Configure Your Raspberry Pi for Breezy4Pi – Raspbian Jessie

I. Unboxing Your Raspberry Pi

The documentation that comes with your Raspberry Pi will direct you on how to load the operating system and to upgrade the Pi to the latest software revisions. Therefore, there is no need to repeat those instructions here.

Breezy4Pi runs on top of the Raspbian distribution and so it is recommended that you use this flavor of Linux. We also recommend that you use at least an 8GB micro SD card. Since cards are so inexpensive these days, the larger the card you can afford, the better.

Once you've unboxed your Pi and have tested it out per its accompanying documentation, then we will be ready to configure it for Breezy4Pi. Be sure you are connected to the internet and have a monitor, keyboard, and mouse plugged in.

II. First Time Boot-up

The first time you boot up your Raspberry Pi under Jessie, you will be automatically logged in and taken to the Desktop. From here, you will need to do some additional configuration.

i. Expanding the Filesystem:

Typically, you will need to expand the file system in order to take advantage of the entire SD card.

1. From your desktop, click on 'Menu->Preferences->Raspberry Pi Configuration.
2. Click on the 'Expand Filesystem' button then click 'OK'.
3. You may reboot the machine at this point or wait until you're done with your configuration changes.

ii. Enable I2C and SPI interfaces:

Breezy4Pi will potentially make use of both I2C and SPI interfaces. So, while you have the Raspberry Pi Configuration dialog showing:

1. Click on the 'Interfaces' tab.
2. Click on the I2C and SPI enable radio buttons
3. Click on 'OK'

iii. Localizations:

Setting the local, time zone, and keyboard language are optional, but highly recommended:

1. Click on the 'Localisation' tab
2. Select the desired Local, Timezone, and Keyboard for your local. The keyboard is important if you wish to have special characters show up properly while typing.
3. Reboot the Pi. After reboot, your username will be 'pi' (unless you changed it) and your password will be 'raspberry'.

III. Install Pi4J

The Pi4J library is needed by Breezy4Pi. Please follow the installation instructions given on the Pi4J website: http://pi4j.com/install.html

IV. Install TomEE from Apache

TomEE is the web container of choice for Breezy4Pi. In short, you will need to do the following:

1. Install TomEE
2. Copy over the Pi4J libraries into the TomEE lib folder
3. Edit the configuration files to add a user with admin permissions
4. Configure TomEE to auto start when the Raspberry Pi reboots.
5. Install Breezy4Pi (BreezyWeb)

i. Install TomEE:

1. If you're not already in the desktop, then type 'startx' from the command line to start it.
2. Click on the icon for the web browser.
3. Navigate to http://tomee.apache.org. Click on the 'Download' button. You will be directed to a list of downloadable versions of TomEE. Versions 7.0.1 and 1.7.4 are available of this writing. You will need download the 'tar.gz' format for the 'Plus' version. Once the tar file has downloaded, then the Xarchiver should pop-up showing the proper Apache Tomee plus file to extract. Click on 'Extract' icon. Another dialog box will pop up. Use the default values then click on 'Extract' . Both the tar file and the extracted file folder should end up in the '/home/pi/Downloads' folder.
4. The expanded TomEE folder will have the full versioned name of TomEE. You will need to rename the folder to 'tomcat'. Right click on the versioned folder of TomEE and select rename. Enter 'tomcat'.
5. Open a command line window for the following steps:
6. Within the command line window, copy the contents of the tomcat folder to the /opt folder using: '*sudo cp –r tomcat /opt*'

ii. Copy the Pi4J library to the TomEE lib folder:

1. Navigate to the '/opt' folder: '*cd /opt*'
2. Copy the pi4j jars to tomcat lib: '*sudo cp –r pi4j/lib/*.* tomcat/lib*'

iii. Edit the TomEE Configuration files to set user admin permissions:

i. Navigate to /opt/tomcat/conf
   a. Remove Session persistence: 'sudo nano context.xml'
   b. uncomment out <Manager pathname="" /> line
   c. Type <ctrl> 'X' 'Y' <return>

ii. Setup the admin username and password:
   a. Type 'sudo nano tomcat-users.xml'
   b. Comment out the existing <role…/> and <user…/> tags
   c. Add the following:

i. <role rolename="manager-gui"/>
ii. <role rolename="manager-script"/>
iii. <user username="system" password="raspberry" roles="manager-gui, manager-script/>

d. Save and exit (Type <ctrl> 'X' 'Y' <return>).

iii. Modfiy 'server.xml'

a. Sudo nano server.xml
b. Scroll down to the tag <Server port="8005" shutdown="SHUTDOWN">
c. On the next line place the following if it's not already present:
   i. <!—TomEE plugin for Tomcat →
   ii. <Listener className="org.apache.tomee.catalina.ServerListener"/>
d. Save and exit.

iv. Configure TomEE to auto start:

From within the a command line window, navigate to "/etc/init.d' using '*cd /etc/init.d*'

1. Type 'sudo wget https://raw.githubusercontent.com/tomtibbetts/Breezy/master/Scripts/tomcat' to download the tomcat command script to the current folder.
2. sudo chmod 755 tomcat
3. sudo update-rc.d tomcat defaults
4. reboot the server for changes to take affect

Now tomcat should boot automatically. This assumes that tomcat (TomEE) was installed in /opt/tomcat directory.

