

## **Natural for UNIX**

### **Natural Web I/O Interface**

Version 6.3.8 for UNIX

February 2010

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Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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



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# 1 Natural Web I/O Interface

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This documentation is organized under the following headings:

	<b>Introduction</b>	What is the Natural Web I/O Interface?
	<b>Installing and Configuring the Natural Web I/O Interface Server</b>	How to install and configure the Natural Web I/O Interface server in a UNIX environment.
	<b>Installing the Natural Web I/O Interface Client</b>	How to install the Natural Web I/O Interface client on a web/application server so that it can be used with the Natural Web I/O Interface server.
	<b>Configuring the Client</b>	How to define the information that is to appear in the logon page.  The information in this part not only applies to the Natural Web I/O Interface client, it also applies to Natural for Ajax which is also a client of the Natural Web I/O Interface server.



## Notes:

1. This documentation only explains how to install the Natural Web I/O Interface server in a UNIX environment. For information on how to install it in a mainframe, OpenVMS or Windows environment, see the Natural documentation for the appropriate platform.
2. For information on how to install and use Natural for Ajax, see the *Natural for Ajax* documentation which is provided with the Natural documentation for all supported platforms.





# 2 Introduction

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- Components of the Natural Web I/O Interface ..... 4
- Executing a Natural Application in a Web Browser ..... 5
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This chapter describes the purpose and the functions of the Natural Web I/O Interface.



**Note:** This introduction mainly describes how the Natural Web I/O Interface works in a runtime (production) environment. The section *Differences in a SPoD Development Environment* briefly explains the special version that is used in a SPoD development environment.

## What is the Natural Web I/O Interface?

---

The Natural Web I/O Interface is used to execute Natural applications in a web browser. It fully supports the following:

- The display and input of Unicode characters. See *Unicode Input/Output Handling in Natural Applications* in the *Unicode and Code Page Support* documentation.
- Rich internet applications. See the *Natural for Ajax* documentation.

## Components of the Natural Web I/O Interface

---

The Natural Web I/O Interface consists of a server and a client.

### Server

The Natural Web I/O Interface server enables you to use a browser as the I/O device for Natural applications. The server does the user authentication, creates the Natural session and handles the I/O between Natural and the client. The Natural Web I/O Interface server is installed on the same machine as the Natural application.

### Client

The client handles the communication between the user's web browser and the Natural Web I/O Interface server. It converts the output from the Natural application to web pages, and returns the user input to Natural.

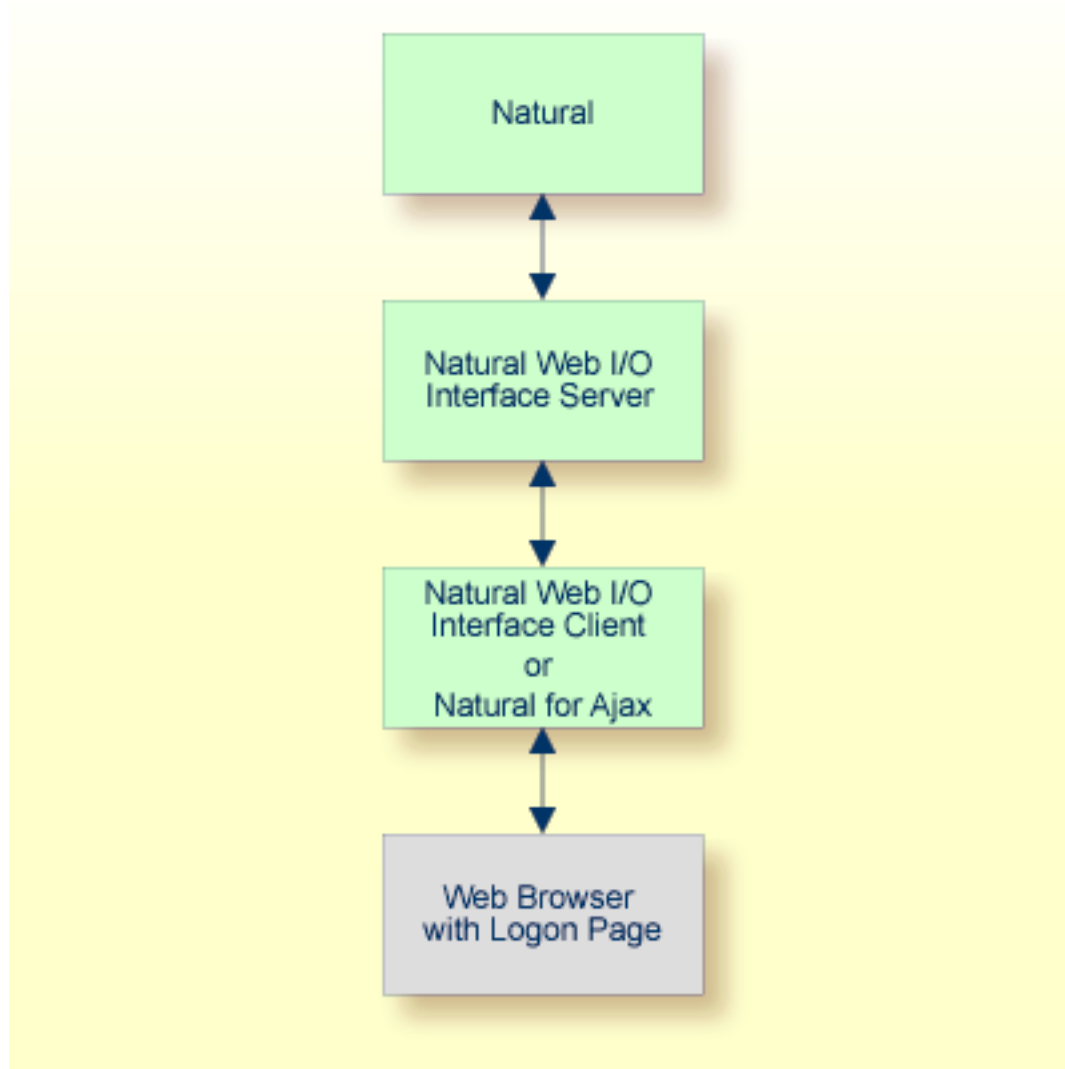
Two types of client are supported:

- Natural Web I/O Interface client for displaying character-based applications in the web browser. Maps with GUI controls are not supported in this case.
- Natural for Ajax for displaying rich internet applications in the web browser.

The client is installed on a web/application server. This can be done on any machine in the network.

## Executing a Natural Application in a Web Browser

The Natural Web I/O Interface receives data from a Natural application and delivers web pages to the user's web browser. This is illustrated in the following graphic:



The communication steps for executing a Natural application in the web browser are:

1. The user enters the address (URL) of a logon page in the web browser. The client then displays the logon page in the web browser.



**Note:** For information on how to invoke and configure the logon page, see [Configuring the Client](#).

2. The user enters all required information for starting a Natural application into the logon page. This information is sent to the client.
3. The client asks the Natural Web I/O Interface server to start the requested Natural application for this user.
4. The Natural Web I/O Interface server checks the supplied user ID and password, creates a Natural session for the user and starts the Natural application.
5. The Natural application returns the first application screen which is then transferred via the Natural Web I/O Interface server to the client and finally as a web page to the web browser.

Different web browsers are supported. Note that cookies and JavaScript must be enabled in the web browser. For a list of the currently supported web browsers, see the documentation for the type of client that you are using:

- **Natural Web I/O Interface Client**

See [Browser Prerequisites](#) in this documentation.

- **Natural for Ajax**

See [Browser Prerequisites](#) in the *Natural for Ajax* documentation.

With Firefox, you can use caret browsing. The following exception applies for Natural applications: you can only use the RIGHT-ARROW and LEFT-ARROW keys to position the cursor (also called “caret”) in an output field. Caret browsing is enabled and disabled by pressing F7. For more information, see the documentation for your web browser.

## Client-Server Compatibility

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The following rules apply:

- The Natural Web I/O Interface server can work with any client that has the same or a higher protocol version.

If the server detects that the client is using a version that is lower than the server version, the server replies that the client is too old and the connection is closed.

- The client can work with any server that has the same or a lower protocol version.

If the client detects that the server is using a version that is lower than the client version, the client switches to the server version. However, new client functionality is not supported in this case.

- The Natural Web I/O Interface server must have the same protocol version as the Natural process that is started by the server. If Natural detects that the server is using a different protocol version, an error message is sent to the user and the connection is closed.

## Terminology

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On the different Natural platforms for which the Natural Web I/O Interface is supported, different techniques are used for implementing the server part of the Natural Web I/O Interface. On Natural for UNIX and Natural for OpenVMS, it is implemented as a daemon. On Natural for Windows, it is implemented as a service. On the mainframe, it is implemented as a server. In this documentation, the general term “server” is therefore used for all different kinds of implementation.

## Differences in a SPoD Development Environment

---

The previous sections of this introduction have described how the Natural Web I/O Interface works in a runtime (production) environment. This section briefly explains the differences in a SPoD development environment.

A special version of the Natural Web I/O Interface is used when working in a remote development environment with Natural for Windows (SPoD). In this case, the Natural Web I/O Interface is an integrated component which does not require a separate installation. The server is part of the Natural Development Server (NDV), and the client is part of Natural Studio. Other than in the runtime environment, the screen is not displayed in a browser but in a normal window. Rich GUI pages created by Natural for Ajax are not supported in the development environment.

It is important that I/O via the Natural Web I/O Interface has been enabled on the Natural host. Otherwise, the Natural Web I/O Interface cannot be invoked. See also *Unicode Input/Output Handling in Natural Applications* in the *Unicode and Code Page Support* documentation.

## Restrictions When Using the Natural Web I/O Interface with Natural Applications

---

There are several restrictions when using the Natural Web I/O Interface with Natural applications on UNIX, OpenVMS, mainframe or Windows hosts.



**Note:** The term “application” refers to application software. It does not refer to system software or software for development.

The following restrictions apply:

**■ GUI controls**

GUI controls are not supported: dialogs, buttons, radio buttons, list boxes, list views, check boxes etc. The Natural Web I/O Interface only supports Natural applications developed without GUI controls.

**■ File transfer**

File transfer (for example, with the `DOWNLOAD` statement) is not supported by the Natural Web I/O Interface.

**■ Runtime errors**

This restriction applies to older Natural versions on UNIX and Windows. As of version 6.3.3, this restriction no longer applies.

Runtime errors in Natural applications are not handled by the Natural Web I/O Interface. This leads to a loss of the session. Bypass: use the Natural system variable `*ERROR-TA` to handle the error. Sample Natural error transaction:

```
DEFINE DATA
LOCAL
1 ERR_INFO
  2 ERR_NR(N5)
  2 ERR_LINE(N4)
  2 ERR_STAT(A1)
  2 ERR_PNAM(A8)
  2 ERR_LEVEL(N2)
END-DEFINE
INPUT ERR_INFO
DISPLAY ERR_INFO
TERMINATE
END
```

**■ Return to the Natural main screen**

You must not use Natural applications that return to the Natural main screen as this leads to wrong screen display and a loss of the session.

**■ Natural editors and utilities**

You must not use Natural utilities such as `SYSMAIN` or `SYSDDM` and editors such as the program editor as this leads to wrong screen display and a loss of the session.

**■ Natural system commands**

You must not use any Natural system command such as `CATALL`, `FIND`, `GLOBALS`, `HELP`, `KEY`, `LIST`, `RETURN`, `SCAN`, `SETUP` or `XREF` as this leads to wrong screen display and a loss of the session.

**■ Terminal commands**

Terminal commands are not supported. They do not work when entered in the Natural Web I/O Interface client.

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- **Natural system variable** \*INIT-ID

When using the Natural Web I/O Interface client with Natural applications on UNIX, OpenVMS, mainframe or Windows hosts, the Natural system variable \*INIT-ID will not be filled with a value for the terminal type. On UNIX, OpenVMS and Windows, it will contain the value "notty". On mainframes, it will contain a session ID that is unique on that server.

## Differences between the Natural Web I/O Interface Client and Terminal Emulation

---

The Natural Web I/O Interface client runs as an HTML terminal emulator inside a browser control. The look and feel of the Natural Web I/O Interface client display is quite similar to that of the regular terminal (emulation), but there are some differences due to browser functionality:

- A double-click with the mouse pointer on any field simulates the ENTER key.
- Using the mouse pointer, it is possible to position the cursor on an output-only field, however, the returned cursor position (system variable \*CURSOR) is always on the first field character.
- It is not possible to position the cursor outside the range of input and output fields.
- The cursor can be moved with the left and right arrow keys within one input field only. Other cursor movements with the other arrow keys (for example, within output fields or to the next input field or vertical movements) are not possible.
- The insert mode can be switched on and off using the INSERT key.
- For Unicode character sets (type U; for example, Chinese), one character may require more space than an ordinary alphanumeric character, because the Unicode character representation is proportional. The application design must take this into account, because Natural is based on characters with fixed width. For input fields it is possible to scroll within the field, but for output fields there may not be sufficient space to display the Unicode characters. The display length for a field can be controlled by the session parameter DL.
- Type-ahead mode is not supported.
- Paste in overwrite mode is not supported.
- Key schemes are fixed; keys such as the right CTRL key and the ENTER key on the numeric pad are no longer definable.
- Screen update is slower since the complete screen is sent rather than updates.
- The blink attribute is not supported. The reverse attribute is currently only supported in the implementation for Microsoft's Internet Information Services (IIS).
- The keys PF1 through PF12 are simulated by the key combinations F1 through F12.
- The keys PF13 through PF24 are simulated by the key combinations SHIFT+F1 through SHIFT+F12.

### **IBM Mainframes Only**

- The terminal screen size is controlled by the Natural profile parameter `TMODEL`. The default setting `TMODEL=0` means 43 lines and 132 columns.
- The program attention keys (PA1, PA2 and PA3) are simulated by the key combinations `CTRL+F1`, `CTRL+F2`, `CTRL+F3`.
- The clear key is simulated by `CTRL+F4`,
- There is no `ATTN` (attention interrupt) key, no `RESET` key and no `EEOF` (erase end of file) key.

### **VT Only**

- The I/O occurs in block mode. Therefore, the Natural program will only react when a function key is pressed.
- The keys `PF25` through `PF36` are simulated by the key combinations `CTRL+F1` through `CTRL+F12`.
- The keys `PF37` through `PF48` are simulated by the key combinations `ALT+F1` through `ALT+F12`.



# 3 Installing and Configuring the Natural Web I/O Interface

## Server

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On UNIX, the server part of the Natural Web I/O Interface is implemented as a daemon.

## Installing the Natural Web I/O Interface Daemon

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The installation of the Natural Web I/O Interface daemon is part of the Natural for UNIX installation.

### Before You Start

---

This section contains important information on the necessary activities before installing Natural Web I/O Interface daemon.

The Natural Web I/O Interface daemon `$SAG/nat/$NATVERS/nwo/bin/nwosrvd`

- needs a Tcl shared library which is delivered in the directory `$SAG/nat/$NATVERS/lib`,
- is linked with the runpath `/opt/softwareag/nat/$NATVERS/lib`,
- will be installed with permissions 6755 (s-bit).

Since the s-bit is used, `$LD_LIBRARY_PATH` will not be searched. Therefore, ensure that the Natural Web I/O Interface daemon will find the Tcl shared library by

- installing Natural into `/opt/softwareag`,
- setting a symbolic link from `opt/softwareag` to your current `$SAG` directory, or
- making the Tcl shared library available from a system directory.

## Setting Up the Natural Web I/O Interface Components

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Setting up the Natural Web I/O Interface on UNIX consists of the following steps:

- [Step 1: Stop the Natural Web I/O Interface Daemons](#)
- [Step 2: Establish the Environment](#)
- [Step 3: Install Natural and the Natural Web I/O Interface](#)
- [Step 4: Check the Environment Variables for the Natural Web I/O Interface](#)

- [Step 5: Read the READ\\_NWO Files](#)

### Step 1: Stop the Natural Web I/O Interface Daemons

This step is only required for an upgrade installation. It is not required when you install the Natural Web I/O Interface for the first time.

1. Stop the *nwosrzd* process using the following command:

```
nwosrzd.sh portnumber stop
```

Or use the script `$NATDIR/$NATVERS/INSTALL/nwosrzd.bsh` which will be generated during the Natural Web I/O Interface installation for a specified port.

```
nwosrzd.bsh stop
```

2. Repeat the above command (with an adapted port in script *nwosrzd.bsh*, if applicable) for each Natural Web I/O Interface service that is needed.

### Step 2: Establish the Environment

- Ensure that the environment settings in the file *sagenv.new* are correct and set. Note that the *nwoenv* environment script will be called by the *natenv* environment script.

Or use the shell script *nwoenv.csh* by entering the following command:

```
source nwoenv.csh
```

This script can be found after the installation in `$NATDIR/$NATVERS/INSTALL`.

### Step 3: Install Natural and the Natural Web I/O Interface

- The Natural Web I/O Interface can be selected in the **Choose Packages** screen during the Natural installation.

Optionally, you may install a runlevel script to start/stop a Natural Web I/O Interface daemon and start the Natural Web I/O Interface daemon on a specified port. After the Natural installation has finished, the Natural Web I/O Interface must be activated by starting Natural through a Natural Web I/O Interface client on Windows.

When a runlevel script is used, the Natural Web I/O Interface daemon can only be administered by the user "root".

When you install Natural with the Natural Web I/O Interface, the directory `$NATDIR/nwo/$NWONODE` is created. The template files located in `$NATDIR/$NATVERS/nwo/node-name` are then copied to this new directory.

