

Cygwin for IBM Rhapsody Installation Guide

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Rhapsody Cygwin support and Installation

Rhapsody supports Cygwin out of the box and expects the compiler to be installed in C:\Cygwin. If you want to install Cygwin in a different folder then its recommended to install the Cygwin compiler before you install IBM[®] Rational[®] Rhapsody[®]. Then the installation wizard can detect and integrate with the compiler.

If you installed the Cygwin compiler after you installed Rational Rhapsody, open Cygwinmake.bat in <Rational Rhapsody installation path>\Share\etc and change the **Path** command to point to your Cygwin installation. For example: PATH=C:\cygwin\bin;%PATH%

Download and Install Cygwin

This document guides you through all steps to install a minimalistic cygwin environment for Rhapsody.

- 1. To install or update Cygwin from https://www.cygwin.com select one of the two options
 - Open https://cygwin.com/setup-x86.exe in your browser any time you want to update or install a Cygwin 32bit package.
 - Open https://www.cygwin.com/setup-x86_64.exe in your browser any time you want to update or install a Cygwin 64bit package .
 - **Tip:** Which bit version shall I use ? As a rule we could say, also to simplify the upcoming installation steps: Download Cygwin32 bit if you have Rhapsody 32bit installed, download Cygwin 64bit, if you have Rhapsody 64 bit version. Otherwise, the benefit of **Cygwin64** is, it allows for maximal use of RAM on 64-bit machines, which probably doesn't matter much unless you're doing some very memory-intensive work.
 - **Warning:** Once you commit to 32-bit or 64-bit (and assuming you don't install both), it's recommended to stick to this choice when installing anything else that will interact with Cygwin

The Cygwin Setup Dialog Window will appear:

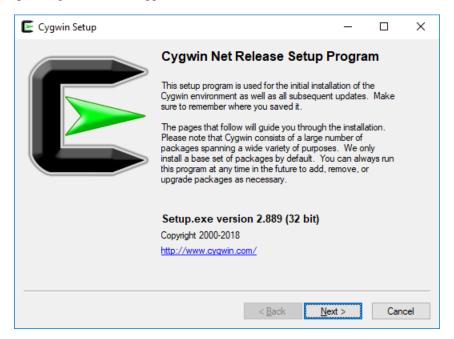


Figure 1: Cygwin Setup Window

- 2. Click Next>
- 3. In the Choose Installation Type Window select Install from Internet then press Next>

E Cygwin Setup - Choose Installation Type	—		×
Choose A Download Source Choose whether to install or download from the internet, or install from files in a local directory.			E
 Install from Internet (downloaded files will be kept for future re-use) Download Without Installing 			
O Install from Local Directory			
< Back Next	>	Car	ncel

4. In Choose Installation Directory select *Root Directory* type c:\cygwin then press Next|>

E Cygwin Setup - Choose Installation Directory -		×
Select Root Install Directory Select the directory where you want to install Cygwin. Also choose a few installation parameters.	(
Root Directory		
C:\cygwin	Browse	
Install For		
 All Users (RECOMMENDED) Cygwin will be available to all users of the system. 		
Just Me Cygwin will still be available to all users, but Desktop Icons, Cygwin Menu Entries, a Installer information are only available to the current user. Only select this if you lac Administrator privileges or if you have specific needs.		nt
< Back Next >	Cano	:el

Figure 2: Choose Installation Directory

- **Note:** Per default Rhapsody expects *Cygwin* to be located at this location. If you chose a different one, you can point in Rhapsody to a different one during Rhapsody Installation.
- 5. In Select Local Package Directory select the location where you want to store the Installations Files for later reuse

E Cygwin Setup - Select Local Package Directory	_		\times
Select Local Package Directory Select a directory where you want Setup to store the installation files it downloads. The directory will be created if it does not already exist.			
Local Package Directory			
C:\Users\FrankBraun\Downloads		Browse	
< <u>B</u> ack <u>N</u> e	ext >	Can	cel

Figure 3: Select Local Package Directory

6. In Select Internet Connectionwindow select how you want to connect to the internet (in general *Direct Connection*) then press Next>

