CrossGrid Installation Guide

JIMS - the JMX-based Infrastructure Monitoring System

Task 3.3.3 - JIMS

Document Filename:	**CG-InstallGuide**
Workpackage:	**Task 3.3.3 - JIMS**
Partner(s):	**FZK**
Lead Partner:	**FZK**
Config ID:	**cg-installguide-v1.5.20**
Document classification:	**PUBLIC**

Abstract: This is the skeleton/example for an installation guide for software developed within the CrossGrid project.

Delivery Slip

	Name	Partner	Date	Signature
From	Harald Kornmayer	FZK	Aug 2004	
Verified By				
Approved By				

Document Log

Version	Date	Summary of changes	Author
1-0	aug 11th, 2004	First draft version	Garcia/Kornmayer

Contents

Copyright Notice

Copyright (c) 2005 by **Kazimierz Balos, Slawomir Zielinski, Marek Smet, Tomasz Sekman, Leszek Bizon, Michal Rozenau** . All rights reserved.

Use of this product is subject to the terms and licenses stated in the EDG license agreement. Please refer to Chapter 5 for details.

If your software, or documentation thereof, makes use of any externally copyrighted products, please include the following notices for each such product:

JIMS is a registered trademark of **JMX-based Infrastructure Monitoring System**. All rights reserved.

This research is partly funded by the European Commission IST-2001-32243 Project CrossGrid.

1 About the software

JIMS (JMX-based Infrastructure Monitoring System) is designed to monitor grid infrastructure parameters, ie.:

1. parameters of worker node host platform:
   - CPU load, memory and disk usage
2. parameters of worker node network interfaces
3. network resources and condition:
   - ICMP packets latency
   - UDP packets latency
   - throughput measured using UDP packets

Summary of features in this package:

1. JIMS service (cg-jims-agent):
   - starting, stopping and restarting JIMS agent
2. JIMS CLI application (cg-jims-cli):
   - connect to chosen SOAP Gateway (cluster)
   - list Worker Nodes
   - display CPU statistics for all WNs (supports many CPUs per WN)
   - displays network parameters to chosen WN in current or external cluster
3. JIMS GUI application (cg-jims-manger):
   - displays diagrams of CPU load, memory and filesystem usage

1.1 software components

JIMS is organized in following RPM packages:

- cg-wp3.3.3-jims-agent-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-client-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-modules-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-docs-1.5.20-1.noarch.rpm

Describe which components exists, how the interact with each other and where they will be deployed. A deployment diagram might be helpful.

1.2 Dependencies

Full list of RPMs:

1. cg-wp3.3.3-jims-agent-1.5.20-1.noarch.rpm, depends on:
   - jmxri >= 1.2.1 (JSR-160)
   - jmxremote >= 1.0.1 (JSR-160)
2. cg-wp3.3.3-jims-client-1.5.20-1.noarch.rpm, depends on:
   - Chart2D = 1.9.3c
3. cg-wp3.3.3-jims-modules-1.5.20-1.noarch.rpm, depends on:
   - cg-wp3.3.3-jims-agent >= 1.5.20
   - junit >= 3.8.1
   - jakarta-axis >= 1.2alpha
   - jakarta-commons-logging >= 1.0.2
   - net-snmp >= 5.0.7
4. cg-wp3.3.3-jims-docs-1.5.20-1.noarch.rpm

Source RPM:

1. cg-wp3.3.3-jims-agent-1.5.20-1.src.rpm

Sources in TGZ format:

1. cg-wp3.3.3-jims-1.5.20.src.tgz

Notice: In current version JIMS dependencies are not required by the JIMS RPMs explicitely. All "Requires:" tags in specification file are commented out in order not to make problem during installation.