## Step 4: Check the Environment Variables for the Natural Web I/O Interface

- The Natural Web I/O Interface-specific settings are shown below:

Environment Variable	Description
NWODIR	The home directory for the product located at $\$NATDIR/\$NATVERS/nwo$ .
NWONODE	The name of the node on which the Natural Web I/O Interface is installed.
NWO_SRVDCONF	The configuration file $\$NATDIR/nwo/\$NWONODE/nwosrvd.conf$ for the Natural Web I/O Interface daemon.
NWO_TIMEOUT	The maximum time, in seconds, that the Natural Web I/O Interface daemon will wait for a response. "0" means no timeout. The Natural Web I/O Interface daemon will terminate when it receives the timeout.

## Step 5: Read the READ\_NWO Files

1. Access the directory  $\$NATDIR/\$NATVERS$  and check the files *READ\_NWO.TXT* and *READ\_NWO.FIX* for any version-specific installation considerations concerning the particular platform.
2. Add the services as described in the file *READ\_NWO.TXT*.

## Directories

The following directories are created when Natural is installed together with the Natural Web I/O Interface on a UNIX system:

Directory	Description
$\$NATDIR$	Top-level Natural directory.
$\$NATDIR/\$NATVERS$	Directory with all components for the current Natural version.
$\$NWODIR$	Directory with the Natural Web I/O Interface components for the current version.
$\$NWONODE$	Contains the name of the machine ( <code>uname -n</code> ).
$\$NATDIR/\$NATVERS/INSTALL$	Shell scripts and environment files for the Natural Web I/O Interface ( <i>nwoenv</i> , <i>nwoenv.csh</i> ).
$\$NWODIR/bin$	Natural Web I/O Interface executable files ( <i>nwosrvd</i> , <i>nwosrvd.tr</i> ).
$\$NWODIR/node-name$	Contains the template files ( <i>nwosrvd.sh</i> , <i>nwo.sh</i> , <i>nwosrvd.conf</i> ).
$\$NWODIR/nwoexuex/userexit1$	Contains the files for building the <i>libnwouserexit1</i> .
$\$NWODIR/nwoexuex/userexit2$	Contains the files for building the <i>libnwouserexit2</i> .

Directory	Description
<code>\$NATDIR/nwo/\$NWNODE</code>	Work directory, contains the configuration files ( <i>nwosrvd.sh</i> , <i>nwo.sh</i> , <i>nwosrvd.conf</i> ).



**Note:** The above table lists the most important directories and files.

## Configuring the Natural Web I/O Interface Daemon on UNIX

When the Natural installation has finished, the directory `$NATDIR/nwo/$NWNODE` contains the files *nwosrvd.conf*, *nwosrvd.sh* and *nwo.sh*.

The configuration of the Natural Web I/O Interface daemon can be done using the Natural Web I/O Interface daemon commands or by editing the configuration file *nwosrvd.conf*.

The following topics are covered below:

- [Natural Web I/O Interface Daemon Commands](#)
- [nwosrvd.conf - Configuration File for the Natural Web I/O Interface Daemon](#)
- [nwosrvd.sh - Shell Script for Starting and Stopping the Natural Web I/O Interface Daemon](#)
- [nwo.sh - Shell Script for Starting Natural](#)
- [Environment Variables](#)

### Natural Web I/O Interface Daemon Commands

The following commands can be specified at the UNIX command prompt:

Command	Description
<code>nwosrvd -help</code>	Shows all available Natural Web I/O Interface daemon commands and subcommands.
<code>nwosrvd -v</code>	Shows the version of the Natural Web I/O Interface daemon.
<code>nwosrvd nnnn</code>	Defines the listening port number.
<code>nwosrvd -show</code>	Shows the configuration of the Natural Web I/O Interface daemon.
<code>nwosrvd -config keys</code>	Changes the configuration of the Natural Web I/O Interface daemon. The following keys can be specified:  <ul style="list-style-type: none"> <li>-userexit1=<i>pathname</i> The message defined with this key is saved in the UserExit1 key of the configuration file <i>nwosrvd.conf</i>, section [UserExits].</li> <li>-userexit2=<i>pathname</i> The message defined with this key is saved in the UserExit2 key of the configuration file <i>nwosrvd.conf</i>, section [UserExits].</li> </ul>

Command	Description
	<p><code>-passparam=<i>parameters</i></code> The message defined with this key is saved in the <code>Parameters</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[PasswdArguments]</code>.</p> <p><code>-passwd=<i>message</i></code> The message defined with this key is saved in the <code>EnterOldPassword</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[PasswdMessages]</code>.</p> <p><code>-passnew=<i>message</i></code> The message defined with this key is saved in the <code>NewPassword</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[PasswdMessages]</code>.</p> <p><code>-passreenter=<i>message</i></code> The message defined with this key is saved in the <code>ReEnterNewPassword</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[PasswdMessages]</code>.</p> <p><code>-passsuccess=<i>message</i></code> The message defined with this key is saved in the <code>PasswordSuccessful</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[PasswdMessages]</code>.</p> <p><code>-logging=<i>option</i></code> The option defined with this key is saved in the <code>Logging</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[Miscellaneous]</code>.</p> <p><code>-ssl=[yes no]</code> The option defined with this key is saved in the <code>ssl</code> key of the configuration file <code>nwosrvd.conf</code>, section <code>[SSL]</code>.</p> <p>To remove any user exits from the configuration, enter the following command:</p> <pre>nwosrvd -config -userexit1=</pre> <p>Once the configuration was changed, the Natural Web I/O Interface daemon must be restarted.</p>

### nwosrvd.conf - Configuration File for the Natural Web I/O Interface Daemon

The configuration file `nwosrvd.conf` contains information that the user exits need for the Natural Web I/O Interface daemon. It has the following content:

```
[Miscellaneous]
Logging=I

[UserExits]
; UserExit1=/FS/sag/nat/nwoexuex/userexit1/libnwouserexit1.so
; UserExit2=/FS/sag/nat/nwoexuex/userexit2/libnwouserexit2.so

[PasswdArguments]
Parameters=

[PasswdMessages]
```

```

EnterOldPassword=Enter existing login password:
NewPassword=New Password:
ReEnterNewPassword=Re-enter new Password:
PasswordSuccessful=passwd: password successfully changed for*

```

```

[SSL]
ssl=no

```

Section in Configuration File	Description
[Miscellaneous]	<p>The key <code>Logging</code> is used to define the amount of logging information that is to be reported. One of the following options can be specified:</p> <p>E for errors.  W for warnings.  I for information.</p> <p>See also <a href="#">Logging Information</a>.</p>
[UserExits]	<p>Two user exits can be defined:</p> <p><code>UserExit1</code></p> <p>The library that is defined by <code>UserExit1</code> contains the following function:</p> <pre>int nwo_CheckUsernameAndPassword(const char *pUsername, const char *pPassword, const char *pNewPassword, char *pErrorMessage)</pre> <p>If the key <code>UserExit1</code> is defined in the configuration file, the function <code>nwo_CheckUsernameAndPassword</code> is responsible for checking the user name and password. If a new password is received, user exit 1 is also responsible for changing the password.</p> <p>In the case of an error, the return code of the function must be "0"; in this case, the <code>pErrorMessage</code> is returned to the client. When user name and password are correct, the return code must be a value other than "0".</p> <p><code>UserExit2</code></p> <p>The library that is defined by <code>UserExit2</code> contains the following functions:</p> <pre>■ int nwo_Messages(int *iNumberOfMessages, char *pMessage[])</pre> <p><code>iNumberOfMessages</code>: Number of messages returned in the array.</p> <p><code>pMessage</code>: Array of messages.</p> <p>If the key <code>UserExit2</code> is defined in the configuration file, the function <code>nwo_Messages</code> is called when a new connection (client) is accepted and the messages returned by this function are sent to the client. User exit 2 may be used, for example, to send a message such as the following: "For maintenance reasons, the Natural application XXXXX will be down next monday, from 18:00 until 19:00".</p>

Section in Configuration File	Description
	<p>In the case of an error, the return code of the function must be "0".</p> <p>After the function <code>nwo_Messages</code> has been called, the function <code>nwo_FreeMessages</code> is called.</p> <pre> ■ int nwo_FreeMessages(int iNumberOfMessages, char *pMessage[]) </pre> <p><code>iNumberOfMessages</code>: Number of messages.</p> <p><code>pMessage</code>: Array of messages.</p> <p>If the key <code>UserExit2</code> is defined, the function <code>nwo_FreeMessages</code> is called to free any resources (normally memory) allocated in the function <code>nwo_Messages</code>.</p> <p>In the case of an error, the return code of the function must be "0".</p>
[PasswdArguments]	<p>The key <code>Parameters</code> is used to define any additional parameter(s) that have to be passed to the <code>passwd</code> command.</p>
[PasswdMessages]	<p>The keys in this section define the messages that are to be returned by the system (<code>passwd</code> command) when a user changes the password. If any of these messages is not identified by the daemon, an error will be returned to the client.</p> <p><b>Password Mechanism</b></p> <p>The password and new password are encrypted on the client side and decrypted on the UNIX side. A maximum of 8 characters is allowed.</p> <p>If user exit 1 is active, user name, password and new password are passed to the user exit.</p> <p>If user exit 1 is not active, the daemon checks whether user name and password are correct for the system. If a new password is sent, the daemon changes the password by calling the UNIX command <code>passwd</code>.</p>
[SSL]	<p>The key <code>ssl</code> is used to define whether the SSL protocol is to be used. One of the following values can be specified: "yes" or "no".</p> <p>See also <a href="#">SSL Support</a>.</p>

### nwosrvd.sh - Shell Script for Starting and Stopping the Natural Web I/O Interface Daemon

The shell script `nwosrvd.sh` is used to start and stop the Natural Web I/O Interface daemon. For further information, see [Starting and Stopping the Natural Web I/O Interface Daemon](#).



## nwo.sh - Shell Script for Starting Natural

In order to start a Natural session, the Natural Web I/O Interface service executes a shell script. The shell script prepares the environment for the Natural session and eventually starts Natural.

The shell script receives certain parameters from the Natural Web I/O Interface client. The parameters can either be evaluated by the shell script itself or passed on to Natural. A client who wants to start a Natural session can specify the shell script to be used.

The shell script *nwo.sh* is called from the Natural Web I/O Interface daemon in order to start a Natural session. It has the following content:

```
#!/bin/sh

echo "Number of arguments $# " > nwo.log

IPAddress=""
ClientId=""
CodePage=""
CustomParameters=""
NaturalParameters=""

if [ "$1" != "null" ]
then
  IPAddress="$1"
fi

if [ "$2" != "null" ]
then
  ClientId="$2"
fi

if [ "$3" != "null" ]
then
  CodePage="$3"
fi

if [ "$4" != "null" ]
then
  CustomParameters="$4"
fi

if [ "$5" != "null" ]
then
  NaturalParameters="$5"
fi

echo "IP Address=$IPAddress >> nwo.log
echo "Client Id=$ClientId >> nwo.log
echo "Code Page=$CodePage >> nwo.log
```

```
echo "Custom Parameters=" $CustomParameters >> nwo.log
echo "Natural Parameters=" $NaturalParameters >> nwo.log
echo "NWO_BROWSER_IO=" $NWO_BROWSER_IO >> nwo.log

$NATDIR/$NATVERS/bin/natural $NaturalParameters etid=$$ > /tmp/natural_$$$.out 2>&1
```

You have to create such a shell script for each Natural application. It can have any name and it must be located in a directory which is defined in the environment variable `PATH`.

The name of the shell script is taken from the configuration file for the session. It is taken from the configuration file section that is defined for the session that the user has selected in the logon page. For further information, see [Configuring the Client](#).

### Arguments

The shell script will receive the following arguments:

Order	Argument	Description
1	IPAddress	The client IP address from where the session is opened.  <b>Note:</b> If there is a proxy, this will not be the IP address of the client workstation. Instead, it will be the IP address of the proxy.
2	ClientId	The user name from the logon page is passed as the client ID.
3	CodePage	The encoding that is defined in the configuration file for the session. This value can be used to set the Natural system variable <code>*CODEPAGE</code> .
4	CustomParameters	From the logon page, it is possible to pass any values to the script in order to execute any desired action.  Example: you pass a small text to the script which describes an error. When the script receives this error text, it sends it as an e-mail to the administrator.
5	NaturalParameters	These can be any Natural parameters. The parameters are either defined in the configuration file for the session, or they are entered in the logon page. The following is an example of the corresponding entry in the configuration file:  <natural_parameter>parm=nwoparm\ stack=(logon\ mylib;start-program;fin)<natural_parameter>  The language that is selected in the logon page is added as the first element to the Natural parameters in the form "ulang=x".

Arguments 1 to 4 can be used to audit the client, to allow to run an application from a specific PC (identifying the IP address), to build statistics, to do special actions, etc.

## Environment Variables

In the shell script, several environment variables can be set for the Natural session that is started by the daemon:

**NWO\_ENABLE\_ACK**=["YES"|"NO"]

This environment variable is used for asynchronous screens (SET CONTROL N).

**YES** When asynchronous screens are sent to the client, Natural will wait to receive an ACK package before the next screen can be sent.

**NO** No waiting between asynchronous screens. Default value.

**NWO\_TIMEOUT**=[*number-of-seconds*]

The maximum time, in seconds, that Natural waits to receive any input from the client before it closes the session. If the number of seconds is "0", Natural waits infinitely (no timeout). The default value is "0".

Error NAT5466 is returned at timeout. In Natural, the application can handle this error and decide how to continue or terminate.

## Logging Information

The logging information system reports errors, warnings and/or session information, depending on the option that has been defined with the following **Natural Web I/O Interface daemon command**:

```
nwosrvd -config -logging=option
```

*option* can be one of the following:

Option	Description
E	<p>Error.</p> <p>When this option is specified, the Natural Web I/O Interface daemon reports only errors.</p> <p>In the case of an error, the daemon usually exits immediately.</p>
W	<p>Warning.</p> <p>When this option is specified, the Natural Web I/O Interface daemon reports errors and warnings for uncritical errors.</p> <p>In the case of a warning, the daemon continues to run.</p>
I	Information.

Option	Description
	When this option is specified, the Natural Web I/O Interface daemon reports errors, warnings and information.  The information messages allow to check the session parameters, IP address, etc.

Help information, for example, on how to run, configure and install the Natural Web I/O Interface daemon is always provided. The messages which inform you when the daemon has been started or stopped are also part of the help information.

To find out which logging option is currently active, enter the following Natural Web I/O Interface daemon command:

```
nwosrvd -show
```

The logging messages are shown directly for the standard output. The format of the messages is as in the following example:

```
%NWOSRVD-E: 18.01.2008 14:55:20 NWO_SRVDCONF is not established.
```

The following information is provided:

- %NWOSRVD is the internal name of the Natural Web I/O Interface daemon.
- The message type is shown directly after %NWOSRVD. It can be one of the following: -E (error), -W (warning), -I (information), or -H (help).
- Date and time when the message was reported.
- Any text or message which pertains to the error, warning, information or help.

If you want to save these messages, you have to redirect the standard output to a file.

Example for csh:

```
nwosrvd 5454 >& nwosrvd_5454.log
```

Example for sh, ksh and bsh:

```
nwosrvd 5454 >& nwosrvd_5454.log 2>&1
```

## SSL Support

SSL is used for a secure connection between the Natural Web I/O Interface server and the Natural Web I/O Interface client or Natural for Ajax. Server authentication cannot be switched off. A certificate and a private key is always required on the server.

To create and use an SSL certificate and a private key on the server, proceed as described below.

- Adapt the example configuration file *openssl.cnf* to your needs.



**Note:** *openssl.cnf* and *openssl* are delivered in *\$NATDIR/\$NATVERS/bin*.

- Set the environment variable so that it points to the file *openssl.cnf*:

```
set OPENSSL_CONF=$NATDIR\NATVERS\bin\openssl.cnf
export OPENSSL_CONF;
```

- Generate a certificate signing request:

```
openssl req -new > server.cert.csr
```

- Generate a private RSA key:

```
openssl rsa -in privkey.pem -out server.cert.key
```

- Generate a self-signed certificate:

```
openssl x509 -in server.cert.csr -out server.cert.crt -req -signkey server.cert.key
-days 365
```



**Note:** The certificate can be self-signed or it can be signed by a CA (Certificate Authority) such as VeriSign.

- Put the generated files into the same directory as the scripts which start the Natural Web I/O Interface server.
- Import the generated files to a truststore on the client. See also [Trust Files \(J2EE only\)](#).



```
<natural_program>your-shell-script.sh</natural_program>
```

## Starting a Natural Application

Almost any Natural application can be used with the Natural Web I/O Interface. See also [Differences between the Natural Web I/O Interface Client and Terminal Emulation](#).

To start a new Natural application with the Natural Web I/O Interface, proceed as follows:

1. Create a new parameter file from NWOPARM using the Configuration Utility.
2. In this new parameter file, modify the STACK command as follows:

```
logon library; startprogram; fin
```



**Note:** Only “real” Natural applications can be used. The Natural **Main Menu** cannot be used as a Natural application.

Add the new service as follows:

1. Look for a port number which is not yet used.
2. Create a new shell script (similar to *nwo.sh*) for starting the Natural application:

```
cd $NATDIR/nwo/$NWONODE
copy nwo.sh your-shell-script.sh
vi your-shell-script.sh
```

You have to decide which (last) line you will use in the script. Use one of the following:

```
$NATDIR/$NATVERS/bin/natural parm=parameter-file etid=$$ >output-file 2>&1
```

```
$NATDIR/$NATVERS/bin/natural $5 etid=$$ >output-file 2>&1
```

When using the line with `parm=parameter-file`, the above step in which you modify the STACK command is mandatory.

