

JBOSS/Wildfly

Java Naming and Directory Interface

What is JBoss/Wildfly ?

- JBoss Application Server (or **JBoss AS**) is a free software/open-source **Java EE**-based application server.
- Not only implements a server that runs on Java, but it actually implements the Java EE part of Java.
- Because it is Java-based, the JBoss application server operates **cross-platform**: usable on any operating system that supports Java.
- JBoss AS was developed by JBoss, now a division of **Red Hat**.

JEE

- JEE provides an API and runtime environment for developing and running **enterprise software, including network and web services**, and other large-scale, multi-tiered, scalable, reliable, and secure network applications.
- Java EE extends the Java SE providing API for **object-relational mapping, distributed and multi-tier architectures**, and **web services**.
- The platform incorporates a design based largely on modular components running on an **application server**.

Key JEE Components

- **EJB** (Enterprise JavaBeans) define a distributed component system that is the heart of the Java EE specification . This system , in fact, provides the typical features required by enterprise applications , such as scalability, security , data persistence , and more.
- **JNDI** defines a system to identify and list generic resources , such as software components or data sources .
- **JDBC** is an interface for access to any type of data bases.
- **JTA** is a system for distributed transaction support .
- **JPA** is an API for the management of persistent data .
- **JAXP** is an API for handling files in XML format.
- **JMS** (Java Message Service) a system for sending and managing messages.

Installing Wildfly

- <http://wildfly.org/downloads/>

- Download 21.0.0.Final

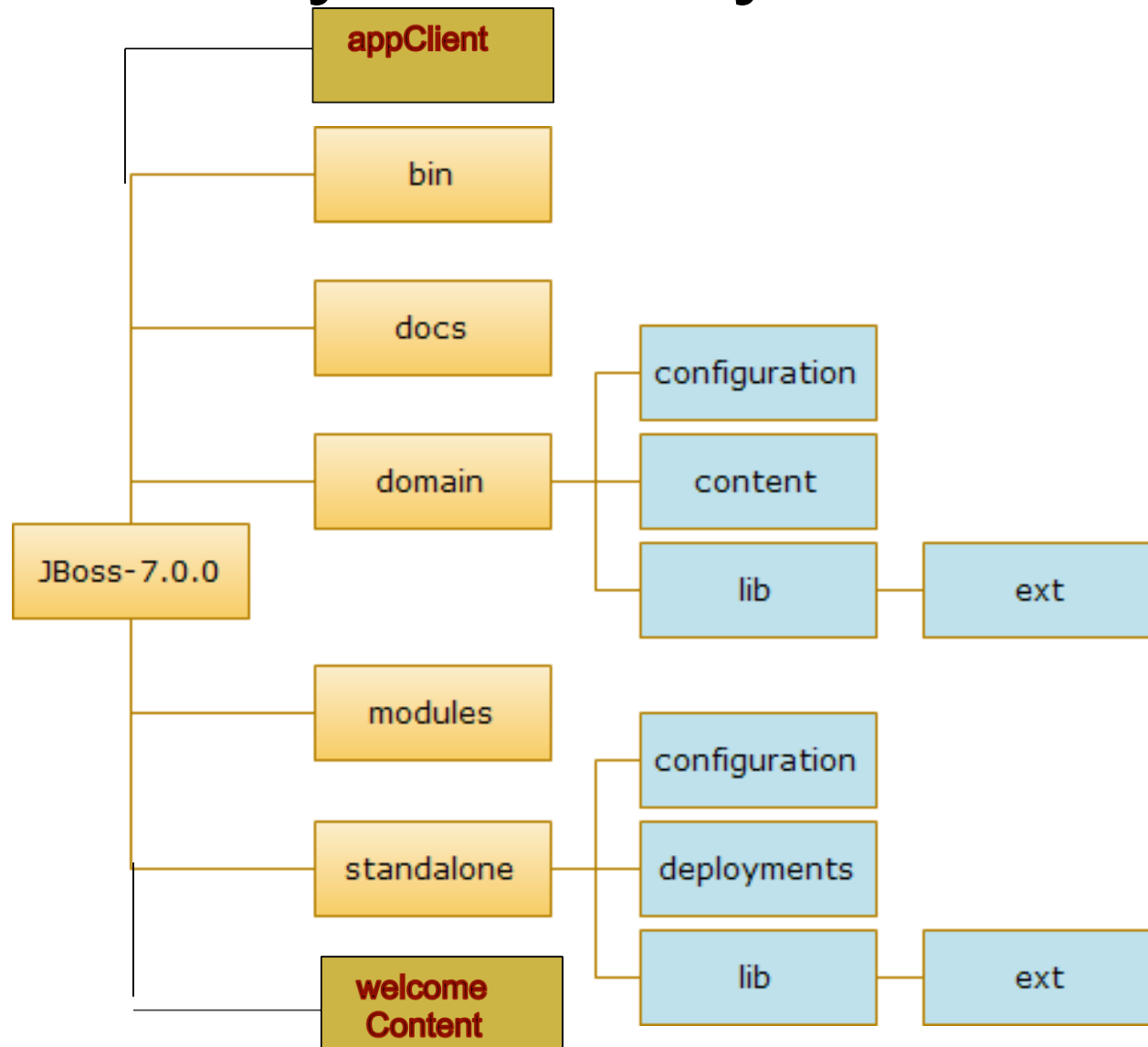
.

