

CRaSH

CRaSH reference guide

Julien Viet

eXo Platform

Copyright © 2011 eXo Platform SAS

Table of Contents

Preface

1. Running CRaSH

1.1. Standalone

1.2. Embedded mode

2. Interacting with the shell

2.1. Shell usage

2.2. Command usage

2.3. Base commands

3. Configuration

3.1. Configuring the standalone or attach mode

3.2. Configuring the web application mode

3.3. Configuration properties

4. Developers

4.1. Developing commands

4.2. Parameter annotations: Don't Repeat Yourself

4.3. Command context

4.4. Adding style

4.5. Inter command API

5. Extending CRaSH

5.1. Embedding CRaSH

5.2. Pluggable authentication

6. JCR extension

6.1. JCR implementations

6.2. JCR commands

6.3. SCP usage

7. Hey, I want to contribute!

List of Examples

1.1. Embedding CRaSH in a web application

1.2. Embedding CRaSH in Spring

1.3. Spring managed authentication plugin

1.4. Custom authentication bean in spring.xml

2.1. Remove all nt:unstructured nodes

2.2. Update the security of all nt:unstructured nodes

2.3. Add the mixin mix:referenceable to any node of type nt:file or nt:folder

4.1. Our custom value type

4.2. The custom value type declared in META-INF/services/org.crsh.cli.type.ValueType

4.3. The command context

4.4. Using shell session

4.5. Obtaining a Spring bean

4.6. The invocation context

4.7. Printing on the shell

4.8. Reading on the console

4.9. Decorating and coloring text

- 4.10. [Printing styled text](#)
- 4.11. [Styling with the leftshift operator](#)
- 4.12. [dbscript.groovy](#)

Preface

The Common Reusable SHell (CRaSH) deploys in a Java runtime and provides interactions with the JVM. Commands are written in Groovy and can be developed at runtime making the extension of the shell very easy with fast development cycle.

Running CRaSH

There are several ways to run CRaSH, as a standalone application it controls its own JVM or as an embedded service in an existing runtime like a web application or a Spring application.


1.1. Standalone

1.1.1. Standalone mode

The standalone mode allows you to run CRaSH from the command line directly. It provides the same functionality as the war deployment but does not require a web container as it runs its own virtual machine. The `crash` directory in the application contains the standalone distribution.

The bin directory `/crash/bin` can be added to the system path, it contains the `crash.sh` script that will start the standalone mode, for instance you can set it up this way:

```
> export PATH=/.../crash/bin:$PATH
> crash.sh
```



```
Follow and support the project on http://vietj.github.com/crash
Welcome to jerry + !
It is Thu Apr 12 21:19:35 CEST 2012 now
```

Let's review quickly what you can find in standalone crash:

- The `bin` directory contains the `crash.sh` script and the standalone crash jar file
- The `conf` directory contains the configuration properties `crash.properties` and JVM logging configuration `logging.properties`
- The `cmd` directory contains the commands that will be available in crash by default it contains a few example commands
- The `lib` directory contains the various libraries used by crash, you should place additional jar files there

1.1.2. Attach mode

The attach mode allows you to attach CRaSH to a JVM located on the same host with the attach API provided by the Hotspot JVM. It is the standalone mode attached to a running JVM specified by a process id. CRaSH will hook into the targetted JVM instead of the JVM started by CRaSH. Let's see quickly an example of how to use it

- The *read* option value uses configuration files from directories and classpath.
- The *copy* option value scans the classpath during the startup and copies the files in the first configuration folder, then configuration are used from the folders. This value requires at least one conf directory to be specified for extracting the configuration files.

1.1.3.5. **--property option**

The *--cmd* option sets and overrides a shell configuration property, the value follows the pattern *a=b*, for instance:

```
crash.sh --property crash.telnet.port=3000
```

1.1.3.6. **--non-interactive option**

The *--non-interactive* option disable the usage of the JVM input and output.

```
crash.sh --non-interactive
```

1.1.3.7. **pid arguments**

The `org.crsh.standalone.CRaSH` main has an optional list of arguments that are JVM *process id*. When one or several JVM process id are specified, CRaSH will dynamically attach to this virtual machine and will be executed in that machine. By default the two JVM will communicate with a socket unless the *non-interactive* option is set.

When more than one process id is specified, the *non-interactive* option must be set because CRaSH will not be able to aggregate two command lines in the same terminal.

1.1.4. **Resource extraction**

When the options *--cmd-mode* or *--conf-mode* are set to the *copy*, CRaSH will scan the classpath and extract the resources in the corresponding directory.

The default value of these options is *copy* however no copy happens unless at least one directory for extracting the resources is specified, therefore

- The `org.crsh.standalone.CRaSH` does nothing by default
- The *crash.sh* or *crash.bat* extracts the resources in the corresponding directory as the *cmd* and *conf* directories are specified

To prevent any resource copying the value *read* should be used/

1.2. Embedded mode

1.2.1. Embedding in a web app

CRaSH can use a standard web archive to be deployed in a web container. The war file is used for its packaging capabilities and triggering the CRaSH life cycle start/stop. In this mode CRaSH has two packaging available:

- A core war file found under *deploy/core/crash.war* provides the base CRaSH functionalities
- A gatein war file found under *deploy/gatein/crash.war* provides additional Java Content Repository (JCR) features but deploys only in a GateIn server (Tomcat or JBoss). It extends the core packaging and adds
 - JCR browsing and interactions
 - SCP support for JCR import and export

You have to copy the *crash.war* in the appropriate server, regardless of the packaging used.

If you want you can embed CRaSH in your own *web.xml* configuration:

Example 1.1. Embedding CRaSH in a web application

```
<web-app>
  <listener>
    <listener-class>org.crsh.plugin.WebPluginLifeCycle</listener-class>
  </listener>
</web-app>
```

1.2.2. Embedding in Spring

CRaSH can be easily embedded and configured in a Spring configuration

1.2.2.1. Embedding as a Spring bean

Here is an example of embedding crash:

Example 1.2. Embedding CRaSH in Spring

```
<beans xmlns="http://www.springframework.org/schema/beans" xmlns:xsi="http://www
<bean class="org.crash.spring.SpringBootstrap">
  <property name="config">
    <props>
      <!-- VFS configuration -->
      <prop key="crash.vfs.refresh_period">1</prop>

      <!-- SSH configuration -->
      <prop key="crash.ssh.port">2000</prop>

      <!-- Optional SSH timeouts -->
      <prop key="crash.ssh.auth-timeout">300000</prop>
      <prop key="crash.ssh.idle-timeout">300000</prop>

      <!-- Telnet configuration -->
      <prop key="crash.telnet.port">5000</prop>

      <!-- Authentication configuration -->
      <prop key="crash.auth">simple</prop>
      <prop key="crash.auth.simple.username">admin</prop>
      <prop key="crash.auth.simple.password">admin</prop>
    </props>
  </property>
</bean>

</beans>
```

The configuration properties are set as properties with the *config* property of the SpringBootstrap bean.

Any Spring managed beans that extend `org.crash.plugin.CRaSHPlugin` will be automatically registered as plugins in addition to those declared in META-INF/services/org.crash.plugin.CRaSHPlugin.

