



Tip or Technique

Managing Fonts

Product(s): IBM Cognos 8

Area of Interest: Infrastructure

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Contents

1 INTRODUCTION 4

1.1 PURPOSE 4

1.2 APPLICABILITY 4

1.3 EXCLUSIONS AND EXCEPTIONS 4

2 HOW FONTS ARE USED BY IBM COGNOS8 5

3 STYLESHEETS IN IBM COGNOS8 9

4 WHERE ARE THE FONTS? 12

4.1 WHERE FONTS CAN BE FOUND 12

4.2 HOW FONTS ARE LOCATED 14

4.3 WHICH FONTS ARE REALLY AVAILABLE 17

5 HOW TO INSTALL FONTS ON UNIX 20

5.1 FONTS.DIR 20

5.1.1 General Form 20

5.1.2 Example 21

6 BARCODES 22

6.1 FONTS 22

6.2 IMAGES 22

7 REFERENCES 29

1 Introduction

1.1 Purpose

IBM Cognos content authors who are using fonts to control layout of their Reports may find that these Reports do not appear as expected when generated as PDF on Unix. This is generally because those fonts are not being found on the Unix server and are being substituted.

This document outlines where to find TrueType fonts on Unix, how to install additional fonts, and how to expose them to the IBM Cognos products. Also covers the special-case of rendering data as a Barcode.

1.2 Applicability

Applies to all IBM Cognos-supported platforms:

AIX

Linux

Solaris

HPUX

Windows

Includes IBM Cognos 8 and IBM Cognos Report Net;

Includes Series 7 PowerPlay Enterprise Server, Impromptu Web Reports.

1.3 Exclusions and Exceptions

Fonts are copyright content and may not generally be copied or installed without a licence from the Type Foundry or vendor.

Some Microsoft licence agreements permit copying of their Font files subject to ownership of a licence for a related Microsoft product.

Check with the Font Vendor for licensing information.

2 How Fonts are used by IBM Cognos8

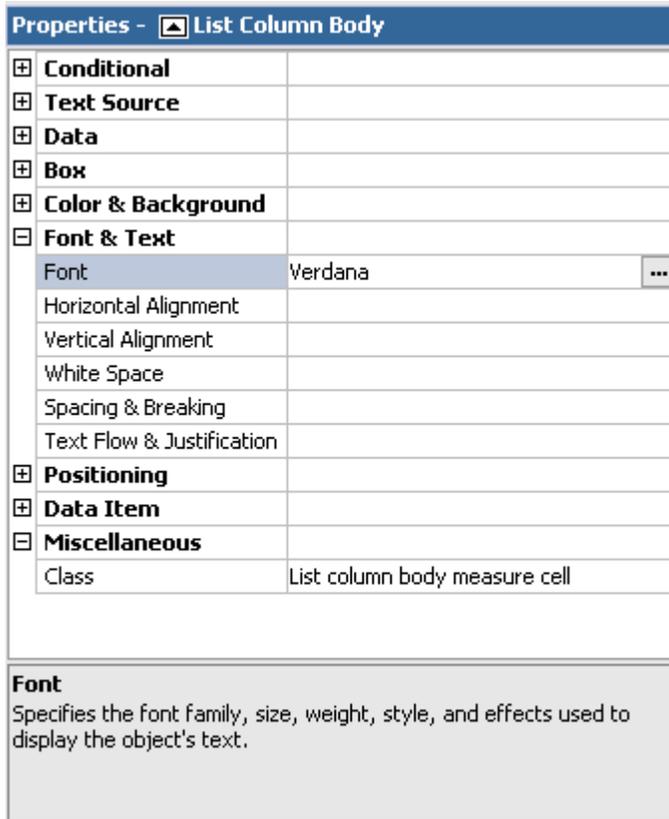
When developing a Report with a IBM Cognos Studio, the author may choose to specify a particular Font. Report Studio is an HTML and JavaScript application that runs in a browser. Because of the browser design, Report Studio operates within the browser security sandbox and has no access to the list of fonts installed on the local computer.

The font the author uses may be on their Workstation but not necessarily on other users workstations or on the Report Servers. This may cause the Report to be displayed differently on other's workstations.

When specifying a particular Font, the program that displays the data to the End User must also have that font available locally. If displaying as HTML then the Browser (ie Desktop) must have that font installed. If displaying as PDF or controlling the Fonts in a Chart or Map then the ReportServer must also have access to the Font to correctly kern the characters.

Consequently, it may be necessary to install Custom Fonts on the Server and distribute to all Desktops.

Using Report Studio, you can format an object using a particular font:

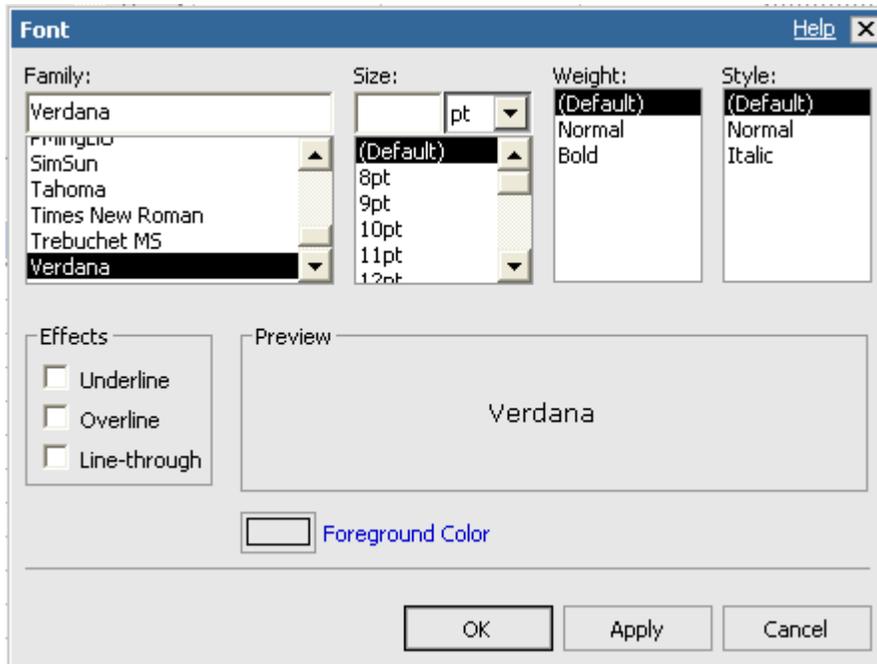


1. Click the object for which you want to specify the font.
Tip: To specify the default font for the report, click the page.