JAR files (Java libraries/archives) required by JIMS are listed below. These files are available also on autobuild machine (ui010.fzk.de). Details about all JARs (where they can be found in the filesystem and by which RPM they are installed):

- /usr/share/java/[junit.jar -> junit-3.8.1.jar] (junit-3.8.1-1jpp)
- /usr/share/java/[xml-commons-apis.jar -> xml-commons-apis-1.0.jar]
- /usr/share/java/[axis.jar -> axis-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[axis-ant.jar -> axis-ant-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[commons-discovery.jar -> commons-discovery-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[jaxrpc.jar -> jaxrpc-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[saaj.jar -> saaj-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[wsdl4j.jar -> wsdl4j-1.2alpha.jar] (jakarta-axis-1.2alpha)
- /usr/share/java/[commons-logging.jar -> commons-logging-1.0.3.jar] (jakarta-commons-logging-1.0.3-1jpp)
- /usr/share/java/[log4j.jar -> log4j-1.2.8.jar] (log4j-1.2.8)

- /usr/share/java/[snmp.jar -> snmp-4.13.jar] (snmp_4.13.jar)
- /usr/share/java/[Chart2D-old.jar -> Chart2D-1.9.3c.jar] (Chart2D-1.9.3c)
- /usr/share/java/[jmxri.jar -> jmxri-1.2.1.jar] (jmxri-1.2.1 JSR-160)
- /usr/share/java/[jmxtools.jar -> jmxtools-1.2.1.jar] (jmxri-1.2.1 JSR-160)
- /usr/share/java/[jmxremote.jar -> jmxremote-1.0.1.jar] (jmxremote-1.0.1 JSR-160)
- /usr/share/java/[jmxremote_optional.jar -> jmxremote_optional-1.0.1.jar] (jmxremote-1.0.1 JSR-160)
- /usr/share/java/[xercesImpl.jar -> xercesImpl-2.6.2.jar] (xerces-2.6.2)
- /usr/share/java/[antlr.jar -> antlr-2.7.2.jar] (antlr-2.7.2)
- /usr/share/java/[drmaa.jar] (jdrmaa.tar.gz, version 0.4.2)

Build time dependencies:

1. J2SDK Java(TM) 2 SDK, Standard Edition v1.4.2_01, http://java.sun.com/j2se/1.4.2/download.html j2sdk-1_4_2_01-linux-i586.bin
2. ant.jar >= 1.5.4 Ant v1.5.4, http://ant.apache.org/index.html http://sunsite.icm.edu.pl/pub/www/apache/dist/ant/bi ant-1.5.4-bin.zip
3. antlr.jar ANTLR, ANother Tool for Language Recognition, v2.7.2, http://www.antlr.org http://www.antlr.org/downloa 2.7.2.zip

Run time dependencies:

1. Java(TM) 2 Runtime Environment, Standard Edition v1.4.2_01, j2re-1_4_2_01-linux-i586.bin, http://java.sun.com/j2se/1.4.2/download.html
2. Chart2D, v1.9.3c http://chart2d.sourceforge.net/ http://heanet.dl.sourceforge.net/sourceforge/chart2d/Chart2D_1.9.3c.jar
3. Java(TM) Management Extensions (JMX TM) Reference Implementation v1.2.1 JSR-160, http://java.sun.com/products/JavaManagement/download.html
4. Java(TM) Management Extensions (JMX TM) Remote API 1.0.1,
5. JUnit Framework for Testing Resources for Extreme Programming v3.8.1 http://prdownloads.sourceforge.net/junit/junit3.8.1.zip?download Junit3.8.1.zip
6. Westhawk's Java SNMP stack v4.13 http://snmp.westhawk.co.uk/
7. Xerces Java Parser v2.6.2 http://xml.apache.org/xerces2-j/index.html
8. WebServices - Axis v1.2 alpha http://ws.apache.org/axis/
9. Net snmp linux package 5.1.1 http://net-snmp.sourceforge.net/
10. DRMAA 0.4.2 http://gridengine.sunsource.net/servlets/ProjectDownloadList

Describe the dependencies to other software components. From which component is your software dependent, what else must be running to use this software, ...

2 Installation in the CrossGrid testbed

The CrossGrid testbeds are managed by the LCFG deployment support tool. This tool allows an automatic installation of the software on all the required nodes.

2.1 rpm lists for LCFG

This section will be written in principle by the LCFG gurus from WP4. They know what to write here. The intention is to have that LCFG configuration documented somewhere. But it is the responsibility of the software developer to fill this paragraph by asking the LCFG gurus (or better pump them for this information).

2.2 profile modifications for LCFG

This section will be written in principle by the LCFG gurus from WP4. They know what to write here. The intention is to have that LCFG configuration documented somewhere. But it is the responsibility of the software developer to fill this paragraph by asking the LCFG gurus (or better pump them for this information again and again and .....).