GETTING STARTED GUIDE:

<http://docs.wildfly.org/21/>

- unzip it where you like: that will be your JBOSS_HOME
- define it as a login variable, e.g. in bash
export JBOSS_HOME=yourpath)

Wildfly directory structure



See http://docs.wildfly.org/14/Getting_Started_Guide.html#wildfly---a-quick-tour

Starting and stopping Wildfly

cd into your JBOSS_HOME/bin

UNIX (LINUX-MAC)

- START: `./standalone.sh &`
- STOP: `./jboss-cli.sh --connect command=:shutdown`

WINDOWS

- START: `./standalone.bat`
- STOP: `./jboss-cli.bat --connect command=:shutdown`

On starting....

JBoss Bootstrap Environment

JBOSSE_HOME: /Users/ronchet/Downloads/wildfly-21.0.0.Final

JAVA: /Library/Java/JavaVirtualMachines/jdk1.8.0_111.jdk/Contents/Home/bin/java

JAVA_OPTS: -server -Xms64m -Xmx512m -XX:MetaspaceSize=96M -XX:MaxMetaspaceSize=256m
-Djava.net.preferIPv4Stack=true -Djboss.modules.system.pkgs=org.jboss.byteman
-Djava.awt.headless=true



watch
for
errors!

17:20:18,631 INFO [org.jboss.modules] (main) JBoss Modules version 1.10.2.Final
17:20:19,035 INFO [org.jboss.msc] (main) JBoss MSC version 1.4.12.Final
17:20:19,042 INFO [org.jboss.threads] (main) JBoss Threads version 2.4.0.Final
17:20:19,129 INFO [org.jboss.as] (MSC service thread 1-2) WFLYSRV0049: WildFly Full
21.0.0.Final (WildFly Core 13.0.1.Final) starting
17:20:19,567 INFO [org.wildfly.security] (ServerService Thread Pool -- 27)
ELY00001: WildFly Elytron version 1.13.1.Final

...
17:20:20,491 INFO [org.jboss.as] (Controller Boot Thread) WFLYSRV0025:
WildFly Full 21.0.0.Final (WildFly Core 13.0.1.Final) started in 2213ms - Started 317 of 579 ser
17:20:20,492 INFO [org.jboss.as] (Controller Boot Thread) WFLYSRV0060:
Http management interface listening on http://127.0.0.1:9990/management
17:20:20,492 INFO [org.jboss.as] (Controller Boot Thread) WFLYSRV0051:
Admin console listening on http://127.0.0.1:9990



Welcome to WildFly

Your WildFly Application Server is running.

However you have not yet added any users to be able to access the admin console.

