the parameters set for the output feature class match the source data. Improper spatial domain settings in the *Extent* box of the *Manage Scan Sets* dialog often result in the error: “... *{The coordinates or measures are out of bounds.}*...” .



The Extent Longitude/Latitude Min/Max must contain the area for all of the data you will scan now, and in the future. Once the scan set is saved, it cannot be extended. The Longitude/Latitude must be in decimal degrees between +180 to -180 and +90 to -90. The Latitude range will not “wrap” across 180. If your source data includes negative Z (depth) coordinates, or negative M (measurement) the *Depth/Time* and *Measurement* fields must also include a negative range. In order to help you visualize the scan set’s extent, click on the *Show Map* button. This will launch a *Map Utility* that will help you pick the extent. In the map extent tool, click on the last icon on the right to go into pick

mode, and then highlight your area of interest. The Map Utility can be dismissed by clicking on the *close window* icon in the upper right hand portion of the window. When you are satisfied with the Extents, click on the *Apply* button in the Manage Scan Sets tool. You can change the geographic extents of the scan sets up until you have scanned data into the scan set.

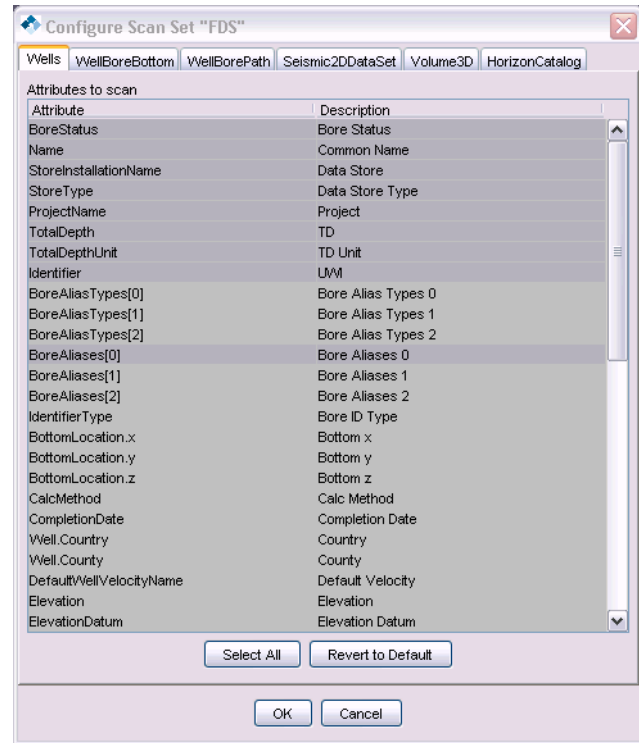
The *Description* field in the Manage Scan Sets tools is a free form text field where you can place information to describe the Scan Set.

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The last step in defining a scan set is selecting the attributes for each data set. In the Manage Scan Sets tool, click on the *Save* button. This will launch the *Configure Scan Set* attribute window. Each tab represents a separate data type. Select the attributes you wish to save into the SDE database with your scan set. Once data is scanned into a data set, the selected attributes cannot be changed.

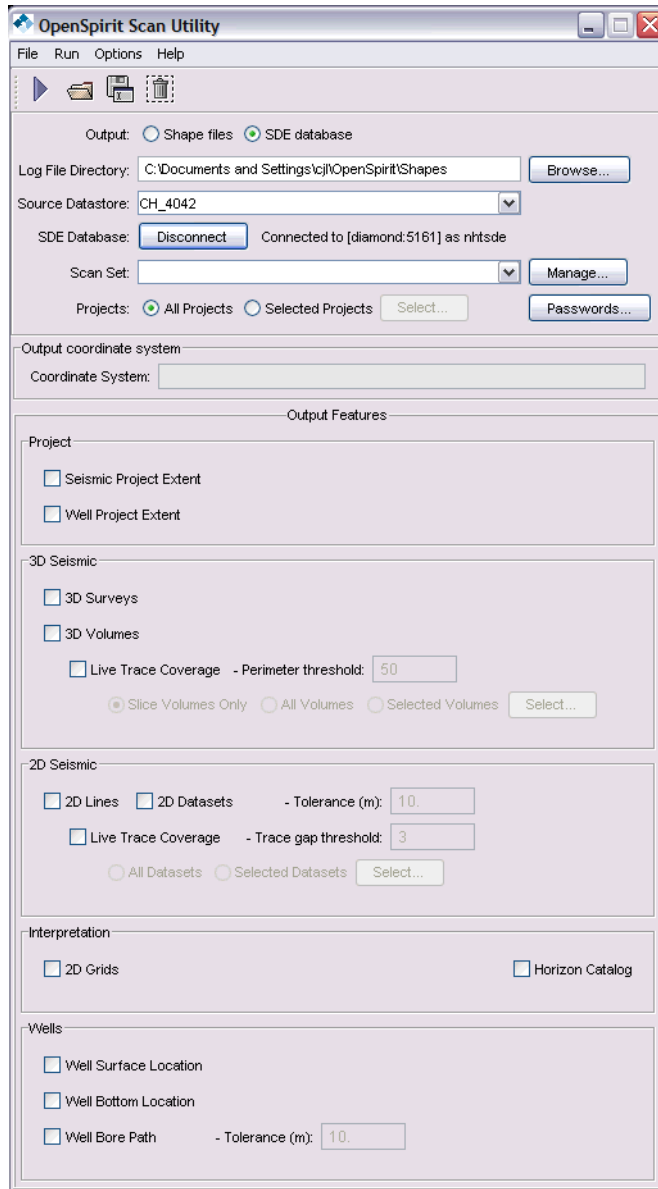
When you are happy with your scan set definition, click on the *Save* button in the Manage Scan Sets tool. The Scan Utility will then create all of the necessary tables in the SDE for your scan set.

Scan sets are deleted using the Manage Scan Sets tool. Select the scan set you want to delete and click on the *Remove* button. This will delete all of the SDE tables that make up the scan set, and can take several minutes to complete. A scan set can only be removed using an SDE account that has the ability to delete the SDE scan set tables.



Running SDE Scan Utility in SDE Mode

After the SDE Scan Set is defined, running the Scan Utility in shape SDE mode is the same as running it in shape file mode described earlier in the section Running the Scan Utility in Shape File Mode. The *Source Data Store*, *Projects*, *Coordinate System*, and *Output Features* are selected exactly the same as described in detail in the earlier section. Running the scan utility in interactive mode and batch mode are the same, as well as all options.



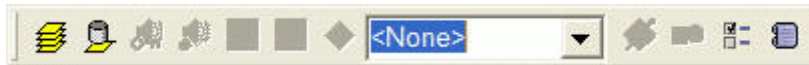
Using the OpenSpirit ArcMap Extension

Overview

The OpenSpirit ArcView Extension is designed to be used with ESRI's ArcMap 9.0 (or newer) product. This allows ArcMap (aka ArcView) to visualize and analyze the themes that are generated by the OpenSpirit Scan Utility and to send object selection, data selection, GIS Feature selection, and cursor tracking events to other OpenSpirit enabled applications. When used with the OpenSpirit data viewers, these combined utilities give users an extensive set of tools for browsing and selecting data from a variety of project data stores.

The ArcMap Extension must be run on Windows in conjunction with ESRI's ArcMap (ArcView) version 9.0 (or newer).

The OpenSpirit extension adds this tool bar to ArcView.



Installation

The OpenSpirit ArcMap Extension is distributed with the OpenSpirit Windows Runtime Installation. To install the Extension you can either:

1) Install as part of the original installation chosen to install the .NET options and select the ExcelAdapter option.

-or-

2) Subsequent to the original OpenSpirit Windows Runtime, if you did not elect to install the .NET options, you can later install the .NET options by executing setup.exe in the %OSP_HOME%\external\OpenSpirit.NET directory (usually C:\Program Files\OpenSpirit\external\OpenSpirit.NET).

After installing the ArcMap Extension you will need to make sure that a valid license feature key is available. To obtain an evaluation license you can send an email request to support@openspirit.com. The OpenSpirit ArcMap Extension is an optional add-on product to the OpenSpirit Base Framework and Subsurface Data Module products and requires a separate license. On UNIX, its license key is installed in the FLEXlm license file along with the other OpenSpirit license keys. If a license key is available, the OpenSpirit ArcMap Extension toolbar will appear in ArcMap.