For example, the following implements a CRaSH authentication plugin that uses a JDBC DataSource managed by Spring:

Example 1.3. Spring managed authentication plugin

```
package example;

import java.sql.Connection;
import java.sql.PreparedStatement;
import java.sql.ResultSet;

import javax.sql.DataSource;

import org.crsh.auth.AuthenticationPlugin;
import org.crsh.plugin.CRaSHPlugin;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Component;

@Component("dbCrshAuth")
public class DbCrshAuthPlugin extends CRaSHPlugin<AuthenticationPlugin>
    implements AuthenticationPlugin {

    @Autowired
    private DataSource dataSource;

    @Override
    public AuthenticationPlugin getImplementation() {
        return this;
    }

    @Override
    public boolean authenticate(String username, String password)
        throws Exception {
        Connection conn = dataSource.getConnection();

        PreparedStatement statement = conn
            .prepareStatement("SELECT COUNT(*) FROM users WHERE username =
statement.setString(1, username);
statement.setString(2, password);

        ResultSet rs = statement.executeQuery();
        return rs.getInt(1) >= 1;
    }

    @Override
    public String getName() {
        return "dbCrshAuth";
    }

    public void setDataSource(DataSource dataSource) {
        this.dataSource = dataSource;
    }
}
```

The above code uses Spring annotation driven beans, but this works the same with beans configured in XML:

Example 1.4. Custom authentication bean in spring.xml

```
<beans xmlns="http://www.springframework.org/schema/beans" xmlns:xsi="http://www.springframework.org/schema/xsi" xsi:schemaLocation="http://www.springframework.org/schema/beans http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean class="example.DbCrshAuthPlugin">
        <property name="dataSource" ref="dataSource"/>
    </bean>

</beans>
```

1.2.2.2. Embedding in a Spring web app

In case you are embedding CRaSH in a Spring application running with a servlet container, the bean `org.crsh.spring.SpringWebBootstrap` can be used instead of `org.crsh.spring.SpringBootstrap`. The `SpringWebBootstrap` extends the `SpringBootstrap` class and adds the *WEB-INF/crash* directory to the command path.

An example packaging comes with the CRaSH distribution, a `spring` war file found under *deploy/spring/crash.war* provides the base CRaSH functionalities bootstrapped by the Spring Framework. It can be used as an example for embedding CRaSH in Spring.

This example is bundled with a `spring` command that shows how the Spring factory or beans can be accessed within a CRaSH command.

2

Interacting with the shell

2.1. Shell usage

2.1.1. Connection

You need to connect using telnet, SSH or *directly* to use the shell. The last method is a special mode using the JVM input and output.

2.1.1.1. Telnet access

Telnet connection is done on port 5000:

```
(! 520)-> telnet localhost 5000  
Trying ::1...  
Connected to localhost.  
Escape character is '^]'.  
  
    _____  
   ~~~~~~ | ^^^^^^^^ ,      . . . . . |_____| 1.2.9  
  |       | |'""|''''' |         . . . . . |_____  
  |       | |     |     |        . . . . . |_____  
  |_____.' |      . . . . . |          .. |_____  
                                     |          |  
Follow and support the project on http://vietj.github.com/crash  
Welcome to julien.local + !  
It is Fri Dec 03 16:20:40 CET 2010 now
```

The `bye` command disconnect from the shell.

2.1.1.2. SSH access

SSH connection is done on port 2000 with the password **crash** :

```
juliens-macbook-pro:~ julien$ ssh -p 2000 -l root localhost
root@localhost's password:
CRaSH 1.2.9 (http://vietj.github.com/crash)
Welcome to juliens-macbook-pro.local!
It is Fri Jan 08 21:12:53 CET 2010 now.
%
```

The `bye` command disconnect from the shell.

2.1.1.3. Native access

A third mode is available for standalone CRaSH usage where it uses the JVM native input and output. When you run in standalone, CRaSh will be available just after the JVM is launched.

2.1.2. Features

- Line edition: the current line can be edited via left and right arrow keys
- History: the key up and key down enable history browsing
- Quoting: simple quotes or double quotes allow to insert blanks in command options and arguments, for instance *"old boy"* or *'old boy'*. One quote style can quote another, like *"hi, it's me"*.
- Completion: an advanced completion system is available

2.2. Command usage

2.2.1. Getting basic help

The `help` command will display the list of known commands by the shell.

```
[/]% help
% help
Try one of these commands with the -h or --help switch:

cd                changes the current node
commit           saves changes
consume          collects a set of nodes
cp               copy a node to another
env              display the term env
exportworkspace  Export a workspace on the file system (experimental)
fail             Fails
help             provides basic help
importworkspace Import a workspace from the file system (experimental)
invoke           Invoke a static method
log              logging commands
ls               list the content of a node
man              format and display the on-line manual pages
mixin            mixin commands
mv               move a node
node             node commands
produce           produce a set of nodes
pwd              print the current node path
rm               remove one or several node or a property
rollback         rollback changes
select           execute a JCR sql query
setperm          modify the security permissions of a JCR node
sleep            sleep for some time
thread           vm thread commands
version          versioning commands
wait             Invoke a static method
ws               workspace commands
xpath            execute a JCR xpath query
```

2.2.2. Command line usage

The basic CRaSH usage is like any shell, you just type a command with its options and arguments. However it is possible to compose commands and create powerful combinations.

2.2.2.1. Basic command usage

Typing the command followed by options and arguments will do the job

```
% ls /  
...
```

2.2.2.2. Command help display

Any command help can be displayed by using the -h argument:

```
% ls -h  
usage: ls [-h | --help] [-h | --help] [-d | --depth] path  
  
[-h | --help]  command usage  
[-h | --help]  command usage  
[-d | --depth] Print depth  
path           the path of the node content to list
```

In addition of that, commands can have a complete manual that can be displayed thanks to the `man` command:


```

% man ls
NAME
    ls - list the content of a node

SYNOPSIS
    ls [-h | --help] [-h | --help] [-d | --depth] [-d | --depth] path

DESCRIPTION
    The ls command displays the content of a node. By default it lists the content of the current directory. It also accepts a path argument that can be absolute or relative.

    [/]% ls
    /
    +-properties
    | +-jcr:primaryType: nt:unstructured
    | +-jcr:mixinTypes: [exo:owneable,exo:privilegeable]
    | +-exo:owner: '__system'
    | +-exo:permissions: [any read,*/platform/administrators read,*/platform/
    +-children
    | +-/workspace
    | +-/contents
    | +-/Users
    | +-/gadgets
    | +-/folder

PARAMETERS
    [-h | --help]
        Provides command usage

    [-h | --help]
        Provides command usage

    [-d | --depth]
        Print depth

    path
        the path of the node content to list

```

2.2.2.3. Advanced command usage

A CRaSH command is able to consume and produce a stream of object, allowing complex interactions between commands where they can exchange stream of compatible objects. Most of the time, JCR nodes are the objects exchanged by the commands but any command is free to produce or consume any type.

By default a command that does not support this feature does not consume or produce anything. Such commands usually inherits from the `org.crsh.command.ClassCommand` class that does not care about it. If you look at this class you will see it extends the `org.crsh.command.BaseCommand`.

More advanced commands inherits from `org.crsh.command.BaseCommand` class that specifies two generic types `<C>` and `<P>`:

- `<C>` is the type of the object that the command consumes

- `<P>` is the type of the object that the command produces

The command composition provides two operators:

- The pipe operator `|` allows to stream a command output stream to a command input stream
- The distribution operator `+` allows to distribute an input stream to several commands and to combine the output stream of several commands into a single stream.

2.2.2.4. Connecting a `<Void,Node>` command to a `<Node,Void>` command through a pipe

Example 2.1. Remove all `nt:unstructured` nodes

```
% select * from nt:unstructured | rm
```

2.2.2.5. Connecting a `<Void,Node>` command to two `<Node,Void>` commands through a pipe

Example 2.2. Update the security of all `nt:unstructured` nodes

```
% select * from nt:unstructured | setperm -i any -a read + setperm -i any -a w
```

2.2.2.6. Connecting two `<Void,Node>` command to a `<Node,Void>` commands through a pipe

Example 2.3. Add the mixin `mix:referenceable` to any node of type `nt:file` or `nt:folder`

```
% select * from nt:file + select * from nt:folder | addmixin mix:referenceable
```

2.2.2.7. Mixed cases

When a command does not consume a stream but is involved in a distribution it will not receive any stream but will be nevertheless invoked.

Likewise when a command does not produce a stream but is involved in a distribution, it will not produce anything but will be nevertheless invoked.

2.3. Base commands

2.3.1. *sleep* command

```
NAME
    sleep - sleep for some time

SYNOPSIS
    sleep [-h | --help] time

PARAMETERS
    [-h | --help]
        Display this help message

    time
        sleep time in seconds
```

2.3.2. *man* command

```
NAME
    man - format and display the on-line manual pages

SYNOPSIS
    man [-h | --help] command

PARAMETERS
    [-h | --help]
        Display this help message

    command
        the command
```

2.3.3. *log* command

```
NAME
    log add - create one or several loggers

SYNOPSIS
    log [-h | --help] add ... name

PARAMETERS
    [-h | --help]
        Display this help message

    ... name
        The name of the logger
```

NAME

log set - configures the level of one of several loggers

SYNOPSIS

log [-h | --help] set [-l | --level] ... name

DESCRIPTION

The set command sets the level of a logger. One or several logger names and the -l option specify the level among the trace, debug, info, warn and error. If no level is specified, the level is cleared and the level will be inherited from its parent.