When using `$5`, the Natural parameter (*parameter-file* and STACK command) is taken from the configuration file for the session (see [Configuring the Client](#)). The following is an example of the corresponding entry in the configuration file:

```
<natural_parameter>parm=myparm stack=(logon mylib;menu;fin)<natural_parameter>
```

3. If you want to define special settings for the Natural session, you can set the environment variables in your shell script. See [above](#).
4. Set the permissions for the shell script which starts the service as follows:

```
chmod 775 script-name
```

The service is now available for use with a PC.



# 4 Installing the Natural Web I/O Interface Client

---

This part explains how to install the Natural Web I/O Interface client on an application server or web server so that it can be used with the server part of the Natural Web I/O Interface that is running in a Natural for Mainframes, Natural for UNIX, Natural for OpenVMS or Natural for Windows runtime environment.

The following topics are covered:

<a href="#">Prerequisites</a>
<a href="#">Installing the Natural Web I/O Interface Client on Sun Java System Application Server</a>
<a href="#">Installing the Natural Web I/O Interface Client on JBoss Application Server</a>
<a href="#">Installing the Natural Web I/O Interface Client on Microsoft Internet Information Services (IIS)</a>



# 5 Prerequisites

---

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## Application Server or Web Server

---

The following application/web servers are supported. The application/web servers are not delivered with the Natural Web I/O Interface.

### ■ J2EE Server

The following application servers are supported.

#### ■ Sun Java System Application Server 8.1, 8.2 and 9.1

This can be downloaded from <http://www.sun.com/>.

#### ■ JBoss Application Server 4.0.5 and 4.2.2

This can be downloaded from <http://www.jboss.org/>.

On these application servers, the Natural Web I/O Interface client consists of a J2EE enterprise application (*natuniapp.ear*) and a J2EE resource adapter (*naturalunicode.rar*). Both components are installed on a J2EE server.

The prerequisite for using the Natural Web I/O Interface client on a J2EE server is that Java Runtime 5 or above is installed.

### ■ Microsoft Internet Information Services (IIS)

On this web server, the Natural Web I/O Interface client is based on the ASP.NET 2.0 technology. Therefore, the prerequisite for running the Natural Web I/O Interface client with IIS is that the .NET framework 2.0 is installed on the same server on which Microsoft Internet Information Services is installed.

When ASP.NET 2.0 has not yet been installed, you can download the .NET Framework Version 2.0 from:

<http://www.microsoft.com/downloads/details.aspx?familyid=0856eacb-4362-4b0d-8edd-aab15c5e04f5&displaylang=en>

You have to install the Natural Web I/O Interface client on one of these servers as described later in this documentation.



**Note:** Server farms are not supported.

## Apache Ant

---

Apache Ant 1.6.5 or above is required to perform the deployment on JBoss Application Server. This tool is freely available on <http://ant.apache.org/>.

## Natural for Mainframes

---

If you want to use the Natural Web I/O Interface client with Natural for Mainframes, the following must be installed:

- Natural for Mainframes Version 4.2.3 or above, and
- the Natural Web I/O Interface server.

For detailed information, see:

- the *Installation* documentation for the different operating systems which is provided for Natural for Mainframes;
- the section *Installing and Configuring the Natural Web I/O Interface Server* in the version of this *Natural Web I/O Interface* documentation which is provided for Natural for Mainframes.

## Natural for UNIX

---

If you want to use the Natural Web I/O Interface client with Natural for UNIX, the following must be installed:

- Natural for UNIX Version 6.2.5 or above, and
- the Natural Web I/O Interface server (which is implemented as a daemon).

For detailed information, see:

- the *Installation* documentation which is provided for Natural for UNIX;
- the section *Installing and Configuring the Natural Web I/O Interface Server* in the version of this *Natural Web I/O Interface* documentation which is provided for Natural for UNIX.

## Natural for OpenVMS

---

If you want to use the Natural Web I/O Interface client with Natural for OpenVMS, the following must be installed:

- Natural for OpenVMS Version 6.3.4 or above, and
- the Natural Web I/O Interface server (which is implemented as a daemon).

For detailed information, see:

- the *Installation* documentation which is provided for Natural for OpenVMS;
- the section *Installing and Configuring the Natural Web I/O Interface Server* in the version of this *Natural Web I/O Interface* documentation which is provided for Natural for OpenVMS.

## Natural for Windows

---

If you want to use the Natural Web I/O Interface client with Natural for Windows, the following must be installed:

- Natural for Windows Version 6.3.3 or above, and
- the Natural Web I/O Interface server (which is implemented as a service).

For detailed information, see:

- the *Installation* documentation which is provided for Natural for Windows;
- the section *Installing and Configuring the Natural Web I/O Interface Server* in the version of this *Natural Web I/O Interface* documentation which is provided for Natural for Windows.

## Browser Prerequisites

---

Supported browsers in this version are:

- Internet Explorer 6.0 through 8.0.
- Mozilla Firefox 2.0 through 3.5.



**Important:** Cookies and JavaScript must be enabled in the browser.

# 6 Installing the Natural Web I/O Interface Client on Sun Java System Application Server

---

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If you want to use the Natural Web I/O Interface client with Sun Java System Application Server, you must proceed as described in this chapter.

## Installation Steps

---

The Natural Web I/O Interface client is installed using the Administration Console of Sun Java System Application Server.

The following is assumed:

- *<host>* is the name of the machine on which the application server is installed.
- *<port>* is the name of the port where the application server is installed. In a default installation, this is port 8080.
- *<adminport>* is the name of the port where the Administration Console is installed. In a default installation, this is port 4848.
- *<sunas>* is the path to the directory in which the application server is installed. In a default installation on Windows, this is *C:/Sun/AppServer*.

The following topics are covered below:

- [First-time Installation](#)
- [Update Installation](#)

### First-time Installation

#### ► To install the Natural Web I/O Interface client

- 1 Download the Natural Web I/O Interface client for Sun Java System Application Server from Empower (<https://empower.softwareag.com/>) and unzip the contents to a directory of your choice on your hard disk.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the *nwo/⟨platform⟩/j2ee/v⟨nnnn⟩/sun-apps* directory from the installation medium to a directory of your choice on your hard disk.

- 2 On UNIX platforms: Dearchive the TAR file using the following command:

```
tar -xvf nwonnnn.tar
```



- 3 Edit the file `<sunas>/domains/domain1/config/server.policy` and add the following setting in order to enable the Java Logging API:

```
grant {  
  permission java.util.logging.LoggingPermission "control";  
};
```



**Important:** If you do not add this setting, the resource adapter will not start and the Natural Web I/O Interface client will therefore be inoperative.

- 4 Make sure that the application server is running.
- 5 Open your web browser and enter the following URL:

```
http://<host>:<adminport>
```

This opens the Administration Console.

- 6 Deploy the resource adapter `naturalunicode.rar`:
  1. Open the tree node **Applications > Connector Modules**.
  2. Choose **Deploy**.
  3. Select `naturalunicode.rar` as the package file to be uploaded to the application server.
  4. Choose **Next**. "naturalunicode" is automatically included as the application name.
  5. Choose **Finish**.
- 7 Define the JNDI name for the resource adapter:
  1. Open the tree node **Resources > Connectors > Connector Connection Pools**.
  2. Choose **New**.
  3. Enter "NatPool" (the name is arbitrary) as the name.
  4. Select **naturalunicode** as the resource adapter.
  5. Each connection to a Natural host results in a new connection being made. Since each user requires a unique host session, connection pooling cannot be used. Therefore, you should make sure there are enough sessions for your users. The default maximum number is "32".
  6. Choose **Next**.
  7. Choose **Next**.
  8. Choose **Finish**.
  9. Open the tree node **Resources > Connectors > Connector Resources**.
  10. Choose **New**.
  11. Enter "eis/NaturalUnicodeRA" as the JNDI name.

12. Select **NatPool** (or whatever name you specified previously) as the pool name.
  13. Choose **OK**.
8. Deploy the enterprise application *natuniapp.ear*:
    1. Open the tree node **Applications > Enterprise Applications**.
    2. Choose **Deploy**.
    3. Select *natuniapp.ear* as the file to upload.
    4. Choose **Next**.
    5. Choose **OK**. The deployment may take several minutes.
  9. Restart the application server.

## Update Installation

### ► To update the Natural Web I/O Interface client

1. Make a backup copy of your *sessions.xml* file which is located in *../AppServer/domains/domain1/applications/j2ee-apps/natuniapp/natuniweb\_war/WEB-INF*. If you have changed any other files (such as style sheets), also make backup copies of these files.
2. Download the Natural Web I/O Interface client for Sun Java System Application Server from Empower (<https://empower.softwareag.com/>) and unzip the contents to a directory of your choice on your hard disk.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the *nwo/<platform>/j2ee/v<nnnn>/sun-apps* directory from the installation medium to a directory of your choice on your hard disk.

3. On UNIX platforms: Dearchive the TAR file using the following command:

```
tar -xvf nwonnnn.tar
```

- 4 Edit the file `<sunas>/domains/domain1/config/server.policy` and make sure that the following setting has been defined:

```
grant {  
  permission java.util.logging.LoggingPermission "control";  
};
```



**Important:** This setting is required as of Natural Web I/O Interface Version 1.3.2. If this setting is missing, the resource adapter will not start and the Natural Web I/O Interface client will therefore be inoperative.

- 5 Make sure that the application server is running.
- 6 Open your web browser and enter the following URL:

```
http://<host>:<adminport>
```

This opens the Administration Console.

- 7 Undeploy the resource adapter `naturalunicode.rar`:
  1. Open the tree node **Resources > Connectors > Connector Connection Pools**.
  2. Mark the check box **Natpool** (or the check box for whatever name you specified previously).
  3. Choose **Delete**.
  4. Open the tree node **Applications > Connector Modules**.
  5. Mark the check box **naturalunicode**.
  6. Choose **Undeploy**.
- 8 Undeploy the enterprise application `natuniapp.ear`:
  1. Open the tree node **Applications > Enterprise Applications**.
  2. Mark the check box **natuniapp**.
  3. Choose **Undeploy**.
- 9 Deploy the resource adapter `naturalunicode.rar` as in a first-time installation.
- 10 Define the JNDI name for the resource adapter as in a first-time installation.
- 11 Deploy the enterprise application `natuniapp.ear` as in a first-time installation.
- 12 Copy your backup files back to the required places.
- 13 Restart the application server.

## Installation Verification

---

It is assumed that `http://<host>:<port>` is the URL of your application server.

▶ **To verify the installation**

- Enter the following URL in your web browser:

```
http://<host>:<port>/natuniweb/natural.jsp
```

For example:

```
http://myhost:8080/natuniweb/natural.jsp
```

The Natural Web I/O Interface client is now started in your browser. The entries which appear in the resulting logon page depend on the settings in your configuration file. For further information, see [Configuring the Client](#).

# 7 Installing the Natural Web I/O Interface Client on JBoss

## Application Server

---

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If you want to use the Natural Web I/O Interface client with JBoss Application Server, you must proceed as described in this chapter.

## Installation Steps

---

Only one version of the Natural Web I/O Interface client can be installed on the same JBoss Application Server.

You can either install the Natural Web I/O Interface client or Natural for Ajax on the same JBoss Application Server, not both.

It is assumed that `<jboss>` is the directory of your JBoss Application Server installation.

The following topics are covered below:

- [First-time Installation](#)
- [Update Installation](#)

### First-time Installation

#### ▶ To install the Natural Web I/O Interface client

- 1 Download the Natural Web I/O Interface client for JBoss Application Server from Empower (<https://empower.softwareag.com/>) and unzip the contents to a directory of your choice on your hard disk.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the `nwo/⟨platform⟩/j2ee/v⟨nnnn⟩/jboss` directory from the installation medium to a directory of your choice on your hard disk.

- 2 On UNIX platforms: Dearchive the TAR file using the following command:

```
tar -xvf nwonnnn.tar
```

- 3 Install Apache Ant (you need Apache Ant to deploy the Natural Web I/O Interface client to the JBoss Application Server; see the [Prerequisites](#) above for the required version number):
  1. Download and unzip Apache Ant (from <http://ant.apache.org/>) into an installation directory of your choice. Avoid a directory name that contains blanks.
  2. Let the environment variable `ANT_HOME` point to the directory `<ant>` (where `<ant>` is the directory of your Ant installation).
  3. Add `<ant>/bin` to your `PATH` environment variable.

## 4 Deploy the Natural Web I/O Interface client to JBoss Application Server:

1. Copy the the Natural Web I/O Interface client distributables to a directory on a disk drive.
2. In the directory that contains the the Natural Web I/O Interface client distributables, there is an Ant script named *jbosdeploynwo.xml*. Edit this script and change the setting

```
<property name="jbossHome" value="C:/Program Files/Java/jboss-4.0.5"/>
```

to

```
<property name="jbossHome" value="<jboss>"/>
```

where *<jboss>* is your JBoss Application Server installation directory.



**Important:** Take care to use forward slashes (also on Windows) when specifying the directory path.

3. Execute the script *jbosdeploynwo.xml* by entering the following command:

```
ant -f jbosdeploynwo.xml
```

Wait for the message “BUILD SUCCESSFUL”. This indicates that the deployment was successful.

5 Edit the file *<jboss>/server/default/deploy/jbossjca-service.xml* and change the setting

```
<!-- Enable connection close debug monitoring -->
<attribute name="Debug">true</attribute>
```

to

```
<!-- Enable connection close debug monitoring -->
<attribute name="Debug">>false</attribute>
```

6 JBoss Application Server 4.0.5 only: Edit the file *<jboss>/server/default/deploy/natuniapp.ear/natuniweb.war/WEB-INF/web.xml* and uncomment the section

```
<!--
Uncomment the next lines, in case the configuration tool is installed on a JBOSS
4.0.5.GA
<listener>

<listener-class>org.apache.myfaces.webapp.StartupServletContextListener</listener-class>
</listener>
-->
```

so that it looks as follows:

```
<listener>
<listener-class>org.apache.myfaces.webapp.StartupServletContextListener</listener-class>
</listener>
```

 **Important:** For JBoss Application Server 4.2, you must not remove this comment.

- 7 Start JBoss Application Server.

## Update Installation

### ► To update the Natural Web I/O Interface client

- 1 Download the Natural Web I/O Interface client for JBoss Application Server from Empower (<https://empower.softwareag.com/>) and unzip the contents to a directory of your choice on your hard disk.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the `nwo/⟨platform⟩/j2ee/v⟨nnnn⟩/jboss` directory from the installation medium to a directory of your choice on your hard disk.

- 2 On UNIX platforms: Dearchive the TAR file using the following command:

```
tar -xvf nwo⟨nnnn⟩.tar
```

- 3 Shut down JBoss Application Server.
- 4 Deploy the Natural Web I/O Interface client to JBoss Application Server as in a first-time installation.
- 5 Make sure that the file `⟨jboss⟩/server/default/deploy/jbossjca-service.xml` contains the same settings as described for a first-time installation.
- 6 JBoss Application Server 4.0.5 only: Make sure that the file `⟨jboss⟩/server/default/deploy/natuniapp.ear/natuniweb.war/WEB-INF/web.xml` contains the same settings as described for a first-time installation.
- 7 Start JBoss Application Server.



## Installation Verification

---

It is assumed that `http://<host>:<port>` is the URL of your application server.

▶ **To verify the installation**

- Enter the following URL in your web browser:

```
http://<host>:<port>/natuniweb/natural.jsp
```

For example:

```
http://myhost:8080/natuniweb/natural.jsp
```

The Natural Web I/O Interface client is now started in your browser. The entries which appear in the resulting logon page depend on the settings in your configuration file. For further information, see [Configuring the Client](#).



# 8 Installing the Natural Web I/O Interface Client on Microsoft Internet Information Services (IIS)

---

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- Installation Verification ..... 48

If you want to use the Natural Web I/O Interface client with Microsoft Internet Information Services (IIS), you must proceed as described in this chapter.

## Installation Steps

---

The descriptions below apply when working with Windows XP. The procedure may be slightly different when working with a different Windows version.

The following topics are covered below:

- [First-time Installation](#)
- [Update Installation](#)

### First-time Installation

#### ▶ To install the Natural Web I/O Interface client

- 1 Download the Natural Web I/O Interface client for IIS from Empower (<https://empower.software-ag.com/>) and unzip the contents to a directory of your choice on your hard disk.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the `nwo/windows/iis/v<nnnn>` directory from the installation medium to a directory of your choice on your hard disk.

- 2 Open the Control Panel and choose **Administrative Tools > Internet Information Services**.
- 3 In the resulting window, expand the node with the name of your computer in the tree and select the node **Web Sites > Default Web Site**.
- 4 Open the context menu and choose **New > Virtual Directory**.

Or:

From the **Action** menu, choose **New > Virtual Directory**.

A wizard for creating a new virtual directory appears.

- 5 Choose the **Next** button to proceed to the next page of the wizard.
- 6 Enter an alias name for the virtual directory (for example, "Natural") and choose the **Next** button.



**Important:** If you want to use the Natural Execution and Debugging plug-in for Eclipse, the alias name for the virtual directory must be "Natural".

- 7 Enter the path to the directory which contains the files you have copied to your hard disk and choose the **Next** button.
- 8 Leave the access permissions with the default values (that is: **Read** and **Run script** are selected) and choose the **Next** button.
- 9 Choose the **Finish** button.

