IBM Information Management software

IBM® DB2® Amazon® Machine Image (AMI)

Re-Bundling Guide

Thomas Chong (*chongt@ca.ibm.com*)

Information Management Emerging Partnership and Technologies
IBM Toronto Lab
28/09/2009

Contents

1. Introduction

1.1 Purpose

The purpose of this document is two-fold:

- To outline the process for integrating software applications into the IBM® DB2® AMIs in the Amazon® Elastic Compute Cloud™ (EC2™)
- To explain the steps, technical issues, and considerations regarding the re-bundling of Amazon Machine Images (AMIs)

For instructions on the deployment of the AMIs, please refer to:

- IBM DB2 9.7 Amazon Machine Image (AMI) Get Started Guide, available at: http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB2_9.7_AMI.pdf
- Amazon EC2 guide, available at: http://docs.amazonwebservices.com/AWSEC2/latest/GettingStartedGuide/

The integration instructions contained in this guide can be applied to:

- DB2 Express-C 9.7 AMI (32-bit / 64-bit)
- DB2 Express 9.7 AMI (32-bit)
- DB2 Workgroup 9.7 AMI (64-bit)

This document is intended for a technical audience and will help independent solution vendors (ISVs) obtain knowledge about integrating their software with the existing DB2 AMIs in Amazon Web Services (AWS).

1.2 Prerequisites for Bundling an AMI Instance

In order to perform bundling and uploading operations on your AMI Instance, you will need the EC2 AMI Tools. By default, both the EC2 AMI and API Tools are installed on all IBM DB2 AMIs. If you had removed the EC2 AMI Tools at an earlier time, they can be downloaded at http://developer.amazonwebservices.com/connect/entry.jspa?externalID=368. Likewise, the EC2 API Tools can be downloaded at http://developer.amazonwebservices.com/connect/entry.jspa?externalID=351.

Since you will be performing these operations directly within your instance, you will also need to place within the file system of your instance your AWS credentials, such as the X.509 certificate and private key files.

This guide assumes that files mentioned within this document were not removed prior to the usage of this guide.

2. Integrating Custom ISV Software

The purpose of pre-integrating software into the DB2 AMI is to alleviate the application installation, configuration, and integration tasks from the end-user, making the deployment of the applications on DB2 in an AMI easy and painless.

Before continuing on the task of integrating an application on a running AMI instance, it is recommended that you create an AMI that captures the current state of the instance. In the case where the application fails to be configured properly or there is a problem with the AMI, a backed-up, working AMI may be deployed so the next iteration of the integration process can start from a clean environment.

Integrating an ISV application into the DB2 AMI is similar to installing and configuring the application to work within an operating system in a normal, physical environment with a few extra considerations.

The following guidelines specify the process for integrating an ISV application into a DB2 AMI:

1. Install all required dependencies needed by the ISV application (e.g. Linux® operating system packages).
2. Install the ISV application and configure the default settings of the ISV application to work with DB2,
3. Verify that all components of the ISV application are installed and configured successfully. Create, test, or sample data from the ISV application.
4. Develop and execute test plans for this integration task; Ensure the application is able to run properly, able to access the DB2 database, and is fully functional on the EC2 instance.
5. Identify tasks to be performed at “first boot” of an AMI instance. E.g. any configuration of the ISV application that requires user input such as user name and password for security.
6. Develop post-install plans based on the tasks identified in the previous step (if applicable). For example, if the ISV software files are dependent on any system or DB2 parameters such as system hostname, domain name, network protocol, DB2 instance name, port number, etc, be prepared to develop customized shell scripts and/or YaST configuration modules to configure the AMI instance accordingly.
7. Set the AMI instance back to a “first boot” state by resetting any configuration scripts and/or YaST configuration modules. This will ensure the scripts/modules will be executed during the initial boot-up of an instance of the newly re-bundled AMI.
8. Re-bundle the file system into an AMI. When you re-bundle an AMI in EC2, the directories `/sys`, `/proc`, `/dev`, `/media`, and `/mnt` are not included. Therefore,

it's recommended that any files that need to be preserved in the newly re-bundled AMI should not be stored in these directories.

3. AMI Re-Bundling Instructions

If you have installed an ISV application on top of the DB2 AMI, you may want to restore the AMI back to the initial state. This will allow end-users to go through the original sequence of license agreement acceptance screens and any DB2 and AMI related configuration modules. An outline of the AMI re-bundling steps are listed as follows:

1. Adding additional license text associated with the integrated ISV application to be displayed in the license agreement acceptance screens. See section 3.1 License Screens for details.
2. Restoring awsconfig, ebsconfig, awssysconfig, and db2config YaST modules into their initial state to allow these modules to be run during the initial boot-up of the re-bundled AMI. See sections 3.2 Restoring db2config to its Initial State, 3.3 Restoring awssysconfig to its Initial State, and 3.4 Restoring awsconfig and ebsconfig to their Initial States for details.
3. Editing the file `/var/adm/ibmvmcoc-postinstall/bashrc_root_yast` and the corresponding shell scripts it references to invoke the YaST modules required for DB2 AMI configuration upon first login of the root user. See section 3.5 The /var/adm/ibmvmcoc-postinstall/bashrc_root_yast Script for more details.
4. Removing any user specific confidential data such as RSA public keys, and lock files from the AMI instance, as well as performing last-minute cleanup duties on the YaST modules and laying down the system files in their correct locations. See section 3.7 Re-setting the Instance to First-Boot State for more details.

   Note: If you do not remove any user specific confidential data before re-bundling, it may be included within the file system of the new AMI, potentially exposing them to the public if you choose to make this new AMI public.

5. Packaging up the AMI which has ISV application integrated with DB2. See section 3.8 Re-bundling, Uploading, and Registering of AMI for details.

3.1 License Screens

If you wish to add additional products to the DB2 AMI, you will need to add the corresponding license agreements for your product to the initial license acceptance screen. All license text screens are displayed via the `/var/adm/ibmvmcoc-postinstall/ibmvmcoc-license` script shown below:

```
#! /bin/sh
# THIS PRODUCT CONTAINS RESTRICTED MATERIALS OF IBM
# (C) COPYRIGHT International Business Machines Corp.,
2009
# All Rights Reserved * Licensed Materials - Property
of IBM
# US Government Users Restricted Rights - Use,
duplication or disclosure
# restricted by GSA ADP Schedule Contract with IBM
Corp.
#
export TEXTDOMAINDIR=/usr/share/locale
export TEXTDOMAIN=ibmvmcoc-license
USERDATA=`curl http://169.254.169.254/latest/user-data
2>>/dev/null`
. gettext.sh

export LICENSENAME=""
BACKTITLEGENERAL="License Agreement"
BACKTITLE0="Linux Distribution Statement"
THISPATH=`dirname $0`
UNLOCKFILE="${THISPATH}/wasrun.lck"

# display license agreements the first time through
if test ! -f ${UNLOCKFILE} ; then
  if [ ! "$(echo $USERDATA | grep –w
SLES_LICENSE_AGREEMENT=ACCEPT)" ]; then
          # Display license
          clear
          /usr/bin/dialog --backtitle "`gettext
\"${BACKTITLE0}\"`" --no-label "`gettext \"Cancel\"`" -
-yes-label "`gettext \"I understand\"`" --yesno
"`gettext \"I understand and accept that SUSE Linux
Enterprise Server is provided and licensed directly by
Novell. The Novell website is novell.com.\"`" 10 60 ||
/sbin/halt -f -p
          clear
          #callout to SLES license display handler

          . /var/adm/ibmvmcoc-
postinstall/SLESLicense.sh;
          LICENSETEXT=$LICENSENAME
```