2.3 manual post installation steps

In most cases the installation will be fully automated, so you should tell here that no extra postinstallation steps are required. If they are required (like database setup or initialisation, special config-file), please write here what to do!!!

3 Manual Installation

3.1 JIMS installation

3.1.1 Installation steps

JIMS RPMs depend on many other RPMs. Due to the fact that proper installation of these RPMs is rather complicated and some packages are not available as RPMs at all, they are not included in the 'requires' list in JIMS RPMs. JIMS should be started automatically after system start using cg-jims-agent init.d script. It executes "$CG_LOCATION/bin/cg-jims-agent start" command as cgjims user. Logs of init script are in $CG_LOCATION/var/log/jims/jims.log file.

3.1.2 Running JIMS test client

The client from the $CG_LOCATION/bin/cg-jims-cli—client can be used for testing JIMS installation.

```
[user@host dir]$ cg-jims-client localhost list
JIMS client v 1.5.20, List nodes
[01] 149.156.97.159

[user@host dir]$ cg-jims-client localhost cpustats
JIMS client v 1.5.20, CPU statistics
[01] 149.156.97.159:  98[ 98]    0[  0]    0[  0]    3[  4]

[user@host dir]$ cg-jims-client localhost netstats 149.156.97.159
JIMS client v 1.5.20, Nodes' network statistics
[01] 149.156.97.159:    ICMP:   0.11 [ms],      UDP:    0.6 [ms],       Throughput: 1.6864E7 [bit/s]

[user@host dir]$ cg-jims-cli
JIMS CLI v. 1.5.20, type "help" for help
JIMS>l
[01] 149.156.97.159
JIMS>cpu
TIME/CPU0,1,... USER NICE IDLE SYSTEM [hs/s]:
[01] 149.156.97.159:   1[  1]    0[  0]   97[ 97]    2[  2]
JIMS>net 149.156.97.159
[01] 149.156.97.159:    ICMP:  0.107 [ms],      UDP:   0.75 [ms],       Throughput: 1.054E7 [bit/s]
JIMS>q
```

3.2 Download

JIMS source code is available from CVS repository at cvs.fzk.de:
http://savannah.fzk.de/cgi-bin/viewcvs.cgi/crossgrid/crossgrid/wp3/wp3_3-moninfr/wp3_3_3-jims/
Sources in TGZ format are available at:
http://savannah.fzk.de/distribution/crossgrid/autobuilt/i386-rh7.3-gcc3.2.2/wp3/SOURCES/cg-wp3.3.3-jims-1.5.20.src.tgz
RPMs are available at:

Figure 3.1: JIMS packages in site

http://savannah.fzk.de/distribution/crossgrid/autobuilt/i386-rh7.3-gcc3.2.2/wp3/RPMS/
Current version of JIMS is 1.5.20. Following RPMs are available from the site above:

- cg-wp3.3.3-jims-agent-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-client-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-modules-1.5.20-1.noarch.rpm
- cg-wp3.3.3-jims-docs-1.5.20-1.noarch.rpm

Software design of JIMS is included in presentation:

- "JIMS - the JMX Infrastructure Monitoring System" at http://www.eu-crossgrid.org/Seminars-INP/JIMS_monitoring_system.zip

Installation guide is available at:
http://gridportal.fzk.de/websites/crossgrid/cg-wp3-3/wp3_3_3-jims/docs/jims-1.5.20-installguide.pdf

3.3 Installation from rpm

Packages should be installed as follows (listed in order of installation, shown in Fig. 3.1):

CE (Computing Element)

1. cg-wp3.3.3-jims-agent-1.5.20-1.noarch.rpm
2. cg-wp3.3.3-jims-modules-1.5.20-1.noarch.rpm

WN (Worker Node)

1. cg-wp3.3.3-jims-agent-1.5.20-1.noarch.rpm

CLIENT (Client machine)

1. cg-wp3.3.3-jims-client-1.5.20-1.noarch.rpm

3.4 Installation from source

JIMS can be build from sources using following source archive:
http://savannah.fzk.de/cgi-bin/viewcvs.cgi/crossgrid/crossgrid/wp3/wp3_3-moninfr/wp3_3_3-jims/wp3_3_3-jims.tar.gz?tarball=1
Though JIMS is now being built using autobuild system, it can be built anywere using JIMS source code downloaded from CVS under wp3_3_3-jims tree:
https://savannah.fzk.de/cgi-bin/viewcvs.cgi/crossgrid/crossgrid/wp3/wp3_3-moninfr/wp3_3_3-jims/
Having JIMS source code it can be build using ant with default target (rpm) and then installed using "ant -Dprefix=DESTINATION" install", where DESTINATION will be the CG_LOCATION directory. Default CG_LOCATION is /opt/cg.