The virtual directory is now created on the IIS server.

- 10 Select the name of the new virtual directory in the tree.
- 11 Open the context menu and choose **Properties**.

Or:

From the **Action** menu, choose **New > Properties**.

- 12 In the resulting dialog box, choose the **ASP.NET** page. Select the ASP.NET version. It has to be at least 2.0.50727 (the release version of ASP.NET 2.0). Choose the **OK** button to close the dialog box.

## Update Installation

### ▶ To update the Natural Web I/O Interface client

- 1 On your hard disk, create a new directory for the update version that you want to install.
- 2 Download the Natural Web I/O Interface client for IIS from Empower (<https://empower.software-ag.com/>) and unzip the contents to the new directory.

Or:

Natural for UNIX, Natural for OpenVMS and Natural for Windows: Copy the complete contents of the *nwo/windows/iis/v<nnnn>* directory from the installation medium to a directory of your choice on your hard disk.

- 3 Open the Control Panel and choose **Administrative Tools > Internet Information Services**.
- 4 Open the properties for the existing virtual directory (for example, "Natural"). On the **Virtual Directory** page, change the path so that it points to the new directory which contains the update version.
- 5 Copy your *settings.xml* file from the directory which contains the previous version to the new directory (the *settings.xml* file is located in the root of your installation directory). If you have changed any other files (such as style sheets), also copy these files to the new directory.

## Installation Verification

---

It is assumed that `http://<host>:<port>` is the URL of your web server.

▶ **To verify the installation**

- When you have defined the alias name "Natural" in the IIS (see above), you can start the Natural Web I/O Interface client in the browser using the following URL:

Enter the following URL in your web browser:

```
http://<host>:<port>/Natural/Default.aspx
```

For example:

```
http://myhost:8080/Natural/Default.aspx
```

The Natural Web I/O Interface client is now started in your browser. The entries which appear in the resulting logon page depend on the settings in your configuration file. For further information, see [Configuring the Client](#).

# 9

## Configuring the Client

---

The information in this part not only applies to the Natural Web I/O Interface client, it also applies to Natural for Ajax which is also a client of the Natural Web I/O Interface server.

This part explains how to configure the client so that it can be used in a Natural runtime environment. The following topics are covered:

•	<a href="#">About the Logon Page</a>
•	<a href="#">Managing the Configuration File for the Session</a>
•	<a href="#">Using the Configuration Tool (J2EE only)</a>
•	<a href="#">Overview of Configuration File Elements</a>
•	<a href="#">Starting a Natural Application with a URL</a>
•	<a href="#">Using Style Sheets (J2EE only)</a>
•	<a href="#">Using Themes (IIS only)</a>
•	<a href="#">Configuring Security (J2EE only)</a>
•	<a href="#">Wrapping a Natural for Ajax Application as a Servlet</a>
•	<a href="#">Trust Files (J2EE only)</a>
•	<a href="#">Logging (J2EE only)</a>





# 10

## About the Logon Page

---

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- Examples of Logon Pages ..... 52
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- Browser Restrictions ..... 56

When you start the Natural Web I/O Interface client or Natural for Ajax in the browser, a logon page appears. The entries in this logon page depend on the settings in your configuration file (see [Managing the Configuration File for the Session](#)).

## Starting a Natural Application from the Logon Page

---

In order to start a Natural application from the logon page, you enter one of the URLs listed below inside your browser. Different names and locations are used for the logon pages, depending on the application/web server and the type of client that you are using.

### ■ J2EE Server

For the Natural Web I/O Interface client, you have to enter the following URL:

```
http://<host>:<port>/natuniweb/natural.jsp
```

For Natural for Ajax, you have to enter the following URL:

```
http://<host>:<port>/cisnatural/servlet/StartCISPage?PAGEURL=/cisnatural/NatLogon.html
```

### ■ Microsoft Internet Information Services (IIS)

This web server can only be used with the Natural Web I/O Interface client. You have to enter the following URL:

```
http://<host>:<port>/Natural/Default.aspx
```

where *<host>* and *<port>* are the host name and port number of your application/web server.

## Examples of Logon Pages

---

For each session definition that has been configured in the configuration file, an entry appears on the logon page. If the user selects the corresponding entry, only those parameters that were not preconfigured in the configuration file need to be specified in the logon page in order to start the application. Usually, you will preconfigure all connection parameters except user name and password.

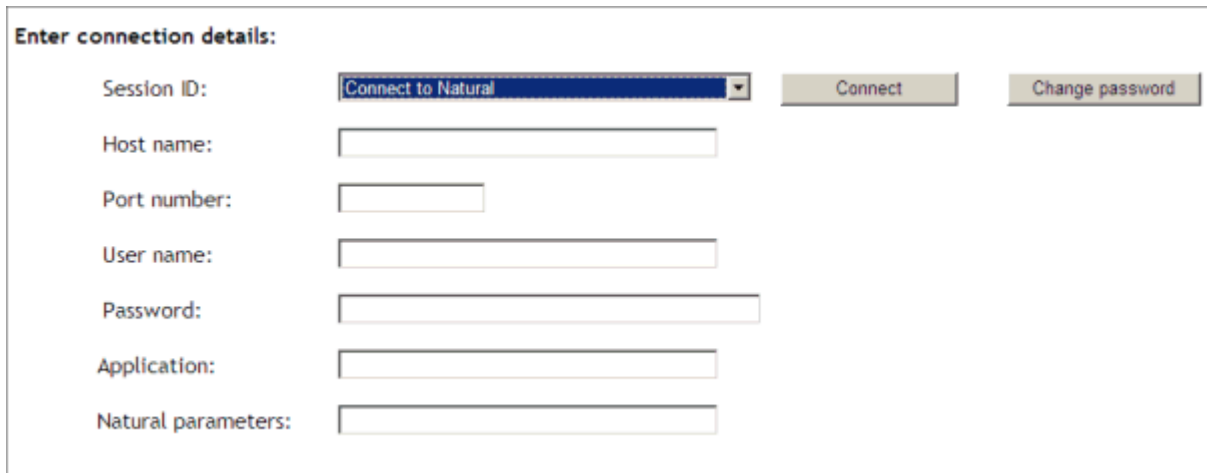
The look of the logon page depends on the type of client that you are using.

- [Natural Web I/O Interface Client](#)

- Natural for Ajax

### Natural Web I/O Interface Client

The following example shows part of a logon page which results from a configuration file in which no special entries are defined for a session:



Enter connection details:

Session ID:

Host name:

Port number:

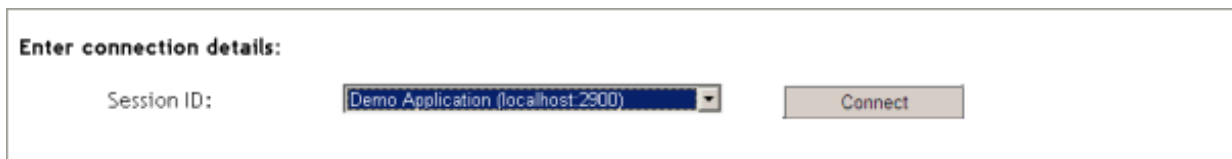
User name:

Password:

Application:

Natural parameters:

The following example shows part of a logon page which results from a configuration file in which many settings are already predefined (including user ID and password):



Enter connection details:

Session ID:

To log on to a session, you have to specify all required information in the logon page (for example, you select a session from the corresponding drop-down list box). When you choose the **Connect** button, the screen for the selected session appears.

## Natural for Ajax

The following example shows part of a logon page which results from a configuration file in which no special entries are defined for a session:

The screenshot shows a web form with two main sections. The first section, titled "Connection Details", contains a dropdown menu for "Session ID" with the selected option "Connect to Natural". Below this are input fields for "Host name", "Port number", "User name", "Password", "Application", and "Natural parameters". The second section, titled "Change Password", contains input fields for "New password" and "Repeat new password". At the bottom of the form is a "Connect" button.

The following example shows part of a logon page which results from a configuration file in which many settings are already predefined (including user ID and password):

The screenshot shows a web form with one main section titled "Connection Details". It features a dropdown menu for "Session ID" with the selected option "Demo Application (localhost:2900)". Below the dropdown is a "Connect" button.

To log on to a session, you have to specify all required information in the logon page (for example, you select a session from the corresponding drop-down list box). When you choose the **Connect** button, the screen for the selected session appears.

---

## Changing the Password in the Logon Page

---

Currently, this functionality is only available for Natural for UNIX, Natural for OpenVMS and Natural for Windows.

The following information applies when the fields for entering a user ID and a password appear on the logon page. These fields do not appear when user ID and password have already been defined in the configuration file; in this case, it is not possible to change the password in the logon page.

When your password has expired, you are automatically asked for a new password. When you try to log on with your current password, an error message appears and input fields for changing the password are shown.

### ▶ To change the password with the Natural Web I/O Interface client

- 1 Choose the **Change password** button in the logon page.

The name of this button changes to **Don't change password** and the following two input fields are shown in the logon page:

- **New password**
- **Repeat new password**

- 2 Enter your user ID and your current password as usual.
- 3 Enter the new password in the two input fields.
- 4 Choose the **Connect** button to change the password.

Or:

If you do not want to change your password, choose the **Don't change password** button. The two input fields will then disappear.

### ▶ To change the password with Natural for Ajax

- 1 Click the title **Change Password** to show the content of this input area.

The following two input fields are shown in the logon page:

- **New password**
- **Repeat new password**

- 2 Enter your user ID and your current password as usual.

- 3 Enter the new password in the two input fields.
- 4 Choose the **Connect** button to change the password.

## Browser Restrictions

---

The browser's "Back" and "Forward" buttons do not work with the two types of clients and should therefore not be used.

If you want to run two Natural sessions in parallel, you have to start a new instance of the browser (for example, by choosing the corresponding icon in the Quick Launch toolbar of Windows). You must not use the browser's "New Window" function. This would result in one session running in two browsers, which is not allowed.

# 11 Managing the Configuration File for the Session

---

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- Name and Location of the Configuration File ..... 58

The configuration file is required to define the sessions that can be invoked from the logon page.

## General Information

---

The session configurations are stored in an XML file. They can be created in the following ways:

- When the Natural Web I/O Interface client or Natural for Ajax has been installed on a J2EE server, you can use the configuration tool. Using this tool has the advantage that it is not possible for you to create invalid XML code and thus damage the XML file. See [Using the Configuration Tool](#) for further information.
- You can edit the XML file manually. See [Overview of Configuration File Elements](#).

When the Natural Web I/O Interface client has been installed on IIS, this is the only way to change the XML file.

## Name and Location of the Configuration File

---

Different names and locations are used for the configuration files, depending on the application/web server that you are using.

### ■ J2EE Server

The name of the configuration file is *sessions.xml*. It can be found in the *WEB-INF* directory. The path to this directory depends on the application server and the type of client that you are using.

#### ■ JBoss Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>server/default/deploy/natuniapp.ear/natuniweb.war/WEB-INF
```

Natural for Ajax:

```
<application-server-install-dir>/server/default/deploy/njx<nnn>.ear/cisnatural.war/WEB-INF
```

#### ■ Sun Java System Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>/domains/domain1/applications/j2ee-apps/natuniapp/natuniweb_war/WEB-INF
```

Natural for Ajax:



*<application-server-install-dir>/domains/domain1/applications/j2e-apps/njx<nnn>.ear/cisnatural\_war/WEB-INF*

■ **Microsoft Internet Information Services (IIS)**

Natural Web I/O Interface client only.

The name of the configuration file is *settings.xml*. It can be found in the root directory of your application in IIS.



# 12

## Using the Configuration Tool (J2EE only)

---

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The Natural Web I/O Interface client and Natural for Ajax both offer a configuration tool. The configuration tool is used to create the session configurations which are then available in the logon page. It can also be used for logging purposes in case of problems; however, this should only be done when requested by Software AG support.

Two different versions of the configuration tool are available, one for the Natural Web I/O Interface client and another for Natural for Ajax. The configuration tool is automatically installed when you install the Natural Web I/O Interface client or Natural for Ajax on a J2EE server.

## Invoking the Configuration Tool

---

The URL with which you invoke the configuration tool determines the configuration files that are to be managed. You can either manage the configuration files for the Natural Web I/O Interface client or for Natural for Ajax.

### ▶ To invoke the configuration tool

- Enter the following URL in browser, depending on the type of client that you are using:

- Natural Web I/O Interface client:

```
http://<host>:<port>/natuniweb/conf_index.jsp
```

- Natural for Ajax:

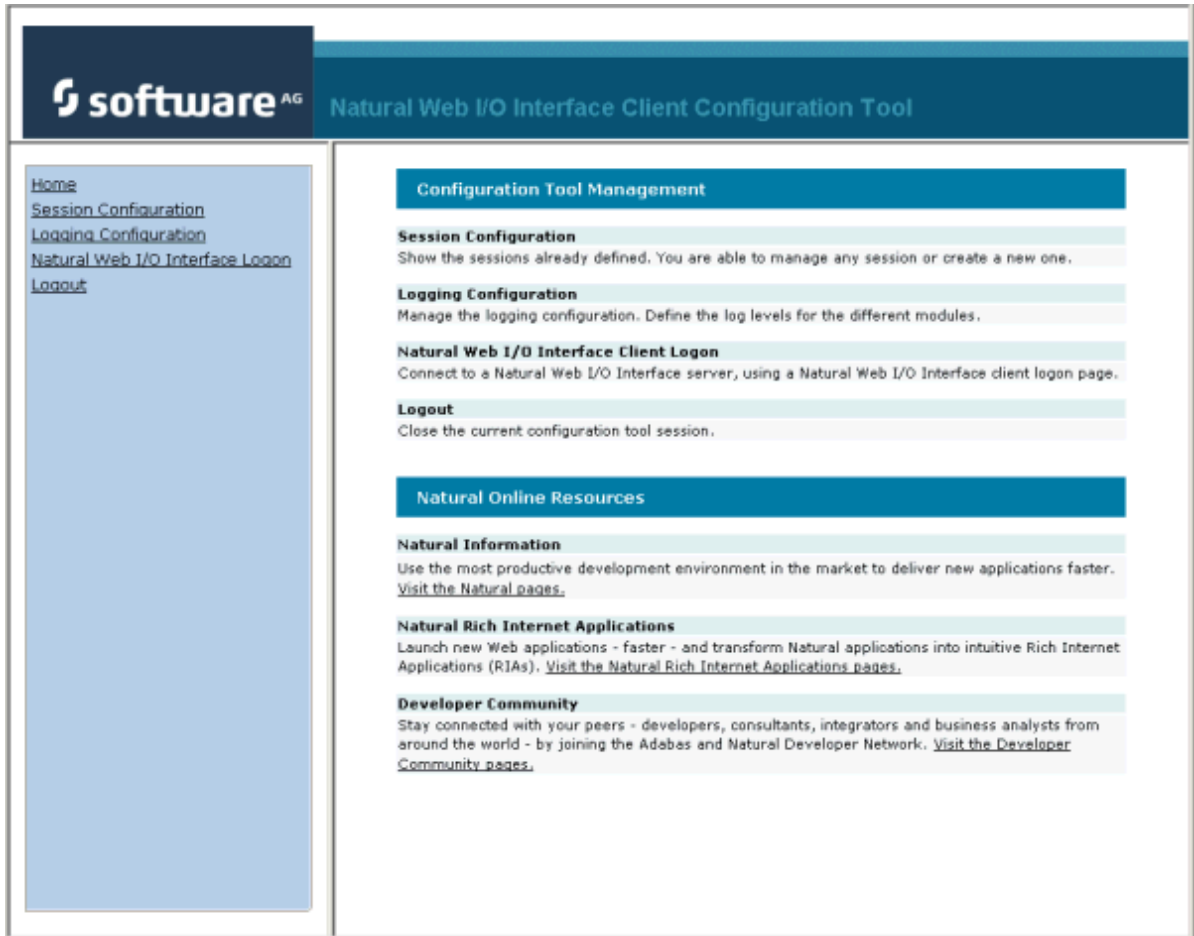
```
http://<host>:<port>/cisnatural/conf_index.jsp
```

where *<host>* and *<port>* are the host name and port number of your application server.



**Note:** You might wish to protect the configuration tool against unauthorized access. See [Configuring Security](#) for information on how to restrict the access to sensitive areas of the application server environment. If you have restricted access to the configuration tool, an authentication dialog appears. The appearance of this dialog depends on the authentication model you have chosen.

The configuration tool appears. Example for the Natural Web I/O Interface client:



The configuration tool has two frames.

The home page of the configuration tool is initially shown in the right frame. It provides brief descriptions for the links provided in the left frame. It also provides links to several Software AG pages on the web.

When you have invoked a function (for example, when you are currently viewing the session configuration), you can always choose the **Home** link in the left frame to return to the home page of the configuration tool.

The functions that are invoked by the other links in the left frame are described below.



**Note:** With Natural for Ajax, an additional link for invoking the Natural for Ajax logon page is provided in the left frame.

## Session Configuration

---

This section explains how to manage the content of the configuration file for the sessions.

- [Invoking the Session Configuration Page](#)
- [Global Settings](#)
- [Adding a New Session](#)
- [Editing a Session](#)
- [Overview of Session Options](#)
- [Duplicating a Session](#)
- [Deleting a Session](#)
- [Adding a New User](#)
- [Saving the Configuration](#)

### Invoking the Session Configuration Page

The content of the configuration file for the sessions is managed using the **Session Configuration** page.

#### ▶ To invoke the Session Configuration page

- In the frame on the left, choose the **Session Configuration** link.