```
% logset -l trace foo
% logset foo
```

The logger name can be omitted and instead stream of logger can be consumed. The following set the level warn on all the available loggers:

```
% log ls | log set -l warn
```

PARAMETERS

[-h | --help]

Display this help message

[-l | --level]

The logger level to assign among {trace, debug, info, warn, error}

... name

The name of the logger

NAME

log send - send a message to a logger

SYNOPSIS

log [-h | --help] send [-m | --message] [-l | --level] name

DESCRIPTION

The send command log one or several loggers with a specified message. For example, you can use the `javax.management.mbeanserver` class and send a message on its own log.

```
#% log send -m hello javax.management.mbeanserver
```

Send is a `<Logger, Void>` command, it can log messages to consumed log objects.

```
% log ls | log send -m hello -l warn
```

PARAMETERS

[-h | --help]

Display this help message

[-m | --message]

The message to log

[-l | --level]

The logger level to assign among {trace, debug, info, warn, error}

name

The name of the logger

NAME

log ls - list the available loggers

SYNOPSIS

log [-h | --help] ls [-f | --filter]

DESCRIPTION

The logls command list all the available loggers., for instance:

```
% logls
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/].[default]
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/eXoGadget]
org.apache.catalina.core.ContainerBase.[Catalina].[localhost].[/dashboard]
...
```

The -f switch provides filtering with a Java regular expression

```
% logls -f javax.*
javax.management.mbeanserver
javax.management.modelmbean
```

The logls command is a <Void,Logger> command, therefore any logger produced

PARAMETERS

[-h | --help]
Display this help message

[-f | --filter]
A regular expressions used to filter the loggers

2.3.4. *thread* command

NAME

thread stop - stop vm threads

SYNOPSIS

thread [-h | --help] stop ... threads

DESCRIPTION

Stop VM threads.

PARAMETERS

[-h | --help]
Display this help message

... threads
the thread ids to stop

NAME

thread interrupt - interrupt vm threads

SYNOPSIS

thread [-h | --help] interrupt ... threads

DESCRIPTION

Interrupt VM threads.

PARAMETERS

[-h | --help]
Display this help message

... threads
the thread ids to interrupt

NAME

thread ls - list the vm threads

SYNOPSIS

thread [-h | --help] ls [-n | --name] [-g | --group] [-s | --state]

PARAMETERS

[-h | --help]
Display this help message

[-n | --name]
Filter the threads with a glob expression on their name

[-g | --group]
Filter the threads with a glob expression on their group

[-s | --state]
Filter the threads by their status (new,runnable,blocked,waiting,tir

NAME

thread top - thread top

SYNOPSIS

thread [-h | --help] top [-n | --name] [-g | --group] [-s | --state]

PARAMETERS

[-h | --help]

Display this help message

[-n | --name]

Filter the threads with a glob expression on their name

[-g | --group]

Filter the threads with a glob expression on their group

[-s | --state]

Filter the threads by their status (new,runnable,blocked,waiting,timed-out)

NAME

thread dump - dump vm threads

SYNOPSIS

thread [-h | --help] dump ... threads

DESCRIPTION

Dump VM threads.

PARAMETERS

[-h | --help]

Display this help message

... threads

the thread ids to dump

2.3.5. *system* command

NAME

system gc - call garbage collector

SYNOPSIS

system [-h | --help] gc

PARAMETERS

[-h | --help]

Display this help message

NAME

system propls - list the vm system properties

SYNOPSIS

system [-h | --help] propls [-f | --filter]

PARAMETERS

[-h | --help]

Display this help message

[-f | --filter]

filter the property with a regular expression on their name

NAME

system propset - set a system property

SYNOPSIS

system [-h | --help] propset name value

PARAMETERS

[-h | --help]

Display this help message

name

The name of the property

value

The value of the property

NAME

system propget - get a system property

SYNOPSIS

system [-h | --help] propget name

PARAMETERS

[-h | --help]

Display this help message

name

The name of the property

NAME
system proprm - remove a system property

SYNOPSIS
system [-h | --help] proprm name

PARAMETERS
[-h | --help]
Display this help message

name
The name of the property

NAME
system freemem - show free memory

SYNOPSIS
system [-h | --help] freemem [-u | --unit] [-d | --decimal]

PARAMETERS
[-h | --help]
Display this help message

[-u | --unit]
The unit of the memory space size {(B)yte, (O)ctet, (M)egaOctet, (G)

[-d | --decimal]
The number of decimal (default 0)

NAME
system totalmem - show total memory

SYNOPSIS
system [-h | --help] totalmem [-u | --unit] [-d | --decimal]

PARAMETERS
[-h | --help]
Display this help message

[-u | --unit]
The unit of the memory space size {(B)yte, (O)ctet, (M)egaOctet, (G)

[-d | --decimal]
The number of decimal (default 0)

2.3.6. *jdbc* command

NAME

jdbc props - show the database properties

SYNOPSIS

jdbc [-h | --help] props

PARAMETERS

[-h | --help]
Display this help message

NAME

jdbc close - close the current connection

SYNOPSIS

jdbc [-h | --help] close

PARAMETERS

[-h | --help]
Display this help message

NAME

jdbc table - describe the tables

SYNOPSIS

jdbc [-h | --help] table ... tableNames

PARAMETERS

[-h | --help]
Display this help message

... tableNames
the table names

NAME

jdbc open - open a connection from JNDI bound datasource

SYNOPSIS

jdbc [-h | --help] open globalName

PARAMETERS

[-h | --help]
Display this help message

globalName
The datasource JNDI name

NAME

`jdbc connect` - connect to database with a JDBC connection string

SYNOPSIS

`jdbc [-h | --help] connect [-u | --username] [-p | --password] [--properties]`

PARAMETERS

`[-h | --help]`

Display this help message

`[-u | --username]`

The username

`[-p | --password]`

The password

`[--properties]`

The extra properties

`connectionString`

The connection string

NAME

`jdbc info` - describe the database

SYNOPSIS

`jdbc [-h | --help] info`

PARAMETERS

`[-h | --help]`

Display this help message

NAME

`jdbc execute` - execute a SQL statement

SYNOPSIS

`jdbc [-h | --help] execute ... statement`

PARAMETERS

`[-h | --help]`

Display this help message

`... statement`

The statement

```
NAME
    jdbc select - select SQL statement

SYNOPSIS
    jdbc [-h | --help] select ... statement

PARAMETERS
    [-h | --help]
        Display this help message

    ... statement
        The statement
```

```
NAME
    jdbc tables - describe the tables

SYNOPSIS
    jdbc [-h | --help] tables

PARAMETERS
    [-h | --help]
        Display this help message
```

2.3.7. *java* command