To add a new user execute the `add-user.sh` script within the bin folder of your WildFly installation and enter the requested information.

By default the realm name used by WildFly is "ManagementRealm" this is already selected by default.

After you have added the user follow this link to [Try Again](#).

Wildfly: Creating an admin user

```
ronchet$ ./add-user.sh
```

What type of user do you wish to add?

- a) Management User (mgmt-users.properties)
- b) Application User (application-users.properties)

(a): **a**

Enter the details of the new user to add.

Using realm 'ManagementRealm' as discovered from the existing property files.

Username : **admin123**

Password recommendations are listed below. ... The password should contain at least 8 characters, 1 alphabetic character(s), 1 digit(s), 1 non-alphanumeric symbol(s)

Password : **password1\$**

Re-enter Password : **password1\$**

What groups do you want this user to belong to? (Please enter a comma separated list, or leave blank for none)[]: **<return>**

About to add user 'admin123' for realm 'ManagementRealm'

Is this correct yes/no? **yes**

Added user 'admin123' to file '/home/francesco/jboss/wildfly-16.0.0.Final/standalone/configuration/mgmt-users.properties'

Added user 'admin123'...

Is this new user going to be used for one AS process to connect to another AS process? e.g. for a slave host controller connecting to the master or for a Remoting connection for server to server EJB calls. yes/no? **yes**

...

HAL Management Console



Deployments

Add and manage deployments

Deploy an Application | Start

Deploy an application to the server

1. Use the 'Add Deployment' wizard to deploy the application
2. Enable the deployment



Configuration

Configure subsystem settings

Create a Datasource | Start

Define a datasource to be used by deployed applications. The proper JDBC driver must be deployed and registered.

1. Select the Datasources subsystem
2. Add a Non-XA or XA datasource
3. Use the 'Create Datasource' wizard to configure the datasource settings



Runtime

Monitor server status

Monitor the Server | Start

View runtime information such as server status, JVM status, and server log files.

1. Select the server
2. View log files or JVM usage



Access Control

Manage user and group permissions for management operations

Assign User Roles | Start

Assign roles to users or groups to determine access to system resources.

1. Add a new user or group
2. Assign one or more roles to that user or group



Patching

Manage WildFly Full patches

making WildFly accessible from remote

edit the server descriptor:

- cd into `${JBOSS_HOME}/standalone/configuration/`
- edit `standalone.xml`

toward the end of the file, find the interfaces definitions:

```
<interfaces>
```

```
...
```

```
</interfaces/>
```

ADD A NEW INTERFACE (give it a name: in this example *myInterface*), setting the access of it to any ip.



making WildFly accessible from remote

```
<interfaces>
  <interface name="management">
    <inet-address value="${jboss.bind.address.management:127.0.0.1}">
  </inet-address></interface>
  <interface name="public">
    <inet-address value="${jboss.bind.address:127.0.0.1}">
  </inet-address></interface>
  <interface name="unsecure">
    <inet-address value="${jboss.bind.address.unsecure:127.0.0.1}">
  </inet-address></interface>
  <interface name="myInterface">
    <any-address/>
  </interface>
</interfaces>
```

making JBOSS accessible from remote

find the socket-binding-group tag, which sets the ports required for the given interfaces.

change the default-interface parameter to match the new interface (*myInterface* in ourcase)

was:

```
<socket-binding-group default-interface="default" name="standard-sockets" port-  
offset="$${jboss.socket.binding.port-offset:0}">
```

must become:

```
<socket-binding-group default-interface="myInterface" name="standard-sockets" port-  
offset="$${jboss.socket.binding.port-offset:0}">
```

Save, and restart the server

JBOSS: Creating other users

What type of user do you wish to add?

- a) Management User (mgmt-users.properties)
- b) Application User (application-users.properties)

(a): **b**

Enter the details of the new user to add.

Using realm 'ApplicationRealm' as discovered from the existing property files.