a

b

```
    fi
    clear

    #callout to license display handlers. handlers use
  LICENSENAME as return string

  for i in `ls -x /var/adm/ibmvmcoc-
  postinstall/licenseadds`;
      do
        if [ ! "$(echo $USERDATA | grep –w $i=ACCEPT)" ];
  then
                clear
                . /var/adm/ibmvmcoc-
  postinstall/licenseadds/$i;
                # append returned license name
                LICENSETEXT=$LICENSETEXT"\n "$LICENSENAME
        fi
      done

    # reset textdomain info since the callout to other
  handlers may leave things in an unknown state
  export TEXTDOMAINDIR=/usr/share/locale
  export TEXTDOMAIN=ibmvmcoc-license
    if [ ! "$(test -e $LICENSETEXT)" ]; then
            clear
            /usr/bin/dialog --backtitle "`gettext
  \"${BACKTITLEGENERAL}\"`" --no-label "`gettext
  \"Cancel\"`" --yes-label "`gettext \"I accept\"`" --
  yesno "`gettext \"Do you accept the license
  agreement(s) listed below?\"` \n ${LICENSETEXT} " 15 60
  || /sbin/halt -f -p
            clear
    fi
  fi
  # set marker so we don't display the licenses again
  /bin/touch ${UNLOCKFILE}
```

c

d

e

a. The USERDATA variable is set here. It receives input from the ***ec2-run-instances*** command as instance metadata. This is where a user can silently accept specified license screens and bypass YaST modules. For more information on how to pass user data into the USERDATA variable, please refer to the Amazon DB2 9.7 AMI Start-up Guide found at http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB29.7_AMI.pdf.
b. The license agreement text for SUSE® Linux Enterprise Server is displayed here. Notice that if a user declines the agreement, the instance will perform a `halt` command, thereby terminating the instance. This can be modified to have different system behavior upon input.

c. This is where all the license display scripts are launched. Each script within the folder `/var/adm/ibmvmcoc-postinstall/licenseadds` is run in alphabetical order. The running of the scripts in this folder can be prevented via instance metadata stored in the `USERDATA` variable. To disable the displaying of a specific license text, the `USERDATA` must contain the following parameters and values: `<license_script_name>=ACCEPT`. For more information on how to pass user data into the `USERDATA` variable, please refer to the Amazon DB2 9.7 AMI Start-up Guide found at http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB29.7_AMI.pdf.
d. This displays the summary of all license agreement screens on the instance. It will only execute if there is a license being displayed on the instance on the first boot sequence.
e. This creates a file called `wasrun.lck`. The file prevents the license agreement screens from being shown again.

Next, we'll go over the process of adding and displaying ISV specific license texts:

1. You will need to have your product license file in plain text format.

2. Copy the wrapped license txt file into `/var/adm/ibmvmcoc-postinstall` directory.

```
# cp <license> /var/adm/ibmvmcoc-postinstall/.
```

3. Open the `DB2_LICENSE_AGREEMENT` script in `/var/adm/ibmvmcoc-postinstall/licenseadds` directory.
The `DB2_LICENSE_AGREEMENT` file is a shell script which is used to display the DB2 product specific license agreement and user acceptance buttons in text mode. This script will serve as a template for displaying additional license texts.

```
#!/bin/sh
#
# Copyright (c) 2008 IBM Corporation
# All rights reserved.
#
#based on the language just set, display the correct
license file
export TEXTDOMAINDIR=/usr/share/locale
export TEXTDOMAIN=ibmvmcoc-license
. gettext.sh
LICENSEFILE="/var/adm/ibmvmcoc-
postinstall/expc_LI_en.txt"
BACKTITLE="IBM DB2 Software License Agreement"
#format the license file
#move the file, format it and put it back in the
```

```
original file name
mv $LICENSEFILE $LICENSEFILE.org
# add one extra line to make sure that format doesn't
drop the last line
echo "\n" >> $LICENSEFILE
fmt -w 65 $LICENSEFILE.org > $LICENSEFILE
# show the license
/usr/bin/dialog --backtitle "${BACKTITLE}" --exit-label
"`gettext \"I understand\"`" --textbox ${LICENSEFILE}
20 70
# restore the original file
mv $LICENSEFILE.org $LICENSEFILE
# return the license name
LICENSENAME=$BACKTITLE
```

4. Make a copy of the `DB2_LICENSE_AGREEMENT` and name it `my_license.sh`

```
# cp DB2_LICENSE_AGREEMENT my_license.sh
```

5. Edit the following variables in the `/var/adm/ibmvmcoc-postinstall/licenseadds/my_license.sh` script file (also shown highlighted in blue in step 3):

```
LICENSEFILE="/var/adm/ibmvmcoc-postinstall/<name of
license file>"
BACKTITLE="<License_Agreement_Title>"
```

   The `LICENSEFILE` variable refers to the location of the license text to be displayed in Step 1. The `BACKTITLE` variable refers to the heading text to be displayed along with the license text.

6. To create more license text screens, follow steps 2-5 again. Keep in mind that every license text must be of a unique name along with the shell script that displays the text file.

7. If the license screens have been previously displayed, the `/var/adm/ibmvmcoc-postinstall/wasrun.lck` file will be created. The existence of this lock file will prevent all shell scripts in `/var/adm/ibmvmcoc-postinstall/licenseadds` from displaying the license agreement screens again. Remove the `/var/adm/ibmvmcoc-postinstall/wasrun.lck` file so that the license screens can be displayed in the initial boot-up of the AMI instance.

3.2 Restoring db2config to its Initial State

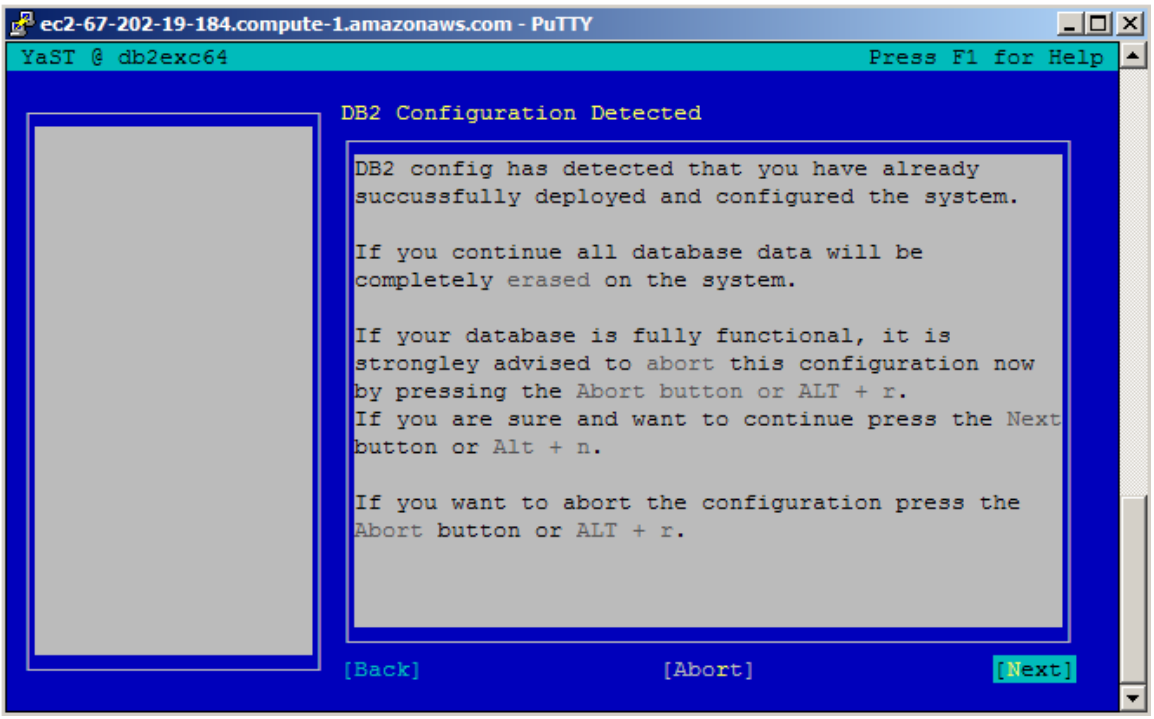
1. Logout all DB2 instance users, Database Administration Server (DAS) users, and fenced users from the system.