The **Session Configuration** page appears in the right frame. It shows the global settings and lists all sessions and users that are currently defined. For a session, some of the configuration file information is shown. Example:

## Session Configuration

### Global Settings

Last activity timeout (n seconds):

Trace directory:

SSL trust file path:

SSL trust file password:

### Sessions

Session ID	Host Name	Port Number	Application	Natural Parameters	Edit	Duplicate	Delete
Connect to Natural					<a href="#">Edit</a>	<a href="#">Duplicate</a>	<a href="#">Delete</a>
localtestserver	localhost	6640			<a href="#">Edit</a>	<a href="#">Duplicate</a>	<a href="#">Delete</a>

### Users

User ID	Edit	Duplicate	Delete
user1	<a href="#">Edit</a>	<a href="#">Duplicate</a>	<a href="#">Delete</a>

## Global Settings

The global settings apply for all defined sessions. You can define the following global settings in the configuration file:

Option	Description
<b>Last activity timeout (n seconds)</b>	<p>Timeout after the last activity of the user in seconds. The default is 3600 seconds (1 hour). When the defined number of seconds has been reached, the session is closed.</p> <p>You can also set an individual timeout value for each session (see <a href="#">Overview of Session Options</a> below).</p>
<b>Trace directory</b>	<p>Optional. Location of a different trace directory.</p> <p>When a different trace directory is not defined, the trace files are written to the default trace directory. For further information, see <a href="#">Tracing</a>.</p> <p>Tracing can be enabled individually for each session (see <a href="#">Overview of Session Options</a> below). However, it should only be enabled when requested by Software AG support.</p>

Option	Description
SSL trust file path	Optional. The path to your trust file. See <a href="#">Trust Files (J2EE only)</a> for further information.
SSL trust file password	If your trust file is password-protected, you have to specify the appropriate password.  When you do not specify the password for a password-protected trust file, the trust file cannot be opened and it is thus not possible to open an SSL session.  When your trust file is not password-protected, you should not specify a password.

## Adding a New Session

You can add a new session to the configuration file.

### ▶ To add a new session

- 1 Choose the **Add New Session** button.

The **Edit Session** page appears.

- 2 Specify all required information as described below in the section [Overview of Session Options](#).
- 3 Choose the **OK** button to return to the **Session Configuration** page.

The new session is not yet available in the configuration file.

- 4 Choose the **Save Configuration** button to write the new session to the configuration file.

## Editing a Session

You can edit any existing session in the configuration file.

### ▶ To edit a session

- 1 Choose the **Edit** link that is shown next to the session that you want to edit.

The **Edit Session** page appears.

- 2 Specify all required information as described below in the section [Overview of Session Options](#).
- 3 Choose the **OK** button to return to the **Session Configuration** page.

The modifications are not yet available in the configuration file.

- 4 Choose the **Save Configuration** button to write the modifications to the configuration file.



## Overview of Session Options

The **Edit Session** page appears when you

- **add** a new session, or
- **edit** an existing session.

Example for the Natural Web I/O Interface client:

The screenshot shows a dialog box titled "Edit Session" with the following fields and options:

- Session ID:
- Type:
- Host name:
- Port number:
- Use SSL:  Yes  No
- User name:
- User name in upper case:  Yes  No
- Password:
- Application:
- Natural parameters:
- Screen rows:
- Screen columns:
- Show function key numbers:  Yes  No
- Trace:  Yes  No
- Timeout (n seconds):

At the bottom of the dialog are two buttons: "OK" and "Cancel".

With Natural for Ajax, more options are provided on the **Edit Session** page:

**Edit Session**

Session ID:

Type:

Show style sheet selector:  Yes  No

Style sheet:

Host name:

Port number:

Use SSL:  Yes  No

User name:

User name in upper case:  Yes  No

Password:

Save user credentials:  Yes  No

Share session user:  Yes  No

Application:

Natural parameters:

Language:

Double-click behavior:

PF keys display style:


Screen rows:

Screen columns:

Show function key numbers:  Yes  No

Trace:  Yes  No

Timeout (n seconds):

 **Note:** If you need to set the protocol version for the Natural Web I/O Interface (which is only required for older Natural versions), you have to do this manually in the configuration file. See the description of the `protocol` attribute in the section [Overview of Configuration File Elements](#).

The **Edit Session** page provides the following options:

Option	Description
Session ID	Mandatory. A session name of your choice. On the logon page, the session name is provided in a drop-down list box.

Option	Description
<b>Type</b>	<p>The platform on which user ID and password are authenticated. You can select the required setting from the drop-down list box.</p> <ul style="list-style-type: none"> <li>■ <b>Undefined</b> Default. User ID and password can have a maximum of 32 characters. See also the description for Natural for Windows, UNIX or OpenVMS below.</li> <li>■ <b>Natural for Mainframes</b> User ID and password can have a maximum of 8 characters.</li> <li>■ <b>Natural for Mainframes with Natural Security</b> User ID and password can have a maximum of 8 characters. The user ID must comply with the Natural naming conventions for library names.</li> <li>■ <b>Natural for Windows, UNIX or OpenVMS</b> User ID and password can have a maximum of 32 characters. When a domain is required, you have to specify it together with the user ID (in the form "<i>domain\user-ID</i>").</li> </ul>
<b>Show style sheet selector</b>	<p>Natural for Ajax only.</p> <p>With Natural for Ajax, the users can switch to another style sheet during a running session. If set to <b>No</b>, the users are no longer able to select another style sheet.</p>
<b>Style sheet</b>	<p>Natural for Ajax only.</p> <p>The name of the style sheet which determines the colors, fonts and PF key button style of the current session. See <a href="#">Using Style Sheets</a>. When this element is specified, a fixed style sheet is used. In this case, the corresponding field does not appear on the logon page and the user is thus not able to select a different style sheet.</p>
<b>Host name</b>	<p>The name or TCP/IP address of the server on which Natural and the Natural Web I/O Interface server are running. When this is specified, the corresponding field does not appear on the logon page.</p>
<b>Port number</b>	<p>The TCP/IP port number on which the Natural Web I/O Interface server is listening. When this is specified, the corresponding field does not appear on the logon page.</p>
<b>Use SSL</b>	<p>If set to <b>Yes</b>, a secure connection is established between the Natural Web I/O Interface client or Natural for Ajax on the application server and the Natural Web I/O Interface server.</p> <p><b>Important:</b> If you want to use SSL with Natural for Mainframes, one of the corresponding mainframe types must be selected; the type must not be <b>Undefined</b> or <b>Natural for Windows, UNIX or OpenVMS</b>. The other way around, if you want to use SSL with Natural for Windows, UNIX or OpenVMS, you must not select one of the mainframe types; the type may also be <b>Undefined</b> in this case.</p>
<b>User name</b>	<p>Optional. A valid user ID for the current machine. When this is specified, the corresponding field does not appear on the logon page.</p>
<b>User name in upper case</b>	<p>If set to <b>Yes</b>, the input field for the user ID is in upper-case mode.</p>

Option	Description
<b>Password</b>	<p>Optional. A valid password for the above user ID. When this is specified, the corresponding field does not appear on the logon page.</p> <p>The configuration tool saves the password in encrypted form.</p>
<b>Save user credentials</b>	<p>Natural for Ajax only. Applies only to applications that are designed as Application Designer workplaces.</p> <p>If set to <b>Yes</b> (default), the default behavior of the option <b>Share session user</b> applies.</p> <p>If set to <b>No</b>, the user credentials (user ID and password) are not saved in the Application Designer session and are therefore not available for an Application Designer subsession.</p> <p>An example for a workplace application is available under the following URL:</p> <p><i>http://&lt;host&gt;:&lt;port&gt;/cisnatural/servlet/StartCISPage?PAGEURL=/njxdemos/wpworkplace.html</i></p> <p>where <i>&lt;host&gt;</i> and <i>&lt;port&gt;</i> are the host name and port number of your application server.</p>
<b>Share session user</b>	<p>Natural for Ajax only. Applies only to applications that are designed as Application Designer workplaces.</p> <p>If set to <b>No</b> (default), the user credentials of the main Application Designer session are automatically used in an Application Designer subsession if the server and port of the subsession is the same as in the main session. If the server and port are not the same, the user has to specify the user ID and password in a logon dialog.</p> <p>If set to <b>Yes</b>, the user credentials of the Application Designer main session are always used for all Application Designer subsessions on all involved servers - even if the server and port are different.</p>
<b>Application</b>	<ul style="list-style-type: none"> <li>■ <b>Natural for Mainframes</b> The name of the Natural program or a command sequence that starts your application as you would enter it on the NEXT prompt. Example:  TEST01 data1,data2</li> <li>■ <b>Natural for UNIX</b> The name of the UNIX shell script for starting the Natural application (a file similar to <i>nwo.sh</i>).</li> <li>■ <b>Natural for OpenVMS</b> The name of the Natural image file (for example, <i>natural&lt;version&gt;</i> or <i>natural&lt;version&gt;.exe</i>).</li> <li>■ <b>Natural for Windows</b> The name of the Windows command file (<i>.bat</i>) for starting the Natural application.</li> </ul> <p>When this is specified, the corresponding field does not appear on the logon page.</p>
<b>Natural parameters</b>	<p>Optional. Parameters for starting the Natural application. This can be stack parameters, a parameter file/module or other Natural-specific information.</p>

Option	Description
	<ul style="list-style-type: none"> <li>■ <b>Natural for Mainframes</b> Used to pass dynamic Natural profile parameters to the session, for example:  SYSPARM=(MYPARMS) STACK=(LOGON MYAPPL)  <b>Note:</b> It is recommended to specify the Natural program that starts the application with the option <b>Application</b> instead of passing it with the profile parameter STACK.</li> <li>■ <b>Natural for UNIX and Natural for Windows</b> Used when the above shell script (UNIX) or command file (Windows) uses the parameter \$5 after "natural", for example:  PARM=MYPARM STACK=(LOGON MYLIB;MENU)</li> <li>■ <b>Natural for OpenVMS</b> Used for starting a Natural application, for example:  BP=BPnode-name NLDCHK WEBIO=ON "STACK=(LOGON SYSEXT;MENU)"</li> </ul>
<b>Language</b>	<p>Natural for Ajax only.</p> <p>You can select the required language from the drop-down list box. See also <i>Multi Language Management</i> in the <i>Natural for Ajax</i> documentation. Default: English.</p>
<b>Double-click behavior</b>	<p>Natural for Ajax only. Applies only to Natural maps, not to rich GUI pages.</p> <p>The key that is to be simulated when double-clicking an output field. By default, this is the ENTER key.</p> <p>It is possible to disable the double-click behavior, or to define a function key (PF1 through PF12).</p> <p>You can select the required setting from the drop-down list box.</p> <p><b>Tip:</b> When context-sensitive help has been defined for the output fields, it may be useful to define PF1. The help function will then be invoked when the user double-clicks an output field.</p>
<b>PF keys display style</b>	<p>Natural for Ajax only. Applies only to Natural maps, not to rich GUI pages.</p> <p>By default, only the named function keys are shown as buttons.</p> <p>It is also possible to show buttons for all function keys, including those which do not have names. You can specify whether to display buttons for 12, 24, 36 or 48 function keys. Each line always contains 12 function key buttons. The first line also contains a button for the ENTER key. Each function key button is always displayed at the same position.</p> <p>You can select the required setting from the drop-down list box.</p>
<b>Screen rows</b>	<p>Applies only to Natural maps, not to rich GUI pages.</p> <p>The number of rows in the output window. Possible values: minimum 24, no upper limit. Default: 24.</p>

Option	Description
	Not used by Natural for Mainframes which uses the profile parameter <code>TMODEL</code> instead.
<b>Screen columns</b>	Applies only to Natural maps, not to rich GUI pages. The number of columns in the output window. Possible values: minimum 80, no upper limit. Default: 80. Not used by Natural for Mainframes which uses the profile parameter <code>TMODEL</code> instead.
<b>Show function key numbers</b>	Applies only to Natural maps, not to rich GUI pages. If set to <b>Yes</b> , the PF key numbers are shown next to the PF keys.
<b>Trace</b>	Should only be set to <b>Yes</b> when requested by Software AG support. For further information, see <a href="#">Tracing</a> .
<b>Timeout (n seconds)</b>	The number of seconds that the client waits for an answer from Natural after an update of a page was sent to Natural. The default is 60 seconds. Normally, you need not change this default value.

## Duplicating a Session

You can add a copy of any existing session to the configuration file.

### ▶ To duplicate a session

- 1 Choose the **Duplicate** link that is shown next to the session that you want to duplicate.  
A new entry is shown at the bottom of the list of sessions. Its name is "Copy of *session-ID*". The duplicated session is not yet available in the configuration file.
- 2 **Edit** and save the duplicated session as described above.

## Deleting a Session

You can delete any existing session from the configuration file.

### ▶ To delete a session

- 1 Choose the **Delete** link that is shown next to the session that you want to delete.  
The session is deleted from the list of sessions. It is not yet deleted in the configuration file.
- 2 Choose the **Save Configuration** button to delete the session from the configuration file.

## Adding a New User

You can predefine Natural users and their passwords in the configuration file.

When a Natural page is opened with a URL that specifies a user in the URL parameter `natuser`, the specified user is matched against the list of users in the configuration file. When the specified user is defined in the configuration file, the corresponding password is used to authenticate the user when the Natural session is started. See also [Starting a Natural Application with a URL](#).

Example - when the following URL is used, the password defined for "user1" is used:

- **Natural Web I/O Interface Client**

*http://myhost:8080/natuniweb/natural.jsp?natuser=user1...*

- **Natural for Ajax**

*http://myhost:8080/cisnatural/servlet/StartCISPage?PAGEURL=/cisnatural/NatLogon.html&xciParameters.natuser=user1 ...*



**Note:** With Natural for Ajax, the URL parameters have the prefix `xciParameters`.

### ▶ To add a new user

- 1 Choose the **Add New User** button.

The **Edit User** page appears.

- 2 Specify a user name and password
- 3 Choose the **OK** button to return to the **Session Configuration** page.

The new user is not yet available in the configuration file.

- 4 Choose the **Save Configuration** button to write the new user to the configuration file.



**Note:** You edit, duplicate and delete a user in the same way as a session (see the corresponding descriptions above).

## Saving the Configuration

When you choose the **Save Configuration** button, all of your changes are written to the configuration file. The server picks up the new settings automatically the next time it reads data from the configuration file.



**Caution:** If you do not choose the **Save Configuration** button but logout instead or leave the configuration tool by entering another URL, the new settings are not written to the configuration file.

## Logging Configuration

---

The content of the configuration file for logging is managed using the **Logging Configuration** page. See the section *Logging (J2EE only)* for detailed information.

## Logon Page

---

The configuration tool provides one or both of the following links in the left frame, depending on the type of client that you are using:

- **Natural Web I/O Interface Logon**
- **Natural for Ajax Logon** (not available with the configuration tool for the Natural Web I/O Interface client)

Each of these links opens the corresponding logon page in the right frame.

The logon page uses the current settings in the configuration file. When you select a session from the drop-down list box, you can check whether the connection details are shown as desired. If not, you can go back to the session configuration and modify the settings of the corresponding session.

See also *About the Logon Page*.

## Logout

---

When the configuration tool is protected against unauthorized access and you log out of the configuration tool, you make sure that no other user can change the client configuration when you leave your PC unattended for a while.

### ▶ To log out

- In the frame on the left, choose the **Logout** link.

When the configuration tool is protected against unauthorized access, the authentication dialog is shown again.

When it is not protected, the home page is shown again.



# 13

## Overview of Configuration File Elements

---

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## Contents of the Configuration File

---

By default, the configuration file is delivered with the following entries, depending on the type of client that you are using:

### ■ Natural Web I/O Interface Client

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <global>
    <last_activity_timeout>3600</last_activity_timeout>
  </global>
  <sessions>
    <session id="Connect to Natural" trace="false">
      </session>
    <session id="localtestserver" trace="false">
      <natural_server>localhost</natural_server>
      <natural_port>6640</natural_port>
      <natural_program/>
      <user id="" pwd=""/>
      <natural_parameter/>
    </session>
  </sessions>
</settings>
```

### ■ Natural for Ajax

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <global>
    <last_activity_timeout>3600</last_activity_timeout>
  </global>
  <sessions>
    <session id="Connect to Natural" trace="false">
      </session>
    <session id="Natural for Ajax Examples (UNIX)" trace="false">
      <natural_server>127.0.0.1</natural_server>
      <natural_port>2800</natural_port>
      <natural_program>nwo.sh</natural_program>
      <natural_parameter>STACK=(LOGON SYSEXNJK;MENU-NJX)</natural_parameter>
    </session>
    <session id="Natural for Ajax Examples (Windows)" trace="false">
      <natural_server>127.0.0.1</natural_server>
      <natural_port>2900</natural_port>
      <natural_program>nwo.bat</natural_program>
      <natural_parameter>STACK=(LOGON SYSEXNJK;MENU-NJX)</natural_parameter>
    </session>
    <session id="Natural for Ajax Examples (Mainframe)" trace="false">
```


```

    <natural_server>myhost</natural_server>
    <natural_port>4711</natural_port>
    <natural_program>MENU-NJX</natural_program>
    <natural_parameter>STACK=(LOGON SYSEXNJX)</natural_parameter>
</session>
<session id="Local" trace="false">
    <natural_program>nwo.bat</natural_program>
</session>
<session id="127.0.0.1" trace="false">
    <natural_program>nwo.bat</natural_program>
</session>
<session id="Session template" trace="false">
    <natural_server></natural_server>
    <natural_port></natural_port>
    <natural_program></natural_program>
    <user id="" pwd="" />
    <natural_parameter></natural_parameter>
</session>
</sessions>
</settings>

```

 **Note:** With Natural for Mainframes, it is recommended to specify the Natural program that starts the application in the element `natural_program` instead of passing it with the profile parameter `STACK`.