2. Click the font button  in the toolbar
3. In the Family box, click the font you want to use.

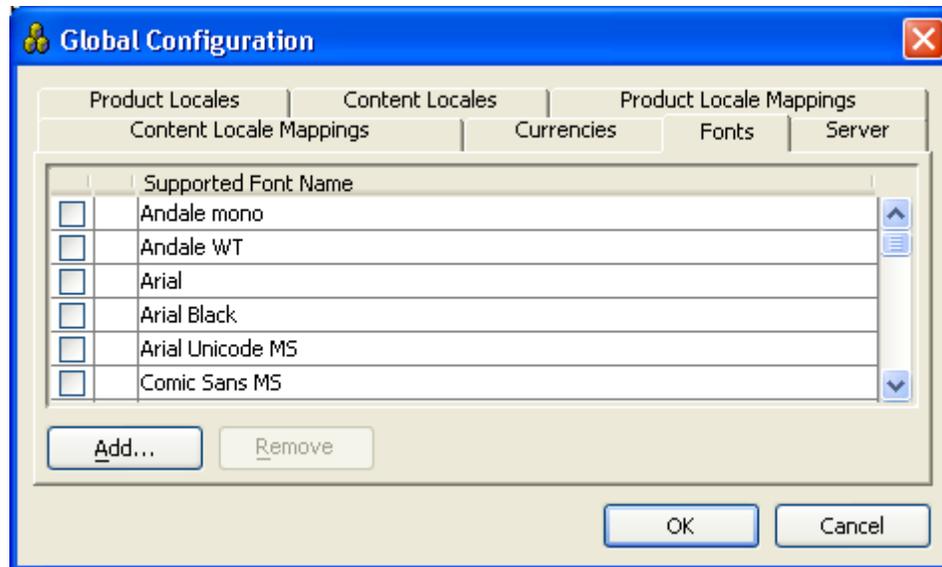
Tip: Type a list of fonts if you are not sure whether a specific font is installed on a user's computer. For example, if you type 'Times New Roman', Arial, monospace, Report Studio checks to see if Times New Roman is installed. If it is not, Report Studio checks for Arial. If Arial is not installed, the monospace font used by the computer is used.

4. In the Size box, type the font size.
5. In the Weight box, click the weight of the font.
6. In the Style box, click the font style.
7. In the Effects box, select the formatting options you want.
8. Click Foreground Color to specify the color of the text.
9. Click OK.



The example above uses the "Verdana" font from Microsoft. This may appear correctly while Authoring the Report or viewing as HTML because the Font is available to the Internet Explorer Browser. However, when rendered as PDF by a Unix ReportServer the font may be substituted or the data not displayed at all. It is necessary to use a Font which is also available where the PDF is created.

Javascript cannot access the local disk on the author's PC. The list of fonts in the dialog above is NOT derived from those available on the PC or on the Server. This list is managed using IBM Cognos Configuration on the Application Tier. See the menu Actions > Edit Global Configuration > Fonts:



The IBM Cognos PDF Rendering Engine is proprietary [not OEM'd from Adobe], and supports only TrueType and OpenType fonts.

To ensure that PDF reports appear in Adobe Reader as intended, IBM Cognos 8 embeds required fonts in reports, by default. To minimize the resulting increase in file size, IBM Cognos 8 embeds only the characters (also called glyphs) used in the report rather than all characters in the font set.

Refer:

- "Administration and Security Guide" (ug_cra.pdf)

The IBM Cognos supplied "Andale WT" font is Unicode and conveniently includes characters for many languages (Japanese, Chinese, East Asian, Semitic, Eastern European). However it is large – which can cause performance issues – and is not always attractive in all languages. We encourage customers to use fonts targeted at their language and style preferences, and use the IBM Cognos-supplied fonts only when better alternatives are not available.

"Arial" and "Swiss 721 SWM" are good alternatives. "Tahoma" is also very popular.

Rather than specifying an explicit font that must be available on many hosts, it may be better to use a Stylesheet. Stylesheets allow for control of alternate fonts if the primary font is not available.

3 Stylesheets in IBM Cognos8

Though a Report Author can specify an explicit [list of] font[s] for an element on a report, it may be simpler to centralise control of the Fonts used. This can be achieved using Stylesheets.

Additionally, modifications to the Stylesheets will apply to all reports that reference those styles.

There are two StyleSheet files:

- *c8_location/webcontent/schemas/GlobalReportStyles.css*
on the WebServer(s)
used interactively by Studios and for delivering reports as HTML
- *c8_location/bin/GlobalReportStyles.css*
on the Report Servers
used for generating reports delivered as PDF and Excel

IBM Cognos 8 does not automatically preserve changes made to style sheets and other customization-related files. We recommend that you keep a careful record of your changes. Otherwise, you may inadvertently lose them during a reinstallation or upgrade of IBM Cognos8.

Append the following fragment to both instances of **GlobalReportStyles.css**:

```
.handwritten /* Handwritten Font */
{
  font-family: 'Lucida Handwriting Italic', 'Freestyle Script', Mistral,
Tahoma, arial, 'Andale WT', sans-serif;
}

.barcode /* Barcode */
{
  font-family: 'Free 3 of 9 Extended Regular', arial;
}
```

The names of the Classes visible in Report Studio are multilingual. The labels for the Classes are defined in Report Studio resource files on the WebServer(s) in the *c8_location/webcontent/pat/res* directory.