> ***Note*:** This step removes all existing data from the current DB2 instance. If you have any needed DB2 data on the existing instance, please make sure you back-up your data outside of your AMI instance, e.g. to an EBS volume

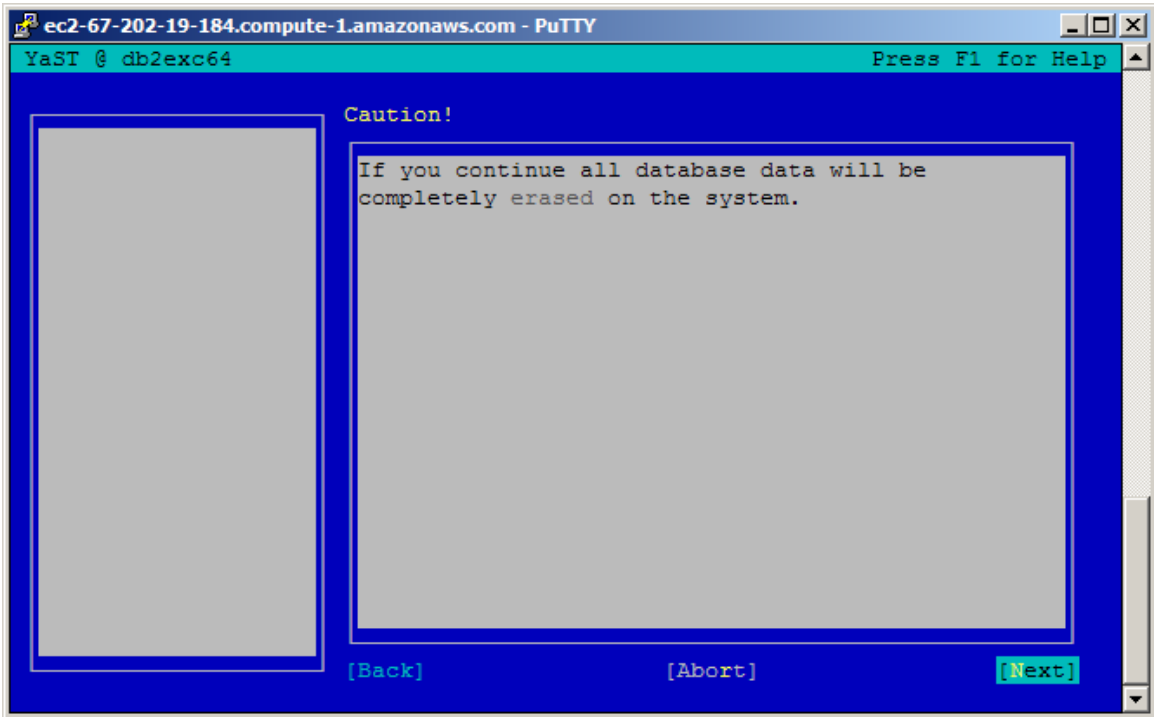
2. Execute the following command in a terminal. This will start the db2config module again.

```
# yast2 db2config
```

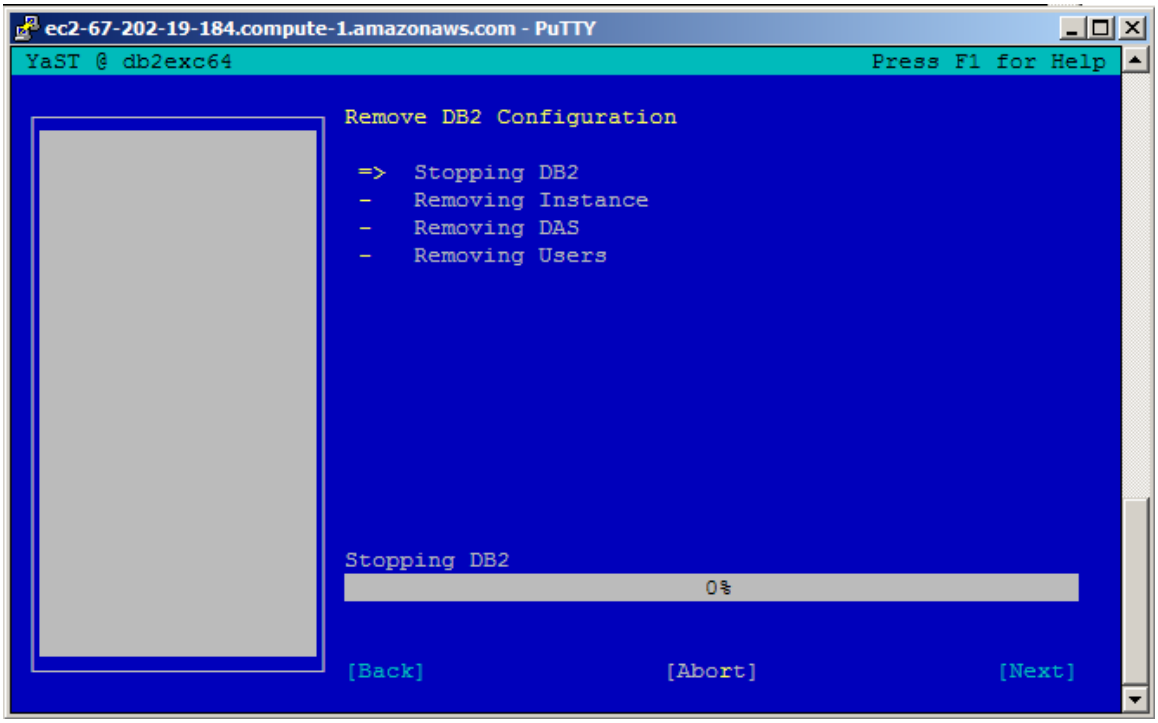
3. The YaST2-db2config module will start. The following screen shows that there is an existing DB2 Configuration. Press **[Next]** to continue.



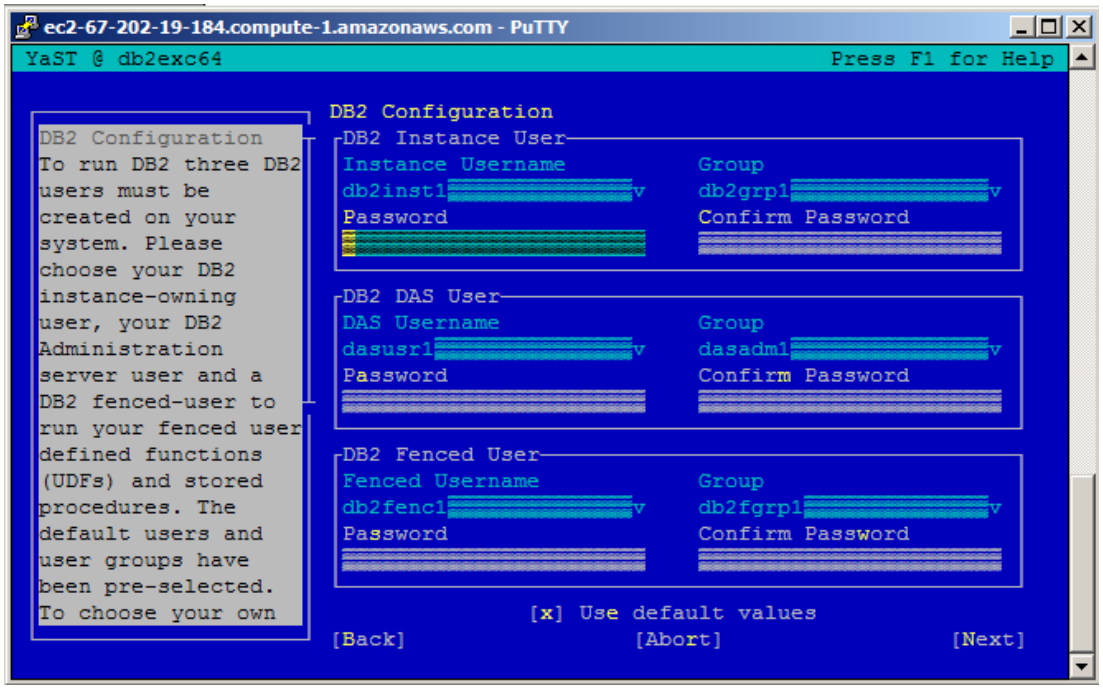
4. The next screen will present a warning stating that the existing DB2 configuration will be erased. Press **[Next]** to continue.



