

# Unicode Input/Output Handling in Natural Applications

This chapter covers the following topics:

- Displaying and Entering Unicode Data
  - Natural Web I/O Interface Client
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## Displaying and Entering Unicode Data

If you want to display or enter Unicode data, the following possibilities exist:

- When working in the local development environment with Natural for Windows, all Unicode characters can be displayed and entered in the Natural output window.
- When working in a remote development environment with Natural for Windows (SPoD), the Natural Web I/O Interface client (see below) is necessary for displaying and entering all Unicode characters.
- When running applications with Natural for UNIX, Natural for OpenVMS, Natural for Mainframes or Natural for Windows, see *Natural Web I/O Interface Client* below.

### Notes:

1. Even if you are working with a Unicode-enabled output interface on Windows, you will see only the Unicode characters which are supported by the currently selected font.
2. Unicode data cannot be displayed on 3270 terminals.

If you run Natural via a terminal emulation or a mainframe terminal like 3270/3279, the page will be converted to the default code page (value of the system variable \*CODEPAGE) before displaying it, so that all characters which are not contained in the default code page are replaced with the substitution character. Equally, input is only possible in code page format and will be converted to Unicode format before assigning it to a U format field. You have to regard that the substitution character is defined by the ICU conversion tables. Depending on this character, it is possible that garbage is displayed with a terminal emulation. On UNIX and OpenVMS platforms, you can change this substitution character by setting the profile parameter SUBCHAR. However, it is strongly recommended that you use the Natural Web I/O Interface when displaying characters not contained in the default code page. When running a remote Windows session, the Natural Web I/O Interface will be used in any case.

On code page oriented mainframe terminals, it is important to select the suitable code page. The default code page of Natural, the code page of the terminal and even the font used by the terminal determine the capability of displaying certain characters correctly.

## Natural Web I/O Interface Client

The Natural Web I/O Interface client is used to display non-GUI information which contains Unicode characters. It can be used in the following environments:

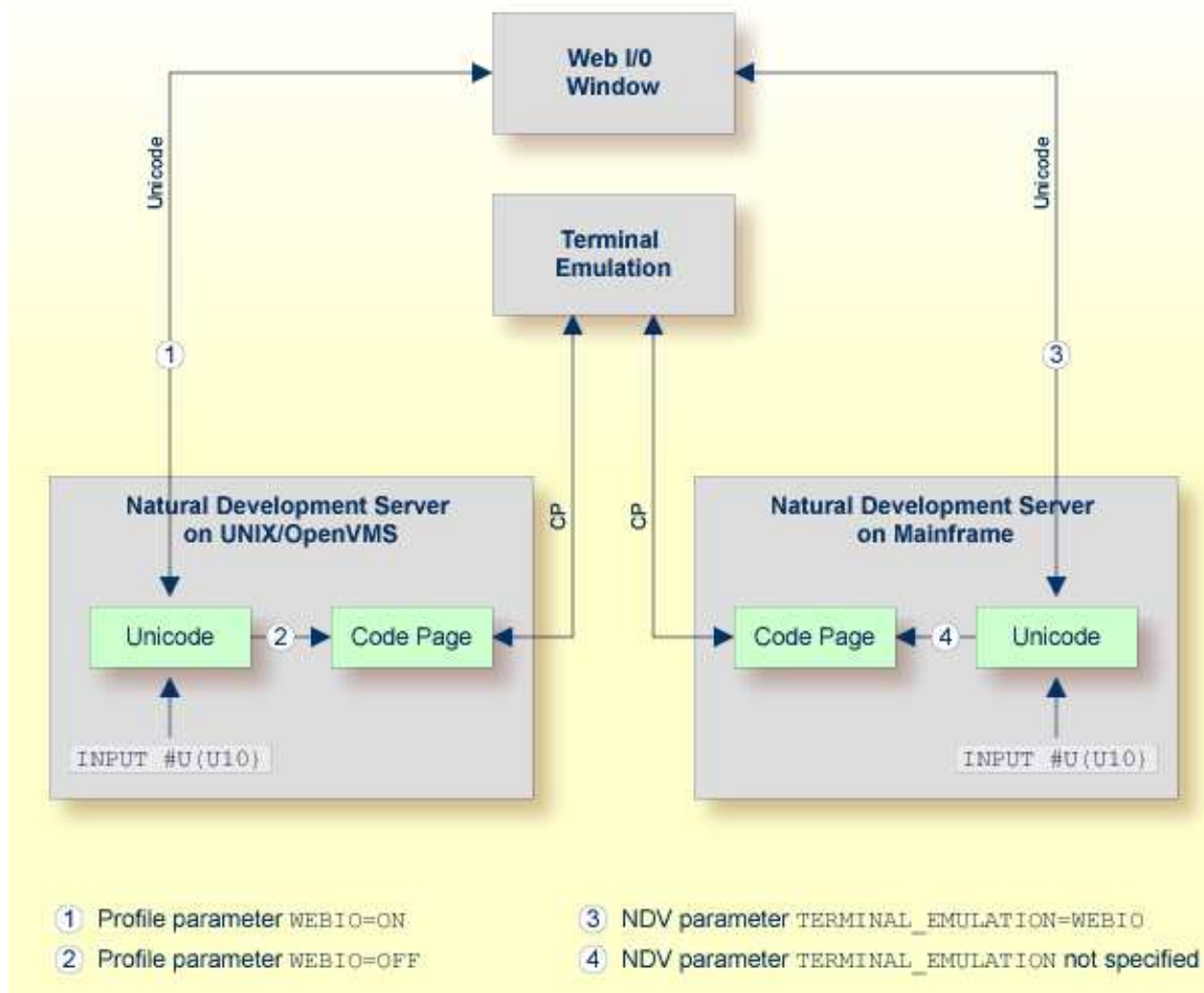
- SPoD Environment
- Runtime Environment

## SPoD Environment

The Natural Web I/O Interface client can be invoked when you use Natural for Windows and you are working with Natural Studio in a remote development environment (SPoD); see *Natural Web I/O Interface Client in Remote Development Using SPoD* which is part of the Natural for Windows documentation.