There are **reportstudio_lang.xml** files for each of the installed languages. By default, IBM Cognos Connection supports English, French, German and Japanese out of the box. If the language pack has been installed for a particular region there will be further files added to this directory.

Each **reportstudio_lang.xml** file should be modified by adding the following line in the appropriate language:

```
<string id="IDS_CLASS_CLASSID">CLASS STYLE NAME</string>
```

e.g. English

```
<string id="IDS_CLASS_handwritten">Handwritten</string>  
<string id="IDS_CLASS_barcode">Barcode</string>
```

French

```
<string id="IDS_CLASS_handwritten">Manuscrit</string>  
<string id="IDS_CLASS_barcode">Code barres</string>
```

German

```
<string id="IDS_CLASS_handwritten">Handgeschrieben</string>  
<string id="IDS_CLASS_barcode">Barcode</string>
```

Note: The case of the class name must be reflected in the string id.

Then in Report Studio, rather than specifying a Font, you can specify the Class:

Properties - List Column Body

Spacing & Breaking		
Text Flow & Justification		
<input type="checkbox"/>	Positioning	
Size & Overflow		
<input type="checkbox"/>	Data Item	
Name	Description	
Label		
Expression	[gosales_goretailers],[...	
Aggregate Function	None	
Rollup Aggregate Function	Automatic	
<input type="checkbox"/>	Miscellaneous	
Class	Handwritten	...

Class
Specifies a class to apply to the object. The Class provides a default style.

4 Where are the Fonts?

4.1 Where Fonts can be found

IBM Cognos supply "Andale WT" and "Swiss 721 SWM" fonts:

Product	Font Location (Unix and Windows)
Series 7	cerN\bin\fonts
IBM Cognos 8	c8\bin\fonts

Any installed Java may include some fonts (free, but not very useful):

Operating System	Font Location (Unix and Windows)
Windows	%JAVA_HOME%\lib\fonts
Any Unix or Linux	\${JAVA_HOME}/lib/fonts

The Operating System may be delivered with few TrueType fonts. Unix will generally **not** include the familiar fonts that users have on their Windows Desktop:

Operating System	Font Location
Windows	%SYSTEMROOT%\fonts
AIX	/usr/lib/X11/fonts/TrueType
Linux	/usr/lib/X11/fonts/TTF
Solaris	/usr/openwin/lib/X11/fonts/TrueType
HPUX	/usr/lib/X11/fonts/TrueType /usr/lib/X11/fonts/ms.st/typefaces

IBM Cognos recommend that you either add fonts directly to the Operating System locations, or create a "fonts" directory that is a child of the IBM Cognos Installation location. This can be accessed by Series 7 and IBM Cognos 8 programs, and will persist across Software Upgrades.

Operating System	Custom Font Location
Windows	C:\Program Files\Cognos\fonts
Unix	/opt/cognos/fonts

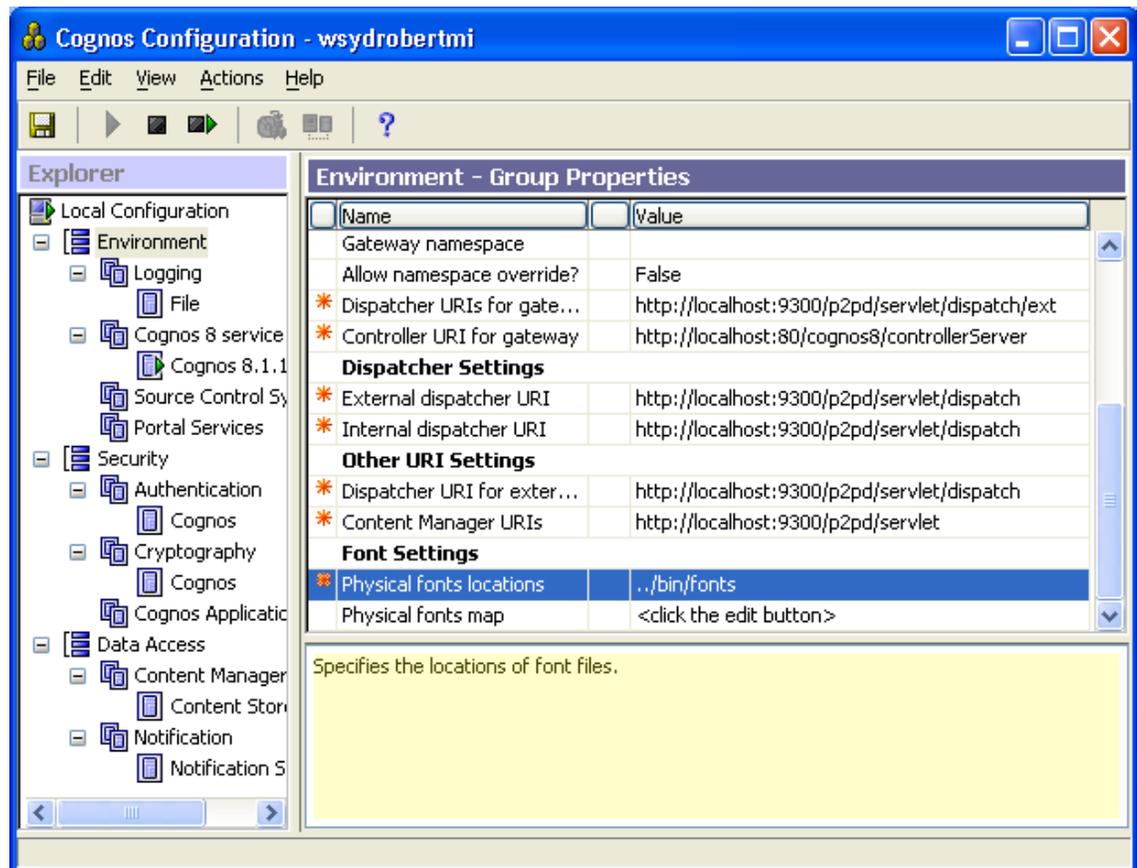
This location could be identified "../..../fonts" relative to the IBM Cognos product "bin" folder. You could place the shared fonts at an NFS or UNC location [if acceptable in the Font licence agreement] but this may impair Report Performance slightly.