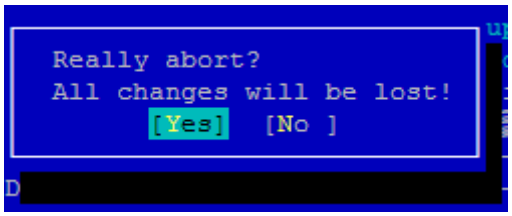
5. The next screen will show the progress of clearing existing DB2 configurations. This will stop the DB2 service and remove all DB2 instances and users on the AMI instance.



6. When the YaST module has finished removing the existing DB2 configurations, the following screen will appear. At this stage, press **[Abort]** to abort the db2config module.



7. A message box will pop up prompting you to confirm the Abort. Click **[Yes]** to exit the module.



8. The db2config module and DB2 configuration on the instance is now reverted back to its original state.

9. Remove any `.ok`, `.error`, `.logfile*` files from `/usr/share/YaST2/include/db2config` directory by using the following commands. This will clean up the environment so the db2config YaST module can run on a clean environment at the next initial boot-up.

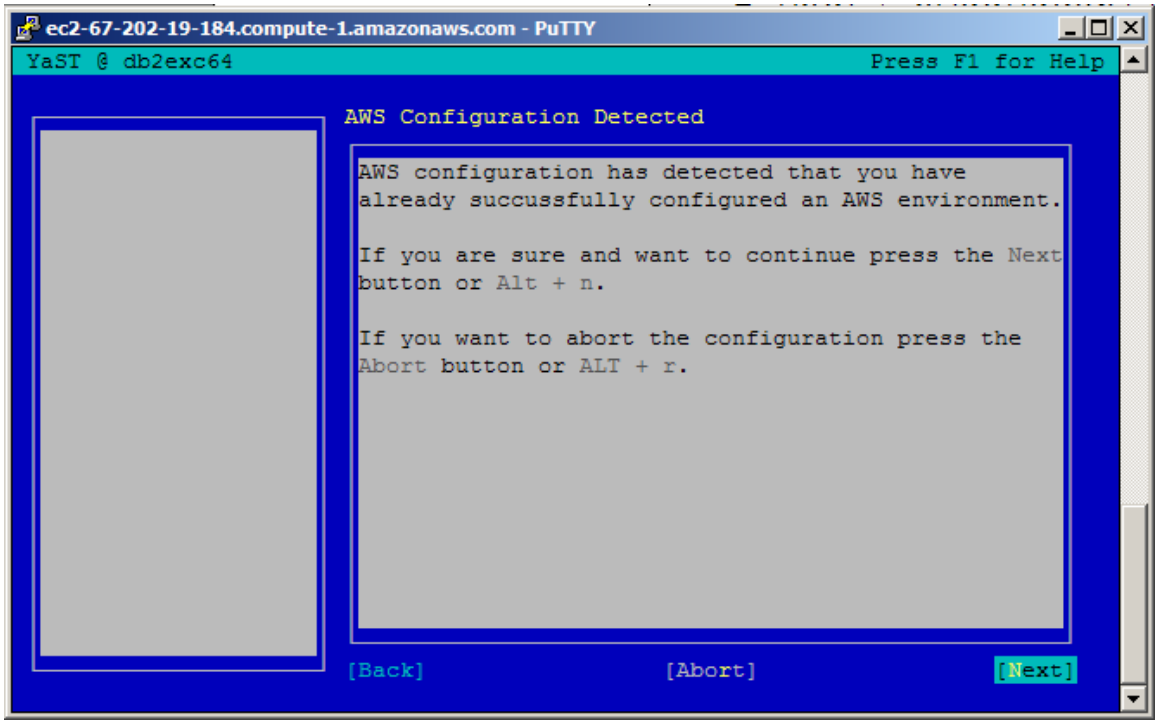
```
# cd /usr/share/YaST2/include/db2config/
# rm .ok .error .logfile*
```

3.3 Restoring awssysconfig to its Initial State

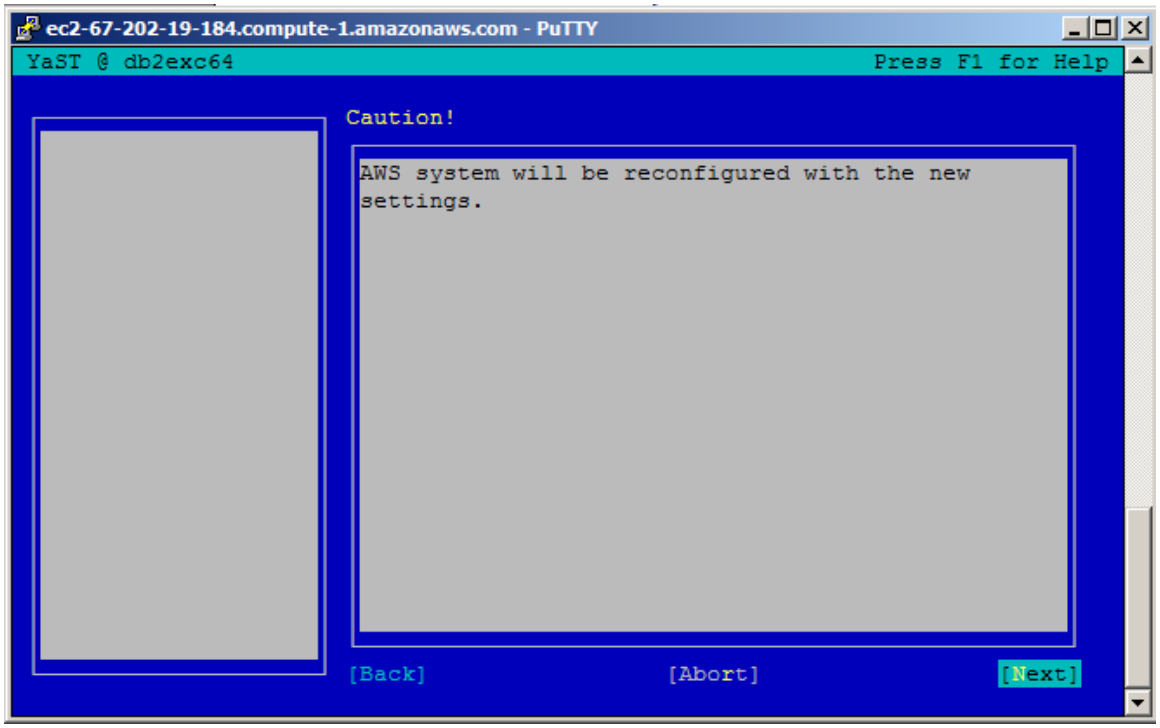
1. Execute the following command on the command line. This will start the awssysconfig module.

```
# yast2 awssysconfig
```

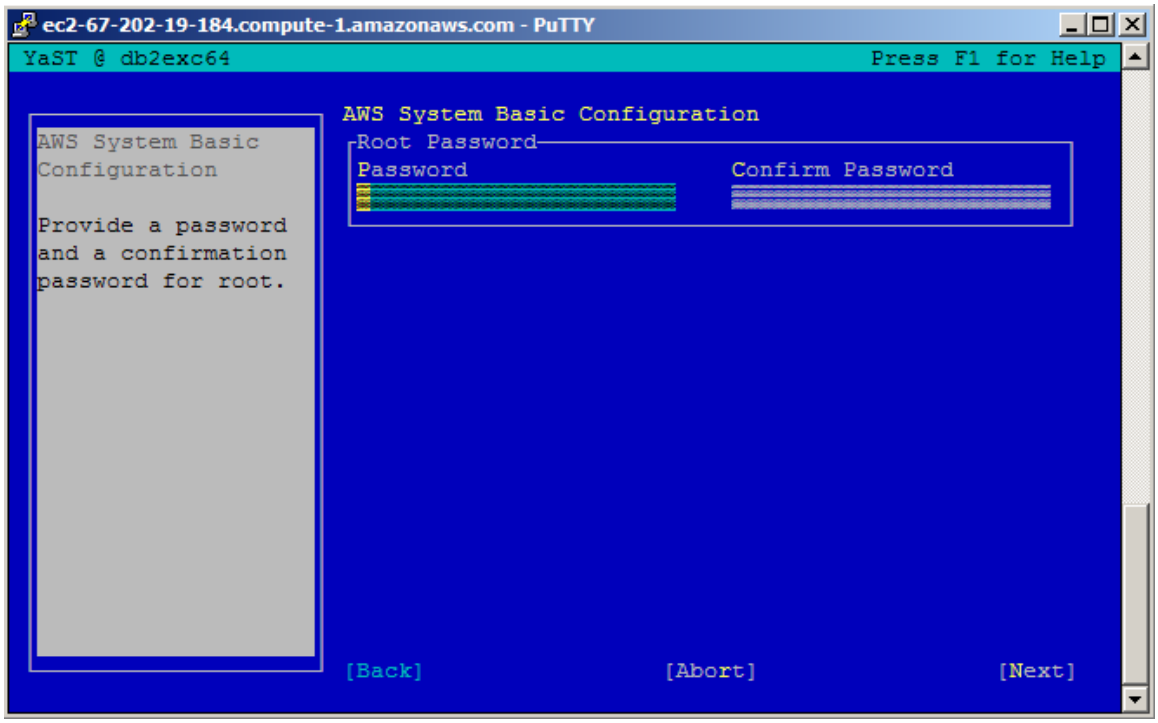
2. The YaST2-awssysconfig module will start. You will see the following screen stating that an existing AWS System configuration is detected. Press **[Next]** to continue.