Username : **user**

Password recommendations are listed below. ...The password should contain at least 8 characters, 1 alphabetic character(s), 1 digit(s), 1 non-alphanumeric symbol(s)

Password : **password1\$**

Re-enter Password : **password1\$**

What groups do you want this user to belong to? (Please enter a comma separated list, or leave blank for none)[]: **<return>**

About to add user 'user' for realm 'ApplicationRealm'

Is this correct yes/no? **yes**

Added user 'user' to file ...

Is this new user going to be used for one AS process to connect to another AS process?

e.g. for a slave host controller connecting to the master or for a Remoting connection for server to server EJB calls.

yes/no? **yes**

Adding JNDI bindings

1) locate in your standalone/configuration/standalone.xml the line

```
<subsystem xmlns="urn:jboss:domain:naming:2.0">  
  <remote-naming/>  
</subsystem>
```

2) replace it with the following section

```
<subsystem xmlns="urn:jboss:domain:naming:2.0">  
  <bindings>  
    <simple name="java:global/a" value="100" type="int" />  
    <simple name="java:global/myhome" value="https://latemar.science.unitn.it"  
type="java.net.URL" />  
    <simple name="java:jboss/exported/jndi/mykey" value="MyJndiValue"/>  
    <lookup name="java:jboss/exported/link/mykey"  
lookup="java:jboss/exported/jndi/mykey"/>  
  </bindings></bindings>  
</subsystem>
```

3) restart your server

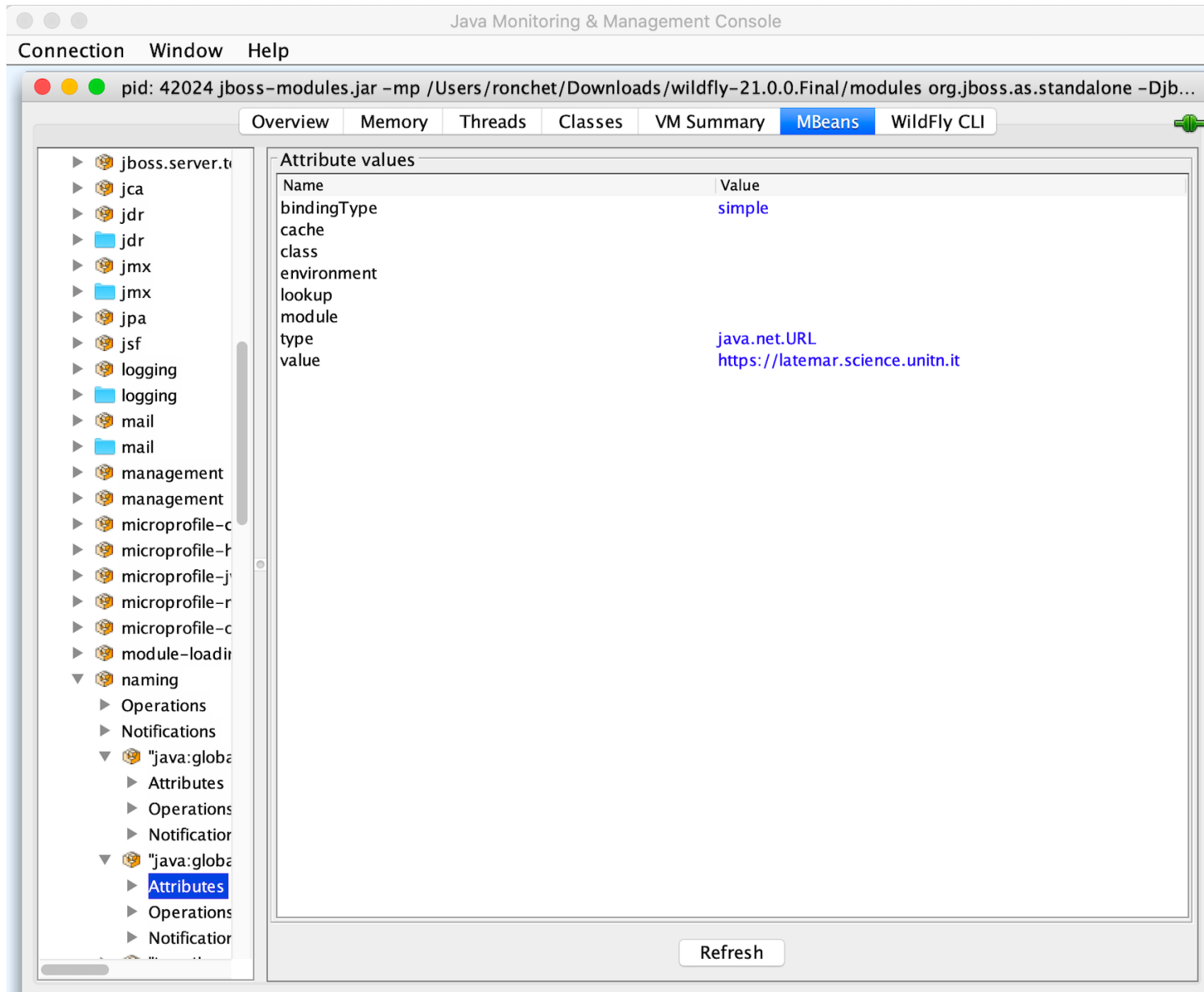
NOTE: the space visible on the client is the one following java:jboss/exported/