4.2 How Fonts are located

IBM Cognos 8 locates TrueType and OpenType fonts only in the semi-colon (";") delimited [on Windows AND Unix] list of directories or folders in IBM Cognos Configuration:



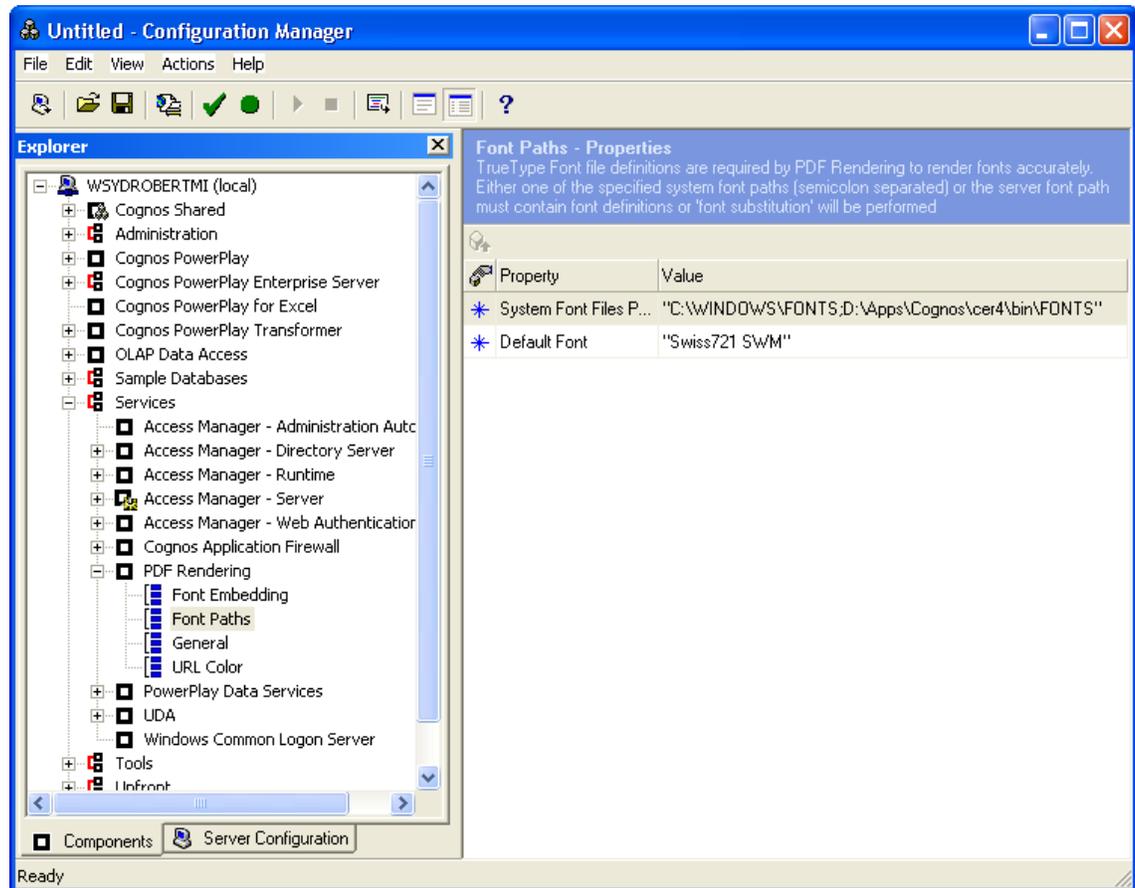
The value "../bin/fonts" is relative to the IBM Cognos 8 "bin" directory, hence resolves to "<installationlocation>/bin/fonts". Additional locations can be specified:

Operating System	Suggested Font Locations
Windows	..\bin\fonts;..\..\fonts;C:\Windows\fonts
AIX	../bin/fonts;../../fonts;/usr/lib/X11/fonts/TrueType
Linux	../bin/fonts;../../fonts;/usr/lib/X11/fonts/TTF
Solaris	../bin/fonts;../../fonts;/usr/openwin/lib/X11/fonts/TrueType
HPUX	../bin/fonts;../../fonts; /usr/lib/X11/fonts/ms.st/typefaces;/usr/lib/X11/fonts/TrueType

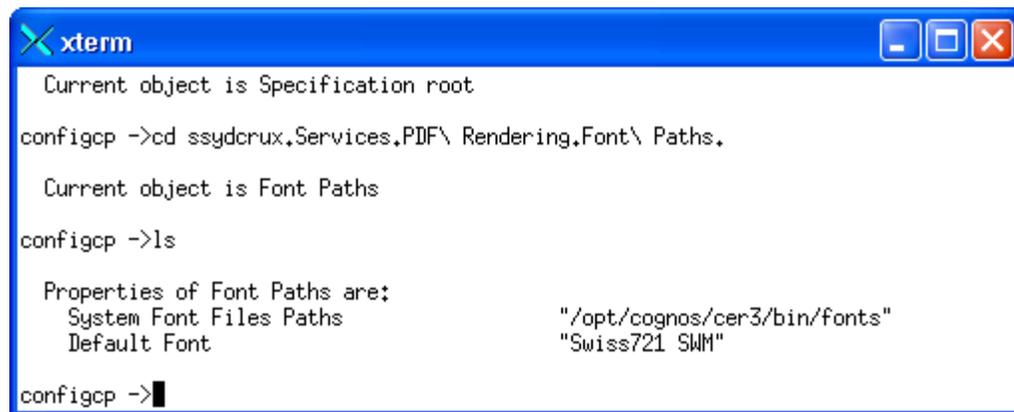




Series 7 locates fonts in a similar manner. The settings are recorded in "cerN/bin/PdfDefault.cps", and can be managed using Configuration Manager:



On Unix, Configuration Manager is also used to amend the Font Path:

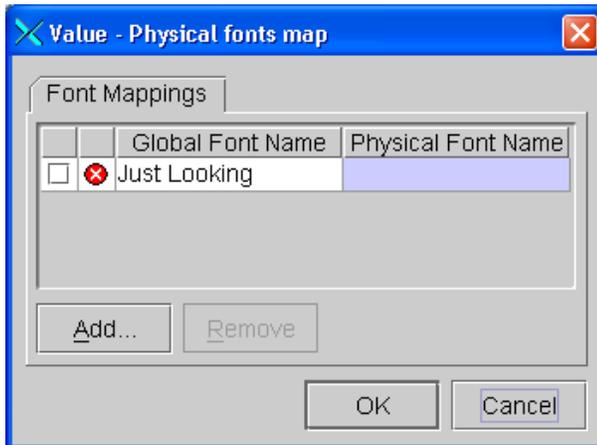


4.3 Which Fonts are REALLY Available

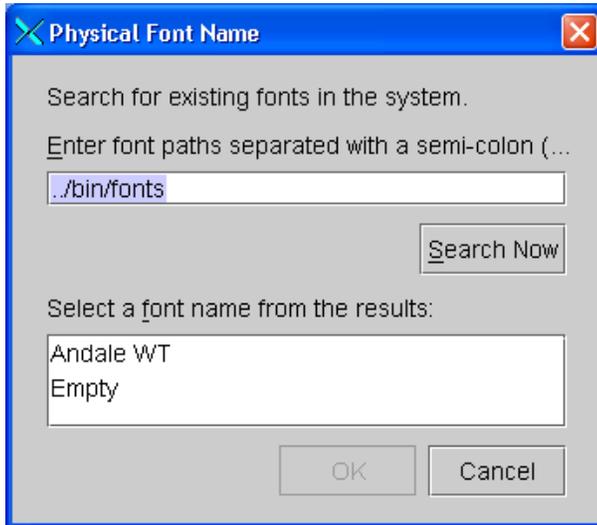
Sometimes an author will use a Font that isn't available on the Report Server. Consequently the PDF Reports will not appear as expected. Ideally the Report Server Administrator will ensure the font is present on the Report Server so that PDFs do appear as intended. Alternatively, the Report Server Administrator can use the "Physical fonts mapping" tool in IBM Cognos Configuration to substitute available physical fonts for the unavailable global font names the Authors may have used.

If the Physical Fonts Map does replace the font in the PDF, then the Document Properties in Adobe Reader will show that the substituted font has been used rather than the original.

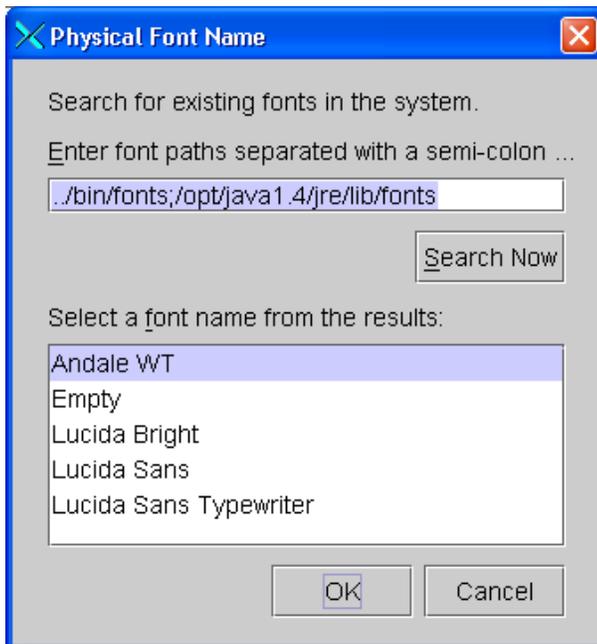
Generally the Physical fonts map should be empty, however the tool is a useful means to determine which Fonts are actually available to the Cognos application(s), and to confirm that the fonts that may be used in Studios from a Browser are actually available to the ReportServer when constructing a PDF.



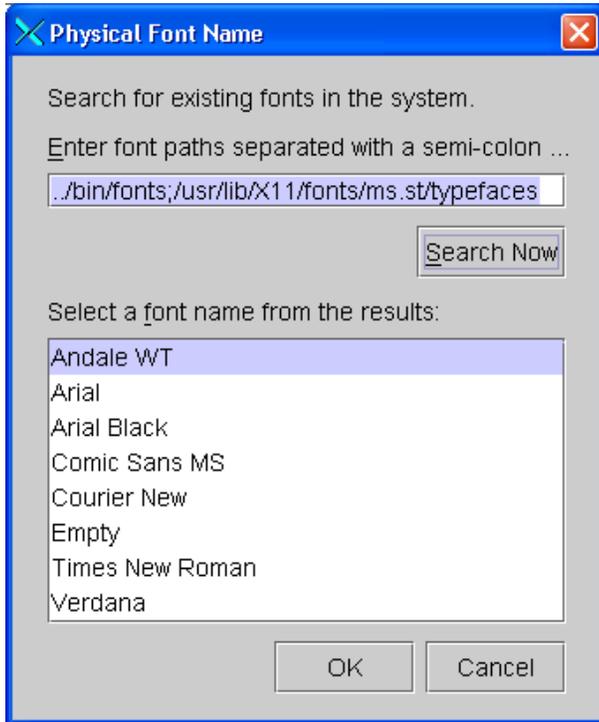
With the "Physical fonts locations" set to the default of merely "../bin/fonts", you'll see only the IBM Cognos-supplied fonts:



When you extend the Font Path to include additional locations, more Fonts may appear:



In this example from HPUX, familiar Microsoft fonts are available. Reports which use those fonts will be created correctly.