3. On the next screen, you will be warned that the existing system configuration will be replaced with new setting. Press **[Next]** to continue.



4. The following screen will prompt you to enter a root password for the DB2 AMI instance. The root super-user has access to all commands and files on the AMI instance, and is also needed to create sub-user accounts to grant and restrict access to specific users. Enter ***password*** as the root password and confirm it by entering it again. Press **[Next]** to continue.



5. After the awssysconfig module has finished running, remove any `.ok/`, `.error/`, and `.logfile*` files from the `/usr/share/YaST2/include/awssysconfig` directory by issuing the following commands. This will clean up the environment so the awssysconfig YaST module can run on a clean environment at the next initial boot-up.

```
# cd /usr/share/YaST2/include/awssysconfig/
# rm .ok .error .logfile*
```

3.4 Restoring awsconfig and ebsconfig to their Initial States

To restore awsconfig and ebsconfig YaST modules to their original states, remove any `.ok/`, `.error/`, and `.logfile*` files from`/usr/share/YaST2/include/awsconfig` and `/usr/share/YaST2/include/awsconfig` directories:

```
# cd /usr/share/YaST2/include/awsconfig/
# rm .ok .error .logfile*

# cd /usr/share/YaST2/include/ebsconfig/
# rm .ok .error .logfile*
```

This will allow the awsconfig and ebsconfig YaST modules to run on a clean environment upon the next initial boot-up.

Should you choose not to remove the files listed above, the related modules will perform clean-up duties as if they had been run previously, in order to return the module to a first-run state. While this is not detrimental to the configuration of the AMI instance, this will result in behaviour that is not expected of these modules during first-boot state.

3.5 The /var/adm/ibmvmcoc-postinstall/bashrc_root_yast Script

The `/root/.bashrc` script is executed every time a shell is opened by the root user. The `/var/adm/ibmvmcoc-postinstall/bashrc_root_yast` script is to be copied to`/root/.bashrc` for the first interactive shell login of the root user.

Follow the below instructions to take a closer look at the bashrc_root_yast file.

1. Open up the `/var/adm/ibmvmcoc-postinstall/bashrc_root_yast` file with a text editor. (For example, `vi` in Linux).

2. The `/var/adm/ibmvmcoc-postinstall/bashrc_root_yast` file contains scripts, environment variables, and commands that will be executed during the first interactive login of the root user. The root user is the only existing user on an AMI before the initial boot-up configuration is completed.

The following shows the content of the bashrc_root_yast file in a default DB2 AMI:

```
# Sample .bashrc for SUSE Linux
# Copyright (c) SUSE GmbH Nuernberg

# There are 3 different types of shells in bash: the login shell,
normal shell
# and interactive shell. Login shells read ~/.profile and
interactive shells
# read ~/.bashrc; in our setup, /etc/profile sources ~/.bashrc -
thus all
# settings made here will also take effect in a login shell.
#
# NOTE: It is recommended to make language settings in ~/.profile
rather than
# here, since multilingual X sessions would not work properly if
LANG is over-
# ridden in every subshell.

# This might be helpful for Linux newbies who previously used
DOS...
if [ "$(echo $- | grep -c i)" == 1 ]; then
test -f /etc/profile.dos && . /etc/profile.dos
```

```
# Some applications read the EDITOR variable to determine your
favourite text
# editor. So uncomment the line below and enter the editor of
your choice :-)
#export EDITOR=/usr/bin/vim
#export EDITOR=/usr/bin/mcedit

# For some news readers it makes sense to specify the NEWSSERVER
variable here
#export NEWSSERVER=your.news.server

# If you want to use a Palm device with Linux, uncomment the two
lines below.
# For some (older) Palm Pilots, you might need to set a lower
baud rate
# e.g. 57600 or 38400; lowest is 9600 (very slow!)
#
#export PILOTPORT=/dev/pilot
#export PILOTRATE=115200

test -s ~/.alias && . ~/.alias

#Run the language script
#/var/adm/ibmvmcoc-postinstall/setLanguage.sh
#get the user selected language
export LANG=`cat /etc/sysconfig/language | grep RC_LANG= | cut -d
'"' -f2`

export JAVA_HOME=/usr/java
export EC2_HOME=/root/ec2

# Run license agreements screen
/var/adm/ibmvmcoc-postinstall/ibmvmcoc-license
# unlock virtuser once licenses have been accepted
usermod -U virtuser

#callout to user supplied pre basic config scripts
USERDATA=`curl http://169.254.169.254/latest/user-data
2>>/dev/null`

for i in `ls -x /var/adm/ibmvmcoc-postinstall/preconfigadds`;
do
  if [ ! "$(echo $USERDATA | grep –w $i=OFF)" ]; then
          /var/adm/ibmvmcoc-postinstall/preconfigadds/$i ;
  fi
done


#run basic configuration if not already done
```

```
#CONFIG_BASIC_UNLOCKFILE=/usr/share/YaST2/include/configbasic/.ok
#if test ! -f ${CONFIG_BASIC_UNLOCKFILE} ; then
#   yast2 configbasic
#fi
# copy the support file for configbasic used during appliance
install
#cp /tmp/networkconfig_config
/etc/networkconfig_config.imageinstall >/dev/null 2>&1

#callout to user supplied post basic config scripts
for i in `ls -x /var/adm/ibmvmcoc-postinstall/postconfigadds`;
do
  if [ ! "$(echo $USERDATA | grep –w $i=OFF)" ]; then
          /var/adm/ibmvmcoc-postinstall/postconfigadds/$i ;
  fi
done

# Switch default run level to 5 if not slim mode
#APPLIANCE_MODE=/usr/share/YaST2/include/configbasic/.slim
#if test ! -f ${APPLIANCE_MODE} ; then
# perl -pi -e 's/id:3:initdefault:/id:5:initdefault:/'
/etc/inittab
#fi

# remove startup scripts
mv /var/adm/ibmvmcoc-postinstall/bashrc_root_default
/root/.bashrc
rm /etc/bash.bashrc.local

#switch to mode 5 if not slim
#if test ! -f ${APPLIANCE_MODE} ; then
# init 5
#else
# clear
# logout
#fi
```

e

f

When a user launches an AMI instance and login as root user, the `/root/.bashrc` script will kick-off the following tasks:

a. Two environment variables are set, namely the `JAVA_HOME` environment variable and the `EC2_HOME` variable, both of which are required for the EC2 API tools to work properly. Both environment variables are set to the respective location of the two programs.
b. The license agreement screens will be displayed to the user by the `/var/adm/ibmvmcoc-postinstall/ibmvmcoc-license` script. The user must accept these license agreements to proceed.