The first session that is defined in the configuration file has the name "Connect to Natural". This session is automatically preselected in the logon page. Since no further elements are defined for this session, all required input fields for logging on to a session are shown on the logon page and the user has to specify all required information.

 **Note:** The `global` section containing the timeout value is only available in a J2EE configuration file. See also [Setting the Timeout](#).

To add a new session definition to the configuration file, you must add a new `session` element. It should have the following minimum entries:

```

<session id="your-session-name" trace="false">
  <natural_server>your-Natural-server</natural_server>
  <natural_port>port-ID-of-Natural-server</natural_port>
  <natural_program>Natural-program-name</natural_program>
</session>

```

## Sessions

The following table explains the elements and attributes that can be used in the `sessions` section of the configuration file for adding a new session.

Element Name	Attribute Name	Description
session	id	Mandatory. A session name of your choice. On the logon page, the session name is provided in a drop-down list box.
session	type	<p>Optional. The platform on which user ID and password are authenticated. Possible values:</p> <ul style="list-style-type: none"> <li>■ <b>MF</b> Natural for Mainframes. User ID and password can have a maximum of 8 characters.</li> <li>■ <b>MF-NSC</b> Natural for Mainframes with Natural Security. User ID and password can have a maximum of 8 characters. The user ID must comply with the Natural naming conventions for library names.</li> <li>■ <b>OS</b> Natural for UNIX, Natural for OpenVMS or Natural for Windows: User ID and password can have a maximum of 32 characters. When a domain is required, you have to specify it together with the user ID (in the form <code>"domain\user-ID"</code>).</li> </ul> <p>Default: "OS".</p>
session	protocol	<p>Optional. The current protocol version for the Natural Web I/O Interface is 6. The latest Natural versions automatically use the appropriate protocol version. For older Natural versions, it is required to define the appropriate protocol version in the configuration file:</p> <ul style="list-style-type: none"> <li>■ Natural versions 6.2.1 through 6.2.4 (UNIX) require protocol version 2.  As of version 6.2.5 it is no longer required to define a protocol version.</li> <li>■ Natural versions 6.3.1 and 6.3.2 (UNIX) require protocol version 3.  As of version 6.3.3, it is no longer required to define a protocol version.</li> <li>■ Natural versions up to version 4.2.3.2 (mainframe) require protocol version 3.</li> </ul>

Element Name	Attribute Name	Description
		<p>As of version 4.2.3.3 and 4.2.4, it is no longer required to define a protocol version.</p> <p>Possible values: 2, 3, 4, 5 and 6. Default: 6.</p>
session	ssl	<p>J2EE only.</p> <p>Optional. If set to "true", a secure connection is established between the Natural Web I/O Interface client or Natural for Ajax on the application server and the Natural Web I/O Interface server.</p> <p><b>Important:</b> If you want to use SSL with Natural for Mainframes, the type "MF" or "MF-NSC" must be defined; the type must not be "OS". The other way around, if you want to use SSL with Natural for Windows, UNIX or OpenVMS, the type must be "OS".</p> <p>Default: "false".</p>
session	trace	<p>Optional. Should only be set to "true" when requested by Software AG support. For further information, see <a href="#">Tracing</a>.</p> <p>Default: "false".</p>
session	savesessionuser	<p>Natural for Ajax only. Applies only to applications that are designed as Application Designer workplaces.</p> <p>If set to "true" (default), the default behavior of <code>sharesessionuser</code> applies.</p> <p>If set to "false", the user credentials (user ID and password) are not saved in the Application Designer session and are therefore not available for an Application Designer subsession.</p> <p>An example for a workplace application is available under the following URL:</p> <p><code>http://&lt;host&gt;:&lt;port&gt;/cisnatural/servlet/StartCISPage?PAGEURL=/njxdemos/wpworkplace.html</code></p> <p>where <code>&lt;host&gt;</code> and <code>&lt;port&gt;</code> are the host name and port number of your application server.</p> <p>Default: "true".</p>
session	sharesessionuser	<p>Natural for Ajax only. Applies only to applications that are designed as Application Designer workplaces.</p> <p>If set to "false" (default), the user credentials of the main Application Designer session are automatically used in an Application Designer subsession if the server and port of the subsession is the same as in the main session. If the server and</p>

Element Name	Attribute Name	Description
		<p>port are not the same, the user has to specify the user ID and password in a logon dialog.</p> <p>If set to "true", the user credentials of the Application Designer main session are always used for all Application Designer subsessions on all involved servers - even if the server and port are different.</p> <p>Default: "false".</p>
user	id	Optional. A valid user ID for the current machine. When this attribute is specified, the corresponding field does not appear on the logon page.
user	pwd	Optional. A valid password for the above user ID. When this attribute is specified, the corresponding field does not appear on the logon page.
user	encrypted	J2EE only. Used by the configuration tool which stores the password in encrypted form.
user	ucase	Optional. If set to "true", the input field for the user ID is in upper-case mode. Default: "false".
natural_server		The name or TCP/IP address of the server on which Natural and the Natural Web I/O Interface daemon (Natural for UNIX and Natural for OpenVMS) or the Natural Web I/O Interface server (Natural for Mainframes) or the Natural Web I/O Interface service (Natural for Windows) are running. When this element is specified, the corresponding field does not appear on the logon page.
natural_port		The TCP/IP port number on which the Natural Web I/O Interface daemon (Natural for UNIX and Natural for OpenVMS) or the Natural Web I/O Interface server (Natural for Mainframes) or the Natural Web I/O Interface service (Natural for Windows) is listening. When this element is specified, the corresponding field does not appear on the logon page.
natural_program		<ul style="list-style-type: none"> <li>■ <b>Natural for Mainframes</b> The name of the Natural program or a command sequence that starts your application as you would enter it on the NEXT prompt. Example:  TEST01 data1,data2</li> </ul>

Element Name	Attribute Name	Description
		<ul style="list-style-type: none"> <li>■ <b>Natural for UNIX</b> The name of the UNIX shell script for starting the Natural application (a file similar to <i>nwo.sh</i>).</li> <li>■ <b>Natural for OpenVMS</b> The name of the Natural image file (for example, <i>natural&lt;version&gt;</i> or <i>natural&lt;version&gt;.exe</i>).</li> <li>■ <b>Natural for Windows</b> The name of the Windows command file (<i>.bat</i>) for starting the Natural application.</li> </ul> <p>When this element is specified, the corresponding field does not appear on the logon page.</p>
natural_parameter		<p>Optional. Parameters for starting the Natural application. This can be stack parameters, a parameter file/module or other Natural-specific information.</p> <ul style="list-style-type: none"> <li>■ <b>Natural for Mainframes</b> This element is used to pass dynamic Natural profile parameters to the session, for example:  <code>SYSPARM=(MYPARMS) STACK=(LOGON MYAPPL)</code></li> <li><b>Note:</b> It is recommended to specify the Natural program that starts the application in the element <code>natural_program</code> instead of passing it with the profile parameter <code>STACK</code>.</li> <li>■ <b>Natural for UNIX and Natural for Windows</b> This element is used when the above shell script (UNIX) or command file (Windows) uses the parameter <code>\$5</code> after "natural", for example:  <code>PARM=MYPARM STACK=(LOGON MYLIB;MENU)</code></li> <li>■ <b>Natural for OpenVMS</b> This element is used for starting a Natural application, for example:  <code>BP=BPnode-name NLDCHK WEBIO=ON "STACK=(LOGON SYSEXT;MENU)"</code></li> </ul>
natural_parameter	visible	<p>IIS only.</p> <p>If set to "true", a field containing the Natural parameters is shown on the logon page.</p> <p>Default: "false".</p>
language		Natural for Ajax only.

Element Name	Attribute Name	Description
		<p>Sets the language to be used. You can specify a one-character code which corresponds to one of the language codes which can be set in the Natural system variable *LANGUAGE. See also <i>Multi Language Management</i> in the <i>Natural for Ajax</i> documentation.</p> <p>Default: English.</p>
double_click		<p>Natural for Ajax only. Applies only to Natural maps, not to rich GUI pages.</p> <p>The key that is to be simulated when double-clicking an output field. Possible values:</p> <ul style="list-style-type: none"> <li>■ "50" for the ENTER key (default).</li> <li>■ "1" through "12" for PF1 through PF12.</li> <li>■ "disabled" to disable the double-click behavior.</li> </ul> <p><b>Tip:</b> When context-sensitive help has been defined for the output fields, it may be useful to define PF1. The help function will then be invoked when the user double-clicks an output field.</p>
pfkeys_display		<p>Natural for Ajax only. Applies only to Natural maps, not to rich GUI pages.</p> <p>The number of PF keys that are to be shown as buttons. Possible values:</p> <ul style="list-style-type: none"> <li>■ "0": only the named function keys are shown (default).</li> <li>■ "1": the function keys PF1 through PF12 are shown.</li> <li>■ "2": the function keys PF1 through PF24 are shown.</li> <li>■ "3": the function keys PF1 through PF36 are shown.</li> <li>■ "4": the function keys PF1 through PF48 are shown.</li> </ul> <p>The values "1" through "4" always shows buttons for all function keys, including those which do not have names. Each line always contains 12 function key buttons. The first line also contains a button for the ENTER key. Each function key button is always displayed at the same position.</p>
nattimeout		<p>J2EE only.</p> <p>Optional. Timeout for the response from the host. See <a href="#">Setting the Timeout</a>.</p>
theme		<p>IIS only.</p> <p>The theme (style) that the web page is using. For a first test, you can use the theme with the name "3270Theme" (see <a href="#">Using</a></p>



Element Name	Attribute Name	Description
		<i>Themes (IIS only)</i> ). When this element is specified, the corresponding field does not appear on the logon page. When themes are shown on the logon page, they are provided in a drop-down list box.
style_sheet		<p>Natural for Ajax only.</p> <p>The name of the style sheet which determines the colors, fonts and PF key button style of the current session. See <i>Using Style Sheets</i>.</p> <p>When this element is specified, a fixed style sheet is used. In this case, the corresponding field does not appear on the logon page and the user is thus not able to select a different style sheet.</p> <p>Default: natural.css.</p>
screen	styleselect	<p>Natural for Ajax only.</p> <p>With Natural for Ajax, the users can switch to another style sheet during a running session.</p> <p>Optional. If set to "false", the users are no longer able to select another style sheet.</p> <p>Default: "true".</p>
screen	rows	<p>Applies only to Natural maps, not to rich GUI pages.</p> <p>Optional. The number of rows in the output window. Possible values: minimum 24, no upper limit. Default: 24.</p> <p>Not used by Natural for Mainframes which uses the profile parameter TMODEL instead.</p>
screen	columns	<p>Applies only to Natural maps, not to rich GUI pages.</p> <p>Optional. The number of columns in the output window. Possible values: minimum 80, no upper limit. Default: 80.</p> <p>Not used by Natural for Mainframes which uses the profile parameter TMODEL instead.</p>
screen	top	<p>IIS only.</p> <p>The top position of the output window inside the browser. Use "0" for the very top. This value is given in Natural units, not pixels.</p>
screen	left	IIS only.

Element Name	Attribute Name	Description
		The left position of the output window inside the browser. Use "0" for the very left. This value is given in Natural units, not pixels.
screen	size	IIS only. The size of the output window. Possible values: "normal", "small", "tiny" and "extratiny". Default: "normal".
screen	pfkeypos	IIS only. The position of the PF keys. Possible values: "bottom" and "right". Default: "bottom". <b>Note:</b> For J2EE, the position of the PF keys is determined in the style sheet. See <a href="#">Using Style Sheets</a> .
screen	showfkeynumbers	Applies only to Natural maps, not to rich GUI pages. Optional. If set to "true", the PF key numbers are shown next to the PF keys. Default: "false".

If a field is not to appear on the logon page, you can specify the corresponding element or attribute as described above. To do so, you either specify a value for the attribute or element or you omit the value. For example, you can specify either of the following:

```
<natural_program></natural_program>
```

or

```
<natural_program>sysprof</natural_program>
```

In both cases, the corresponding field does not appear on the logon page.

Only when an element name or attribute name is not mentioned at all, the corresponding field is shown on the logon page.

## Global Settings

The following table explains the global settings that can be defined in the `global` section of the configuration file.

Element	Description
<code>last_activity_timeout</code>	The timeout after the last activity of the user. See <a href="#">Setting the Timeout (J2EE only)</a> below.
<code>trace_dir</code>	Optional. Location of a different trace directory. See <a href="#">Tracing</a> below.
<code>trustfile_name</code>	J2EE only. Optional. The path to your trust file. See <a href="#">Trust Files (J2EE only)</a> for further information.
<code>trustfile_password</code>	J2EE only. If your trust file is password-protected, the appropriate password is required. The password can only be specified with the <a href="#">configuration tool</a> . It is stored in encrypted form.

### Setting the Timeout (J2EE only)

You can set two different timeouts:

#### ■ Last activity timeout

This is the timeout after the last activity of the user. It is defined with `last_activity_timeout` in the `global` section of the configuration file and is set in seconds. The default is 3600 seconds (1 hour). When the defined number of seconds has been reached, the session is closed.

```
<?xml version="1.0" encoding="utf-8"?>
<settings>
  <global>
    <last_activity_timeout>3600</last_activity_timeout>
  </global>
  <sessions>
    ...
```

#### ■ Natural server timeout

This timeout defines the number of seconds that the client waits for an answer from Natural after an update of a page was sent to Natural. It is defined in the `nattimeout` element of a session definition. The default is 60 seconds. Normally, you need not change this default value. This timeout can be set individually for each session.

```
...
  <session id="Test (UNIX)" trace="false">
    <natural_server>Myserver2</natural_server>
    <natural_port>4321</natural_port>
    <natural_program>test.sh</natural_program>
    <nattimeout>60</nattimeout>
  </session>
...
```

## Tracing

Tracing should only be enabled when requested by Software AG support. To enable tracing, you set the `trace` attribute in a session definition to "true". Example:

```
<session id="MySession" trace="true">
```

### Default Trace Directory for J2EE

By default, the trace files are written to the directory which has been set by the Java property `java.io.tmpdir`. On Windows, this is normally the environment variable `TMP` for the user who started the application server. On UNIX, this is normally `/tmp` or `/var/tmp`.

You can also set this property in the start script for the application server. The following examples apply to JBoss.

- Example for Windows (*run.bat*):

```
set JAVA_OPTS=%JAVA_OPTS% -Djava.io.tmpdir=C:\temp
```

- Example for UNIX (*run.sh*):

```
set JAVA_OPTS="$JAVA_OPTS -Djava.io.tmpdir=/tmp
```

### Default Trace Directory for IIS

By default, the trace files are written to the *Software AG\Natural WebIO\Traces* directory. The path to this directory depends on the operating system:

- **Windows XP**

```
<drive>:\Documents and Settings\<pc-name>\ASPNET\Local Settings\Application Data\Software  
AG\Natural WebIO\Traces
```

### ■ Windows 2003 Server

```
<drive>:\Documents and Settings\Default User\Application Data\Software AG\Natural
WebIO\Traces
```

### ■ Windows Vista

```
<drive>:\Windows\ServiceProfiles\NetworkService\AppData\Local\Software AG\Natural
WebIO\Traces
```

## Defining a Different Trace Directory

It is possible to define a different trace directory by defining the element `trace_dir` in the `global` element of the configuration file. Example:

```
<global>
  <trace_dir>E:\mytracedir</trace_dir>
</global>
```

When a different trace directory is not defined, the default trace directory will be used.

## Users and Passwords

It is possible to predefine Natural users and their passwords. This is done in the `users` section of the configuration file.

The syntax is as follows:

```
<settings>
  ...
  <users>
    <user id="user1" pwd="password1"/>
    <user id="user2" pwd="password2"/>
    <user id="user3" pwd="password3"/>
  </users>
  ...
</settings>
```

When a Natural page is opened with a URL that specifies a user in the URL parameter `natuser`, the specified user is matched against the list of users in the configuration file. When the specified user is defined in the configuration file, the corresponding password is used to authenticate the user when the Natural session is started. See also [Starting a Natural Application with a URL](#).

### Example

When the following URL is used, the password defined for "user1" is used (which is "password1" in the above syntax example):

■ **Natural Web I/O Interface Client**

*http://myhost:8080/natuniweb/natural.jsp?natuser=user1...*

■ **Natural for Ajax**

*http://myhost:8080/cisnatural/servlet/StartCISPage?PAGEURL=/cisnatural/NatLogon.html&xciParameters.natuser=user1 ...*



**Note:** With Natural for Ajax, the URL parameters have the prefix `xciParameters`.

# 14 Starting a Natural Application with a URL

---

The connection parameters available in the configuration file for the session and on the logon page can also be specified as URL parameters of the logon page URL. This allows bookmarking the startup URL of a Natural application or starting an application by clicking a hyperlink in a document.


With Natural for Ajax, the URL parameters have the prefix `xciParameters` (for example, `xciParameters.natsession`).

The URL parameters overrule the definitions in the configuration file, with the exception described below.