5 How to install Fonts on Unix

Font management varies from one flavour of Unix to another. Though X-windows does commonly supply tools such as "ttmkfdir" and "mkfontdir", these perform inconsistently. The instructions below directly manipulate the Font Information files that IBM Cognos uses.

IBM Cognos PDF Rendering applications use only TrueType or OpenType fonts found in the IBM Cognos Font Path and in the "fonts.dir" file in each directory of the Font Path. IBM Cognos does not interact with any X Fonts Server.

If IBM Cognos software is installed to "/opt/cognos" then we suggest creating "/opt/cognos/fonts" and populating this with the TrueType and OpenType Font files from X-Windows, Java and Cognos then amending the "fonts.dir" file appropriately. This location can be accessed by Series 7 and Cognos 8 programs, and will persist across Software Upgrades.

Subject to the licence restrictions on the Fonts that the client intends to use, it is possible to copy TrueType fonts from the Windows "%SYSTEMROOT%\fonts" directory into "/opt/cognos/fonts". After amending "fonts.dir" appropriately and restarting the Cognos daemons the fonts will be available on both the Browser and ReportServer. Note that Unix filenames are Case Sensitive, and that filenames in "fonts.dir" must be accurate.

5.1 fonts.dir

5.1.1 General Form

```
<LineCount>
<FileName> -<Foundry>-<Family>-<Weight>-<Slant>-<Width>-<Serif>-<Size>-
<Resolution>-p-<Registry>-<CharSet>
```

Column	Meaning	Example
Foundry	Font Publisher	monotype
Family	Generic Font Identification	arial
Weight	medium regular bold demibold	regular
Slant	r I (indicating Roman or Italic)	r
Width	normal narrow	normal
Serif	<null> sans (indicating Serif or Sans Serif)	
Size	<pixelsize> - <pointsize>	0-0
Resolution	<xresolution> - <yresolution>	0-0
Registry		0
CharSet	Character Set	iso8859-1

5.1.2 Example

20

```
AndaleWT.ttf -cognos-andalewt-regular-r-normal--0-0-0-0-p-0-iso8859-1
comic.ttf -microsoft-comic sans ms-medium-r-normal--0-0-0-0-p-0-iso8859-1
verdanaz.ttf -microsoft-verdana-bold-i-normal--0-0-0-0-p-0-iso8859-1
verdanab.ttf -microsoft-verdana-bold-r-normal--0-0-0-0-p-0-iso8859-1
verdanai.ttf -microsoft-verdana-medium-i-normal--0-0-0-0-p-0-iso8859-1
verdana.ttf -microsoft-verdana-medium-r-normal--0-0-0-0-p-0-iso8859-1
arialbk.ttf -mono-arial-black-r-normal--0-0-0-0-p-0-iso8859-1
arialz.ttf -monotype-arial-bold-i-normal--0-0-0-0-p-0-iso8859-1
arialb.ttf -monotype-arial-bold-r-normal--0-0-0-0-p-0-iso8859-1
ariali.ttf -monotype-arial-medium-i-normal--0-0-0-0-p-0-iso8859-1
arial.ttf -monotype-arial-medium-r-normal--0-0-0-0-p-0-iso8859-1
courz.ttf -monotype-courier new-bold-i-normal--0-0-0-0-m-0-iso8859-1
courb.ttf -monotype-courier new-bold-r-normal--0-0-0-0-m-0-iso8859-1
couri.ttf -monotype-courier new-medium-i-normal--0-0-0-0-m-0-iso8859-1
cour.ttf -monotype-courier new-medium-r-normal--0-0-0-0-m-0-iso8859-1
timesz.ttf -monotype-times new roman-bold-i-normal--0-0-0-0-p-0-iso8859-1
timesb.ttf -monotype-times new roman-bold-r-normal--0-0-0-0-p-0-iso8859-1
timesi.ttf -monotype-times new roman-medium-i-normal--0-0-0-0-p-0-
iso8859-1
times.ttf -monotype-times new roman-medium-r-normal--0-0-0-0-p-0-iso8859-
1
comicbd.ttf -ms-comic sans ms-bold-r-normal--0-0-0-0-p-0-iso8859-1
```

6 Barcodes

There are two ways to generate a barcode in a Report.

- Render the data using a Barcode Font
- Embed a Graphic that represents the Barcode

6.1 Fonts

When using a Font to render data as a Barcode, the Font must be available on the Report Server where kerning information is used while the PDF or HTML is being generated. The font must also be on the Desktop where that Report is viewed.

If using a Font, IBM Cognos recommends exposing the Font in the IBM Cognos Studios as a named Class in a Stylesheet. This allows for an alternate font to be used if the intended font is not available on the Desktop. Otherwise the barcoded data may display as box characters.

There are many different standards for representation of barcodes. A popular standard is "Code 39", and a satisfactory font is freely available from <http://www.barcodesinc.com/free-barcode-font/> though it does require that the Barcode data is Prefixed and Suffixed with an Asterisk "*".