Instructions for Use


The OpenSpirit ArcMap Extension adds toolbar icons to the ArcMap user interface. It appears in ArcMap as any other extension with its toolbar access controlled from the ArcMap menu *Tools > Extensions*. To use the OpenSpirit ArcMap Extension in ArcMap you must first use the OpenSpirit Scan Utility to generate shape files, or coverages in SDE, that contain the required OpenSpirit

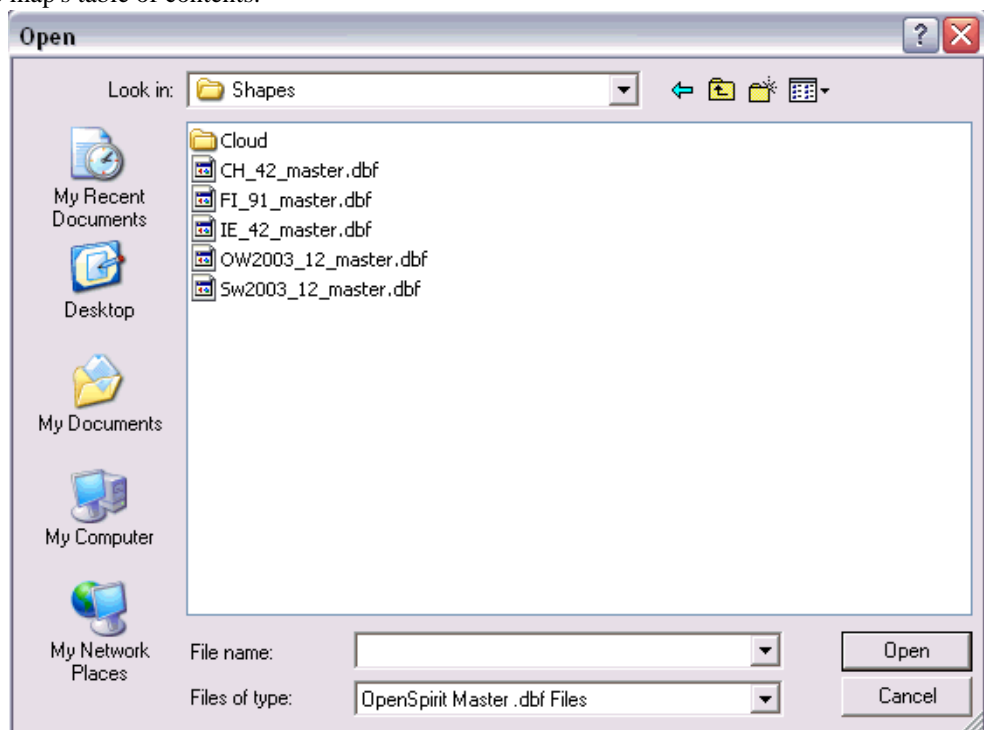
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specific attributes and ensure that the OpenSpirit ArcMap Extension is installed and enabled (see the section above regarding installation).

Add Datastore Themes

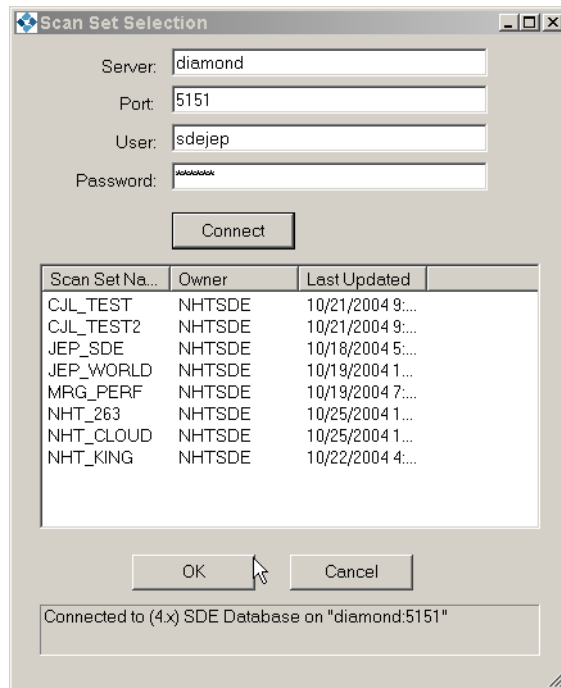
The first step in using the OpenSpirit ArcMap extension is adding the GIS features generated and saved as shape files or in SDE. The process is slightly different for shape files, or SDE.

Click on the *add shape files* icon  and navigate to the area where the shape files were saved from the Scan Utility. Every OpenSpirit data store installation scanned using the Scan Utility has an associated set of shape files. A .dbf file is created called *datastore_master.dbf*, where *datastore* is the name of your data store and is used to identify all of the shape files generated for a particular data store. When the user clicks on *add shape files* icon, a dialog is displayed that will locate the master dbf. When the user selects a master DBF, all the themes related to the same data store are added to the map's table of contents.



Click on the *add SDE scan sets* icon  to add scan sets from SDE. This will launch the Scan Set

Selection dialog. Enter the *Server* the SDE instance is running on and the *Port* number SDE is



listening on. Next enter the *SDE user* and its *password*. Note the SDE user id can, and probably will be different from your UNIX or WINDOWS user ID. Additionally, the SDE user must have the proper SDE/Oracle permissions and access. Consult your SDE administration, and the SDE portion of the Scan Utility in this user guide for additional information on SDE roles. Click on the *Connect* button, and you will be presented a list of scan sets maintained in SDE. Click on the scan set you want to display in arc map and then the *OK* button. All of the themes related to this scan set are added to the ArcMap table of contents.

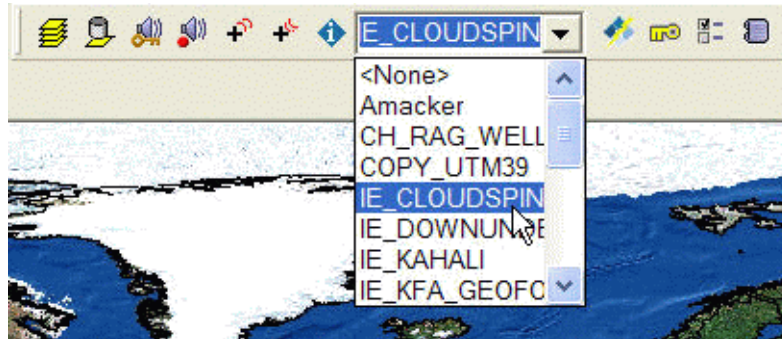
A data store's label properties in ArcMap can be controlled by changing the .lyr files located in the OpenSpirit Windows installation subdirectory external\ArcMapExtension. If you do not like the defaults that come with OpenSpirit save the .lyr file definition here and it will become the default definition for the OpenSpirit extension for the computer.


Options when Connected to an OpenSpirit Session

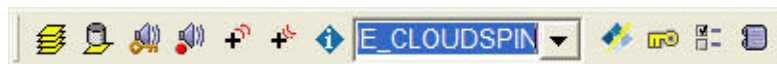
Select an OpenSpirit Session

To interact with other OpenSpirit enabled applications from ArcMap, a connection first has to be

established with an OpenSpirit session. Clicking on the *Session* dialog box causes a drop-down list of available sessions to be displayed. Select the desired session as shown:




The OpenSpirit Toolbar icon will change to indicate a successful connection  and the name of the selected session will appear in the ArcMap Window Title and the OpenSpirit session dialog box. Selection of a session then enables the other OpenSpirit Toolbar icons, and now you can send and receive OpenSpirit events. Your ArcMap extension will look like the picture below:



Send Selection Events and Selection Options

The ArcMap Extension enables ArcMap to send and receive OpenSpirit selection events, just like any other OpenSpirit enabled application. Through selection events, the ArcMap user can communicate with other OpenSpirit enabled applications.

An ArcMap user can use ESRI's powerful spatial selection capability to identify specifically required data and then send an OpenSpirit selection event that contains references to all selected

features can be sent by clicking on the *Send Data Selection Events* icon.  Any OpenSpirit enabled application can pick up this event, and access the data selected in ArcMap, even though the data is not resident in ArcMap itself.


The ArcMap Extension can also send OpenSpirit GIS events to other applications enabled to receive OpenSpirit GIS selection events. In ArcMap, a point, line or polygon can be selected using ESRI's selection capability and then sent to the waiting application by clicking on the *Send GIS Selection*

Events icon. 