You can now use the following commands to start and stop tomcat from the command line:

- Sudo service tomcat start – starts the server
- Sudo service tomcat stop – stops the server.

To see if Tomcat is present you can either test it in the Pi's desktop web browser:

1. 'startx'
2. Click on the browser icon
3. Type: localhost:8080. The Tomcat splash page should now show up.

For your reference, the tomcat shell script looks something like this:

```
#!/bin/bash

### BEGIN INIT INFO
# Provides:          tomcat7
# Required-Start:    $network
```

```
# Required-Stop:    $network
# Default-Start:    2 3 4 5
# Default-Stop:     0 1 6
# Short-Description: Start/Stop Tomcat server
### END INIT INFO

echo "Attempting to start Tomcat"

case "$1" in
  start)
    echo "Starting Tomcat"
    sh /opt/tomcat/bin/startup.sh
    echo "Tomcat is alive"
    ;;
  stop)
    echo "Stopping Tomcat"
    sh /opt/tomcat/bin/shutdown.sh
    echo "Tomcat is dead"
    ;;
  *)
    echo "Usage: /etc/init.d/tomcat7 {start|stop}"
    exit 1
    ;;
esac

exit 0
```

v. Install Breezy4Pi:

Once you've verified that the TomEE server is running, you can now install Breezy4Pi. The best way to obtain Breezy4Pi is to download the latest WAR file from GitHub:

1. Open a web browser and navigate to: 'https://github.com/tomtibbetts/Breezy'. Or, you can search for 'Breezy4Pi' from within Github.com
2. Make sure you're in the 'Master' branch then click on 'Deployments'. You should now see 'BreezyWeb.war'. Click on the WAR file.
3. Now, click on the 'Download' button. The WAR file should now download to your Downloads folder on the Raspberry Pi.

Once it's downloaded, you can then use the TomEE management tool to deploy the WAR file:

1. In your web browser, navigate to the TomEE URL. If you're on the Raspberry Pi, enter localhost:8080 in the browser's address field. Otherwise, enter the IP address of the Raspberry Pi followed by ':8080". Either method should take you to the TomEE splash page.
2. Click on the 'Manager App' button on the right hand side of the screen. You may be prompted to enter the username and password that you configured earlier in the 'tomcat-users.xml'. If the entry is correct, you will be taken to the 'Tomcat Web Application Manager' page.

3. Scroll down until you see the section, 'War file to deploy'. Click on 'Choose File' button to select the Breez4Pi WAR file you downloaded earlier. Click on 'Deploy' to deploy the WAR file. Deployment will take a minute or two.
4. Once deployed, you will notice that 'BreezyWeb' has been added to the list of applications. Off to the right 'Stop', 'Reload', and 'Undeploy' will all be active buttons while 'Start' is not. This indicates that Breezy has booted up properly.
5. Clicking on the link for BreezyWeb will take you to the home page of the application.
6. You are now ready to begin.

vi. If you can't access the TomEE manager app from a remote machine:

Depending upon the version of TomEE that you installed, if you find you can't access the manager app (by clicking on the Manager button on the TomEE splash page) from a remote machine, then you need to open up the permissions.

1. Open up a command window and navigate to 'opt/tomcat/webapps/manager/META-INF'
2. *Sudo nano context.xml.* You may want to make a copy of the context.xml file first.
3. Scroll down to the tag, "<Valve classname="org.apache.cataline.valves…." and comment out this entire tag. Leave the '<Context ' tag alone.
4. Save and exit the file.
5. Reboot TomEE and verify that you can now access the manager app.

V. Applying Updates

If you have an update to Breezy4Pi that you wish to deploy you must first undeploy the current version. It is suggested you do the following:

1. Stop all macros that are currently executing.
2. Undeploy the currently application using the Tomcat Web Application Manager.
3. Deploy your Breezy4Pi update.
4. Stop then start Tomcat from the Raspberry Pi command line using:
    a. Sudo service tomcat stop
    b. Sudo service tomcat start
5. Or, if you need to reset hardware, then do a power cycle reboot.

VI. References:

- Raspberry Pi organization
- Pi4J
- Apache TomEE
- Breezy4Pi