Figure 3.2: Configuration of ports for use with JIMS

3.5 Configuration

3.5.1 List of configuration files

List of all configuration files (with full path):

- $CG_LOCATION/etc/jims/jims-defaults

3.5.2 Editing the configuration files

Editing of any configuration files is not required.

3.5.3 Startup scripts

Names of init.d scripts and supported directives:

- $CG_LOCATION/etc/init.d/cg-jims-agent start—stop—restart

3.5.4 Other requirements

Environment

Make sure that there is present Java configuration file: /etc/java/java.conf with content:

```
export JAVA\_HOME="/usr/java/j2sdk1.4.1\_01"
```

Installation from RPMs (common, service and client) doesn't require editing of any files. All scripts will be automatically configured using the $CG_LOCATION/etc/cg-site.cfg file. The content of the $CG_LOCATION/etc/cg-site.cfg file should be as follows:

```
CE=cehost.domain.com
SE=sehost.domain.com
```

Users

Make sure the cgjims user and cgjims group are created. It doesn't matter what the ids are, because they are taken by names,

Ports

Fig. 3.2 shows connections established permanently, excluding network measurement communication using UDP on ports 7703 and 7704, by JIMS monitoring service. Below there are lists of ports that need to be opened for JIMS to run properly.

Opened ports for CE for incoming connections from following locations:

- UI: TCP 7701, TCP 7702
- CE: UDP 7706

- all WNs: TCP 7701
- outside world: TCP 7702

Opened ports for UI for incoming connections from following locations:

- no additional incoming connections (for use with JIMS)

Opened ports for WN for incoming connections from following locations:

- the same WN: UDP 161
- all other WNs in the site: UDP 7703, UDP 7704
- CE: UDP 7706, TCP 7707

Communication between sites

It's required to allow communication between sites on UDP ports 7703 and 7704 on CEs for network measurements of bandwidth and delay.

SNMP

JIMS uses SNMP agents to gather information about network resources. In order to run properly, JIMS SNMP module (called SNMPMirror) connects to SNMP agets that are running on WNs.

SNMP agents ports must be opened to the same machines on which they are running. On each machine there is Java agent running and connecting to it, so it should not need any ports opened to the outside world.

JIMS SNMP module is configured in $CG_LOCATION/share/java/cg-jims-snmp.jar snmp.properties. In this file there is setting disabling the write access to SNMP agent and setting the R and W community string. Because this string is written in plain text, this file should be disabled from accessing from other users than cgjims.

JIMS requires running SNMP agents on all WN. At https://savannah.fzk.de/cgi-bin/viewcvs.cgi/crossgrid/crossgrid/wp3/wp3 moninfr/wp3_3_3-jims/src/snmp/cfg/ there are configuration files for Net SNMP agents. They include: snmp.conf (client) and snmpd.conf (server), however SNMP client is not required by JIMS.

Firewall configuration

In order to allow multicast traffic in cluster, all firewalls in cluster should pass multicast packets with 224.224.224.224 destination IP address to all WNs in clusters. Such packets are sent from CE to WNs and there should be put special attention to configure firewall and switches to pass the multicast traffic. Using iptables it can be achieved using following command:

```
-A INPUT -s 141.52.160.0/255.255.255.0 -d 224.224.224.224 -i eth0 -p udp -j ACCEPT
```

Certificates

Not required.

Folders

Make sure the $CG_LOCATION/var/log/jims directory exists and is writable by cgjims user. There will be stored all log and pid files It is sufficient to issue the command:

```
chown -R cgjims.cgjims $CG_LOCATION/var/log/jims
```

.