OpenSpirit will send the GIS selection event through the OpenSpirit session. ArcMap coordinates and units will be converted to the OpenSpirit session's coordinate system. Make sure your intended

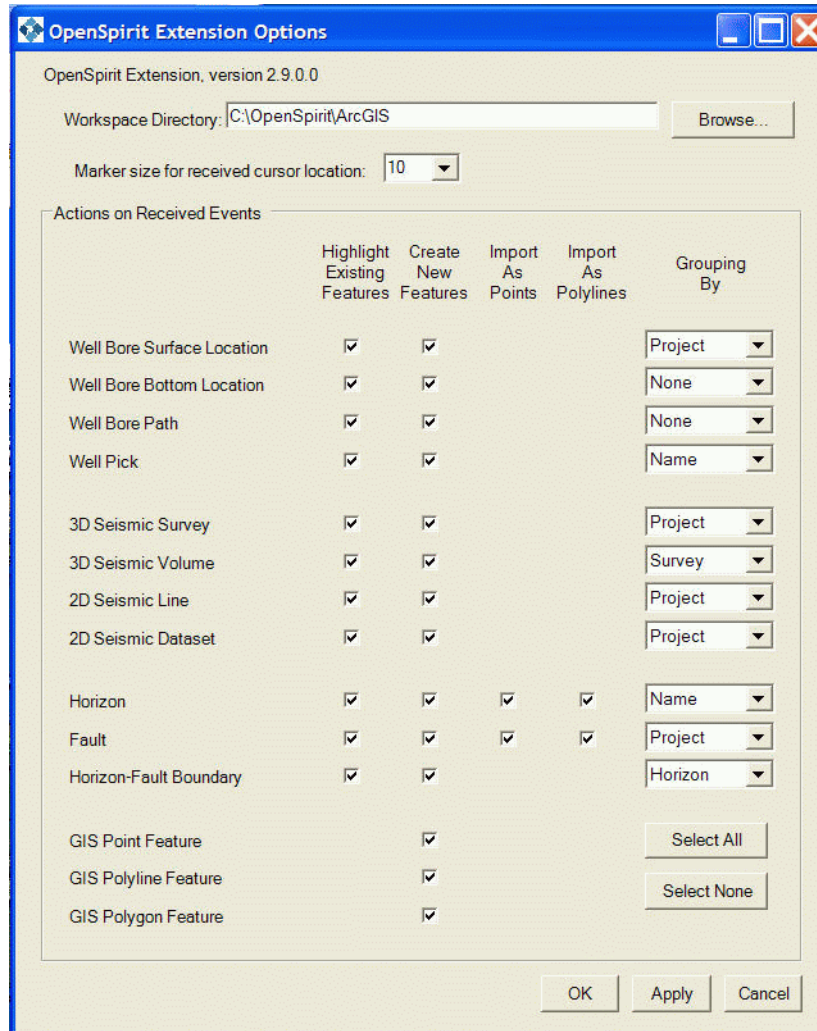
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shape file has a .prj file defining its datum, or your SDE layer has its datum correctly identified. In addition, you must insure ArcMap Frame's Data Frame Properties >Coordinate System tab has the correct transformations to WGS84 set. Click on the ArcMap's Transformation button and inspect every Geographic Coordinate System Transformation to insure every system in the *Convert from* window has a conversion into WGS84 you want to use. This transformation, in most cases, should match the conversion used in your GeoFrame, OpenWorks, Kingdom, Petra, etc. project.

The *Selection Options* icon  launches the OpenSpirit Options dialog box where the ArcMap user can control the OpenSpirit ArcMap Extension's behavior when it receives an OpenSpirit data

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or GIS selection event.



The OpenSpirit Extension Options dialog box controls the OpenSpirit Extension's behavior when receiving an OpenSpirit data, or GIS, selection event. If *Highlight Existing Features* is checked, and you have a layer in ArcMap created from an OpenSpirit Selection Event, or the OpenSpirit Scan Utility, then the item will be highlighted, or selected, in ArcMap. If the *Create New Features* is checked, and the ArcGIS Extension receives an Object Selection Even from another OpenSpirit enabled application such as the DataSelector, then the ArcGIS Extension will generate a shape file for each object. The *Grouping By* column allows you to control if there are one, or multiple shape file made for each data type. Note that this capability to create shapefiles "on the fly" from selection

events is only intended for 10's of items. If you want to produce shapefiles for hundreds, or hundreds of thousands of items, you must use the OpenSpirit Scan Utility.

The ArcMap Extension's workspace directory is controlled by selecting the *Workspace Directory*. This directory will be where any received data files will be stored.

There are three types of selection events that can be sent:

Data Selection Events

This message type contains datakeys (references to items in vendor data stores). This is a newer type of selection event that has the advantage of being very efficient when dealing with a large number of selected items. Since this is a new type of event, not all OpenSpirit enabled applications listen to this event type yet.

Data Selection Events can be sent for the following selected features and then viewed in the indicated OpenSpirit viewer or utility. Other third-party OpenSpirit enabled applications can also respond to these selection events. To receive events, the OpenSpirit viewer or another third-party application must be connected to the same OpenSpirit Session and the ArcMap Extension.

Feature Type	OpenSpirit Utilities which can listen for data selection events
Project	DataSelector
Wellbore, Wellbore path	DataSelector, Well Viewer, 3D Viewer, Excel Adapter
3d seismic volume	DataSelector, Section Viewer, 3D Viewer
3d seismic survey	DataSelector
2d seismic line	DataSelector
2d seismic dataset	DataSelector, Section Viewer, 3D Viewer
Horizon representations (from Horizon table)	DataSelector, Section Viewer, 3D Viewer

In order for an OpenSpirit selection event to be sent, the appropriate OpenSpirit data connectors must be running. These remote UNIX based data connectors will be automatically started as required, but when data is first selected from a project there will be an initial delay as the required connectors start. Also, if data is selected from five or more projects, a warning message will be displayed to remind the user that many data connectors might need to be started. During the data connector startup period, the OpenSpirit toolbar icons will be disabled

GIS Feature Selection Event

This message type contains the name, corresponding layer name, and geometry of the selected features. This message allows OpenSpirit easy access to a limited amount of GIS data in an area of interest.

GIS Feature Selection Events can be sent for the following selected feature types and then viewed in the indicated OpenSpirit viewer or utility. Other third-party OpenSpirit enabled applications can also respond to these selection events. To receive events, the OpenSpirit viewer or another third-party application must be connected to the same OpenSpirit Session and the ArcMap Extension.

Feature Type	OpenSpirit Utilities which can listen for GIS Feature selection events
Point	Excel Adapter
Polyline	Excel Adapter
Polygon	DataSelector, Excel Adapter

Send Cursor Location 

Users can broadcast a cursor location event from ArcMap to OpenSpirit enabled applications (such as the 3D Viewer) by selecting the *Send Cursor* tool button and moving the mouse on the ArcMap map. Note that the cursor location can be sent from a map view regardless of whether it is displayed in geographic coordinates (e.g. latitude– longitude) or map projection coordinates (in either case ArcMap broadcasts the correct geographic position).

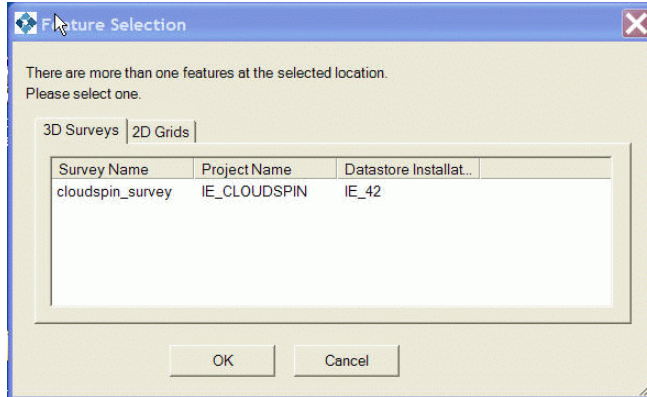
Receive Cursor Location 

User can receive location events from an OpenSpirit enabled application (such as the 3D Viewer) by selecting the *Receive Cursor* tool button and moving the mouse in the OpenSpirit enabled application.

Display OpenSpirit Information 

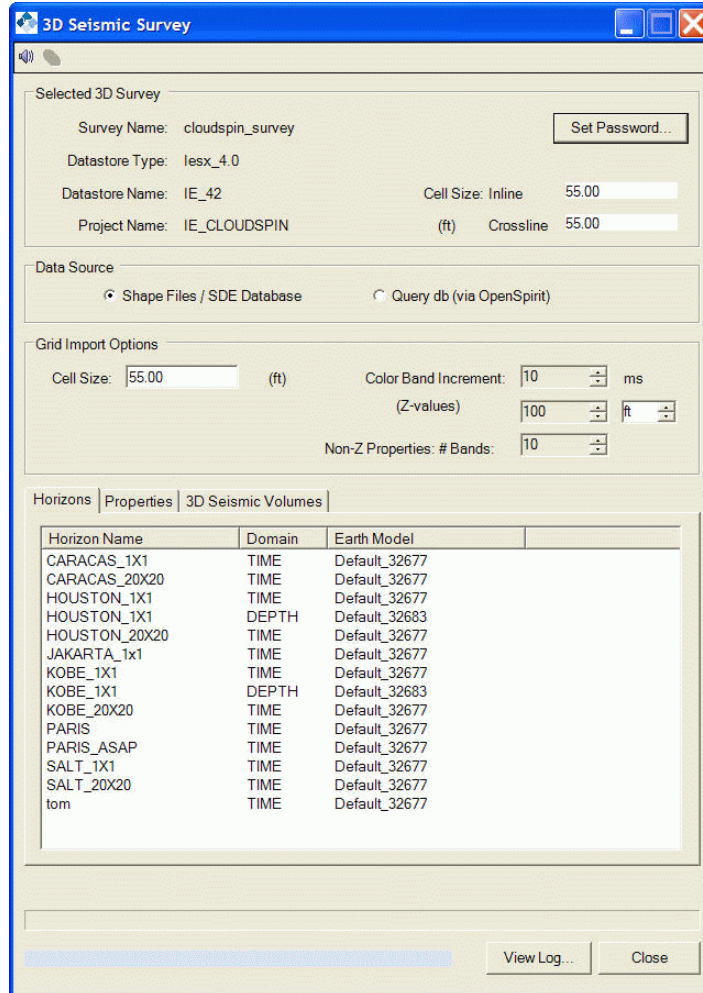
The ArcMap *OpenSpirit Information* icon provides further information on 3D surveys, volumes, and interpretation information, along with non-seismic grids. The tool sends data selection events, or creates ESRI GRID images to represent horizons and non-seismic grids. Click on the *Display OpenSpirit Information* icon, and then click on a polygon representing a 3D survey or a 2D grid. If you have overlapping 3D surveys and 2D grids, then the following *Feature Selection* dialog will

appear. Select the 3D survey, or 2D grid you want to work with.