c. The USERDATA variable is set here. It takes in input from the ***ec2-run-instances*** command as instance metadata. This is where a user can bypass specified license screens and YaST modules. For more information on how to pass user data into the USERDATA variable, please refer to the Amazon DB2 9.7 AMI Start-up Guide found at http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB29.7_AMI.pdf.

d. This executes the scripts within the `/var/adm/ibmvmcoc-postinstall/preconfigadds` folder. The scripts are run in alphabetical order. The running of the scripts in this folder can be prevented via instance metadata stored in the USERDATA variable. To disable the running of specific shell scripts, the USERDATA must contain the following parameters and values: `<script.sh>=OFF`. For more information on how to pass user data into the USERDATA variable, please refer to the Amazon DB2 9.7 AMI Start-up Guide found at http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB29.7_AMI.pdf.

e. This executes the scripts within the `/var/adm/ibmvmcoc-postinstall/postconfigadds` folder. The awsconfig, ebsconfig, awssysconfig, and db2config YaST modules' initiation scripts are located within this folder, and will be executed to complete the initial configuration of the AMI. The initial configuration of the AMI is finished at this point. The running of the scripts in this folder can be prevented via instance metadata stored in the USERDATA variable. To disable the running of specific shell scripts, the USERDATA must contain the following parameters and values: `<script.sh>=ACCEPT`. For more information on how to pass user data into the USERDATA variable, please refer to the Amazon DB2 9.7 AMI Start-up Guide found at http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB29.7_AMI.pdf.

f. Renaming the `/var/adm/ibmvmcoc-postinstall/bashrc_root_default` file to `/root/.bashrc` prevents the above configuration tasks to be re-run at the next login of the root user, after the initial boot-up and login. These configuration tasks are not required since the environment is already setup.

3. If you would like to add any additional steps to the AMI initialization stage, please add the scripts to the folders `/var/adm/ibmvmcoc-postinstall/preconfigadds` and `/var/adm/ibmvmcoc-postinstall/postconfigadds` folder at stages (d) and (e), where all DB2 AMI related customized configuration modules are executed.

Tip: If the installed ISV application is dependent on the DB2 instance/databases, the ISV application custom configuration steps should be executed after yast2-db2config module. The db2config module creates and configures a DB2 instance and database. Any steps dependent on DB2 databases should be done after db2config.

3.6 Resetting the Startup Services

Once you have finished modifying the `/root/bashrc_root_yast` file and the accompanying components, you will need to reset the start-up services. In the original start-up configuration of the DB2 AMI, certain services are not yet run at boot-up time, and as such, preserving the state of the original instance requires removal of certain startup services as listed below.

For DB2 AMIs, issue the following command:

```
# chkconfig –d db2
db2         0:off  1:off  2:off  3:off  4:off  5:off  6:off
```

This will remove the start-up service “db2” from run level 3 (which should be our current run level).

3.7 Re-setting the Instance to First-Boot State

All DB2 9.7 AMIs have a script to perform a “last-call” clean up prior to resetting the AMI instance. The script `/var/adm/ibmvmcoc-postinstall/resetvm.sh` is responsible for running any commands or scripts necessary to facilitate the resetting of the AMI instance to the first-boot state, including moving important system files around as well as ensuring that all modules and files are in place so that the next first-boot sequence will run smoothly.

The following is an example of the resetvm.sh script:

```
#!/bin/sh
# THIS PRODUCT CONTAINS RESTRICTED MATERIALS OF IBM
# (C) COPYRIGHT International Business Machines Corp.,
2009
# All Rights Reserved * Licensed Materials - Property of
IBM
# US Government Users Restricted Rights - Use,
duplication or disclosure
# restricted by GSA ADP Schedule Contract with IBM Corp.
#
# Reset the VM to original defaults as best as possible
# Takes an optional parm. If -resetip is supplied, reset
hostname and IP reset
#
# usage: resetvm.sh [-resetip]

# provide a mechanism for callers to pass parms to their
custom reset scripts
ALL_PARMS=$@

RESETIP="false"
SLIM="false"
```

```
TOOLS="true"
AE="true"
while [ $# -ne 0 ]
do
      case $1 in
            -resetip*)
            RESETIP="true"
            ;;
            -slim*)
            SLIM="true"
            ;;
            -notools*)
            TOOLS="false"
            ;;
            -noae*)
            AE="false"
            ;;
            *)
            ;;
      esac
         shift 1
done

#setup the boot script
echo "reset bashrc script"
/var/adm/ibmvmcoc-postinstall/post-install.sh

#callout to user supplied reset scripts
for i in `ls -x /var/adm/ibmvmcoc-
postinstall/resetadds`;
do
  /var/adm/ibmvmcoc-postinstall/resetadds/$i $ALL_PARMS;
done

#reset the default passwords
echo "reset root password"
chmod 755 /opt/IBM/AE/AS/ConfigPWD.sh
/opt/IBM/AE/AS/ConfigPWD.sh -username root -password
password
echo "reset virtuser password"
/opt/IBM/AE/AS/ConfigPWD.sh -username virtuser -password
password
# lock virtuser
usermod -L virtuser

# If there is no config file in /tmp, use the original
one
CONFIG_BASIC_IPVALUES=/tmp/networkconfig_config
if test ! -f ${CONFIG_BASIC_IPVALUES} ; then
   echo "use imageinstall configuration file"
```

```
   cp /etc/networkconfig_config.imageinstall
/tmp/networkconfig_config  >/dev/null 2>&1
fi

#reset the hostname and IP
if [ $RESETIP == "true" ]
then
 echo "restore default hostname and IP settings"
 /usr/bin/perl /opt/IBM/AE/AS/ConfigNET.pl -hostname
cocbase -domain  charlotte.ibm.com -bootproto dhcp
>/dev/null 2>&1
 echo "remove the networking settings config file"
 rm /tmp/networkconfig_config  >/dev/null 2>&1
 echo "remove the route settings file"
 rm /etc/sysconfig/network/routes  >/dev/null 2>&1
fi

#clear the language marker and ensure the language is
set to English
OURLANG=`cat /etc/sysconfig/language | grep RC_LANG= |
cut -d '"' -f2`
if [ $OURLANG == "en_US.UTF-8" ]
 then
   # we are already english so just reset the marker
   rm /usr/share/YaST2/include/configbasic/.langok
>/dev/null 2>&1
 else
   # we need to set the language back to English
   echo "set the default image language to English US."
   # /opt/IBM/AE/AS/ConfigLocale.sh
   #edit /etc/sysconfig/languages with new locale
   sed --in-place=.bak "/RC_LANG=/
c\RC_LANG=\"en_US.UTF-8\"" /etc/sysconfig/language
   sed --in-place=.bak "/LANG=/ d"
/home/virtuser/.profile

   rm /usr/share/YaST2/include/configbasic/.langok
>/dev/null 2>&1
fi

#clear the license read markers - next time through the
license files are displayed
echo "clear marker files"
rm /usr/share/YaST2/include/configbasic/.ok
rm /var/adm/ibmvmcoc-postinstall/wasrun.lck  >/dev/null
2>&1
if [ $TOOLS == "true" ]
then
 rm /var/adm/ibmvmcoc-postinstall/tools.ok  >/dev/null
2>&1
```

b

```
else
 touch /var/adm/ibmvmcoc-postinstall/tools.ok
fi
rm -rf /opt/IBM/AE/AR/*
rm -rf /opt/IBM/AE/AP/*

#clean up old eth entries
if [ -a /etc/udev/rules.d/30-net_persistent_names.rules
]
 then
   grep -v "SUBSYSTEM==" /etc/udev/rules.d/30-
net_persistent_names.rules > /tmp/netrules
   cp /tmp/netrules /etc/udev/rules.d/30-
net_persistent_names.rules
fi

#cleanup old files
echo "remove unneeded history files"
HISTSIZE=0
rm /root/.bash_history >/dev/null 2>&1
rm /root/.recently-used >/dev/null 2>&1
rm /root/.xsession-errors >/dev/null 2>&1
rm /home/virtuser/.bash_history >/dev/null 2>&1
rm /home/virtuser/.recently-used >/dev/null 2>&1
rm /home/virtuser/.xsession-errors >/dev/null 2>&1

#set mode marker file
#rm /usr/share/YaST2/include/configbasic/.slim
>/dev/null 2>&1
if [ $SLIM == "true" ]
then
 touch /usr/share/YaST2/include/configbasic/.slim
fi

#set activation engine services based on noae parm
if [ $AE == "true" ]
then
 chkconfig activation.ConfigLicense on
 chkconfig activation.ConfigLocale on
 chkconfig activation.ConfigNET on
 chkconfig activation.ConfigPWD_ROOT on
 chkconfig activation.ConfigPWD_USER on
else
 chkconfig activation.ConfigLicense off
 chkconfig activation.ConfigLocale off
 chkconfig activation.ConfigNET off
 chkconfig activation.ConfigPWD_ROOT off
 chkconfig activation.ConfigPWD_USER off
fi
```

```
#Removing ssh key information

echo "Removing SSH keys"
rm /etc/ssh/*key*
echo "Instance is now in first boot state.  Please re-
bundle."
```