4 Running and testing

JIMS service can be easily tested using cg-jims-cli application. Try simply issue the 'cg-jims-cli' command and then follow the help: connect to computing element already installed, list the nodes and get some parameters. Example is shown below.

```
JIMS CLI v. 1.5.20, type "help" for help
JIMS>connect ce010.fzk.de
Connection prepared for: ce010.fzk.de
JIMS>list
[01] 141.52.160.35
[02] 141.52.160.36
[03] 141.52.160.33
[04] 141.52.160.34
JIMS>get Uptime
[Monitoring:class=SystemInformation] [Uptime]:
[01] 141.52.160.35: 1027137.44
[02] 141.52.160.36: 1027129.94
[03] 141.52.160.33: 1027174.06
[04] 141.52.160.34: 1027178.75
JIMS>list modules
[1] SystemInformation
[2] SNMPMirror
[3] NetworkMetrics
JIMS>module SNMPMirror
Module set to: SNMPMirror
JIMS>get sysName
[Monitoring:class=SNMPMirror] [sysName]:
[01] 141.52.160.35: wn030.fzk.de
[02] 141.52.160.36: wn040.fzk.de
[03] 141.52.160.33: wn010.fzk.de
[04] 141.52.160.34: wn020.fzk.de
JIMS>quit
```

4.1 log files

List of all log files (with full path):

- $CG_LOCATION/var/log/jims/agent$MONITORED_STATION_IP.pid
- $CG_LOCATION/var/log/jims/agent.log
- $CG_LOCATION/var/log/jims/httpserver.log
- $CG_LOCATION/var/log/jims/jims.log
- $CG_LOCATION/var/log/jims/osinfo.log
- $CG_LOCATION/var/log/jims/snmpmirror.log
- $CG_LOCATION/var/log/jims/soapgateway.log

5 EDG License Agreement

This section should contain the EDG agreement, under which CrossGrid software is being licensed. If your software follows a different licensing pattern, replace this text with another license, appropriate for your software.

Copyright (c) 2005 CrossGrid. All rights reserved.

This software includes voluntary contributions made to the CrossGrid Project. For more information on CrossGrid, please see http://www.eu-crossgrid.org.

Installation, use, reproduction, display, modification and redistribution of this software, with or without modification, in source and binary forms, are permitted. Any exercise of rights under this license by you or your sub-licensees is subject to the following conditions:

1. Redistributions of this software, with or without modification, must reproduce the above copyright notice and the above license statement as well as this list of conditions, in the software, the user documentation and any other materials provided with the software.

2. The user documentation, if any, included with a redistribution, must include the following notice:

This product includes software developed by the CrossGrid Project (http://www.eu-crossgrid.org).

Alternatively, if that is where third-party acknowledgments normally appear, this acknowledgment must be reproduced in the software itself.

3. The names CrossGrid and CG may not be used to endorse or promote software, or products derived therefrom, except with prior written permission by cgoffice@cyfronet.krakow.pl.

4. You are under no obligation to provide anyone with any bug fixes, patches, upgrades or other modifications, enhancements or derivatives of the features, functionality or performance of this software that you may develop. However, if you publish or distribute your modifications, enhancements or derivative works without contemporaneously requiring users to enter into a separate written license agreement, then you are deemed to have granted participants in the CrossGrid Project a worldwide, non-exclusive, royalty-free, perpetual license to install, use, reproduce, display, modify, redistribute and sub-license your modifications, enhancements or derivative works, whether in binary or source code form, under the license conditions stated in this list of conditions.

5. DISCLAIMER

THIS SOFTWARE IS PROVIDED BY THE CROSSGRID PROJECT AND CONTRIBUTORS AS IS AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, OF SATISFACTORY QUALITY, AND FITNESS FOR A PARTICULAR PURPOSE OR USE ARE DISCLAIMED. THE CROSSGRID PROJECT AND CONTRIBUTORS MAKE NO REPRESENTATION THAT THE SOFTWARE, MODIFICATIONS, ENHANCEMENTS OR DERIVATIVE WORKS THEREOF, WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADE SECRET OR OTHER PROPRIETARY RIGHT.