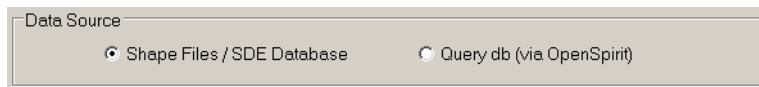
After you have selected you 3D survey, or grid, a tailored dialog box with the data from the grid or

survey will appear like the one below.:



This dialog displays all the seismic volumes, horizons and non-seismic two dimensional grids that are associated with the selected area.

The source of the displayed data is controlled by this radio button group.



If the *Query db* option is selected, then the appropriate OpenSpirit data connectors will start on UNIX and a current list of


horizons, grids and seismic volumes will be displayed. If the *Shape files* option is chosen, then the list includes those items that were current when the OpenSpirit Scan utility was last run. Note that if the *Query db* option is selected there can be some time delay as the OpenSpirit data connectors are first started.

Sending Selection Events from the 3D Seismic Survey Dialogue

If a seismic volume or horizon row is highlighted then a selection event may be sent by clicking on the *Speaker* icon.

Importing a Seismic Horizon or 2D Grid into ArcMap

Select a horizon, or two dimensional grid in the *Horizon* tab. Next, click on the *Properties* tab and select a property associated with the horizon or grid and the *Horizon Image* icon is activated and one can create either a TIFF image or ESRI GRID file in the current ArcMap project by clicking on the

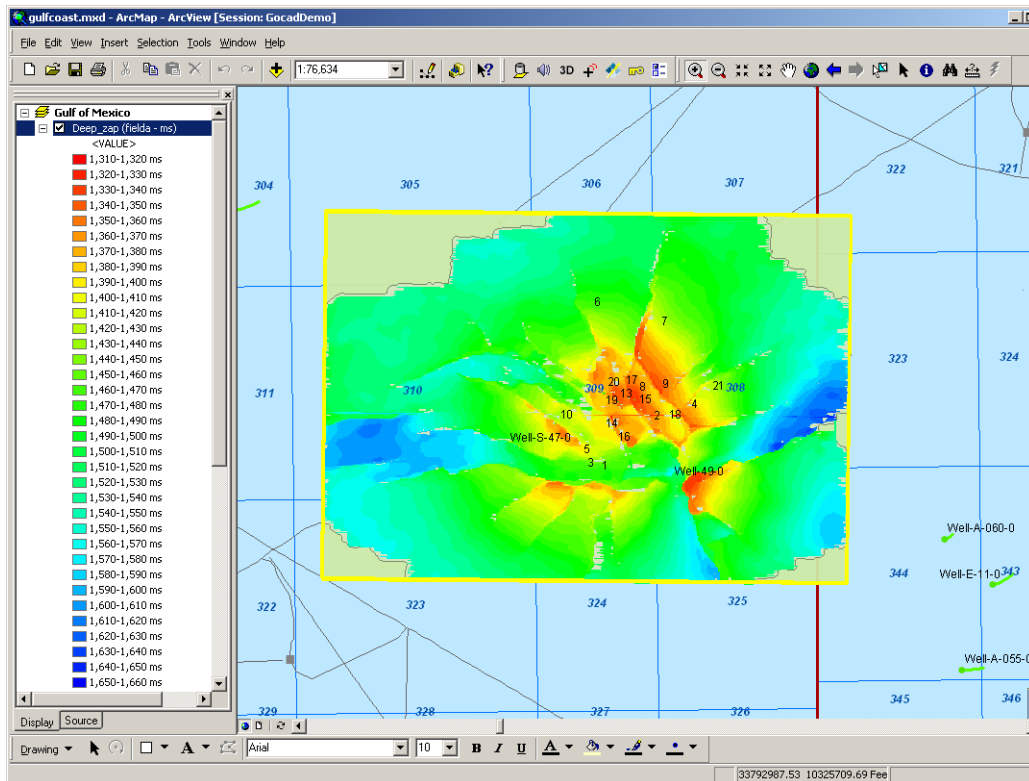
Horizon Image icon . The image type and amount of decimation (if any) is controlled by the settings in the *Image Preferences* box. A default rainbow color map is also created with the desired contour increment. Note that the ESRI GRID format has a restriction that the grid must be square so the inline and crossline spacing must be equal.



Grid Import Options	
Cell Size: <input type="text" value="55.00"/>	(ft)
Color Band Increment: <input type="text" value="10"/>	ms
(Z-values) <input type="text" value="100"/>	ft
Non-Z Properties: # Bands: <input type="text" value="10"/>	

Due to ESRI limitations, the output directory must be a Windows based directory.

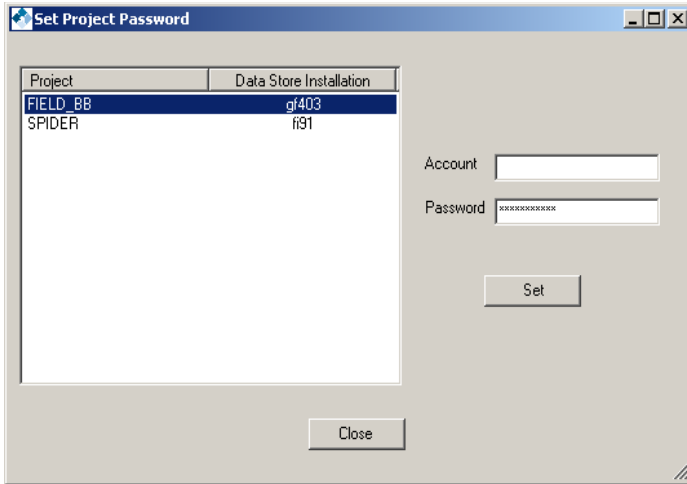
Example of seismic horizons displayed in ArcMap.2



Set Project Passwords

Some data stores, such as Finder and GeoFrame, require that a project password be supplied in order for a user to connect to a project. This toolbar icon allows you to set passwords for projects corresponding to selected features. These passwords will then be used by the OpenSpirit data

connectors to allow them to connect to the selected project.



Tips for Setting Display Attributes on OpenSpirit Features

ArcView has many options for setting the display properties of spatial features in its map view. The following are some tips that can improve the look and utility of your ArcView map displays:


- The OpenSpirit wellbore path and 2D seismic lines have a measure property (measured depth on the wellbore path and SP on the 2D seismic lines) that can be displayed along the path using the "hatching" capability available in ArcView 8.3 or newer
- The OpenSpirit well feature has a number of attributes (e.g. well status, fluid type, flow direction) that can be used to set the display symbology to indicate well type and status (use the "Unique values, many attributes" option under the "Categories" option in the well layer Symbology tab in the Layer Properties dialogue)
- If you are displaying features from multiple datastores in the same map you may wish to display upper layers with a narrower line width or symbol size so that it is easier to recognize when the same data item is present in multiple datastores.

Using the Excel Adapter

Overview

The OpenSpirit Excel Adapter is an optional add-on product to the OpenSpirit Subsurface Data Module. This utility allows users to listen for OpenSpirit data or object section events and then paste desired data attributes into Excel. The Excel Adapter can also receive OpenSpirit point and GIS feature events. This enables a variety of ad-hoc reporting and data reformatting tasks to be performed in a tool, Excel, that most users are already familiar with. Data or object selection events may be sent from:

Any of the OpenSpirit data viewers (well, section, or 3D)
The OpenSpirit DataSelector
ArcView (via the OpenSpirit Extension)
Native Landmark OpenWorks based applications (via the OpenSpirit OpenWorks event gateway)
Native Schlumberger GeoFrame based applications (via the OpenSpirit GeoFrame event gateway)
Other third-party OpenSpirit enabled applications

 *Usage Note:*
 If the application that you are using to send selection events supports sending data selection events, we strongly recommend that you only send data selection events. The default in the DataSelector and the ArcView Extension is to send both data and object selection events.