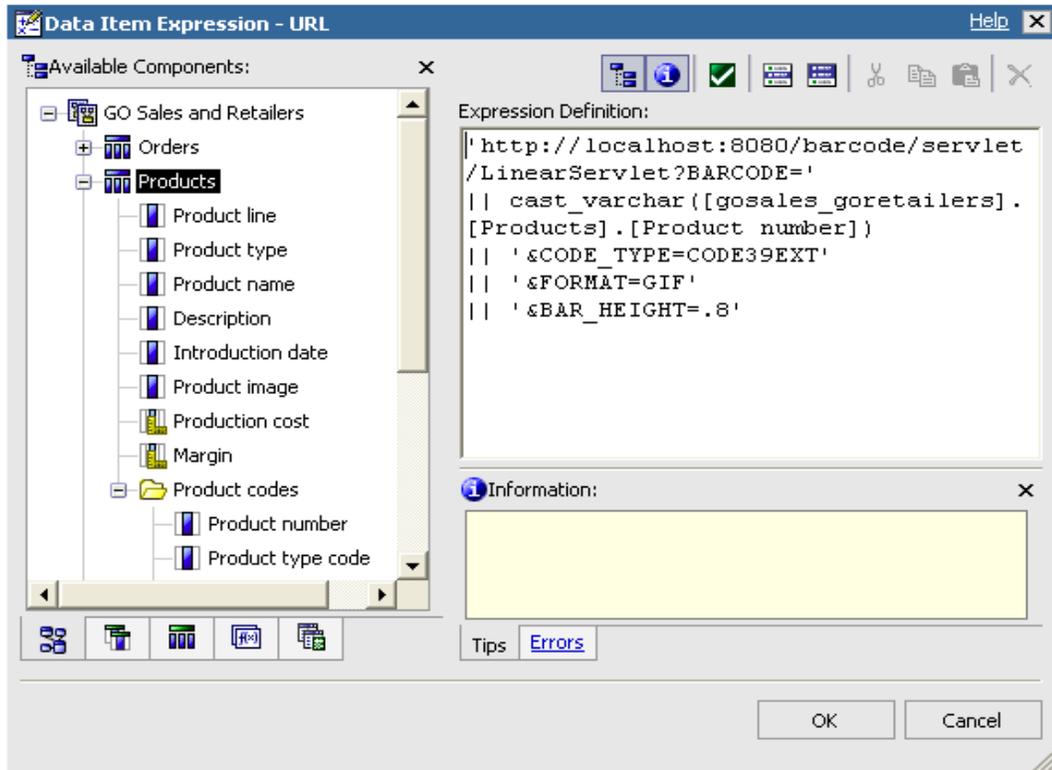
Another Font Foundry also distributes "Code 39" with a restricted licence: <http://www.idautomation.com/fonts/free/> . ID Automation also provide an excellent tutorial at <http://www.idautomation.com/barcoding4beginners.html>

6.2 Images

Delivering the Barcode as an embedded graphic provides greater certainty that it will be rendered accurately. This also removes the need to deploy font files to all Report Recipients. ID Automation provide a JAR file that can deliver a GIF or JPEG from a structured URL. The URL can identify what type of barcode, colours and many other features. See <http://www.idautomation.com/java/> and <http://idautomation.com/tomcat/>

The JAR file from ID Automation can be packaged as a WAR file and deployed to an instance of Tomcat or other Application Server. It can then be referenced from eg IBM Cognos 8 Report Studio as a URL to populate an HTML IMG tag.

In the Report below, a URL is constructed by concatenating strings including the Servlet location, other Parameters and the data to be presented as a Barcode.



Then drag an Image item from the Toolkit on to the Report and populate from the URL above. The report below is accurately delivered in HTML and PDF.

The screenshot shows a web browser window titled "Cognos Viewer - Microsoft Internet Explorer". The browser's address bar and menu bar are visible. The main content area displays a report titled "All Products by Line and Type". The report contains a table with the following data:

Product line	Product type	Product name	Description	Barcode
Camping Equipment	Cooking Gear	TrailChef Water Bag	Lightweight, collapsible bag to carry liquids easily. Wide mouth for easy filling. Holds 10 liters.	 11
		TrailChef Canteen	Aluminum canteen. Rugged fleece-lined cover with belt clips, removable shoulder sling and small pocket for water purification tablets bottle. Holds 2 liters	 22
		TrailChef Kitchen Kit	Zippered nylon pouch contains cutlery for two, can opener, wire whisk, scrubber sponge, 2 60 ml squirt bottles, pancake turner and salt and pepper shaker. Measures 10 x 22 x 5 cm.	 33
		TrailChef Cup	Tin cup. Holds 0.4 liters. Weight: 60 g	 44
		TrailChef Cook Set	All you will ever need on the trail. Pot gripper and nylon carrying bag included. 1.5 and 2 liter pots with individual lids. Weight: 750	 55

At the bottom of the report, there are navigation links: "Top", "Page up", "Page down", and "Bottom". The browser's status bar at the bottom shows "Done" and "Local intranet".

Implementation:

1. Download the Demo Application "JavaBarCodeDemo.zip" from <http://idautomation.com/java/>
2. Create a folder "barcode\WEB-INF\lib"
3. Copy "LinearBarCode.jar" from the ZIP file into "barcode\WEB-INF\lib\"
4. Follow the instructions at <http://idautomation.com/tomcat/> to create the Deployment Descriptor file "barcode\WEB-INF\web.xml" as below:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!DOCTYPE web-app
  PUBLIC "-//Sun Microsystems, Inc.//DTD Web Application 2.3//EN"
  "http://java.sun.com/dtd/web-app_2_3.dtd">

<web-app>

  <display-name>Barcode Generator</display-name>
  <description>
    Barcode Generator from http://idautomation.com/tomcat/
  </description>

  <servlet>
    <servlet-name>LinearServlet</servlet-name>
    <servlet-class>com.idautomation.linear.IDAutomationServlet</servlet-
class>
  </servlet>

  <servlet-mapping>
    <servlet-name>LinearServlet</servlet-name>
    <url-pattern>/servlet/LinearServlet</url-pattern>
  </servlet-mapping>