E Cygwin Setup - Select Connection Type	_		×
Select Your Internet Connection Setup needs to know how you want it to connect to the internet. Choose the appropriate settings below.		1	
 Use System Proxy Settings Direct Connection Use HTTP/FTP Proxy: Proxy Host Port 80 Direct Connection (legacy) 			
< Back Nex	d >	Car	ncel

Figure 4: Select Internet Connection Type

7. In Choose Downloadsite select a site close to you geography then click Next>

E Cygwin Setup	o - Choose Download Site(s)			_		×
Choose A Dov Choose a sit	wnload Site e from this list, or add your own sites to	the list			l	
	Available Download Sites:					
	http://mirror.switch.ch ftp://ftp.fau.de http://ftp.fau.de http://ftp.stu.dhs-esslingen.de http://ftp.stud.hs-esslingen.de ftp://ftp.stud.hs-esslingen.de ftp://ftp.stud.hs-esslingen.de http://ftp.inf.tu-dresden.de http://ftp.inf.tu-dresden.de http://ftp.inf.tu-dresden.de http://ftp.inf.tu-dresden.de http://ftp.inf.tu-dresden.de http://ftp.inf.tu-dresden.de http://ftp.int.a.gr		~			
User URL:				Add		
		< Back	Nex	t >	Can	icel

Figure 5: Site location

8. In Select Packages click on Category View.

E Cygwin Setup - Select Package	es							_		×
Select Packages Select packages to downlo	ad								Þ	
<u>V</u> iew Category ~	<u>S</u> earch		<u>C</u> lear			○ <u>К</u> еер	● <u>B</u> est	⊖ <u>S</u> ync	□ <u>T</u> est	
Package	Current	New	Bin?	Src?	Categories	Size	Description			
. II ⊡ All		Default 🔻								
And and a state of	-11		- des	dente de la	A.A.	and a second	-		1000	
<										>
✓ <u>H</u> ide obsolete packages										
						< <u>B</u> ac	:k <u>N</u>	ext>	Cance	I

9. Underneath Category expand *Devel* Category.

E Cygwin Setup - Select Packages									_		×
Select Packages Select packages to download										E	
<u>V</u> iew Category ∨ <u>S</u> e	arch			<u>C</u> lear			⊖ <u>K</u> eep	● <u>B</u> est	⊖ <u>S</u> ync	□ <u>T</u> est	
Package	Current	New		Bin?	Src?	Categories	Size	Description			^
Devel (1205)		Default	-								
aalib devel		Skip	•			Devel, Graphi	58k	An ascii art li	brary - (dev	velopment)	
algol68g		Skip	-	<u>.</u> .		Devel, Interpr	452k	Algol 68 Ger	nie compiler	Carl State	
astyle		UM,	\mathbf{v}_1			Dever, Ca.	145k	A ic Sty	is a reincer	nter a luo	
autobuild K		Skin	-			Πονοί	115k	Ganarata eu	mmarv info	rmation from ≯	Ť
⊡ <u>H</u> ide obsolete packages											
							< <u>B</u> ac	:k <u>N</u>	lext >	Canc	el

10. Click on the \checkmark icon to select the most recent of following packages:

gdb: The GNU Debugger
gcc-g++: GNU Compiler Collection
make: The GNU version of 'make' Utility

	ct Packages Select packages to download											
<u>/</u> iew	Category ~ <u>S</u> ea	arch			<u>C</u> lear			<u>О К</u> еер	● <u>B</u> est	⊖ <u>S</u> ync	□ <u>T</u> est	
Pac	kage	Current	New		Bin?	Src?	Categories	Size	Descriptio	n		^
E	∃ Debug (2045)		Default	•								
E	Devel (1205)		Default	•								
	gcc-g++		7.4.0-1	▼	~		Devel	12,116k	GNU Com	piler Collectio	n (C++)	
	gdb		8.0.1-1	•	~		Devel	2,783k	The GNU	Debugger		
	make		4.2.1-2	T			Daval	449k	The GNU	version of the	'make' utility	
	makedepend		Skip		_	ninstal		30k	X Makefile	dependency	tool	
	male-common		Skip		Sk	cip		30k	Common o	development f	lies for MAT	
	mcpp		Skip		4.	1-1		171k	C/C++ prep	processor		
	meld		Skip		✓ 4.	2.1-2	N	621k	GNOME d	iff tool for files.	directories.	
	montherind		Skin		1.1.1	111	kar in	9 901a	Differ ha	and Staileday	farminean	