Data Types Covered

The current version covers the following well data types:

Well/Wellbore header
Wellbore path data (including plot option)
Well log header
Well log trace data
Well picks

Well velocity header (checkshot)
Checkshot time-depth tables (including plot option)
3D Seismic survey
3D Seismic Volume
2D Seismic survey
2D Seismic line
2D Seismic dataset
Earth Model
Horizon
Fault
Horizon-Fault Boundary Set
Culture Point Polyline and Polygon Layers
Simple Point Events
GIS Feature Selection (Point, Polyline and Polygon)

Data from any data store with an OpenSpirit well data connector that implements the OpenSpirit attribute query interface can be accessed.

Event Types Covered

The current version covers the following event types:

Data Selection
Object Selection
Point of interest
Area of Interest
Cursor position

GIS Point Feature
GIS Polyline Feature
GIS Polygon Feature

Installation Prerequisites

The OpenSpirit Excel Adapter assumes that either Excel 2000 (part of Office 2000) or Excel XP (part of Office XP) is available on Windows and that OpenSpirit is installed.

Installation

The OpenSpirit Excel Adapter is distributed with the OpenSpirit Windows Runtime. To install the Excel Adapter either:

1) As part of the original installation choose to install the .NET options and select the ExcelAdapter option

-or-

2) Subsequent to the original OpenSpirit Windows Runtime installation, if you did not elect to install the .NET options, you may install the .NET options by executing **setup.exe** in the %OSP_HOME%\external\OpenSpirit.NET directory (usually C:\Program Files\OpenSpirit\external\OpenSpirit.NET).

After installation of the Excel Adapter you will need to ensure that a valid license feature key is available. To obtain an evaluation license send an email request to support@openspirit.com. The OpenSpirit Excel Adapter is an optional add-on product to the OpenSpirit Base Framework and Subsurface Data Module runtime products and requires a separate license.

Launching the Excel Adapter and Excel

The Excel Adapter is launched from the OpenSpirit *Launcher Utilities* menu, running on Windows.

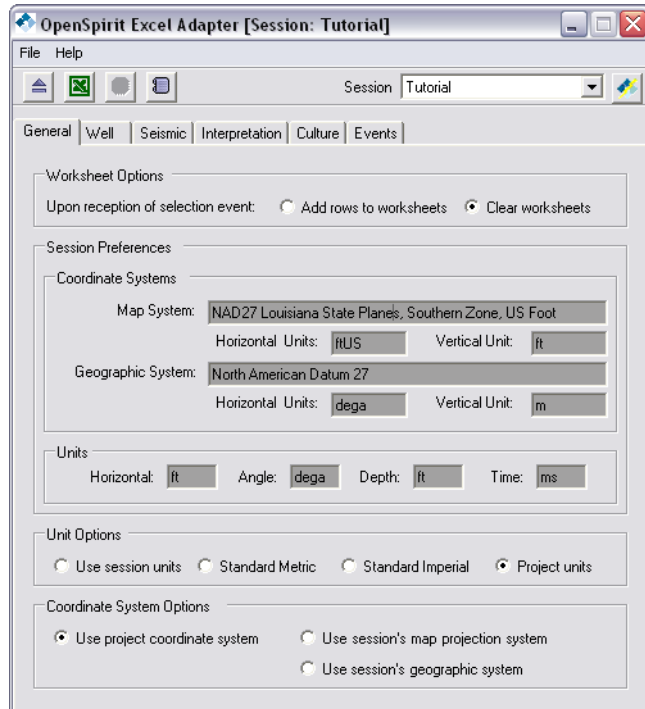
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Usage Note:

You must launch Excel from the OpenSpirit Excel Adapter in order for the adapter to be able to paste data into Excel. Excel will start up with an empty workbook. You may, however, open an existing workbook and the adapter will paste data into this workbook.

Then start Excel from the toolbar icon in the Excel Adapter:



The toolbar gives the user access to useful task:



In order to receive selection events you must connect the Excel adapter to the same session as the application that will be sending OpenSpirit selection events. The desired session may be selected from the combo box in the toolbar. When a session connection is made the OpenSpirit logo will display a lightning bolt indicating that it is enabled for listening and the session unit and coordinate

preferences, if present, will be displayed.

Setting General Preferences

Worksheet Options - options to control the behavior of the adapter when a selection event is received
Add rows to worksheets - this option will cause any new data items to be appended to the appropriate worksheet at the first empty row.
Clear worksheets - this option will first clear the appropriate worksheet and then paste in the received data items.
Unit Preferences - this option controls what units will be used in displaying attributes that have units (e.g. the TD of a wellbore, the x and y offset of the wellbore path, etc.)
Use session units - this option is only available if there are unit preferences set on the session. If chosen, all data quantities will be converted to the session preferred units regardless of what units the data is stored in the project.
Standard Metric -if chosen, all data quantities will be converted to the standard metric units regardless of what units the data is stored in the project.
Standard Imperial -if chosen, all data quantities will be converted to the standard imperial units regardless of what units the data is stored in the project.
Project Units - if chosen all data will be displayed in its native project units without any conversion.
Coordinate System preferences - this option controls what coordinate system will used in displaying attributes that have a spatial location (e.g. the well surface location).
Use project coordinate system - if chosen, all data will be displayed in its native project coordinate system without any conversion.
Use session's map projection system - this option is only available if there is a coordinate system preference set on the session. If chosen, all spatial data quantities will be converted to the session preferred coordinate system regardless of what coordinate system the data is stored in the project.

Use session's geographic system - this option is only available if there is a coordinate system preference set on the session. If chosen, all spatial data quantities will be converted to the session's preferred geographic system regardless of what coordinate system the data is stored in the project.

Setting Data Preferences

Well Data

The *Well* tab allows the user to select which data types they are interested in and what type of selection events they wish to respond to.



Usage note:
Excel Worksheet only allows 65,536 rows. Any additional rows will be discarded.

Excel Charts only allows the first 30 wellbore paths plotted. Additional wellbore paths will be discarded.

Wellbore - well and wellbore header attributes
Listen - if chosen, the adapter will respond to well bore selection events and the desired attributes pasted into a worksheet titled "Well Bore"
None - if chosen, well bore selection events will be ignored
Path - only available when "Listen" is chosen and if chosen, will cause the wellbore path information (X-offset, Y-offset, TVD, MD) to be pasted into a worksheet titled "Path Data"
Plot - only available when "Path" is chosen and if chosen, will cause the wellbore path information to be plotted in two sheets - "Well Path (X)" and "Well Path(Y)"
Well Logs - well log header attributes
Listen - if chosen, the adapter will respond to well log selection events and the desired attributes pasted into a worksheet titled "Well Log"
From wellbore selection - if chosen, the adapter will respond to wellbore selection events and the desired attributes pasted into a worksheet titled "Well Log" for every log associated with the received wellbores
None - if chosen, well log selection events will be ignored and no well log attributes pasted into Excel
Trace Data - available if either "Listen" or "From wellbore selection" options are chosen. If chosen, the log and depth values will be pasted, for the indicated measured depth range into a worksheet titled "Log Data"
Logging Passes - logging pass (log run) attributes

Listen - if chosen, the adapter will respond to logging pass selection events and the desired attributes pasted into a worksheet titled "Logging Passes"
From wellbore selection - if chosen, the adapter will respond to wellbore selection events and the desired attributes pasted into a worksheet titled "Logging Passes" for every log pass associated with the received wellbores
None - if chosen, well pick selection events will be ignored and no well pick attributes pasted into Excel
Well Picks- well pick (marker) attributes
Listen - if chosen, the adapter will respond to well pick selection events and the desired attributes pasted into a worksheet titled "Well Pick"
From wellbore selection - if chosen, the adapter will respond to wellbore selection events and the desired attributes pasted into a worksheet titled "Well Pick" for every pick associated with the received wellbores
None - if chosen, well pick selection events will be ignored and no well pick attributes pasted into Excel
Checkshots - well checkshot header attributes
Listen - if chosen, the adapter will respond to well velocity (checkshot) selection events and the desired attributes pasted into a worksheet titled "Well Velocity"
From wellbore selection - if chosen, the adapter will respond to wellbore selection events and the desired attributes pasted into a worksheet titled "Well Velocity" for every well velocity (checkshot) associated with the received wellbores
None - if chosen, well velocity (checkshot) selection events will be ignored and no well velocity (checkshot) attributes pasted into Excel
T-D data - available if either "Listen" or "From wellbore selection" option is chosen and if chosen, will cause the time-depth data to be pasted into a worksheet titled "Well T-D Data"
Plot - only available when "T-D Data" is chosen and if chosen, will cause the T-D information to be plotted in a sheet titled "Time vs. Depth"

Seismic Data

The *Seismic* tab allows the user to select which data types they are interested in and what type of

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selection events they wish to respond to.