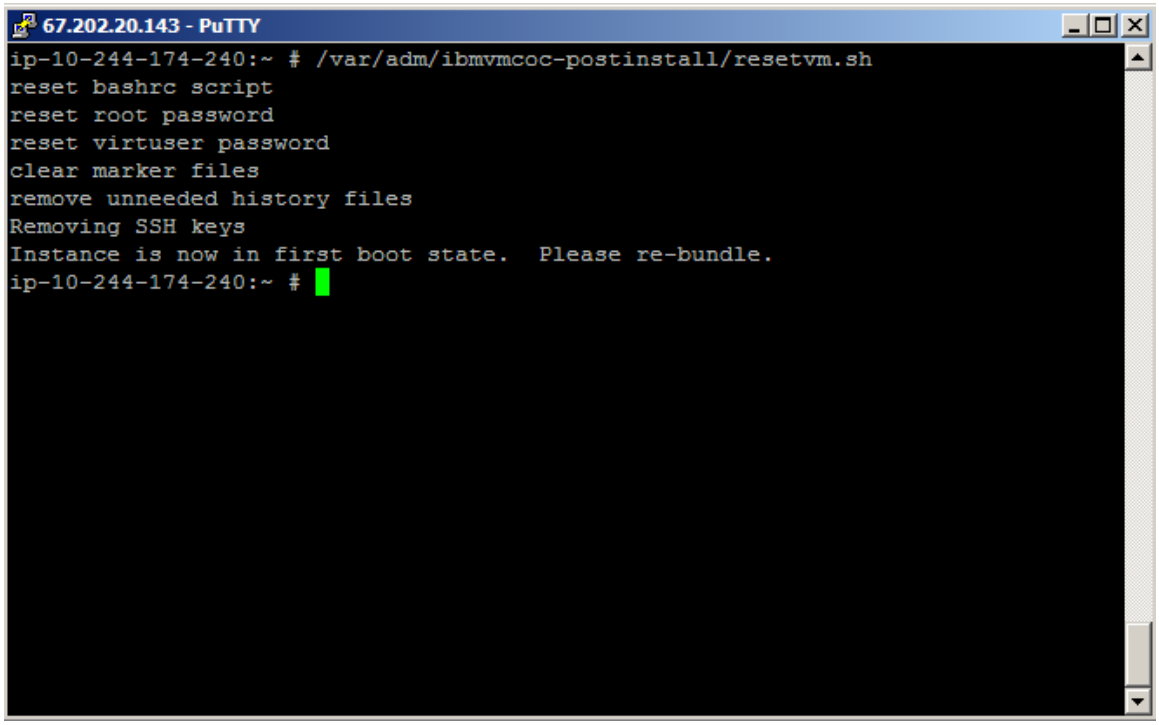
Executing the `/var/adm/ibmvmcoc-postinstall/resetvm.sh` script will kick-off the following tasks:

a. This executes the scripts within the `/var/adm/ibmvmcoc-postinstall/resetadds` folder. The scripts are run in alphabetical order, and will also pass in the same parameter as what the reset script is run with. These scripts are meant to perform clean-up tasks. For example, the removal of result logs from the running of YaST modules can be done here.
b. This line removes the `/var/adm/ibmvmcoc-postinstall/wasrun.lck` lock file which is responsible for preventing the display of the license screens for all logins after first-boot. As such, you will want this file removed for re-bundling, so that the next time the AMI is booted, the license screens will be displayed..
c. This removes the SSH keys, which are generated every time the SSHD service is started up. If the SSH keys are not removed, it will complicate the launching of the re-bundled AMI, and possibly causing any SSH request to the AMI to be denied

To execute the script, type the following:

```
# /var/adm/ibmvmcoc-postinstall/resetvm.sh
```

The output of your console should look similar to the below:



3.8 Re-Bundling, Uploading, and Registering of AMI

At this point, the file system of the AMI instance should be ready for bundling. To bundle the instance, go into the corresponding directory by issuing the command:

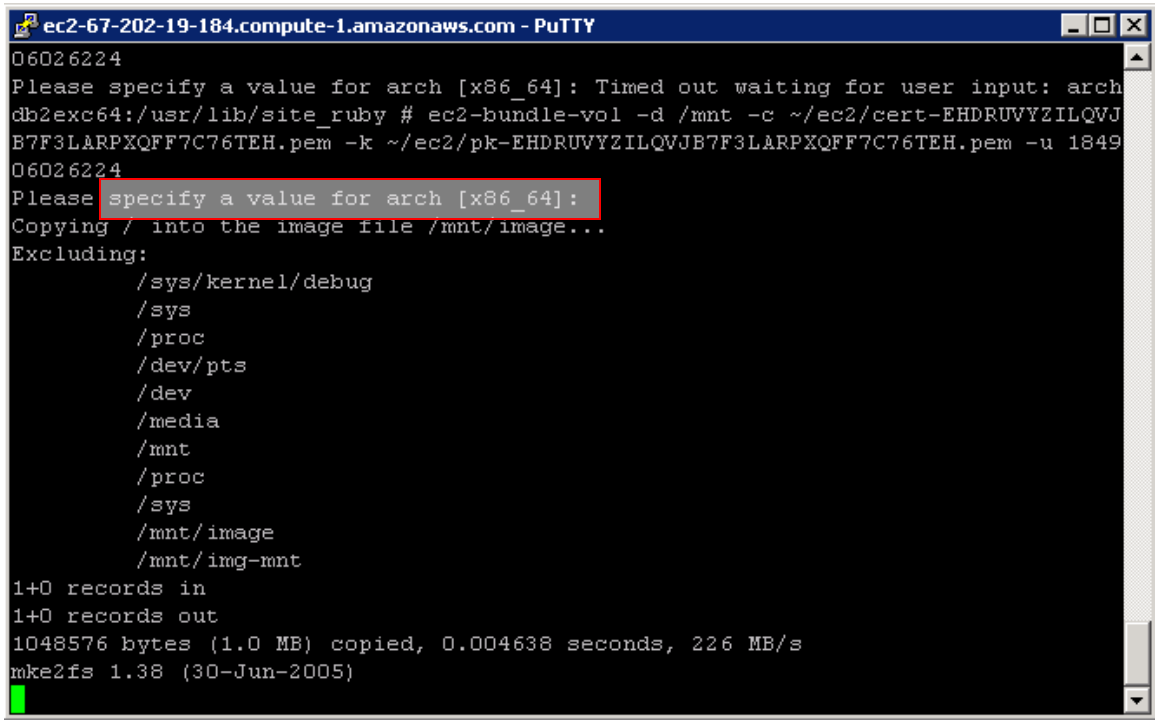
```
cd /usr/lib/site_ruby
```

To bundle the instance, issue the command:

```
ec2-bundle-vol -d /mnt -k <private key location> -c
<certificate location> -u <AWS account ID>
```

The **-d** option specifies the local directory the bundle will be saved to. It is advisable to keep the certificate and private key files in the `/mnt` directory since volume bundling will exclude the `/mnt` directory, thus preventing the new AMI from bundling confidential information.

When prompted for a specifying “a value for arch”, press enter to choose the default value (this value will change depending on whether you are using the 32-bit or 64-bit versions).