The following URL parameters are available for the logon page:

URL Parameter	Corresponding Option in the Session Configuration
<code>natsession</code>	<b>Session ID</b>
<code>natserver</code>	<b>Host name</b>
<code>natport</code>	<b>Port number</b>
<code>natuser</code>	<b>User name</b>
<code>natprog</code>	<b>Application</b>
<code>natparam</code>	<b>Natural parameters</b>
<code>natparamext</code>	<b>Natural parameters</b>  The URL parameter <code>natparamext</code> extends an existing Natural parameter definition in the configuration file. The extension works in the following way: the Natural parameters defined in the configuration file come first. Then, the Natural parameters defined in the URL parameter <code>natparamext</code> are added, separated by a space character.  If you want to overrule the definition in the configuration file, use the URL parameter <code>natparam</code> instead.
<code>nattimeout</code>	<b>Timeout (n seconds)</b>

URL Parameter	Corresponding Option in the Session Configuration
savesessionuser	<b>Save user credentials</b> (Natural for Ajax only)
sharesessionuser	<b>Share session user</b> (Natural for Ajax only)

 **Important:** All parameter values must be URL-encoded.

### Example for the Natural Web I/O Interface Client

In order to start the Natural program `dump`, while your application server is running on `myhost:8080` and your Natural Web I/O Interface server is running on `myserver1:4811`, you can use the following URL:

`http://myhost:8080/natuniweb/natural.jsp?natserver=myserver1&natport=4811&natprog=dump&natuser=my-username`

### Example for Natural for Ajax

In order to start the Natural program `MENU-NJX` from the library `SYSEXNJX`, while your application server is running on `myappserver:4711`, your Natural Web I/O Interface server is running on `mywebio:4712`, and the name of the Natural startup script is `nwo.sh`, you can use the following URL:

`http://myappserver:4711/cisnatural/servlet/StartCISPage?PAGEURL=%2Fcisnatural%2FNatLogon.html&xcParameters.natserver=mywebio&xcParameters.natprog=nwo.sh&xcParameters.natport=4712&xcParameters.natparam=stack%3D%28logon+SYSEXNJX%3BMENU-NJX%3Bfin%29`



# 15 Using Style Sheets (J2EE only)

---

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The font, the color and the representation of the PF keys is controlled by a style sheet (CSS file).

The Natural Web I/O Interface client is delivered with the style sheet *3270.css*.

Natural for Ajax is delivered with a number of predefined style sheets. The default style sheet is *natural.css*.

For more information on style sheets, see <http://www.w3.org/Style/CSS/>.

## Location of the Style Sheets

---

The location of the style sheets depends on the application server and type of client that you are using.

### ■ JBoss Application Server

Natural Web I/O Interface client:

```
../natuniapp.ear/natuniweb.war/resources
```

Natural for Ajax:

```
../njax<nn>.ear/cisnatural.war/resources
```

### ■ Sun Java System Application Server

Natural Web I/O Interface client:

```
../j2ee-apps/natuniapp/natuniweb_war/resources
```

Natural for Ajax:

```
../j2ee-apps/njax<nn>.ear/cisnatural_war/resources
```

where *<nn>* is the current Natural for Ajax version.

## Editing the Style Sheets

---

It is recommended that you have a basic understanding of CSS files.

You can edit the predefined style sheets or create your own style sheets.

It is recommended that you work with backup copies. When a problem occurs with your style sheet, you can thus always revert to the original state.

To see your changes in the browser, you have to

1. delete the browser's cache, and
2. restart the session.

## Switching to Another Style Sheet During the Session

This feature is available with Natural for Ajax only.

If enabled in the configuration file for the session, a user can switch to another style sheet during a running session. In this case, the user can open the **Style Sheet** control in the output screen.



To switch to another style sheet, the user has to select it from the drop-down list box and then choose the **Apply** button.

## Modifying the Position of the Main Output and of the PF Keys

Applies when only the named PF keys are displayed. This feature cannot be used when all PF keys are displayed, since they are always displayed at the same position. See also [Overview of Session Options](#).

The following elements are available:

Element Name	Description
#mainlayer	Controls the position of the main output in the output window.
#pfkeydiv	Controls the position of the PF keys in the output window.

If the PF keys are to appear at the bottom, define these two elements as shown in the following example:

```
#mainlayer {
  top: 0px;
  left: 0px;
  height: 600px;
}

#pfkeydiv {
  top: 610px;
  left: 0px;
```

```
width: 100%;  
height: 100px;  
}
```

If the PF keys are to appear at the left, define these two elements as shown in the following example:

```
#mainlayer {  
    top: 0px;  
    left: 100px;  
    height: 600px;  
}  
  
#pfkeydiv {  
    top: 0px;  
    left: 0px;  
    width: 100px;  
    height: 600px;  
}
```

Predefined sample CSS files are also provided in which the PF keys are defined to appear at the right or at the top.

## Modifying the Font Size

---

Depending on the screen resolution, one of the following style sheets for defining the font size is used in addition to the default style sheet:

- *model2.css*
- *model3.css*
- *model4.css*
- *model5.css*

These style sheets are located in the *tmodels* subdirectory of the *resources* directory in which all style sheets are located.

Depending on what comes closest to the standard 3270 screen model, the corresponding style sheet from the *tmodels* subdirectory is automatically used. It is selected according to the following criteria:

Standard 3270 Screen Model	Criteria	Style Sheet
Model 2 (80x24)	30 rows or less.	<i>model2.css</i>
Model 3 (80x32)	Between 31 and 40 rows.	<i>model3.css</i>
Model 4 (80x43)	41 rows or more.	<i>model4.css</i>
Model 5 (132x27)	30 rows or less, and more than 100 columns.	<i>model5.css</i>

The font sizes in the above style sheets can be adjusted. Example for *model4.css*:

```
body {
    font-size: 10px;
}
```

The default font sizes for the above 3270 screen models are:

Standard 3270 Screen Model	Default Font Size
Model 2	18px
Model 3	14px
Model 4	10px
Model 5	12px

When you modify the font size in one of the above style sheets, it is recommended that you also adjust the font width multiplication factor in the following JavaScript files:

- *natunicript-ie.js* (for Internet Explorer)
- *natunicript-ff.js* (for Firefox)

These JavaScript files are located in the *scripts* directory which can be found in the directory which also contains the *resources* directory.

You enter the font width multiplication factors in the definitions of the variables `FONT_WIDTH_MULT_MOD2` to `FONT_WIDTH_MULT_MOD5`. The following example shows the default values:

```
var FONT_WIDTH_MULT_MOD2 = 0.612;  
var FONT_WIDTH_MULT_MOD3 = 0.573;  
var FONT_WIDTH_MULT_MOD4 = 0.600;  
var FONT_WIDTH_MULT_MOD5 = 0.586;
```

The following table shows the multiplication factors that should be used for the default font "Courier New":

Font Size	Multiplication Factor
9px	0.557
10px	0.60
11px	0.635
12px	0.586
13px	0.615
14px	0.572
15px	0.60
16px	0.625
17px	0.589
18px	0.612
19px	0.579
20px	0.600
21px	0.619
22px	0.591
23px	0.608
24px	0.584

## Modifying the Font Type

---

As a rule, you should only use monospace fonts such as Courier New or Lucida Console. With these fonts, all characters have the same width. Otherwise, when using variable-width fonts, the output will appear deformed.

If you want to define a different font type, you should define the same font type for the body, the output fields and the input fields as shown in the following example:

```
body {
  background-color: #F3F5F0;
  font-family: Lucida Console;
}

.OutputField {
  white-space:pre;
  border-width:0;
  font-family: Lucida Console;
  font-size: 100%;
}

.InputField {
  background-color: white;
  font-family: Lucida Console;
  border-width: 1px;
  font-size: 100%;
  border-color: #A7A9AB;
}
```

## Defining Underlined and Blinking Text

The following elements are available:

Element Name	Description
.natTextDecoUnderline	Defines underlined text.
.natTextDecoBlinking	Defines blinking text.
.natTextDecoNormal	Defines normal text (no underline, no blinking).

Example:

```
/* Text decoration */
.natTextDecoUnderline { text-decoration:underline; }
.natTextDecoBlinking {text-decoration:blink; }
.natTextDecoNormal {text-decoration:normal;}
```

Blinking text is not supported by the Internet Explorer.

## Defining Italic Text

---

The following elements are available:

Element Name	Description
<code>.natFontStyleItalic</code>	Defines italic text.
<code>.natFontStyleNormal</code>	Defines normal text (no italics).

Example:

```
/* font style */
.natFontStyleItalic {font-style:italic;}
.natFontStyleNormal {font-style:normal;}
```

## Defining Bold Text

---

The following elements are available:

Element Name	Description
<code>.natFontWeightBold</code>	Defines bold text.
<code>.natFontWeightNormal</code>	Defines normal text (not bold).

```
/* Font weight */
.natFontWeightBold {font-weight:bolder}
.natFontWeightNormal {font-weight:normal;}
```



## Defining Different Styles for Output Fields

The following elements are available:

Element Name	Description
.FieldVariableBased	Defines the style for output fields that are based on a variable.
.FieldLiteralBased	Defines the style for output fields that are based on a literal.

Example:

```
.FieldVariableBased {
    /* font-style:italic; */
}

.FieldLiteralBased {
    /* font-style:normal; */
}
```



**Note:** In the above example, as well as in the standard CSS files delivered by Software AG, the variable-based output fields are defined as italic, but are commented out.

## Modifying the Natural Windows

The following elements are available:


Element Name	Description
.naturalwindow	Controls the rendering of the Natural windows.
.wintitle	Controls the rendering of the titles of the Natural windows.

Example:

```
.naturalwindow {
    border-style: solid;
    border-width: 1px;
    border-color: white;
    background-color: black;
}

.wintitle {
    left: 0px;
    top: 1px;
}
```

```
height: 17px;
width: 100%;
color: black;
font-size: 100%;
font-weight: bold;
background-color: white;
text-align: center;
font-family: Verdana;
border-bottom-style: solid;
border-bottom-width: 2px;
}
```

 **Note:** In a mainframe environment, you have to set the Natural profile parameter `WEBIO` accordingly to enable this feature. See *WEBIO - Web I/O Interface Screen Rendering* in the *Parameter Reference* which is provided with Natural for Mainframes.


## Modifying the Message Line

---

The rendering of the message line is controlled by the `.MessageLine` element.

Example:

```
.MessageLine {
  color: blue;
}
```

 **Note:** In a mainframe environment, you have to set the Natural profile parameter `WEBIO` accordingly to enable this feature. See *WEBIO - Web I/O Interface Screen Rendering* in the *Parameter Reference* which is provided with Natural for Mainframes.

## Modifying the Background Color

---

The background color is defined in the `body` element.

Example:

```
body {  
    background-color: #F3F5F0;  
    font-family: Lucida Console;  
}
```

## Modifying the Color Attributes

---

You can define different colors for all Natural color attributes. These are:

Red  
Green  
Blue  
Yellow  
White  
Black  
Pink  
Turquoise  
Transparent

You can define these color attributes for input fields and output fields, and for normal output and reverse video.

The following examples show how to define the color attribute “Red”.

Define the color for a normal output field:

```
.natOutputRed {color: darkred;}
```

Define the foreground and background colors for an output field with reverse video:

```
.reverseOutputRed {background-color: darkred; color:#F3F5F0;}
```

Define the color for a normal input field:

```
.natInputRed {color: darkred;}
```

Define the foreground and background colors for an input field with reverse video:

```
.reverseInputRed {background-color: darkred; color:#F3F5F0;}
```

## Modifying the Style of the PF Key Buttons

---

The following elements are available:

Element Name	Description
.PFButton	Controls the style for normal rendering.
.PFButton:hover	Controls the style that is used when the mouse hovers over a PF key button.

Example:

```
.PFButton {
  text-align: center;
  width: 90px;
  border-style: ridge;
  border-width: 3px;
  padding: 2px;
  text-decoration: none;
  font-family: Verdana;
  font-size: 12px;
  height: 22px;
}

.PFButton:hover {
  color: #FFFFF0;
  background-color: #222222;
}
```



**Note:** In a mainframe environment, you have to set the Natural profile parameter `WEBIO` accordingly to enable this feature. See *WEBIO - Web I/O Interface Screen Rendering in the Parameter Reference* which is provided with Natural for Mainframes.

# 16

## Using Themes (IIS only)

---

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The information in this chapter applies only to Microsoft Internet Information Services (IIS).

Themes are used to define the output style for the Natural application. Some themes are already delivered in the installation package.

Themes are standard functionality in ASP.NET 2.0. They must be contained in the *App\_Themes* folder. For each theme, the *App\_Themes* folder contains a subfolder. For example, the theme with the name "3270Thema" is contained in the folder *3270Theme*.

Each subfolder which is provided for a theme must contain the following files:

- *SkinFile.skin* (see below)
- *StyleSheet.css* (see below)

## The Skin File

---

The skin file (*SkinFile.skin*) contains entries for Natural elements (such as fields) in the following form:

```
<asp:Label SkinId="Red" runat="server" forecolor="red" />
<asp:Label SkinId="Green" runat="server" forecolor="green" />
<asp:Label SkinId="Blue" runat="server" forecolor="blue" />
...
```

The table below shows the minimum settings that are required in the skin file to map the Natural screen in the Natural Web I/O Interface. This table contains the following columns:

- **Natural Attributes**  
The attributes that can be set in Natural.
- **Output Fields**  
The Natural output fields for text.
- **Input Fields**  
The Natural fields in which you can enter data.
- **Read-only Input Fields**  
When a window is displayed on a Natural screen, the input fields in the main screen are set to read-only. The input fields of the windows that are lying behind the top window are also displayed as read-only.

Natural Attributes	Output Fields	Input Fields	Read-only Input Fields
Red	<code>&lt;asp:Label runat="server" SkinId="Red"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Red"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="RedReadOnly"/&gt;</code>
Green	<code>&lt;asp:Label runat="server" SkinId="Green"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Green"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="GreenReadOnly"/&gt;</code>
Blue	<code>&lt;asp:Label runat="server" SkinId="Blue"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Blue"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="BlueReadOnly"/&gt;</code>
Pink	<code>&lt;asp:Label runat="server" SkinId="Pink"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Pink"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="PinkReadOnly"/&gt;</code>
Yellow	<code>&lt;asp:Label runat="server" SkinId="Yellow"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Yellow"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="YellowReadOnly"/&gt;</code>
Turquoise	<code>&lt;asp:Label runat="server" SkinId="Turquoise"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Turquoise"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="TurquoiseReadOnly"/&gt;</code>
White	<code>&lt;asp:Label runat="server" SkinId="White"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="White"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="WhiteReadOnly"/&gt;</code>
Black	<code>&lt;asp:Label runat="server" SkinId="Black"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Black"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="BlackReadOnly"/&gt;</code>
Intensified	<code>&lt;asp:Label runat="server" SkinId="Intensified"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Intensified"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="IntensifiedReadOnly"/&gt;</code>
No attribute	<code>&lt;asp:Label runat="server" SkinId="Normal"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="Normal"/&gt;</code>	<code>&lt;asp:TextBox runat="server" SkinId="NormalReadOnly"/&gt;</code>

The information in the cells of the above table shows the settings of the ASP.NET web server controls. ASP.NET defines a lot of web server controls. The attribute `runat="server"` indicates that the web controls are interpreted at the server site.

The following controls are used in the default skin files:

Control	Description
asp:Label	A text output field.
asp:TextBox	A text input field.
asp:Table	A table where the field elements are the PF key buttons.
asp:Button	A PF key button.
asp:Image	An image link.
asp:Panel	A container for other web controls.

In addition to defining colors as shown above, the `SkinId` is also used to define the following:

Natural Element	Description	ASP.NET Skin File
Message line	Information text line in the Natural screen.	<code>&lt;asp:Label runat="server" SkinId="messageline"/&gt;</code>
Child window	The child windows of a Natural application.	<code>&lt;asp:Panel runat="server" SkinId="WindowPanel"/&gt;</code>
Child window title	The title of a Natural child window.	<code>&lt;asp:TextBox runat="server" SkinId="WindowTitle"/&gt;</code>
Child window shadow	The child window is shown with a shadow.	<code>&lt;asp:Panel runat="server" SkinId="WinShadow"/&gt;</code>
PF key table	The row of PF key buttons is defined in a table.	<code>&lt;asp:Table runat="server" SkinId="PFKeys"/&gt;</code>
PF key button	The definition of the PF keys.	<code>&lt;asp:Button runat="server" SkinId="Pfkey"/&gt;</code>
Head picture	Picture displayed at the top of the page.	<code>&lt;asp:Image runat="server" SkinId="headpic"/&gt;</code>

## The Style Sheet

In the style sheet (*StyleSheet.css*), you can define styles according to the CSS standard. See <http://www.w3.org/Style/CSS/>.



---

The following is an example style sheet which defines the background color and font of the web page:

```
body
{
background-color: transparent;
font-family: Courier New, Monospace;
}
```



**Note:** If you define the font size in a CSS file, this has no influence on the screen size. If the font size is changed, only smaller text is displayed.



# 17

## Configuring Security (J2EE only)

---

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The Natural Web I/O Interface client and Natural for Ajax come as standard J2EE applications. For the ease of installation, the access to these applications is by default not secured. You might, however, wish to restrict the access to certain parts of these applications to certain users. An important example is the **configuration tool**, which enables you to modify the Natural session definitions and the logging configuration of the Natural Web I/O Interface client and of Natural for Ajax. Other examples are the Application Designer development workplace contained in Natural for Ajax or the Natural logon page.

This chapter does not cover the concepts of J2EE security in full extent. It provides, however, sufficient information to activate the preconfigured security settings of the Natural Web I/O Interface client and of Natural for Ajax and to adapt them to your requirements. More information on the topics described in this chapter can be found, for instance, at <http://www.jboss.org/jbossas/docs/> (security on JBoss is described in the *Configuration Guide*) or <http://java.sun.com/j2ee/1.4/docs/tutorial/doc/index.html> (see the chapter on security).