3D Survey - 3D seismic survey attributes
Listen - if chosen, the adapter will respond to 3D seismic survey selection events and the desired attributes pasted into a worksheet titled "3D Survey"
None - if chosen, 3D seismic survey selection events will be ignored
Corner Point Locations - only available when "Listen" is chosen and if chosen, will cause the x, y location of the survey 4 corner points to be pasted into a worksheet titled "3D Survey Corners" (Note the project coordinates for x, y are inline crossline. If you want real world coordinates you must select the option to use the session's coordinate system)
3D Seismic Volume- 3D seismic volume attributes
Listen- if chosen, the adapter will respond to 3D seismic volume events and the desired attributes pasted into a worksheet titled "3D Volume "
From 3D Survey Selection- if chosen, the adapter will respond to 3d survey selection events and the desired attributes pasted into a worksheet titled "3D Volume" for every 3D volume associated with the received 3D surveys
None- if chosen, 3D seismic volume selection events will be ignored and no 3D seismic volume attributes pasted into Excel
2D Survey - 2D seismic survey attributes
Listen - if chosen, the adapter will respond to 2D seismic survey selection events and the desired attributes pasted into a worksheet titled "2D Survey"
None - if chosen, 2D seismic survey selection events will be ignored
2D Seismic Line- 2D seismic line attributes
Listen- if chosen, the adapter will respond to 2D seismic line events and the desired attributes pasted into a worksheet titled "2D Line"
From 2D Survey Selection- if chosen, the adapter will respond to 2D survey selection events and the desired attributes pasted into a worksheet titled "2D Line" for every 2D line associated with the received 2D surveys
None- if chosen, 2D seismic line selection events will be ignored and no 2D seismic line attributes pasted into Excel

2D Seismic Dataset- 2D seismic dataset attributes
Listen- if chosen, the adapter will respond 2D seismic dataset events and the desired attributes pasted into a worksheet titled "2D Dataset"
From 2D Survey Selection- if chosen, the adapter will respond to 2D survey selection events and the desired attributes pasted into a worksheet titled "2D Dataset" for every 2D dataset associated with the received 2D surveys
None- if chosen, 2D seismic dataset selection events will be ignored and no 2D seismic dataset attributes pasted into Excel

Interpretation Data

The *Interpretation* tab allows the user to select which data types they are interested in and what type of selection events they wish to respond to.

Earth Model - earth model attributes
Listen - if chosen, the adapter will respond to Earth Model selection events and the desired attributes pasted into a worksheet titled "Earth Model"
None - if chosen, Earth Model selection events will be ignored
Horizon- horizon attributes
Listen- if chosen, the adapter will respond to horizon events and the desired attributes pasted into a worksheet titled "Horizon" <i>note: at this time the adapter does not listen for 2D interpretations or non-seismic grids</i>
From Earth Model Selection- if chosen, the adapter will respond to Earth Model selection events and the desired attributes pasted into a worksheet titled "Horizon" for every horizon associated with the received Earth Models
None- if chosen, horizon selection events will be ignored and no horizon attributes pasted into Excel
Fault- fault attributes
Listen- if chosen, the adapter will respond to fault events and the desired attributes pasted into a worksheet titled "Horizon"

From Earth Model Selection- if chosen, the adapter will respond to Earth Model selection events and the desired attributes pasted into a worksheet titled "Fault" for every fault associated with the received Earth Models
Type - can pick either Polyline Set (fault sticks), or just the Point Set that makes up the faults.
Fault Properties - Will display all of the properties associated with each fault in a separate worksheet titled "Fault Properties".
None- if chosen, fault selection events will be ignored and no fault attributes pasted into Excel
Horizon-Fault Boundary Set - fault boundary attributes
Listen- if chosen, the adapter will respond to fault boundary events and the desired attributes pasted into a worksheet titled "Horizon-Fault Boundary"
Display boundary summary- provides the corner coordinates for the fault boundary.
Display geometry- provides all of the xy information and data for the fault boundary.
None- if chosen, Horizon-Fault boundary set selection events will be ignored and no fault attributes pasted into Excel

Culture Data

The *Culture* tab allows the user to display and collect attributes from the OpenSpirit SDE Culture selected and broadcasted from the OpenSpirit DataSelector.

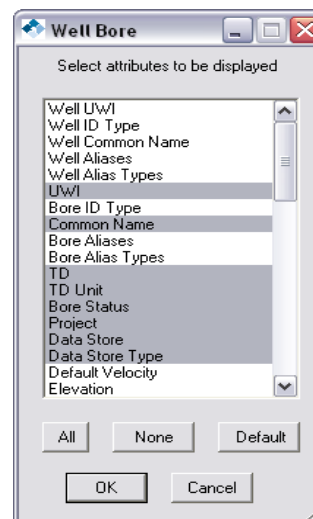
Point Layer - controls SDE point layer types
Polyline Layer - controls SDE line layer types
Polygon Layer - controls SDE polygon layer types
Layer controls:
Listen - respond to culture events sent to the ExcelAdapter for this layer type and return information on the Layer selected to an Excel tab named Point Layer, Polyline Layer, or Polygon Layer.
None - ignore culture events sent to the ExcelAdapter for this layer type

Feature Controls:
Listen - responds to culture events sent to the ExcelAdapter for this feature type, irregardless if the Layer control is set to Listen or not. Information on the feature is posted in an Excel tab named Point Feature, Polyline Feature, or Polygon Feature.
From layer selection - If layer control is set to Listen, returns all objects for this feature type from the selected layer. Information on the feature is posted in an Excel tab named Point Feature, Polyline Feature, or Polygon Feature.
None - No features returned or Feature tabs created in Excel.
Display all feature attributes - Returns all of the attributes for the selected feature. Attributes for the feature are posted in an Excel tab named Point Feature Attribute, Polyline Feature Attribute, or Polygon Feature Attribute.
Display feature geometry - only available when "Listen" is chosen. The x,y location information for each feature, with associated project, layer, and feature information is posted in an Excel tab named Point Layer, Polyline Layer, or Polygon Layer.

Select Attributes to Display

For any selected data type you can select the attributes to display by clicking on the *Set Attributes to Display* button.

You may select or deselect attributes by holding the Ctrl key down and then clicking on desired attribute names. A contiguous block of attributes may be selected by holding down the Shift key. You may also easily select all attributes or return to the default set by using the corresponding buttons.



Types of Selection Events

The Excel Adapter responds to both object selection and data selection events. OpenSpirit

applications will send one or the other and some both.

Object Selection Event: A message containing references to OpenSpirit objects. This is the traditional selection event type that most OpenSpirit enabled applications that listen for selection events use. Sending an object selection event containing many selected objects may be slow as every object needs to be created in the remote OpenSpirit data connectors.

Data Selection Event: A message containing datakeys (references to items in vendor datastores). This is a newer type of selection event that has the advantage of being very efficient for large number of selected items. As this is a new type of event, not many OpenSpirit enabled application yet listen to this event type.

Given a choice, sending a data event is the preferred option. The OpenSpirit DataSelector and ArcView extension both offer the option of sending data selection events.

Other Event Types

The Excel Adapter can also respond the event types listed in the *Events* tab and paste in the spatial location for these event types. The coordinate system is controlled by the setting in the *General* tab. If the *Use project coordinate system* section is chosen then the location information of the events will be in the sender's coordinate system. Otherwise the location information will be converted into session's geographic or map coordinate system.

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Using the Event Gateways

The Event Gateway is only available on UNIX based systems. User interactions or events can be shared between applications within the GeoFrame or OpenWorks suite. For example, one can select a well or well log in one application and “broadcast” this selection event to other applications. Users can also share the 3D cursor locations between applications. With the OpenSpirit Event Gateway, the user can also bidirectionally share these events with any OpenSpirit enabled application.

OpenWorks Event Gateway

This gateway currently supports bidirectional object selection events for Well, WellBore, WellPick, and WellLogTrace and cursor location events. Selection events for other object types will be added in future releases of OpenSpirit.



Depending on how your site has installed and configured OpenSpirit, the OpenSpirit Event gateway can be either launched from the Landmark OpenWorks Launcher or the OpenSpirit Launcher (from the *Tools* menu).

 *Windows Note: The OpenWorks and GeoFrame Event Gateway must be run on UNIX, though the display can be set back to a Windows host (if you are running OpenWorks applications via an X-server on the Windows host)*

Launched from OpenSpirit Launcher

If you have launched the Event Gateway from the OpenSpirit launcher then the session and display will be set to the current values established in the OpenSpirit Launcher. If your OpenSpirit Session contains more than one project coming from different OpenWorks Oracle instances then you will need to select the appropriate datastore from the right most pull-down list.

Launched from OpenWorks Launcher

If you have launched the Event Gateway from the OpenWorks launcher then the X display will be set to the correct value but you will need to select the desired OpenSpirit Session from the left most pull-down list. If your OpenSpirit Session contains more than one project coming from different OpenWorks Oracle instances then you will also need to select the appropriate datastore from the right most pull-down list.

Once the desired OpenSpirit Session, X display, and OpenWorks data is selected you should click on the *Start* button. The OpenWorks Event Gateway will then be started (it can take a few moments before it starts if many data connectors need to be started first). To shutdown the Event Gateway at

 *Usage Note: The OpenWorks Launcher must be running and a project selected before the OpenSpirit OpenWorks Event Gateway will start.*

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the end of your session simply click on the *Shutdown* button.