</web-app>
```

5. At a command prompt, change into the "barcode" folder.
6. Invoke "jar cvf barcode.war ." to construct a Web ARchive file that can be deployed to a Servlet Engine (eg Tomcat, WebSphere, etc).
7. If using Tomcat, copy the "barcode.war" into the "webapps" folder.
8. After a moment, Tomcat will deploy the Web ARchive as an application, and you can access <http://server:port/barcode/servlet/LinearServlet>

Refer to <http://idaautomation.com/java/UserGuide.html> for documented parameters to the Servlet (reproduced below):

Servlet Parameter	Default Value	Comments
AUTOSIZE	TRUE	If true, the size the barcode image will automatically be determined. If this is set to false, the size will need to be specified with setSize(w,h). When using the applet or servlet, autoSize will automatically be set to false if the HEIGHT and WIDTH are manually specified. Because a temp image is created to determine the size, performance is improved by specifying the size and setting autoSize to false.
CODE_TYPE	CODE128	This is the type of barcode to create. Valid values for the barcode types are as follows: CODE39=0; CODE39EXT=1; INTERLEAVED25=2; CODE11=3; CODABAR=4; MSI=5; UPCA=6; IND25=7; MAT25=8; CODE93=9; EAN13=10; EAN8=11; UPCE=12; CODE128=13; CODE93EXT=14; POSTNET=15; PLANET=16; UCC128=17; the default is CODE128. Use the number value for the JavaBean and the text value for the applet and servlet. For example, the servlet query string would include: &CODE_TYPE=CODE39
BACK_COLOR	WHITE	The background color of the barcode. We recommend leaving this at the default setting of WHITE. Valid values are: RED, BLUE, GREEN, BLACK, GRAY, LIGHTGRAY, WHITE, DARKGRAY, YELLOW, ORANGE, CYAN and MAGENTA. You can also use the RGB numerical value of a color as a parameter (e.g. 0x00FF00 if green).
BAR_COLOR	BLACK	The color of the bars. We recommend leaving this at the default setting of BLACK. Valid values are: RED, BLUE, GREEN, BLACK, GRAY, LIGHTGRAY, WHITE, DARKGRAY, YELLOW, ORANGE, CYAN and MAGENTA. You can also use the RGB numerical value of a color as a parameter (e.g. 0x00FF00 if green).
BAR_HEIGHT	1	The height of the bars in CM, which also adjusts the entire height of the barcode.
CODABAR_START	A	Start character for CODABAR. Valid values are "A", "B", "C" or "D".
CODABAR_STOP	B	Start character for CODABAR. Valid values are "A", "B", "C" or "D".
BARCODE	na	This is the data to be encoded in the barcode.
CODE128_SET	0	The set of characters to be used in Code 128. Valid values are : 0, A, B or C. 0 is used for the automatic



		selection. We recommend leaving this at the default setting.
CHECK_CHAR	Y	If true, the software will calculate the check character automatically. The applet and servlet convert "Y" to true and "N" to false.
FONT_COLOR	BLACK	The color of the text below the barcode. Valid values are: RED, BLUE, GREEN, BLACK, GRAY, LIGHTGRAY, WHITE, DARKGRAY, YELLOW, ORANGE, CYAN and MAGENTA. You can also use the RGB numerical value of a color as a parameter (e.g. 0x00FF00 if green).
FORMAT	JPEG	Determines the format of the image when using the servlet or saving a barcode image to a file. Valid values are GIF and JPEG. The GIF files generated are typically 4 to 20 times smaller in size than the JPEG files.
LEFT_MARGIN	0.3	The left margin in CM. This may need to be increased for UPC and EAN barcode types.
N	2	The wide to narrow ratio. A value of 2 (the default), means that wide bars will be 2 times the width of narrow bars. This setting is only valid for barcode types that support an N dimension such as Code 39 and ITF.
na	38	The resolution used to create the X dimension and other measurements in pixels; Default is 38 Pixels Per CM which is about 96 DPI. 96 DPI is the resolution of the web browser; this setting works best when using the servlet or when creating images for the web browser. If you are using JDK 1.3 or greater and printing from the Java application itself, you may set this to the printer resolution. Refer to the <code>java.awt.PageAttributes.setPrinterResolution()</code> in the JDK 1.3 documentation. When creating images for graphic applications, enter 118 to create a 300 DPI image.
ROTATE	0	Indicates the angle of the barcode. Valid values are 0 (normal), 90 (vertical), 180 (inverted) and 270 (inverted vertical).
TEXT_FONT	Arial	The font used to display the human readable code. For example, to change the font in the class library, use the following syntax: <pre>Font newFont = new Font("Arial",Font.PLAIN,30); bc.setFont(newFont);</pre> and to change the font in the applet or servlet use this syntax: <pre>&TEXT_FONT=ARIAL BOLD 12</pre>



WIDTH, HEIGHT	Null	Sets the size in pixels of the barcode image. If the size is set manually, autoSize must be turned off. When using the applet and servlet, autoSize is automatically set to false if the HEIGHT and WIDTH are manually specified.
PT	TRUE	If true (or "Y" when using the applet for servlet) the tilde (~) will be processed as explained here. The default is True.
ST	Y	If this value is true, the human readable text will be displayed with the barcode. The applet and servlet convert "Y" to true and "N" to false.
TOP_MARGIN	0.2	The top margin of the barcode (also know as the quiet zone).
UPCE_SYSTEM	0	The encoding system to be used for UPC-E compression, valid values are 0 and 1. The default is 0.
X	0.03	This setting adjusts the width in centimeters of narrow bars, which also adjusts the entire width of the barcode. The default is 0.03. Set this value to .001 to obtain the smallest barcode possible which is 1 pixel. However, this is usually only adjustable within .03CM (12mil) increments.

7 References

Microsoft Typography

<http://www.microsoft.com/typography/default.mspx>

Font Installation on UNIX and Other Systems

<http://www.idautomation.com/kb/unix-finst.html>

Installing TrueType fonts on Linux

<http://linux.org.mt/article/ttfonts>

How to install X fonts

http://www.mdlug.org/projects/presentations/Howto_Install_X_Font/

<http://www.squirrel.nl/people/jvromans/OOo/oofonts02.html>

Barcodes

<http://www.idautomation.com/barcoding4beginners.html>

"ID Automation"

<http://www.idautomation.com/>