On server: java:jboss/exported/jndi/mykey

On client: jndi/mykey

1. start jconsole (It's in the bin directory)
2. connect with your wildfly running instance
3. inspect the jndi bindings (jboss.as -> naming)

Inspecting your server



Inspecting your server

1. web console -> runtime -> start

← → ↻ ⓘ localhost:9990/console/index.html#runtime;path=standalone-server-column~standalone-host-mr-macbookpro!rss~nami... ☆

HAL Management Console admin1

Homepage Deployments Configuration **Runtime** Patching Access Control

Server	Monitor
✓ mr-mac... View	Datasources >
	EJB >
	IO >
	JAX-RS >
	JNDI View
	JPA >
	Log Files >
	MicroProfile Health Smallrye
	Security Elytron >
	Transaction

JNDI

Provides an overview of the local JNDI namespace. The Java EE platform specification defines the following JNDI contexts:

- `java:comp` - The namespace is scoped to the current component (i.e. EJB)
- `java:module` - Scoped to the current module
- `java:app` - Scoped to the current application
- `java:global` - Scoped to the application server

In addition to the standard namespaces, WildFly also provides the following two global namespaces:

- `java:jboss`
- `java:/`

Please note that only entries within the `java:jboss/exported` context are accessible over remote JNDI. For web deployments `java:comp` is aliased to `java:module`, so EJB's deployed in a war do not have their own comp namespace.

Inspecting your server

2. View

← → ↺

localhost:9990/console/index.html#jndi

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HAL Management Console

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admin1 ▾

« Back / Server ⇒ Standalone Server / Monitor ⇒ JNDI ▾

🔗

JNDI Tree

↺ -

Search

🔍

Java Contexts

▶ java:

▶ java:jboss

▶ java:jboss/exported

▶ jndi

▶ mykey

▶ link

▶ mykey

▶ java:global

▶ a

▶ myhome

Details

[🔗 Help](#)