```
NAME
    java type - print information about a java type

SYNOPSIS
    java [-h | --help] type name

PARAMETERS
    [-h | --help]
        Display this help message

    name
        The full qualified type name
```

2.3.8. *jmx* command

NAME

jmx get - Get managed bean attribute

SYNOPSIS

jmx [-h | --help] get [-a | --attributes]

PARAMETERS

[-h | --help]
Display this help message

[-a | --attributes]

NAME

jmx find - Find managed bean

SYNOPSIS

jmx [-h | --help] find [-p | --pattern]

PARAMETERS

[-h | --help]
Display this help message

[-p | --pattern]
The object name pattern

2.3.9. *thread* command

NAME

thread stop - stop vm threads

SYNOPSIS

thread [-h | --help] stop ... threads

DESCRIPTION

Stop VM threads.

PARAMETERS

[-h | --help]
Display this help message

... threads
the thread ids to stop

NAME

thread interrupt - interrupt vm threads

SYNOPSIS

thread [-h | --help] interrupt ... threads

DESCRIPTION

Interrupt VM threads.

PARAMETERS

[-h | --help]
Display this help message

... threads
the thread ids to interrupt

NAME

thread ls - list the vm threads

SYNOPSIS

thread [-h | --help] ls [-n | --name] [-g | --group] [-s | --state]

PARAMETERS

[-h | --help]
Display this help message

[-n | --name]
Filter the threads with a glob expression on their name

[-g | --group]
Filter the threads with a glob expression on their group

[-s | --state]
Filter the threads by their status (new,runnable,blocked,waiting,timed-out)

NAME

thread top - thread top

SYNOPSIS

thread [-h | --help] top [-n | --name] [-g | --group] [-s | --state]

PARAMETERS

[-h | --help]

Display this help message

[-n | --name]

Filter the threads with a glob expression on their name

[-g | --group]

Filter the threads with a glob expression on their group

[-s | --state]

Filter the threads by their status (new,runnable,blocked,waiting,tir

NAME

thread dump - dump vm threads

SYNOPSIS

thread [-h | --help] dump ... threads

DESCRIPTION

Dump VM threads.

PARAMETERS

[-h | --help]

Display this help message

... threads

the thread ids to dump

2.3.10. *sleep* command

NAME

sleep - sleep for some time

SYNOPSIS

sleep [-h | --help] time

PARAMETERS

[-h | --help]

Display this help message

time

sleep time in seconds

2.3.11. *jpa* command

NAME

jpa close - Close the current JPA session

SYNOPSIS

jpa [-h | --help] close

PARAMETERS

[-h | --help]
Display this help message

NAME

jpa open - Open a JPA session

SYNOPSIS

jpa [-h | --help] open jndiName

PARAMETERS

[-h | --help]
Display this help message

jndiName

NAME

jpa entity - Display JPA entity

SYNOPSIS

jpa [-h | --help] entity name

PARAMETERS

[-h | --help]
Display this help message

name

NAME

jpa select - Execute select JPA query

SYNOPSIS

jpa [-h | --help] select ... statements

PARAMETERS

[-h | --help]
Display this help message

... statements

```
NAME
    jpa entities - List JPA entities

SYNOPSIS
    jpa [-h | --help] entities

PARAMETERS
    [-h | --help]
        Display this help message
```

2.3.12. **env** command

```
NAME
    env - display the term env

SYNOPSIS
    env [-h | --help]

PARAMETERS
    [-h | --help]
        Display this help message
```

Configuration

CRaSH is configured by a set of properties, the properties are configured differently according to the mode.

3.1. Configuring the standalone or attach mode

In standalone or attach mode configuration can be in the `/conf/crash.properties` file or via the command line directly.

The `crash.properties` file does not exist by default and it is created at the first run, so you should run CRaSH at least once to extract the file:

```
% crash
```

You can also specify properties as a CRaSH command line argument with the `-p` option:

```
% crash -p crash.property_name=property_value
```

3.2. Configuring the web application mode

In the war file packaging, the configuration file can be found under `/WEB-INF/crash/crash.properties` file of the archive. Configuration can be overridden by Java Virtual Machine system properties by using the same property name.

3.3. Configuration properties

3.3.1. Changing SSH server key

The key can be changed by replacing the file `WEB-INF/sshd/hostkey.pem`. Alternatively you can configure the server to use an external file by using the `crash.ssh.keypath` parameter in the `crash.properties`. Uncomment the corresponding property and change the path to the key file.

```
#crash.ssh.keypath=/path/to/the/key/file
```

3.3.2. Changing telnet or SSH server ports

The ports of the server are parameterized by the *crash.ssh.port* and *crash.telnet.port* parameters in the *crash.properties* file

```
# SSH configuration
crash.ssh.port=2000
```

```
# Telnet configuration
crash.telnet.port=5000
```

3.3.3. Changing SSH authentication and idle timeouts

Default authentication and idle timeout of the SSH server are set to 10 minutes (600'000 ms). Both timeouts can be configured in milliseconds with the *crash.ssh.auth-timeout* and *crash.ssh.idle-timeout* parameters in the *crash.properties* file

```
# SSH configuration 5 minutes = 5 * 60 * 1000 = 300'000
crash.ssh.auth-timeout=300000
crash.ssh.idle-timeout=300000
```

3.3.4. Removing telnet or SSH access

- to remove the telnet access, remove the jar file in the *WEB-INF/lib/crsh.shell.telnet-1.2.9.jar* .
- to remove the SSH access, remove the jar file in the *WEB-INF/lib/crsh.shell.ssh-1.2.9.jar* .

3.3.5. Configuring shell default message

The */WEB-INF/crash/commands/base/login.groovy* file contains two closures that are evaluated each time a message is required

- The `prompt` closure returns the prompt message
- The `welcome` closure returns the welcome message

Those closure can be customized to return different messages.

3.3.6. Configuring authentication

Authentication is used by the SSH server when a user authenticates. Authentication interface is pluggable and has default implementations. The [Section 5.2, “Pluggable authentication”](#) explains how to write a custom authentication plugin, in this section we cover the configuration of the authentication.

The configuration of the authentication plugin is done via property, this is necessary because several plugins can be detected by CRaSH, and the plugin is selected via the property *crash.auth* that must match the authentication plugin name:

```
crash.auth=simple
```

CRaSH comes out of the box with two authentication plugins.

3.3.6.1. Simple authentication

Simple authentication provides a simple username/password authentication configured with the *crash.auth.simple.username* and *crash.auth.simple.password* properties:

```
# Authentication configuration
crash.auth=simple
crash.auth.simple.username=admin
crash.auth.simple.password=admin
```

3.3.6.2. Jaas authentication

Jaas authentication uses jaas to perform authentication configured with the *crash.auth.jaas.domain* property to define the jaas domain to use when performing authentication:

```
# Authentication configuration
crash.auth=jaas
crash.auth.jaas.domain=my-domain
```

3.3.6.3. Key authentication

Key authentication relies on a set of authorized public keys to perform authentication configured with the *crash.auth.key.path* property to specify the path of the keys. . The property should point to a valid *.pem* file. Obviously only a public key is required to be in the file, although it can also contain a private key (that will not be used).

```
# Authentication configuration
crash.auth=key
crash.auth.key.path=/Users/julien/.ssh/id_dsa.pem
```

Developers

4.1. Developping commands

A CRaSH command is written in the Groovy language. The Groovy language provides several signifiant advantages:

- Commands can be bare scripts or can be a class
- Java developers can write Groovy commands without learning much of it
- Groovy is a dynamic language and can manipulate unknown types

Each command has a corresponding Groovy file that contains a command class that will be invoked by the shell. The files are located in

- *cmd* directory for the standalone distribution
- */WEB-INF/crash/commands* directory for the web archive deployment

New commands can directly be placed in the commands directory; however they can also be placed in a sub directory of the command directory, which is useful to group commands of the same kind.

In addition of that there are two special files called *login.groovy* and *logout.groovy* that are executed upon login and logout of a user. They are useful to setup and cleanup things related to the current user session.

4.1.1. Commands as a script

The simplest command can be a simple script that returns a string

```
return "Hello World";
```

The `out` implicit variable can be used to send a message to the console:

```
out.println("Hello World");
```

It can be even Groovier:

```
out << "Hello World"
```

4.1.2. Commands as a class

Class can also be used for defining a command, it provides significant advantages over scripts:

- A command can declare options and arguments for the command
- Sub command style (git style) can be expressed easily

When the user types a command in the shell, the command line is parsed by the *cmdline* framework and injected in the command class.

Let's study a simple class command example:

```
import org.crsh.cli.Command;
import org.crsh.cli.Usage;
import org.crsh.cli.Option;

class date {
    @Usage("show the current time")
    @Command
    Object main(
        @Usage("the time format")
        @Option(names=["f", "format"])
        String format) {
        if (format == null)
            format = "EEE MMM d HH:mm:ss z yyyy";
        def date = new Date();
        return date.format(format);
    }
}
```

The command is pretty straightforward to grasp:

- The `@Command` annotation declares the `main` method as a command
- The command takes one optional `format` option declared by the `@Option` annotation
- The `@Usage` annotation describes the usage of the command and its parameters

```
% date
Thu Apr 19 15:44:05 CEST 2012
```

The `@Usage` annotation is important because it will give a decent human description of the command

```
% date -h
usage: date [-h | --help] [-f | --format]

        [-h | --help]    command usage
        [-f | --format]  the time format
```

4.1.3. Sub commands

A class can hold several commands allowing a single file to group several commands, let's study the JDBC command structure:

```
@Usage("JDBC connection")
class jdbc {

    @Usage("connect to database with a JDBC connection string")
    @Command
    public String connect(
        @Usage("The username")
        @Option(names=["u", "username"])
        String user,
        @Usage("The password")
        @Option(names=["p", "password"])
        String password,
        @Usage("The extra properties")
        @Option(names=["properties"])
        Properties properties,
        @Usage("The connection string")
        @Argument
        String connectionString) {

        ...
    }

    @Usage("close the current connection")
    @Command
    public String close() {

        ...
    }
}
```

We can see that the class declares two commands `connect` and `close`, they are invoked this way:

```
% jdbc connect jdbc:derby:memory:EmbeddedDB;create=true
Connected to data base : jdbc:derby:memory:EmbeddedDB;create=true
% jdbc close
Connection closed
```

4.1.4. Command line annotations

Let's review the various annotations for declaring a command.

4.1.4.1. @org.crsh.cli.Command

Defines a command method, when using a mono command the method should be named `main`:


```
public class sample {

    @Command
    public void main() {
        ...
    }
}
```

Using this annotation automatically turns a class into a class command.

Previous versions of CRaSH required command classes to extend the `org.crsh.command.CRaSHCommand` class, this is not necessary anymore as the `@Command` annotation is enough.

Sub commands will simply declares several methods:

```
public class sample {

    @Command
    public void sub1() {
        ...
    }

    @Command
    public void sub2() {
        ...
    }
}
```

4.1.4.2. @org.crsh.cli.Option

Declares an option, the *names* member must be specified: single letter name are turned into posix style option (single hyphen) other names are turned into GNU style option (double hyphen). Several names can be specified as aliases of the same option. Option can be declared as method parameters or a class fields.

```
public class sample {

    @Option(names = {"o", "opt1"})
    private String opt1;

    @Command
    public void sub1(@Option(names = ["opt2"]) String opt2) {
        ...
    }
}
```

```
> sample foo
> sample -o foo
> sample --opt1 foo sub1
> sample sub1 --opt2 bar
> sample --opt1 foo foo sub1 --opt2 bar
```

4.1.4.3. `@org.crsh.cli.Argument`

Declares an argument, this annotation should be declares as method parameters.

```
public class sample {

    @Command
    public void sub1(@Argument String arg) {
        ...
    }
}
```

```
> sample sub1
> sample sub1 foo
```

4.1.4.4. `@org.crsh.cli.Required`

By default a parameter is optional, the `@Required` annotation can be used to force the user to specify a parameter:

```
public class sample {

    @Command
    public void sub1(@Required @Argument String arg) {
        ...
    }
}
```

4.1.4.5. `@org.crsh.cli.Usage` and `@org.crsh.cli.Man`

Those annotations are useful for documenting commands help and manual:

```
@Usage("sample commands")
public class sample {

    @Command
    @Usage("command description, begins with lower case")
    @Man("Verbose description of the argument, it should begin with an upper case")
    public void sub1(
        @Usage("argument description, begins with a lower case")
        @Man("Verbose description of the argument, it should begin with an upper c")
        @Argument String arg) {
        ...
    }
}
```

- `@Usage` specifies the usage, rather a short description
- `@Man` provides the manual, rather a verbose description

4.1.5. Parameter types

Option and argument parameters are represented by *simple* types. The string type is universal and will work with any value provided by the user, other types will require parsing.

4.1.5.1. Builtin types

CRaSH provides supports a few builtin simple types other than string:

- *Integer* type
- *Boolean* type
- `java.util.Properties` type
- `javax.management.ObjectName` type
- *Enum* types

Boolean type is special because it does not need a value when combined with options. The option declaration is enough to set the value to true:

```
public class sample {

    @Command
    public void sub1(@Option(names = ["o"]) Boolean opt) {
        ...
    }
}
```

The option will be true with:

```
> sample sub1 -o
```

4.1.5.2. Providing your own type

Providing a custom type is possible, CRaSH uses the `ServiceLoader` discovery mechanism to discover custom types. Custom types are implemented by a `org.ccrsh.cli.type.ValueType` subclass and implement its `parse` method:

Example 4.1. Our custom value type

```
package my;

public class CustomValueType extends ValueType<Custom> {

    public CustomValueType() {
        super(Custom.class); ❶
    }

    @Override
    public <S extends Custom> S parse(Class<S> type, String s) throws Exception {
        return type.cast(new Custom(s)); ❷
    }
}
```

- ❶ The custom type is passed to the super class
- ❷ The parse method should return an instance of the type

The `parse` method uses the `<S>` generic type because the implementation of enum types has an effective type which is a subclass of the base enum type.

In order to make the custom type discovered by CRaSH, a file named `org.crsh.cli.type.ValueType` should be placed in the `/META-INF/services/` directory of the jar containing the custom value type:

Example 4.2. The custom value type declared in `META-INF/services/org.crsh.cli.type.ValueType`

```
my.CustomValueType
```

4.1.6. Parameter multiplicity

The multiplicity is the number of values expected by a parameter, the multiplicity with simple types is always 1. The arity can also be *several* when the `java.util.List` type is used.

```
public class sample {

    @Command
    public void sub1(@Option(names = {"o"}) List<String> opts) {
        ...
    }
}
```

The option can now accept several values:

```
> sample sub1 -o foo -o bar
```

4.2. Parameter annotations: Don't Repeat Yourself

When one or several commands uses the same parameter (option or argument), there is the opportunity to avoid repetition and define a custom annotation that can be used for declaring the parameter:

```
@Retention(RetentionPolicy.RUNTIME)
@Usage("A color")
@Option(names = "c")
public @interface PathOption {
}
```

The annotation can then be used instead for declaring an option:

```
public class mycommand {
    @Command
    public void foo(@ColorOption String color) {
        ...
    }
    @Command
    public void bar(@ColorOption String color) {
        ...
    }
}
```

4.3. Command context

During the execution of a command, CRaSH provides a *context* for interacting with it : the property *context* is resolved to an instance of `org.crsh.command.InvocationContext`, the invocation context class extends the `org.crsh.command.CommandContext`. Let's have a look at those types:

Example 4.3. The command context

```
/**
 * The command context provides the services for invoking a command.
 *
 * @author <a href="mailto:julien.viet@exoplatform.com">Julien Viet</a>
 */
public interface CommandContext<P> extends InteractionContext<P>, RuntimeContext<P> {

    boolean isPiped();

}
```

The `CommandContext` provides access to the shell session as a `Map<String, Object>`. Session attributes can be accessed using this map, but they are also accessible as Groovy script properties. It means that writing such code will be equivalent:

Example 4.4. Using shell session

```
context.session["foo"] = "bar"; ❶  
out.println(bar); ❷
```

- ❶ Bind the session attribute foo with the value bar
- ❷ The bar is resolved as an session attribute by Groovy

The `CommandContext` provides also access to the shell attributes as a `Map<String, Object>`. Context attributes are useful to interact with object shared globally by the CRaSH environment:

- When embedded in a web application context, attributes resolves to servlet context attributes.
- When embedded in Spring context, attributes resolve to Spring objects:
 - `attributes.factory` returns the Spring factory
 - `attributes.beans` returns Spring beans, for example `attribute.beans.telnet` returns the `telnet` bean
- When attached to a virtual machine, the context attributes has only a single instrumentation entry that is the `java.lang.instrument.Instrumentation` instance obtained when attaching to a virtual machine.

Example 4.5. Obtaining a Spring bean