6. LIMITATION OF LIABILITY

THE CROSSGRID PROJECT AND CONTRIBUTORS SHALL HAVE NO LIABILITY TO LICENSEE OR OTHER PERSONS FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, OR PUNITIVE DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, LOSS OF USE, DATA OR PROFITS, OR BUSINESS INTERRUPTION, HOWEVER CAUSED AND ON ANY THEORY OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), PRODUCT LIABILITY OR OTHERWISE, ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Bibliography

[TEST] Jorge Gomes, LIP; **Middleware Test Procedure**;May 2002

[QAP] WP5, CYRFRONET; **Quality Assurance Plan**; Evolving document

A Directory structure

1. jims-agent:
   - bin/cg-jims-agent - jims service init.d helper script (additional administrative options for test and development)
   - etc/init.d/cg-jims-agent - jims service init.d script to be invoked to start the JIMS service
   - etc/jims/jims-defaults - default values of some crucial options
   - share/java/jims-agent.jar - JIMS agent Java package
   - share/java/jims-httpserver.jar - HTTP server module for JIMS agent
   - share/java/jims-oscommon.jar - operating system common information module for JIMS agent
   - share/man/man1/cg-jims-agent.1.gz - man page for cg-jims-agent
   - share/doc/cg-wp3.3.3-jims-agent-1.5.20/LICENSE - CG license file
   - share/doc/cg-wp3.3.3-jims-agent-1.5.20/README - agent README file
2. jims-modules:
   - etc/jims/mbeanOSInfoLinux.mlet - mlet file describing monitoring module for Linux systems
   - etc/jims/mbeanOSInfoSunOS.mlet - mlet file describing monitoring module for SunOS systems
   - etc/jims/mbeanSGE.mlet - mlet file describing monitoring module for SGE and PBS grid engine systems
   - etc/jims/mbeanSoapGateway.mlet - mlet file describing Soap Gateway and Global Discovery Service modules
   - share/java/jims-discovery.jar - Java package of discovery module
   - share/java/jims-downloader.jar - Java package of downloader optional module - not used during normal operation
   - share/java/jims-gds.jar - Java package of Global Discovery Service module
   - share/java/jims-gemonitoring.jar - Java package of grid engine monitoring module
   - share/java/jims-networkmetrics.jar- Java package of network monitoring module
   - share/java/jims-osinfo-linux.jar - Java package of Linux systems monitoring module
   - share/java/jims-osinfo-sunos.jar - Java package of SunOS systems monitoring module
   - share/java/jims-snmp.jar - Java package of SNMP mirror module
   - share/java/jims-soapgateway.jar - Java package of Soap Gateway module
   - share/doc/cg-wp3.3.3-jims-modules-1.5.20/LICENSE - CG license file
   - share/doc/cg-wp3.3.3-jims-modules-1.5.20/README - modules README file
3. jims-client:
   - bin/cg-jims-cli - jims client CLI interactive/batch client
   - bin/cg-jims-client - jims client CLI simple client
   - bin/cg-jims-manager - jims manager using GUI
   - bin/cg-jims-snmpman - jims SNMP MIB browser using GUI
   - share/java/jims-client.jar - jims CLI applications

- share/java/jims-manager.jar - jims GUI application
- share/java/jims-snmp-manager.jar - jims SNMP MIB browser
- share/doc/cg-wp3.3.3-jims-client-1.5.20/LICENSE - CG license file
- share/doc/cg-wp3.3.3-jims-client-1.5.20/README - client README file

4. jims-client Windows (available in source format at cvs.fzk.de or after installation jims-client RPM):
   - bin/cg-jims-client.bat - jims client using CLI
   - bin/cg-jims-manager.bat - jims manager using GUI
   - bin/cg-jims-snmpman.bat - jims SNMP MIB browser using GUI
5. jims-docs:
   - share/doc/cg-wp3.3.3-jims-docs-1.5.20/LICENSE - CG license file
   - share/doc/cg-wp3.3.3-jims-docs-1.5.20/README - docs README file
   - share/doc/cg-wp3.3.3-jims-docs-1.5.20/jims-1.5.20-installguide.pdf - install manual
   - share/doc/cg-wp3.3.3-jims-docs-1.5.20/jims-1.5.20-developermanual.pdf - developers manual
   - share/doc/cg-wp3.3.3-jims-docs-1.5.20/jims-1.5.20-usermanual.pdf - user manual