When the Natural Web I/O Interface client is used, the Web I/O windows appears instead of the terminal emulation window which is not Unicode-enabled in remote UNIX, OpenVMS or mainframe environments, or instead of the output window in remote Windows environments.

The following graphic shows the SPoD environment for Unicode applications with Natural Development Servers (NDV) on UNIX, OpenVMS and mainframes:



So that the Natural Web I/O Interface client can be invoked, the Natural Development Server has to be configured as follows:

- **UNIX and OpenVMS**

If you want to use the Natural Web I/O Interface client in a remote UNIX or OpenVMS environment, the profile parameter `WEBIO` must be set to `ON` on the NDV server. See *Configuration Utility* in the Natural for UNIX or Natural for OpenVMS documentation.

- **Mainframe**

If you want to use the Natural Web I/O Interface client in a remote mainframe environment, the NDV configuration parameter `TERMINAL_EMULATION` must be set to `WEBIO` on the NDV server. See *NDV Configuration Parameters* in the Natural Development Server documentation. Moreover, the Web I/O terminal converter module `NATWEB` must be linked to the Natural nucleus. The Natural profile parameter `TMODEL` can be used to determine the user screen size.

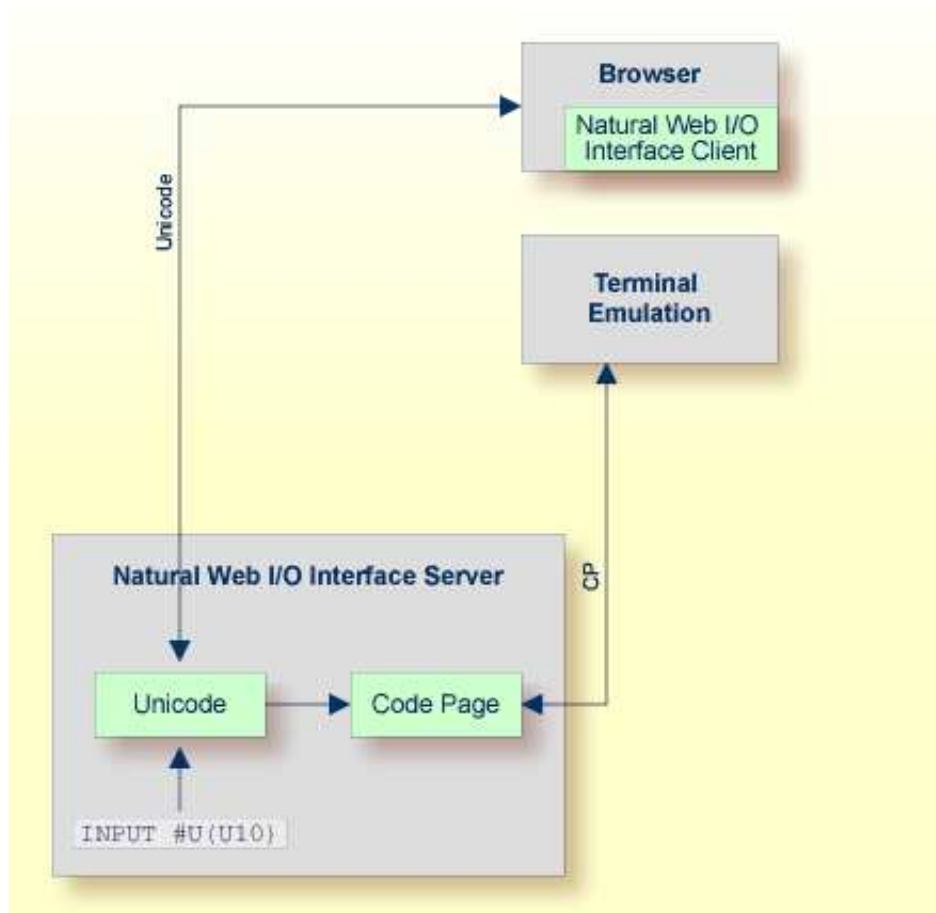
- **Windows**

In a remote Windows environment, the Natural Web I/O Interface client is always used, regardless of the setting of the profile parameter `WEBIO`.

## Runtime Environment

The Natural Web I/O Interface client appears when running applications with Natural for UNIX, Natural for OpenVMS, Natural for Mainframes or Natural for Windows. It runs in a web/application server.

The following graphic shows the runtime environment for Unicode applications:



Natural recognizes automatically whether the session has been started from the Natural Web I/O Interface client or from the terminal emulation.

Prerequisites for using the Natural Web I/O Interface client:

- **Natural for UNIX and Natural for OpenVMS**

It is required that the Natural Web I/O Interface server (which is implemented as a daemon) has been installed and activated. See *Natural Web I/O Interface* in the Natural for UNIX and in the Natural for OpenVMS documentation.

- **Natural for Mainframes**

It is required that the Natural Web I/O Interface server has been installed and configured. See *Natural Web I/O Interface* in the Natural for Mainframes documentation. Moreover, the Web I/O terminal converter module NATWEB must be linked to the Natural nucleus. The Natural profile parameter TMODEL can be used to determine the user screen size.

- **Natural for Windows**

It is required that the Natural Web I/O Interface server (which is implemented as a service) has been installed and activated. See *Natural Web I/O Interface* in the Natural for Windows documentation.