GeoFrame Event Gateway

The GeoFrame Event Gateway only supports GeoFrame 4.x projects. It currently supports bidirectional object selection events for Well, WellBoreList, WellBore, WellPick, WellLogTrace, and WellVelocity. Similar to the GeoFrame 4.0 data connector, the GeoFrame Event Gateway needs to be run on UNIX platform.

Launched from OpenSpirit Launcher



Usage Note: The GeoFrame Application

Manager for the selected project must be running in order to be able to start the GeoFrame Event Gateway.

If you have launched the GeoFrame Event Gateway from the OpenSpirit Launcher, the session will be set to the current values established in the OpenSpirit Launcher. If your OpenSpirit Session contains more than one GeoFrame 4.x data store installation, you will need to select the appropriate datastore from the middle pull-down list. If your OpenSpirit Session contains more than one GeoFrame project, then you will need to select the appropriate project from the right most pull-down list. If you want to start the GeoFrame Event Gateway with a different session than the Launcher's current session, you can select the desired session from the left most pull-down menu.

Once the desired OpenSpirit Session, GeoFrame data source installation, and GeoFrame project are selected, you should click on the *Start* button. The GeoFrame Event Gateway will then be started (it can take a few minutes before it starts if many data connectors need to be started first). Once the Event Gateway is running, the *Start* button will change to *Shutdown* button. To shutdown the Event Gateway, simply click on the *Shutdown* button.



3 OpenSpirit Administration Guide

Welcome to the OpenSpirit Administration Guide. This document presents all aspects of installing, configuring, verifying, and administering an OpenSpirit installation.

The environment where OpenSpirit is installed can be complicated and can vary significantly at each site and even within a single site. While substantial testing has taken place prior to delivering the commercial OpenSpirit Installation Kit(s), it is expected that some scenarios have not been encountered. Therefore, along the way common pitfalls and complexities are pointed out to help avoid problems and to deal with unique environmental issues.

This chapter will describe the required environment for OpenSpirit to operate properly, the installation and configuration process, how to start OpenSpirit, how to verify that it is working and then point out key areas to watch as the installation is used. This chapter assumes that you proceed through this process without running into any problems. The *Support and Trouble Shooting Guide* should be referenced if you run into problems.



Usage Note: The most common problems encountered when configuring OpenSpirit result from a lack of information provided about your data store installations. OpenSpirit installation and configuration is straightforward if you know your application environment and corresponding Oracle database environment.

Getting Started

This section describes the information gathering process. It includes hardware and software as well as specific account requirements.

Installation

Install OpenSpirit and perform some initial configuration procedures. All the OpenSpirit tools work equally well on Solaris, Linux and Windows. There are separate install kits for each supported platform.

OpenSpirit Desktop Administrator tools

- Data Store Configuration
- Installation Admin Tool
- License Admin Tool
- User Manager Tool

Help documentation for these tools is now available online from the tools and therefore not included in this guide.

Managing Shared Services

Before end users can use OpenSpirit, some processes need to be started. These processes are managed by a single script. These services should be managed by someone with an Administrative role.

License File Management

This section describes how FLEXlm licenses work with OpenSpirit.

Getting Started

Gathering Information

Before getting started, it is a good idea to review this section and gather all of the pertinent information. Thinking about this information before getting started will make the process much easier and will reduce the chances of error. After reviewing the short sections on hardware, software, and user account requirements, begin to gather the detailed information that will be required during installation and configuration.

Installation Types

There are two different types of OpenSpirit Runtime installations that are possible a Master and a Satellite. A general overview of the 2 types of installations is:

- Master - a Master installation is the main type of OpenSpirit installation and is required by the other types of OpenSpirit installations. There are two main functions of a Master installation. The first function is to run the OpenSpirit shared services. These are services that all users of OpenSpirit have access to and include modules to perform coordinate transforms, unit conversions, and event notifications. The second function is to create and manage the OpenSpirit database. This database is used by OpenSpirit for storing both system information and user information.
- Satellite - Satellite installations provide the ability to run OpenSpirit data connectors on different servers, running different (or the same) operating system that are only connected via the client's network. Satellite installations must have a corresponding Master installation that it "points" to however, having a shared file system is not required between the master installation and the satellite installations.



*Performance:
One way to
distribute CPU
load is to run the
OpenSpirit data
connectors on multiple
machines.*

Operating System Requirements

OpenSpirit supports master and satellite installations on the following operating systems:

- Sun Solaris
- Linux RedHat
- Microsoft Windows

Hardware Recommendations

For the OpenSpirit Master server installation, we recommend the following:

Solaris: - Sun Blade 1000 or better - 2 Gb RAM - 1Gb of swap
Linux: - 3 GHz Pentium 4 (or equivalent) - 2 Gb RAM - 80 Gb SATA disk drive - standard graphics card for a Windows PC
Windows: - 3 GHz Pentium 4 (or equivalent) - 2 Gb RAM - 80 Gb SATA disk drive - standard graphics card for a Windows PC

Space Requirements

Below are the approximate disk space requirements for each supported platform.

Platform	Installation Kit Size	Installed Size
Solaris	~ 545Mb	Master = ~1300Mb Satellite = ~760Mb
Linux	~566Mb	Master = ~950Mb Satellite = ~800Mb
Windows	~390Mb	Master = ~724Mb Satellite = ~520Mb

User Account Requirements

OpenSpirit requires the use of some specialized user accounts for installation and configuration tasks. Depending on the security in place at your site, there are existing accounts common at most sites that can be used. However, you can create accounts with the minimal requirements if desired. As a start you should review the following, but there is also a more detailed section in the *Support and Troubleshooting Guide* for the Database Administrator that details the specific privileges each required account needs.

Installation Account

It is highly recommended that you create a separate login account to be used for the installation of OpenSpirit. Even though this is not mandatory, it simplifies the installation process. A typical name of the login account is *spirit*.

It is not recommended that you install OpenSpirit as *root*. The root userid is a special account and should not own an installation or the processes that run from it.

Root Access

Installing OpenSpirit does not require root access. However, you may want to start up the OpenSpirit services each time your machine is rebooted. The script, `OpenSpirit_init.d`, located in the `$OSP_HOME/bin/etc` directory can be used for this purpose. Setting this up will require root privileges.

Additional Information Before Getting Started

During installation and configuration various information about the environment is required. The *Support and Troubleshooting Guide* will help you find the likely places to look in order to find the right answers. It is highly recommended that you gather this information before proceeding with installation. This will help reduce the chance of human error during input of data. And if you do run into problems that require an OpenSpirit engineer's involvement, this information will be required.

Reviewing the information may seem overly complex, but these are necessary and are not unlike those requirements for successful installation of GeoFrame and/or OpenWorks. Taking the time to gather the information and enter it correctly will substantially increase the likelihood of a successful OpenSpirit installation. Just like GeoFrame, or OpenWorks, entering one value incorrectly increases the likelihood of an unsuccessful installation. The OpenSpirit installation and configuration attempts to validate the information entered, but there are limitations to what can be checked. You only need to do this once per installation.

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Good luck! If problems are encountered or questions arise please consider the following support possibilities: go to the *Contact Us* section of the *Support and Troubleshooting Guide*. Depending on the specific problem you are having, you may be asked to provide some information regarding your environment so that the support engineer can quickly and efficiently resolve your problem.

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Installation

Installation is performed using an OpenSpirit install kit, available at www.openspirit.com/supportdl. The install kit will guide you through the various phases of installation and install all the files needed to run OpenSpirit services and applications. There are also separate install kit for Solaris, Linux, and Windows. All installation kits give you the option to a master or satellite installation. All kits *look* the same, but perform some different tasks.

Prerequisite Checks

Please visit the [pre-installation webpage](#) to find important information regarding installation prerequisites. Some prerequisite checks should be performed to be sure that the system is compatible with OpenSpirit's requirements.

Starting the Installer

Once the desired OpenSpirit install kit is downloaded you start the installer, from within the directory where you copied it. The installer's initial display will appear. Simply follow the instructions on each screen. Once the master installation is complete and running, you can run any of the needed satellite install kits. During the installation process for the satellites you will be asked to supply information about the master installation:

Obtain a License and Start the Shared Services

Before you can run OpenSpirit, you need to complete configuration, get a license file, and then start the Shared Services. These are described in the following sections. Please contact support@openspirit.com if you do not already have a license file.

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Managing Shared Services

The OpenSpirit Shared Services are those processes that are shared between all users accessing a particular installation. On UNIX based installation they are started using the OpenSpirit administrator account (the login account used for the installation) by executing the script

```
$OSP_HOME/bin/runOSServices.sh <option>
```

The usage options for the script are:

start	start the shared services	runOSServices.sh start
stop	stop the shared services	runOSServices.sh stop
status	status of the shared services	runOSServices.sh status

This script can be configured to start at bootup and shutdown when the machine is stopped. An example script (OpenSpirit_init.d) can be found in \$OSP_HOME/bin/etc.