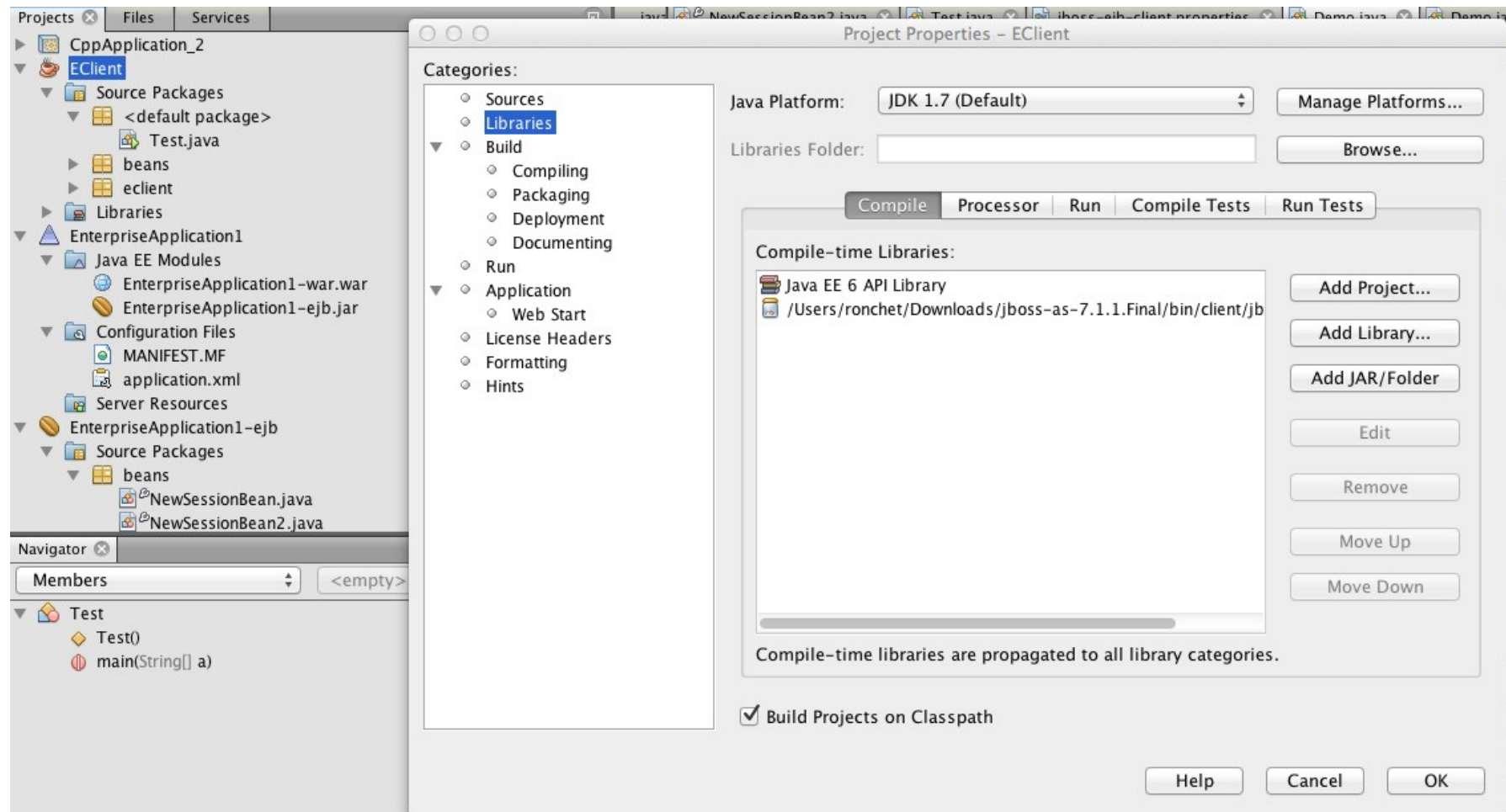
URI	java:global/myhome
Class Name	java.net.URL
Value	https://latemar.science.unitn.it

Accessing via code

```
import java.util.Properties;
import javax.naming.Context;
import javax.naming.InitialContext;
import javax.naming.NamingException;
public class JNDIaccess {
    public static void main(String a[]) throws NamingException {
        new JNDIaccess();
    }
    public JNDIaccess() throws NamingException {
        Properties jndiProps = new Properties();
        jndiProps.put(Context.INITIAL_CONTEXT_FACTORY,
            "org.jboss.naming.remote.client.InitialContextFactory");
        jndiProps.put(Context.PROVIDER_URL, "http-remoting://127.0.0.1:8080");
        // put your username and pw!
        jndiProps.put(Context.SECURITY_PRINCIPAL, "admin1");
        jndiProps.put(Context.SECURITY_CREDENTIALS, "password1$");
        InitialContext initialContext = new InitialContext(jndiProps);
        Object result = initialContext.lookup("jndi/mykey");
        System.out.println(result);
    }
}
```

Add the libraries!