## Name and Location of the Configuration File

---

Security is configured in the file *web.xml*. The path to this file depends on the application server and the type of client that you are using.

### ■ JBoss Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>server/default/deploy/natuniapp.ear/natuniweb.war/WEB-INF
```

Natural for Ajax:

```
<application-server-install-dir>/server/default/deploy/njx<nn>.ear/cisnatural.war/WEB-INF
```

### ■ Sun Java System Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>/domains/domain1/applications/j2ee-apps/natuniapp/natuniweb_war/WEB-INF
```

Natural for Ajax:

```
<application-server-install-dir>/server/domains/domain1/applications/j2ee-apps/njx<nn>/cisnatural_war/WEB-INF
```

## Activating Security

Great care must be taken when editing and changing the configuration file *web.xml*. After a change, the application server must be restarted.

Edit the file *web.xml* and look for the section that is commented with "Uncomment the next lines to add security constraints and roles.". Uncomment this section by removing the comment marks shown in boldface below:

```
<!-- Uncomment the next lines to add security constraints and roles. -->
<!--
<security-constraint>
  <web-resource-collection>
    <web-resource-name>Configuration Tool</web-resource-name>
    <url-pattern>/conf_index.jsp</url-pattern>
    <url-pattern>/faces/*</url-pattern>
  </web-resource-collection>
  ...
  <security-role>
    <description>Administrator</description>
    <role-name>nwoadmin</role-name>
  </security-role>
-->
```

## Defining Security Constraints

The security constraints defined by default are just examples. A `<security-constraint>` element contains of a number of `<web-resource-collection>` elements combined with an `<auth-constraint>` element. The `<auth-constraint>` element contains a `<role-name>`. The whole `<security-constraint>` element describes which roles have access to the specified resources.

**Example** - the following definition specifies that only users in the role "nwoadmin" have access to the configuration tool:

```
<security-constraint>
  <web-resource-collection>
    <web-resource-name>Configuration Tool</web-resource-name>
    <url-pattern>/conf_index.jsp</url-pattern>
    <url-pattern>/faces/*</url-pattern>
  </web-resource-collection>
  <auth-constraint>
    <role-name>nwoadmin</role-name>
  </auth-constraint>
</security-constraint>
```

In the following section, you will see where and how the roles are defined.

## Defining Roles

---

A few lines below in the file *web.xml*, there is a section `<security-role>`. Here, the roles that can be used in `<security-constraint>` elements are defined. You can define additional roles as needed. The assignment of users to roles is done outside this file and will often be done in a user management that is already established at your site.

Example:

```
<security-role>
  <description>Administrator</description>
  <role-name>nwoadmin</role-name>
</security-role>
```

## Selecting the Authentication Method

---

In the file *web.xml*, there is a section `<login-config>`. The only element that should possibly be adapted here is `<auth-method>`. You can choose between the authentication methods "FORM" and "BASIC". Form-based authentication displays a specific page on which users who try to access a restricted resource can authenticate themselves. Basic authentication advises the web browser to retrieve the user credentials with its own dialog box.

Example:

```
<login-config>
  <auth-method>FORM</auth-method>
  ...
</login-config>
```

## Choosing the Login Module (JBoss Application Server only)

---

In the directory `<application-server-install-dir>/server/default/conf`, there is a file named *njxnwo-login-config.xml*. The relevant part in this file is the selection of the login module specified in the `<login-module>` element and the configuration of this login module. The login module determines where the user definitions and the assignment of users to roles is maintained.

By default, the `UsersRolesLoginModule` is preconfigured. The `UsersRolesLoginModule` expects the role definitions in one file (*props/njxnwo-roles.properties*) and the user definitions (password

and assignment to roles in another file (*props/njxnwo-users.properties*). An example user "admin" with the password "adminadmin" and the role "nwoadmin" is defined to begin with.

You can choose and configure a different login module, for instance, one that expects the user and role definitions in a database or in an LDAP directory, or even write a custom login module.

More information on using JBoss login modules is provided at <http://www.jboss.org/jbossas/docs/> (see the *Configuration Guide*).

## Defining the Security Realm and Users (Sun Java System Application Server only)

The following information applies to Sun Java System Application Server 9.1, however, the procedure is similar in other versions.

### ► To create a new security realm and define the user

- 1 Open the tree node **Configuration > Security > Realms**.
- 2 Choose **New**.
- 3 Enter "NaturalWebIOAndAjaxRealm" as the name of the new realm.
- 4 Select `com.sun.enterprise.security.auth.realm.file.FileRealm` as the class name.

Use the following properties which are predefined for this class:

Option	Value
JAAS Context	fileRealm
Key File	<code>\${com.sun.aas.instanceRoot}/config/keyfile</code>

- 5 Choose **OK**.
- 6 Edit the new realm `NaturalWebIOAndAjaxRealm` and choose the **Manage Users** button.
- 7 Choose **New**.
- 8 Enter the user names and the passwords for the users. The name of the group list must be "nwoadmin".
- 9 Choose **OK**.





# 18 Wrapping a Natural for Ajax Application as a Servlet

---

In a production environment, it is inconvenient to start an application with a URL such as the following:

```
http://myappserver:4711/cisnatural/servlet/StartCISPage?PAGEURL=%2Fcisnatural%2FNatLo-  
gon.html&xciParameters.natserver=mywebio&xciParameters.natprog=nwo.sh&xciParameters.nat-  
port=4712&xciParameters.natparam=stack%3D%28logon+SYSEXNJX%3BMENU-NJX%3BFIN%29
```

The URL can be shortened by defining a corresponding session profile in the [configuration tool](#). For example:

```
http://myappserver:4711/cisnatural/servlet/StartCISPage?PAGEURL=%2Fcisnatural%2FNatLo-  
gon.html&xciParameters.natsession=DemoApplication
```

However, this shortened URL is still not practical for security reasons because end users should not be allowed to access the generic servlet `StartCISPage`.

When you define a dedicated servlet for each application, you can easily define the security constraints for each application in the file `web.xml` (for further information on this file, see [Configuring Security](#)). With the servlet `com.softwareag.cis.server.StartCISPageWithParams`, you define a wrapper servlet for a given Natural for Ajax application so that the application can later be invoked with a URL such as the following:

```
http://myappserver:4711/cisnatural/servlet/DemoApplication
```

The following example shows how you define an application as a servlet in the file *web.xml*.

```
<servlet id="DemoApplication">
  <servlet-name>DemoApplication</servlet-name>
  <display-name>DemoApplication</display-name>
  <servlet-class>com.softwareag.cis.server.StartCISPageWithParams</servlet-class>
  <load-on-startup>1</load-on-startup>
  <init-param id="OVERWRITE">
    <param-name>OVERWRITE</param-name>
    <param-value>>false</param-value>
  </init-param>
  <init-param id="PAGEURL">
    <param-name>PAGEURL</param-name>
    <param-value>/cisnatural/NatLogon.html</param-value>
  </init-param>
  <init-param id="xciParameters.natsession">
    <param-name>xciParameters.natsession</param-name>
    <param-value>Local</param-value>
  </init-param>
  <init-param id="xciParameters.natserver">
    <param-name>xciParameters.natserver</param-name>
    <param-value>localhost</param-value>
  </init-param>
  <init-param id="xciParameters.natport">
    <param-name>xciParameters.natport</param-name>
    <param-value>2900</param-value>
  </init-param>
  <init-param id="xciParameters.natparamext">
    <param-name>xciParameters.natparamext</param-name>
    <param-value>STACK=(LOGON SYSEXNJX;MENU-NJX;FIN)</param-value>
  </init-param>
</servlet>
```

You can omit the parameters `xciParameters.natserver`, `xciParameters.natport` and `xciParameters.natparamext` if the corresponding values are defined in the session definition that is referenced in `xciParameters.natsession`. This is the recommended way, because the settings can thus be changed in the configuration tool at any time without the need to adapt the file *web.xml*.

To complete the definition, you define a corresponding servlet mapping in the file *web.xml*:

```
<servlet-mapping>
  <servlet-name>DemoApplication</servlet-name>
  <url-pattern>/servlet/DemoApplication</url-pattern>
</servlet-mapping>
```

As the last step, you exchange the servlet class `com.softwareag.cis.server.StartCISPage` with a different servlet class, namely `com.softwareag.cis.server.StartCISPageInSession`. This servlet class cannot be called directly; it can only be called in an Application Designer session which is

already active. Therefore, each attempt to start an arbitrary - not wrapped - application by just building a URL based on `StartCISPage` will result in an error message.

To exchange the servlet class, you change the following in the file `web.xml`

```
<servlet id="StartCISPage">
  <servlet-name>StartCISPage</servlet-name>
  <display-name>StartCISPage</display-name>
  <servlet-class>com.softwareag.cis.server.StartCISPage</servlet-class>
  <load-on-startup>1</load-on-startup>
</servlet>
```

to

```
<servlet id="StartCISPage">
  <servlet-name>StartCISPage</servlet-name>
  <display-name>StartCISPage</display-name>
  <servlet-class>com.softwareag.cis.server.StartCISPageInSession</servlet-class>
  <load-on-startup>1</load-on-startup>
</servlet>
```

For a workplace application (see *Working with Workplaces* in the *Natural for Ajax* documentation), the definition looks slightly different. You do not define the start-up page of the workplace directly in the `PAGEURL` parameter. Instead, you define an intermediate navigation page `/HTML-BasedGUI/com.softwareag.cis.util.navigatetopage.html`. The start-up page of the workplace is specified in the `navPage` parameter. The navigation page makes sure that an Application Designer session is created before it navigates to the start-up page of the workplace.

```
<servlet id="WorkplaceDemo">
  <servlet-name>WorkplaceDemo</servlet-name>
  <display-name>WorkplaceDemo</display-name>
  <servlet-class>com.softwareag.cis.server.StartCISPageWithParams</servlet-class>
  <load-on-startup>1</load-on-startup>
  <init-param id="OVERWRITE">
    <param-name>OVERWRITE</param-name>
    <param-value>>false</param-value>
  </init-param>
  <init-param id="PAGEURL">
    <param-name>PAGEURL</param-name>
    <param-value>/HTMLBasedGUI/com.softwareag.cis.util.navigatetopage.html</param-value>
  </init-param>
  <init-param id="navPage">
    <param-name>navPage</param-name>
    <param-value>/njxdemos/wpdynworkplace.html</param-value>
  </init-param>
</servlet>
```

In this case, the corresponding servlet mapping is defined as follows:

```
<servlet-mapping>
  <servlet-name>WorkplaceDemo</servlet-name>
  <url-pattern>/servlet/WorkplaceDemo</url-pattern>
</servlet-mapping>
```



**Note:** For further information on the above mentioned servlets, see the Java API documentation which is provided with Application Designer.

# 19

## Trust Files (J2EE only)

---

Trust files are used for a secure connection between the Natural Web I/O Interface server and the Natural Web I/O Interface client or Natural for Ajax. Server authentication cannot be switched off. A trust file is always required.

A trust file contains the certificates that you trust. These can be certificates of a CA (Certificate Authority) such as VeriSign, or self-signed certificates.

In the **configuration tool**, you define the path and, if required, the password for the trust file. With the server authentication, the Natural Web I/O Interface client or Natural for Ajax checks whether the certificate of the Natural Web I/O Interface server is known. If it is not known, the connection is rejected.

When a trust file is not defined in the configuration tool, the Natural Web I/O Interface client or Natural for Ajax tries to read the file *calist* from the *lib/security* directory of the Java Runtime Environment (JRE). The default password for this file is "changeit".

To create your own trust file, you can use, for example, Sun's keytool utility which can be found in the *bin* directory of the Java Runtime Environment (JRE). Here are some helpful examples:

- Create an empty, password-protected trust file:

```
keytool -genkey -alias foo -keystore truststore.jks -storepass "your-password"  
keytool -delete -alias foo -keystore truststore.jks
```

- Import a certificate:

```
keytool -import -alias "name-for-ca" -keystore truststore.jks -storepass  
"your-password" -file server.cert.crt
```

You should use a meaningful name for the alias.

- List the certificates in a trust file:

```
keytool -list -v -keystore truststore.jks
```

- Delete a certificate from a trust file:

```
keytool -delete -alias "name-for-ca" -keystore truststore.jks
```

When you modify the trust file or its password, you have to restart the application server so that your modification takes effect.

# 20

## Logging (J2EE only)

---

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The Natural Web I/O Interface client and Natural for Ajax use the Java Logging API. In case of problems with the Natural Web I/O Interface client or Natural for Ajax, you can enable logging and thus write the logging information to an output file. This should only be done when requested by Software AG support.

You configure logging using the [configuration tool](#).



**Note:** Some logging information is also written to the console, regardless of the settings in the configuration file. The console shows the information which is normally provided by the logging levels SEVERE, WARNING and INFO.

## Name and Location of the Configuration File

---

The name of the configuration file is *natlogger.xml*. The path to this file depends on the application server and type of client that you are using.

### ■ JBoss Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>server/default/deploy/naturalunicode.rar/log
```

Natural for Ajax:

```
<application-server-install-dir>/server/default/deploy/njx<nn>ra.rar/log
```

### ■ Sun Java System Application Server

Natural Web I/O Interface client:

```
<application-server-install-dir>/domains/domain1/applications/j2ee-modules/naturalunicode/log
```

Natural for Ajax:

```
<application-server-install-dir>/domains/domain1/applications/j2ee-modules/njx<nn>rallog
```

## Logging on Sun Java System Application Server

---

On Sun Java System Application Server, the logging information is written to the normal server log. That is because Sun Java System Application Server uses the same Java Logging API as the Natural Web I/O Interface client and Natural for Ajax. You can thus use a powerful Sun Java System Application Server tool, the Log Viewer, for analyzing the log. The Log Viewer is started from the web-based Admin Console; for further information, see the documentation of the Sun Java System Application Server.



We recommend that you disable the file handler in the configuration file *natlogger.xml*. Thus, you avoid that the logging information is written to two different log files (that is, the normal server log and the output file defined in *natlogger.xml*).

## Logging on JBoss Application Server

---

JBoss Application Server uses a different logging API (log4j). In this case, we recommend that you enable the file handler in the configuration file *natlogger.xml*.

## Invoking the Logging Configuration Page

---

The content of the configuration file *natlogger.xml* is managed using the **Logging Configuration** page of the [configuration tool](#).

### ▶ To invoke the Logging Configuration page

- 1 In the frame on the left, choose the **Logging Configuration** link.

The **Logging Configuration** page appears in the right frame. Example for the Natural Web I/O Interface client:

### Logging Configuration

Specify the output log file characteristics.

- "/" : The local pathname separator
- "%t": The system temporary directory
- "%h": The value of the "user.home" system property
- "%g": The generation number to distinguish rotated logs
- "%u": A unique number to resolve conflicts
- "%%": Translates to a single percent sign "%"

File pattern name:

File type:

File size (0=unlimited):

Number of files:

File enabled:  Yes  No

Append mode:  Yes  No

Specify log levels for individual modules. The available settings are:

- SEVERE: Events that interfere with normal program execution
- WARNING: Warnings, including exceptions
- INFO: Messages related to server configuration or server status, excluding errors
- CONFIG: Messages related to server configuration
- FINE: Minimal verbosity
- FINER: Moderate verbosity
- FINEST: Maximum verbosity

Communication:

Resource adapter:

Session beans:

Message beans:

Configuration file:

Logging:

Utilities:

Natural Web I/O Interface pages:

With Natural for Ajax, additional modules are provided at the bottom of the **Logging Configuration** page.

- 2 Specify the characteristics of the output file as described below in the section *Overview of Options for the Output File*.
- 3 Specify the log levels for individual modules by selecting the log level from the corresponding drop-down list box.

A brief description for each log level is provided on the **Logging Configuration** page.

- 4 Choose the **Save Configuration** button to write the modifications to the configuration file.



**Caution:** When you do not choose the **Save Configuration** button but logout instead or leave the configuration tool by entering another URL, your modifications are not written to the configuration file.

## Overview of Options for the Output File

The following options are provided for specifying the characteristics of the output file:

Option	Description
<b>File pattern name</b>	<p>The pattern for generating the output file name. Default: "%h/nwolog%g.log".</p> <p>The default value means that an output file with the name <i>nwolog&lt;number&gt;.log</i> will be created in the home directory of the user who has started the application server.</p> <p>For detailed information on how to specify the pattern, see the Java API documentation at <a href="http://java.sun.com/j2se/1.5.0/docs/api/java/util/logging/FileHandler.html">http://java.sun.com/j2se/1.5.0/docs/api/java/util/logging/FileHandler.html</a>.</p>
<b>File type</b>	<p>The format of the output file. Select one of the following entries from the drop-down list box:</p> <ul style="list-style-type: none"> <li>■ <b>Text format</b> Output in simple text format (default).</li> <li>■ <b>XML format</b> Output in XML format.</li> </ul> <p>The corresponding formatter class is then used.</p>
<b>File size</b>	The maximum number of bytes that is to be written to an output file. Zero (0) means that there is no limit. Default: "0".
<b>Number of files</b>	The number of output files to be used. This value must be at least "1". Default: "10".
<b>File enabled</b>	If set to <b>Yes</b> (default), the file handler is enabled. If set to <b>No</b> , the file handler is disabled.
<b>Append mode</b>	If set to <b>Yes</b> , the logging information is appended to the existing output file. If set to <b>No</b> (default), the logging information is written to a new output file.