In a Windows Master installation the OpenSpirit Shared Services start automatically as Windows services and are configured during the installation procedure.

Below is a list and short description of the shared services.

FLEXIm License Daemon	Manages all OpenSpirit licenses.
Notification Service	Provides the OpenSpirit Event mechanism. Allows objects to send messages via an event channel to objects that have all registered interest.
SharedServices	<ol style="list-style-type: none"> 1) Unit of Measure: Perform units conversions 2) Coordinate Server: Performs geodetic datum shifts, cartographic projections/transformations and user-defined transformations. 3) Reference Value Server: Returns a list of allowable values for a specific type and performs optional translation between reference value sets. 4) Data Store Descriptors Servers: Required for each data store type that is configured. Provides information about each data store. 5) User Alias Server: Provides userid recognition for all users running OpenSpirit.

When running the start script you should observe something similar to the following:

% ./runOSServices.sh start

```
Running on: SunOS agate 5.9 Generic_118558-05 sun4u sparc SUNW,Sun-Blade-1000
Starting OpenSpirit v3.2.0 Build 266(OSP port=15320) services...
Found an existing license daemon...
Starting Notification service...
Notification Service running as pid 27564
### - Waiting for Notification Service to come up..
Starting shared services
### - Waiting for SharedServices server to come up.....
OpenSpirit services are now running...
```

When stopping the services you should observe the following:

% ./runOSServices.sh stop

```
Running on: SunOS agate 5.9 Generic_118558-05 sun4u sparc SUNW,Sun-Blade-1000
Stopping OpenSpirit v3.2.0 Build 266 (OSP port=15320) services...
Shutting down the installation
Sent installation-wide shutdown event on Jan 24, 2008 5:51:58 PM
Installation shutdown event sent: Thu Jan 24 17:51:59 CST 2008
Killing Notification Service (pid=27564) at Thu Jan 24 17:52:39 CST 2008
OpenSpirit services are now stopped...
```

When using the status options you should observe the following:

% ./runOSServices.sh status

```
Running on: SunOS agate 5.9 Generic_118558-05 sun4u sparc SUNW,Sun-Blade-1000
Checking status of OpenSpirit v3.2.0 Build 266 (OSP port=15320) services...
The Notification Service appears to be running as pid: 27728
OpenSpirit Shared Services server appears to be running on 'agate'
```

License File Management

OpenSpirit uses FLEXlm to manage licensed access to all OpenSpirit features and Client applications. The OpenSpirit license file including client application licenses must be obtained from OpenSpirit Corporation via support@openspirit.com.

Once a license file is obtained it should be placed in the default location of \$OSP_HOME/external/flexlm/license.dat. When OpenSpirit is started it will look for a license file running on port 27001 and the license file in the default locations.

Use the License Admin Tool to make any changes to the location of the license file or perhaps start the FLEXlm daemon on a different machine than where OpenSpirit is installed.

4 Support and Troubleshooting Guide

You have come to this section because you have encountered problems and need help solving them. Before contacting OpenSpirit Corporation for support, please go through the steps below. This section will point you to the various places where you can find pertinent information to your specific problem. Following the process outlined in this section will ensure the fastest resolution to the problems you are having.

Step 1- Is the Problem with OpenSpirit?

Since OpenSpirit is an application integration platform, you are normally using OpenSpirit with other vendors' applications. Therefore, the problem could be with those applications rather than with OpenSpirit. We recommend that you check the other applications and make sure that they are up and running. If the problem still persists and you are fairly sure that the problem is with OpenSpirit, then continue on to the next step.

Step 2- Review the Release Notes

Quickly review the Release Notes for known problems at the time of shipping. If you don't find anything necessary to solving your specific problem, then continue on to the next step.

Step 3- Review the Troubleshooting Guide

The Troubleshooting Guide, located on page 131 of this manual, provides some useful tips on diagnosing common problems. It is a self-help guide that explains what to look for in diagnosing common problems. If you still do not find any information pertinent to your specific problem, then continue on to the next step.

Step 4- Review the OpenSpirit FAQ Knowledge Base

In many cases the problem you have encountered will have already been found by someone else after the product was shipped. Our support department keeps a log of common problems in a FAQ Knowledge Base on the OpenSpirit web site. The information in the knowledge base can prove to be very useful since it will be more up to date than the documentation shipped with the installation kits. Each recorded problem is organized with a one-line statement about the problem to help you find it quickly within the list. If you do not find the problem and a resolution or you think you found a problem similar to one in the knowledge base database and need additional help, then continue on to the next step.

Step 5- Gather information and send to support@openspirit.com

If you've reached this step, it is possible that you have found a new problem or you can't find a problem and solution

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in the Release Notes, Troubleshooting Guide, or OpenSpirit knowledge base. If this is the case, don't worry; we don't want you to spend too much time searching and it may be that you have found a new problem that we need to know about right away.

The following paragraphs describe the information that should accompany a problem reported via email.

While running OpenSpirit there are several server log files where information is recorded. In most cases we can successfully diagnose the problem and provide a solution by reviewing those log files. There isn't any sensitive information in the log files, just information related to how OpenSpirit was installed and configured and what exactly was going on when the problem was encountered. We need to review those log files before we can properly start diagnosing the problem. The sooner we get these files the sooner we can solve your problem and get you back up and running.

All OpenSpirit Shared Server log files are stored in the `$OSP_HOME/logs/SharedServices` directory where you installed OpenSpirit. All OpenSpirit user logs are stored in the `$HOME/OpenSpirit/logs` directory. You can tar or zip up those entire directories and e-mail them to us. If the tar file is larger than one megabyte, contact us and we will give you an ftp site to use.

We also need any output that may have been displayed on an xterm or in a message box when you experienced the problem. You can cut and paste this information and add it to the E-mail you send us. But most likely we will be able to see what is happening from the log files.

Receiving these files will help us communicate with you better about your problem. In most cases we can tell enough about what is going on to diagnose your problem and provide a resolution. Not having this information available to the support engineer will most likely delay the resolution of your problem. Please retrieve these files and send them to us prior to logging the support call. Once the dialog with OpenSpirit starts we will be able to effectively diagnose your problem. At times we may ask you to try certain things and then report back to us for the problems that are more obscure.

Step 6- That's it!

You should never reach this section! In the previous steps you should have received help from a support engineer to resolve your problem in a timely manner or at least gather enough information so the problem can be fixed in a future release. If this isn't the case then you have probably come to this section because of an inadequate resolution to your problem. In this event we want to make sure that you receive immediate attention. You can do this by sending e-mail to support@openspirit.com with a subject of URGENT ATTENTION REQUESTED! If, for any reason, you need the troubleshooting process expedited, please call our support line at 281-295-1400. We will do everything humanly possible to contact you as soon as possible and get to the bottom of your problem - your satisfaction is our goal!

Troubleshooting Guide

This guide will help you solve problems that you may run into while using OpenSpirit. It is intended to provide the necessary information as the first line of support prior to contacting OpenSpirit. If you can't solve your problem with the information found in this guide, and you have already reviewed the Release Notes, then proceed to the next step in the *Support* section.

This document is composed of some of the most common problems that you may encounter while using OpenSpirit. It will guide you through some of the items our support engineers would look at first. We do not expect you to spend much time troubleshooting on your own, but very often we find that problems are caused by a few common things. You can quickly look into these areas and possibly solve the problem on your own. However, if you still need assistance, please don't hesitate to contact us.

Troubleshooting is logically separated into Runtime problems and Installation or Configuration problems. If you have had a working installation and are running into problems while using OpenSpirit, skip the Installation Troubleshooting section. However, note that some runtime problems could actually be caused indirectly by an incorrect installation. Such situations should become obvious as you begin to review the information below.

Runtime Troubleshooting

Check the logs

Most OpenSpirit software puts information into log files. The log files for the shared servers are in `$OSP_HOME/logs/SharedServers`. The log files for user related servers are in `$HOME/OpenSpirit/logs`.

Normally the problem you are experiencing will be recorded in the newest file in one or both of these directories. For example, type `ls -alrt` in both of these directories and then look at the end of the newest file in each of these directories. If you see an error in one of these log files, hopefully it will help you to understand what is going wrong. If you find errors that you cannot explain, turn to the Support section for further support.

Installation Troubleshooting

If you are experiencing problems starting the installer you can turn on a debug flag. You can do this by setting it as an environment variable prior to starting the installer, which will help identify what is wrong. To set the flag type: `setenv LAX_DEBUG true`.

CHAPTER 4 Support and Troubleshooting Guide

During installation, all fields are validated to help make sure you end up with a proper installation. If you are having difficulty answering any of the questions, please refer to the following section: *Installation on page 125* and the help dialogs in each screen. If this does not help, please send e-mail to support@openspirit.com.