```
def bean = context.attributes.beans["TheBean"];
```

Now let's examine the `InvocationContext` that extends the `CommandContext`:

Example 4.6. The invocation context

```
public interface InvocationContext<P> extends CommandContext<P> {  
  
    /**  
     * Returns the writer for the output.  
     *  
     * @return the writer  
     */  
    RenderPrintWriter getWriter();  
  
    /**  
     * Resolve a command invoker for the specified command line.  
     *  
     * @param s the command line  
     * @return the command invoker  
     * @throws ScriptException any script exception  
     * @throws IOException any io exception  
     */  
    CommandInvoker<?, ?> resolve(String s) throws ScriptException, IOException;  
  
}
```

The `PrintWriter` object is the command output, it can be used also via the `out` property in Groovy scripts:

Example 4.7. Printing on the shell

```
context.writer.print("Hello"); ❶  
out.print("hello"); ❷
```

- ❶ Printing using the context writer
- ❷ Printing using the `out`

The `readLine` method can be used to get interactive information from the user during the execution of a command.

Example 4.8. Reading on the console

```
def age = context.readLine("How old are you?", false);
```

Finally the `isPiped`, `consume` and `produce` methods are used when writing commands that exchange objects via the pipe mechanism.

4.4. Adding style

CRaSH adds (since version 1.1) the support for colored text and text decoration. Each portion of text printed has three style attributes:

- *Decoration* : bold, underline or blink, as the `org.crsh.text.Decoration` enum.
- *Foreground* color.
- *Background* color.

Available colors are grouped as the `org.crsh.text.Color` enum: black, red, green, yellow, blue, magenta, cyan, white.

Decoration and colors can be applied with overloaded `print` and `println` methods provided by the `ShellPrinterWriter`. This printer is available as the implicit `out` attribute or thanks to the `context.getWriter()` method.

Example 4.9. Decorating and coloring text

```
out.println("hello", red); ❶  
out.println("hello", red, blue); ❷  
out.println("hello", underline, red, blue); ❸
```

- ❶ Print hello in red color
- ❷ Print hello in red with a red blue
- ❸ Print hello in red underlined with a red blue

The combination of the decoration, background and foreground colors is a *style* represented by the `org.crsh.text.Style` object. Styles can be used like decoration and colors:

Example 4.10. Printing styled text

```
out.println("hello", style(red)); ❶  
out.println("hello", style(red, blue)); ❷  
out.println("hello", style(underline, red, blue)); ❸
```

- ❶ Print hello in red color
- ❷ Print hello in red with a red blue
- ❸ Print hello in red underlined with a red blue

When using the print methods, the style will be used for the currently printed object. It is possible to change the style permanently (until it is reset) using Groovy *leftshift* operator : <<

By default the << operator prints output on the console. The `ShellPrintWriter` overrides the operator to work with color, decoration and styles:

Example 4.11. Styling with the leftshift operator

```
out << red ❶  
out << underline ❷  
out << "hello" ❸  
out << reset; ❹
```

- ❶ Set red foreground color
- ❷ Set underline
- ❸ Print hello in underlined red
- ❹ Reset style

Operators can also be combined on the same line providing a more compact syntax:

```
out << red << underline << "hello" << reset
```

```
out << style(underline, red, blue) << "hello" << reset
```

Throughout the examples we have used decoration, color and styles. CRaSH automatically imports those classes so they can be used out of the box in any CRaSH command without requiring prior import.

4.5. Inter command API

In this section we study how a command can reuse existing commands. Here is an example

Example 4.12. dbscript.groovy

```
jdbc.connect username:root, password:crash, "jdbc:derby:memory:EmbeddedDB;create=true"
jdbc.execute "create table derbyDB(num int, addr varchar(40))"
jdbc.execute "insert into derbyDB values (1956,'Webster St.')"
jdbc.execute "insert into derbyDB values (1910,'Union St.')"
jdbc.execute "select * from derbyDB"
jdbc.close
```

This script is written in Groovy and use Groovy DSL capabilities, let's study the first statement:

- the `jdbc.connect` statement can be decomposed into two steps
 - the `jdbc` is resolved as the command itself
 - the `connect` invokes the connect command
- the `username` and `password` are considered as command options
- the SQL statement `"jdbc:derby:memory:EmbeddedDB;create=true"` is the main argument of the command

It is equivalent to the shell command:

```
% jdbc connect --username root --password crash jdbc:derby:memory:EmbeddedDB;create=true
```

The rest of the script is fairly easy to understand, here is the output of the script execution:

```
% dbscript
Connected to data base : jdbc:derby:memory:EmbeddedDB;create=true
Query executed successfully
Query executed successfully
Query executed successfully
NUM          ADDR
1956         Webster St.
1910         Union St.
Connection closed
```

Extending CRaSH

5.1. Embedding CRaSH

The [Chapter 1, *Running CRaSH*](#) explains how to run CRaSH as a standalone or an embedded service. We will study in this section the technical aspect of running application and show how CRaSH can be embedded in specific environments.

The root class for reusing CRaSH is the `org.crsh.plugin.PluginLifeCycle` class. This class is abstract and it cannot be used directly, instead it should be subclasses for providing specific behavior for running CRaSH. There are several subclasses using it:

- The standalone bootstrap with the `org.crsh.standalone.Bootstrap` class : designed for using CRaSH with a real file system (i.e `java.io.File`). It defines a specific layout for locating resources (libraries, configuration and commands).
- The embedded approaches
 - `org.crsh.plugin.WebPluginLifeCycle` : uses a `javax.servlet.ServletContext`
 - `org.crsh.spring.SpringBootstrap` : embeds CRaSH as a Spring bean
 - `org.crsh.spring.SpringWebBootstrap` : extends the `SpringBootstrap` and uses the existing `ServletContext`

5.1.1. Standalone bootstrap

The `org.crsh.standalone.Bootstrap` class is a generic class that can be used to embed the shell in your Java programs Its usage is quite straightforward and configurable. The bootstrap is a coarse grained approach and it needs a bit of configuration for running:

- The `baseLoader` properties is the `java.lang.ClassLoader` used by CRaSH for loading plugins, resources or command sources (under the `/crash/commands/` path. This property is not modifiable and must be provided when the bootstrap is instantiated.
- The `config` properties provides the contextual properties used by CRaSH configuration such as `crash.vfs.refresh_period`

- The `attributes` property provides the contextual attributes used by CRaSH available at runtime via the `org.crsh.command.CommandContext`, it is useful for providing objects to commands in a similar fashion to servlet context attributes
- The `cmdPath` property is a list of `java.io.File` scanned by CRaSH for loading additional commands
- The `confPath` property is a list of `java.io.File` scanned by CRaSH for loading configuration files

Let's see an example on how to use it

5.1.2. Standalone CRaSH

The standalone shell is a Java class configurable and runnable from the command line that is used by the standalone distribution. It is built upon the [Section 5.1.1, “Standalone bootstrap”](#) class.

5.2. Pluggable authentication

Creating a custom authentication mechanism is done by implementing a CRaSH plugin that provides an implementation of the `AuthenticationPlugin` interface. Let's study the *simple* authentication plugin implementation.

The `AuthenticationPlugin` is the interface to implement in order to integrate CRaSH with an authentication mechanism:

```

public interface AuthenticationPlugin<C> {

    /** The authentication plugin to use. */
    PropertyDescriptor<String> AUTH = PropertyDescriptor.create("auth", (String) null);

    /**
     * The plugin that never authenticates, returns the name value <code>null</code>.
     */
    AuthenticationPlugin<Object> NULL = new AuthenticationPlugin<Object>() {
        public Class<Object> getCredentialType() {
            return Object.class;
        }
        public String getName() {
            return "null";
        }
        public boolean authenticate(String username, Object password) throws Exception {
            return false;
        }
    };