Figure 6: Select Packages

11. Press Next>

12. Cygwin resolves missing dependencies to required packages.

E Cygwin Setup - Review and confirm changes		_		×
Review and confirm changes				E
Install base-cygwin 3.8-1 Install cygwin 2.10.0-1 Install libpopt-common 1.16-2 Install mintty 2.8.4-0 Install terminfo 6.0-12.20171125 Install binutils 2.29-1 (automatically added)				* >
	< <u>B</u> ack	<u>N</u> ext >	С	ancel

Figure 7: Resolved Dependencies

13. Click Next> to start the download and installation process.

14. When the installation is complete click Finish>

Testing the Cygwin installation

1. Open the cygwin Terminal



- 2. Type gcc --version and g++ --version
- 3. Type make --version

· ·	_	×
AzureAD+FrankBraun@RhapsodyDemoComputer ~ \$ gccversion gcc (GCC) 6.4.0		^
AzureAD+FrankBraun@RhapsodyDemoComputer ~ \$ g++version g++ (GCC) 6.4.0		
AzureAD+FrankBraun@RhapsodyDemoComputer ~ \$ makeversion GNU Make 4.2.1 Built for i686-pc-cvgwin		
There is NO WARRANTY, to the extent permitted by law.		\sim

Figure 8: Check for no errors

Compiling Rhapsody Framework with Cygwin

Rhapsody Code generation is framework-based: it includes a fixed, predefined framework called the *Object Execution Framework* (OXF). The Rhapsody generated code reuses that framework. The compiled framework libraries which

are located in Share/Lang<Language>/lib are linked to the application generated from the Rational Rhapsody model.

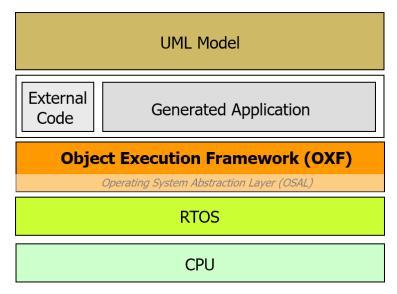


Figure 9: OXF Framework

Before we start, its a best practise to rebuild the OXF with the current Cygwin compiler

- 1. Launch Rhapsody and create a project
 - a) Start Rhapsody in C++ and create an initial project or open an existing one
 - b) Select the active configuration of the projecst

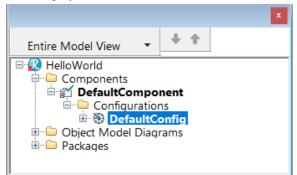


Figure 10: Initial Project

- 2. Select and configure Build-Environment
 - a) Open the Features Dialog of the active Configuration
 - b) In the Settings Tabs under Environment Settings select Cygwin as environment

onfiguration : DefaultConfig in DefaultComponent 🛛 👻 💌								
General Description	Initialization Settings	Checks Relations Tags Properties						
Directory:	C:/Rhapsody/8.3.1/Proj	ect/Hello\ ☑ Use Default						
Standard Headers:								
Include Path:								
Instrumentation								
Instrumentation Mod	le: None	➤ Advanced						
Time Model:	 Real 	◯ Simulated						
Statechart Implemen	tation: OReusable	● Flat						
-Environment Settin	gs							
Environment:	Cygwin	~ Default						
Build Set	Debug							

Figure 11: Environment Settings

- **3.** Checking the CPU property
 - a) In the Features dialog of the active configuration select the Properties Tab

General	Description	Initialization	Settings	Checks	Relations	Tags	Properties
View Loo	ally Overrid	den 🝷					
E CPP_	CG						
		x64					
	G::Cygwin::(property is u	CPU used to specif applications, u	y the CPU	of the targ	et environm	ent.	

Figure 12: CPU Property using Cygwin 64bit

When you install Rational Rhapsody, the value that is assigned to the property [lang]_CG::Cygwin::CPU is determined by the version of Rational Rhapsody that you installed.