They're in JBOSS_HOME/bin/client/jboss-client.jar



run:
Oct 30, 2020 12:25:30 PM
org.jboss.naming.remote.client.InitialContextFactory
<clinit>
INFO: WFNAM00025:
org.jboss.naming.remote.client.InitialContextFactory
is deprecated; new applications should use
org.wildfly.naming.client.WildFlyInitialContextFactory
instead
Oct 30, 2020 12:25:30 PM
org.wildfly.naming.client.Version <clinit>
INFO: WildFly Naming version 1.0.13.Final
Oct 30, 2020 12:25:30 PM org.wildfly.security.Version
<clinit>
INFO: ELY00001: WildFly Elytron version 1.13.1.Final
Oct 30, 2020 12:25:30 PM org.xnio.Xnio <clinit>
INFO: XNIO version 3.8.2.Final
Oct 30, 2020 12:25:30 PM org.xnio.nio.NioXnio
<clinit>
INFO: XNIO NIO Implementation Version 3.8.2.Final
Oct 30, 2020 12:25:30 PM org.jboss.threads.Version
<clinit>
INFO: JBoss Threads version 2.4.0.Final
Oct 30, 2020 12:25:30 PM
org.jboss.remoting3.EndpointImpl <clinit>
INFO: JBoss Remoting version 5.0.19.Final
MyJndiValue

OUTPUT

Warning

JNDI access to these
data on Wildfly is

**READ
ONLY!**

Warning

JNDI access from code is READ ONLY!, but you can write from CLI

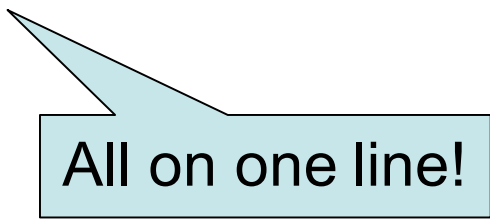
```
$ ./jboss-cli.sh
```

```
connect
```

```
[standalone@localhost:9999 /] /subsystem=naming/binding=  
java\:jboss\exported\demoParam:add(value=  
"Demo configuration value",binding-type=simple)
```

```
{ "outcome" => "success"}
```

```
[standalone@localhost:9999 /] quit
```



All on one line!

Then reconnect with jconsole to see the result

Java Monitoring & Management Console

Connection Window Help

pid: 25687 jboss-modules.jar -mp /Users/ronchet/Downloads/wildfly-9.0.1.Final/modules org.jboss.as.standalone -Djbo...

OverviewMemoryThreadsClassesVM SummaryMBeansWildFly CLI

jcajdrjdrjmxjmxjpajsfloggingloggingmailmailmanagementmanagementmodule-loadimylInterfacenamingOperationsNotifications"java:jboss"AttributesOperationsNotifications"java:jboss"AttributesOperationsNotifications"java:jboss"AttributesOperationsNotificationsremote-na

MBeanInfo

Name	Value
Info:	
ObjectName	jboss.as:subsystem=naming, binding="java:jboss/exported/demoParam"
ClassName	org.jboss.as.controller.ModelController
Description	JNDI bindings for primitive types

Descriptor

Name	Value
Info:	
alternate.mbean	jboss.as.expr:subsystem=naming, binding="java:jboss/exported/demoParam"
alternate.mbean.des...	To be able to set and read expressions go to jboss.as.expr:subsystem=naming, binding...
mbean.expression.su...	true
mbean.expression.su...	This mbean does not support expressions for attributes or operation parameters, even ...

Useful references

- [http://docs.wildfly.org/21/Getting Started Guide.html](http://docs.wildfly.org/21/Getting%20Started%20Guide.html)
- <http://docs.oracle.com/javase/jndi/tutorial/trailmap.html>
- <https://docs.jboss.org/author/display/AS71/CLI+Recipes>