    /**
     * Returns the authentication plugin name.
     *
     * @return the plugin name
     */
    String getName();

    /**
     * Returns the credential type.
     *
     * @return the credential type
     */
    Class<C> getCredentialType();

    /**
     * Returns true if the user is authenticated by its username and credential.
     *
     * @param username the username
     * @param credential the credential
     * @return true if authentication succeeded
     * @throws Exception any exception that would prevent authentication to happen
     */
    boolean authenticate(String username, C credential) throws Exception;
}

```

The integration as a CRaSH plugin mandates to extend the class `CRaSHPlugin` with the generic type `AuthenticationPlugin`:

```

public class SimpleAuthenticationPlugin extends
    CRaSHPlugin<AuthenticationPlugin> implements
    AuthenticationPlugin {

    public String getName() {
        return "simple";
    }

    @Override
    public AuthenticationPlugin getImplementation() {
        return this;
    }

    ...
}

```

- The `getName()` method returns the *simple* value that matches the *crash.auth* configuration property
- The `getImplementation()` method returns the object that implements the `AuthenticationPlugin` class, this method is implemented from the `CRaSHPlugin` abstract class, but in our case it simply returns `this` because `SimpleAuthenticationPlugin` is directly the implementation class.

Now let's study how the plugin retrieves the configuration properties `crash.auth.simple.username` and `crash.auth.simple.password`:

```

public class SimpleAuthenticationPlugin extends
    CRaSHPlugin<AuthenticationPlugin> implements
    AuthenticationPlugin {

    public static final PropertyDescriptor<String> SIMPLE_USERNAME =
        PropertyDescriptor.create(
            "auth.simple.username",
            "admin",
            "The username");

    public static final PropertyDescriptor<String> SIMPLE_PASSWORD =
        PropertyDescriptor.create(
            "auth.simple.password",
            "admin",
            "The password");

    @Override
    protected Iterable<PropertyDescriptor<?>> createConfigurationCapabilities() {
        return Arrays.<PropertyDescriptor<?>>asList(
            SIMPLE_USERNAME,
            SIMPLE_PASSWORD);
    }

    private String username;

    private String password;

    @Override
    public void init() {
        PluginContext context = getContext();
        this.username = context.getProperty(SIMPLE_USERNAME);
        this.password = context.getProperty(SIMPLE_PASSWORD);
    }

    ...

}

```

- The `createConfigurationCapabilities()` method returns the constants `SIMPLE_USERNAME` and `SIMPLE_PASSWORD` that defines the configuration properties that the plugin uses
- The `init()` method is invoked by CRaSH before the plugin will be used, at this moment, the configuration properties are retrieved from the plugin context with the method `getContext()` available in the `CRaSHPlugin` base class

Finally the plugin needs to provide the `authenticate()` method that implement the authentication logic:

```
public boolean authenticate(String username, String password)
    throws Exception {
    return this.username != null &&
        this.password != null &&
        this.username.equals(username) &&
        this.password.equals(password);
}
```

The logic is straightforward with an equality check of the username and password.

Last but not least we must declare our plugin to make it recognized by CRaSH, this is achieved thanks to the `java.util.ServiceLoader` class. CRaSH uses the `ServiceLoader` for loading plugins and the loader needs a file to be present in the jar file containing the class under the name `META-INF/services/org.crsh.plugin.CRaSHPlugin` containing the class name of the plugin:

```
org.crsh.auth.SimpleAuthenticationPlugin
```

When all of this is done, the plugin and its service loader descriptor must be packaged in a jar file and available on the classpath of CRaSH.

You can learn more about the `java.util.ServiceLoader` by looking at the online [javadoc](#)

6

JCR extension

The CRaSH JCR extension allow to connect and interact with Java Content Repository implementations.

6.1. JCR implementations

6.1.1. eXo JCR

todo

6.1.2. Apache Jackrabbit

CRaSH has been tested with Jackrabbit in the following mode : deployment as a resource accessible via JNDI on JBoss 6.1.0.

6.2. JCR commands

6.2.1. *repo* command

NAME

`repo info - show info about the current repository`

SYNOPSIS

`repo [-h | --help] info`

DESCRIPTION

The `info` command print the descriptor of the current repository.

PARAMETERS

`[-h | --help]`
Display this help message

NAME

`repo ls - list the available repository plugins`

SYNOPSIS

`repo [-h | --help] ls`

DESCRIPTION

The `ls` command print the available repository plugins.

PARAMETERS

`[-h | --help]`
Display this help message

NAME

repo use - changes the current repository

SYNOPSIS

repo [-h | --help] use parameters

DESCRIPTION

The use command changes the current repository used by for JCR commands as main command argument that will be used to select a repository:

```
% repo use parameterName=parameterValue;nextParameterName=nextParameterName
```

The parameters is specific to JCR plugin implementations, more details c

PARAMETERS

[-h | --help]

Display this help message

parameters

The parameters used to instantiate the repository to be used in this

6.2.2. ws command

NAME

ws login - login to a workspace

SYNOPSIS

ws [-h | --help] login [-u | --username] [-p | --password] [-c | --container]

DESCRIPTION

This command login to a JCR workspace and establish a session with the repository. When you are connected the shell maintain a JCR session and allows you to work in a terminal oriented fashion. The repository name must be specified and optionally you can specify a container to have more privileges.

Before performing a login operation, a repository must be first selected.

```
% repo use container=portal
```

Once a repository is obtained the login operation can be done:

```
% ws login portal-system
Connected to workspace portal-system
```

```
% ws login -u root -p gtn portal-system
Connected to workspace portal-system
```

PARAMETERS

[-h | --help]
Display this help message

[-u | --username]
The user name

[-p | --password]
The user password

[-c | --container]
The portal container name (eXo JCR specific)

workspaceName
The name of the workspace to connect to

NAME

ws logout - logout from a workspace

SYNOPSIS

ws [-h | --help] logout

DESCRIPTION

This command logout from the currently connected JCR workspace

PARAMETERS

[-h | --help]
Display this help message

6.2.3. *cd* command

NAME

`cd` - changes the current node

SYNOPSIS

`cd [-h | --help] path`

DESCRIPTION

The `cd` command changes the current node path. The command used with no arguments changes the current node to the root node. A relative or absolute path argument can be provided to specify a new path.

```
[/]% cd /gadgets
[/gadgets]% cd /gadgets
[/gadgets]% cd
[/]%
```

PARAMETERS

`[-h | --help]`
Display this help message

`path`
The new path that will change the current node navigation

6.2.4. *pwd* command

NAME

`pwd` - print the current node path

SYNOPSIS

`pwd [-h | --help]`

DESCRIPTION

The `pwd` command prints the current node path, the current node is produced by the `cd` command.

```
[/gadgets]% pwd
/gadgets
```

PARAMETERS

`[-h | --help]`
Display this help message

6.2.5. ls command

NAME

ls - list the content of a node

SYNOPSIS

ls [-h | --help] [-d | --depth] path

DESCRIPTION

The ls command displays the content of a node. By default it lists the content of the current directory. It accepts a path argument that can be absolute or relative.

```
[/]% ls
/
+-properties
| +-jcr:primaryType: nt:unstructured
| +-jcr:mixinTypes: [exo:owneable,exo:privilegeable]
| +-exo:owner: '__system'
| +-exo:permissions: [any read,*:/platform/administrators read,*:/platform/
+-children
| +-/workspace
| +-/contents
| +-/Users
| +-/gadgets
| +-/folder
```

PARAMETERS

[-h | --help]
Display this help message

[-d | --depth]
The depth of the printed tree

path
The path of the node content to list

6.2.6. *cp* command

NAME

cp - copy a node to another

SYNOPSIS

cp [-h | --help] source target

DESCRIPTION

The *cp* command copies a node to a target location in the JCR tree.