- If you installed the Rhapsody 64-bit version, the value of the property is set to x64.
- If you installed the Rhapsody 32-bit version, the value of the property is left blank.

Important: If you are using the 32 Bit Cygwin compiler. you have to make sure that value of the CPU property is set to blank.

4. Build Framework

a) You can build the Framework inside Rhapsody simply select in Code->Build Framework

🛞 IBM Rational Rhaj	osody De	eveloper fo	or C++	- HelloWo	orld.rpyx	
🮯 File Edit View	Code	Layout	Tools	Window	Help	
	G	enerate				>
5 - C - M - L 100		Re Generate				>
Entire Model View		dit				>
	F	orce Round	eltrie 💧	м.,		20
		L , L ,		a		
	С	lean Redui	ndant S	Source File	s	
	В	uild Frame	work			

Figure 13: Building the Framework inside Rhapsody

b) Observe the compiling progress in the log **Output Window** and wait until the build is done.

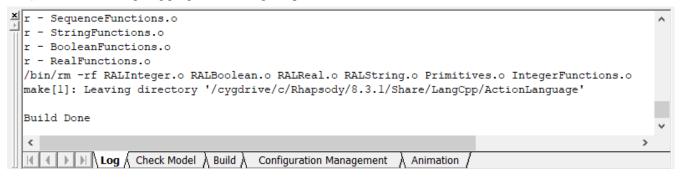


Figure 14: Output Window

c) Observer the build result in the <RhpInstall>/Share/LangCpp/lib path

 ・ This PC → Local D 	isk (C:)	> Rhapsody > 8.3.1 > Share > LangCpp > lib
📕 LangCpp	^	Name
📜 ActionLanguage		cygwinActionLanguagex64.a
📙 aom		cygwinwebcomponentsx64.a
📜 lib		cygwintomtraceRiCx64.a
Linux		cygwintomtracex64.a
omcom		cygwinoxsiminstx64.a
osconfig		cygwinoxsimx64.a
Oscornig		cygwinomcomapplx64.a
📜 oxf		📄 cygwinaomanimx64.a
		cygwinaomtracex64.a
		cygwinoxfinstx64.a
		cygwinoxfx64.a

Figure 15: 64 bit Cygwin Framework libraries

Compiling Rhapsody Webservices with Cygwin

IBM[®] Rational[®] Rhapsody[®] webify provides a Web-Interface to control and monitor your Rhapsody created application. Its purpose is to setup a quick easy User-interface for on the fly testing and visual verification.

This build in Werbserver is provided as compiled webservice library for various targets. The corresponding cygwinWebServices.a are already available for *Cygwin* 32bit and 64bit in <RhpInstall>/Share/Lib folder. It's not mandatory but good practise to rebuild them with your current compiler version.

Create Batch file

a) In the folder <RhpInstall>Share/WebServices create a new batch file called Rebuild Cygwin WebServices.bat



Figure 16: Batch file

b) Fill the batch file with the following content. In case your using Cygwin 32 bit keep CPU empty

```
@echo off
set CYGWIN=nodosfilewarning
set LANG=en US
set PATH=C:\Cygwin\bin;%PATH%
echo Setting environment for Cygwin
make -s -f cygwinWebServices.mak CPU=X64
pause
```

📙 Rebu	ild_Cygwin_WebServices.bat 🔀
1	@echo off
2	<pre>set CYGWIN=nodosfilewarning</pre>
3	set LANG-en_US
4	<pre>set PATH=C:\Cygwin\bin;%PATH%</pre>
	echo Setting environment for Cygwin
6	make -s -f cygwinWebServices.mak CPU=X64
7	pause
8	



c) Double click on the batch file to execute it

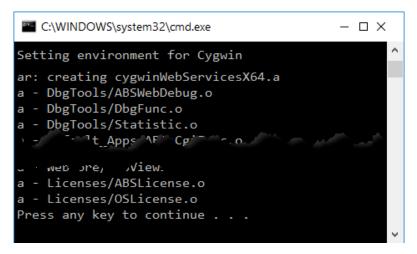


Figure 18: Executed Batchfile to compile the Webservices

d) In the folder <RhpInstall>/Share/lib check that you have a new library