```
[/registry]% cp foo bar
```

PARAMETERS

[-h | --help]

Display this help message

source

The path of the source node to copy

target

The path of the target node to be copied

6.2.7. *mv* command

NAME

mv - move a node

SYNOPSIS

mv [-h | --help] source target

DESCRIPTION

The *mv* command can move a node to a target location in the JCR tree. It command is a <Node,Node> command consuming a stream of node to move them

```
[/registry]% mv Registry Registry2
```

PARAMETERS

[-h | --help]

Display this help message

source

The path of the source node to move, absolute or relative

target

The destination path absolute or relative

6.2.8. *rm* command

NAME

`rm` - remove one or several node or a property

SYNOPSIS

`rm [-h | --help] ... paths`

DESCRIPTION

The `rm` command removes a node or property specified by its path either a is executed against the JCR session, meaning that it will not be effective.

```
[/]% rm foo
```

Node /foo removed

It is possible to specify several nodes.

```
[/]% rm foo bar
```

Node /foo /bar removed

`rm` is a `<Node,Void>` command removing all the consumed nodes.

PARAMETERS

`[-h | --help]`

Display this help message

`... paths`

The paths of the node to remove

6.2.9. *node* command

NAME

node add - creates one or several nodes

SYNOPSIS

node [-h | --help] add [-t | --type] ... paths

DESCRIPTION

The addnode command creates one or several nodes. The command takes at least one path. Each path can be either absolute or relative, relative paths are relative to the current directory. By default the node type is the default repository node type, but the option -t or --type can be used to specify a different node type.

```
[/registry]% addnode foo
Node /foo created
```

```
[/registry]% addnode -t nt:file bar juu
Node /bar /juu created
```

The addnode command is a <Void,Node> command that produces all the nodes created.

PARAMETERS

[-h | --help]
Display this help message

[-t | --type]
The name of the primary node type to create.

... paths
The paths of the new node to be created, the paths can either be absolute or relative.

NAME

node set - set a property on the current node

SYNOPSIS

```
node [-h | --help] set [-t | --type] propertyName propertyValue
```

DESCRIPTION

The set command updates the property of a node.

Create or destroy property foo with the value bar on the root node:

```
[/]% set foo bar  
Property created
```

Update the existing foo property:

```
[/]% set foo juu
```

When a property is created and does not have a property descriptor that with the -t option

```
[/]% set -t LONG long_property 3
```

Remove a property

```
[/]% set foo
```

set is a <Node,Void> command updating the property of the consumed node

PARAMETERS

```
[-h | --help]  
    Display this help message
```

```
[-t | --type]  
    The property type to use when it cannot be inferred
```

propertyName
 The name of the property to alter

propertyValue
 The new value of the property

NAME

node export - export a node to an nt file

SYNOPSIS

node [-h | --help] export source target

DESCRIPTION

Exports a node as an nt file in the same workspace:

```
[/]% node export gadgets /gadgets.xml  
The node has been exported
```

PARAMETERS

[-h | --help]
Display this help message

source
The path of the exported node

target
The path of the exported nt:file node

NAME

node import - imports a node from an nt file

SYNOPSIS

node [-h | --help] import source target

DESCRIPTION

Imports a node from an nt:file node located in the workspace:

```
[/]% importnode /gadgets.xml /  
Node imported
```

PARAMETERS

[-h | --help]
Display this help message

source
The path of the imported nt:file node

target
The path of the parent imported node

6.2.10. *mixin* command

NAME

`mixin add` - add a mixin to one or several nodes

SYNOPSIS

`mixin [-h | --help] add mixin ... paths`

DESCRIPTION

The `add` command adds a mixin to one or several nodes, this command is also used to add a mixin from an incoming node stream, for instance:

```
[/]% select * from mynode | mixin add mix:versionable
```

PARAMETERS

`[-h | --help]`

Display this help message

`mixin`

the mixin name to add

`... paths`

the paths of the node receiving the mixin

NAME

`mixin remove` - removes a mixin from one or several nodes

SYNOPSIS

`mixin [-h | --help] remove mixin ... paths`

DESCRIPTION

The `remove` command removes a mixin from one or several nodes, this command is also used to remove a mixin from an incoming node stream, for instance:

```
[/]% select * from mynode | mixin remove mix:versionable
```

PARAMETERS

`[-h | --help]`

Display this help message

`mixin`

the mixin name to remove

`... paths`

the paths of the node receiving the mixin

6.2.11. *select* command

NAME

`select` - execute a JCR sql query

SYNOPSIS

`select [-h | --help] [-o | --offset] [-l | --limit] [-a | --all] ... query`

DESCRIPTION

Queries in SQL format are possible via the `##select##` command. You can use the specification and add options to control the number of results returned to 5 results:

```
[/]% select * from nt:base
The query matched 1114 nodes
+--/
| +-properties
| | +-jcr:primaryType: nt:unstructured
| | +-jcr:mixinTypes: [exo:owneable,exo:privilegeable]
| | +-exo:owner: '__system'
| | +-exo:permissions: [any read,*/platform/administrators read,*/platform
+--/workspace
| +-properties
| | +-jcr:primaryType: mop:workspace
| | +-jcr:uuid: 'a69f226ec0a80002007ca83e5845cdac'
...
```

Display 20 nodes from the offset 10:

```
[/]% select -o 10 -l 20 * from nt:base
The query matched 1114 nodes
...
```

It is possible also to remove the limit of displayed nodes with the `-a` option:

```
[/]% select -a * from nt:base
The query matched 1114 nodes
...
```

`select` is a `<Void,Node>` command producing all the matched nodes.

PARAMETERS

`[-h | --help]`
Display this help message

`[-o | --offset]`
The offset of the first node to display

`[-l | --limit]`
The number of nodes displayed, by default this value is equals to 5

`[-a | --all]`
Display all the results by ignoring the limit argument, this should be used with caution

`... query`
The query, as is

6.2.12. *xpath* command

NAME
xpath - execute a JCR xpath query

SYNOPSIS
xpath [-h | --help] [-o | --offset] [-l | --limit] [-a | --all] query

DESCRIPTION
Executes a JCR query with the xpath dialect, by default results are limited.

PARAMETERS

- [-h | --help]
Display this help message
- [-o | --offset]
The offset of the first node to display
- [-l | --limit]
The number of nodes displayed, by default this value is equals to 5
- [-a | --all]
Display all the results by ignoring the limit argument, this should

query
The query

6.2.13. *commit* command

NAME
commit - saves changes

SYNOPSIS
commit [-h | --help] path

DESCRIPTION
Saves the changes done to the current session. A node can be provided to commit this nodes and its descendants only.

PARAMETERS

- [-h | --help]
Display this help message

path
The path of the node to commit

6.2.14. *rollback* command

NAME
rollback - rollback changes

SYNOPSIS
rollback [-h | --help] path

DESCRIPTION
Rollbacks the changes of the current session. A node can be provided to this nodes and its descendants only.

PARAMETERS
[-h | --help]
Display this help message

path
the path to rollback

6.2.15. *version* command

NAME
version checkin - checkin a node

SYNOPSIS
version [-h | --help] checkin path

DESCRIPTION
Perform a node checkin

PARAMETERS
[-h | --help]
Display this help message

path
The node path to checkin

```
NAME
    version checkout - checkout a node

SYNOPSIS
    version [-h | --help] checkout path

DESCRIPTION
    Perform a node checkout

PARAMETERS
    [-h | --help]
        Display this help message

    path
        The node path to checkout
```

6.3. SCP usage

Secure copy can be used to import or export content. The username/password prompted by the SSH server will be used for authentication against the repository when the import or the export is performed.

6.3.1. Export a JCR node

The following command will export the node */gadgets* in the repository *portal-system* of the portal container *portal*:

```
scp -P 2000 root@localhost:portal:portal-system:/production/app:gadgets gadgets
```

The node will be exported as *app_gadgets.xml*.

Note that the portal container name is used for GateIn. If you do omit it, then the root container will be used.

6.3.2. Import a JCR node

The following command will reimport the node:

```
scp -P 2000 gadgets.xml root@localhost:portal:portal-system:/production/
```

The exported file format use the JCR system view. You can get more information about that in the JCR specification.

The SCP feature is experimental

Hey, I want to contribute!

Drop me an email (see my @ on www.julienviet.com), any kind of help is welcome.