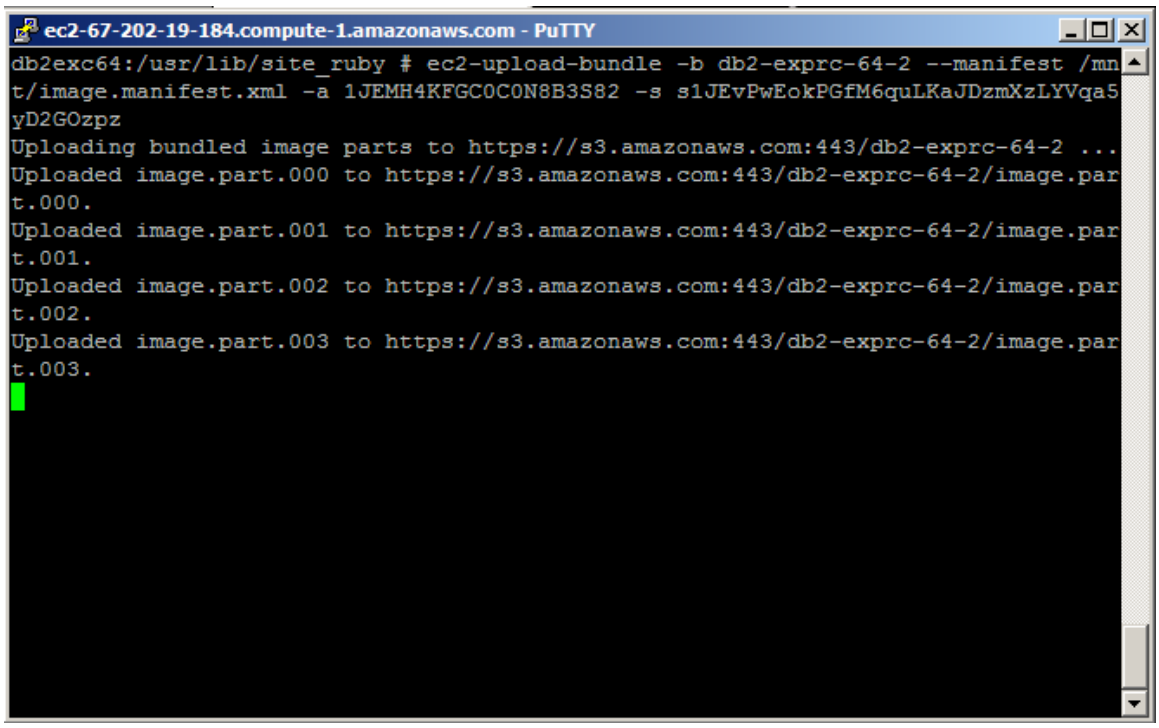


The bundling will now start and the excluded directories are shown. Bundling will take some time, as this step involves compressing the entire file system into a format that is compatible with Amazon EC2.

The bundle will be saved in `/mnt`. After bundling completes, it is time to upload the bundle to Amazon S3 storage by issuing the following command

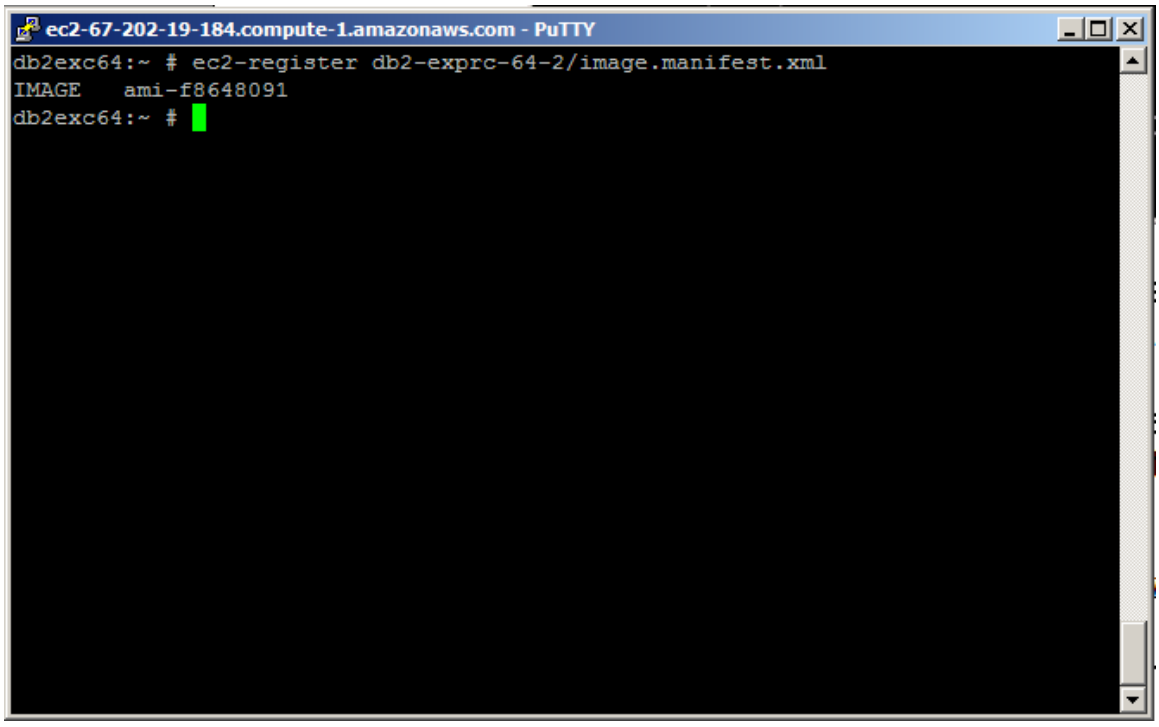
```
ec2-upload-bundle –b <bucket name> --manifest <manifest
location> -a <Amazon access key ID> -s <Amazon secret
access key>
```

The `–b` option specifies the bucket (or folder) location that the bundle will be stored on the Amazon S3 storage. Buckets are automatically created if they do not already exist. The `--manifest` option points to the `image.manifest.xml` file stored locally on your instance.
Please refer to section 2.2 in *IBM DB2 9.7 Amazon Machine Image (AMI) Get Started Guide* regarding Amazon access key ID and secret access key. This document is available at:
http://download.boulder.ibm.com/ibmdl/pub/software/dw/cloud/udbexp/Get_Started_DB2_9.7_AMI.pdf



Once the bundle has been successfully uploaded to Amazon S3 storage, the final step is to register the image by issuing the following command:

```
ec2-register mybucket/image.manifest.xml
```



Your AMI should now be registered in Amazon. To list your AMIs, issue the following command:

```
ec2-describe-images –o self
```

3.9 Publicizing your AMI

By default, AMIs that users create will be private. When an AMI is private, no other AWS user will be able to see your AMI. To publicize an AMI, issue the command below:

```
ec2-modify-image-attribute <ami_id> --launch-permission -a all
```

Once the AMI is publicized, all AWS users will be able to see the AMI, and launch instances from their own accounts. Before publicizing your AMI, be sure to secure your AMI by removing all confidential information on your AMI such as certificates and private keys.

Please take note that depending on which edition of IBM DB2 9.7 AMI you are re-bundling, other Amazon AWS users looking to use the re-bundled AMI will be required to have an active subscription to the AMI, and may need to pay extra according to the AMI subscription fees. The re-bundled AMI will contain the inherited product code from the AMI it was bundled from. The product code determines the extra usage fees associated with running an AMI. For more information on the usage fees of the various editions of IBM DB2 9.7 AMIs, please refer to http://aws.amazon.com/ibm/. For more information regarding on the Amazon DevPay service, please refer to http://aws.amazon.com/devpay/.

4. Additional Information

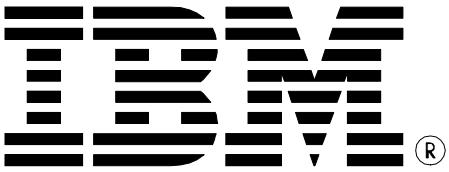
4.1 Feedback

Thank you for using the DB2 AMI

We welcome your feedback about your experience on the DB2 AMI. If you notice any errors or discrepancies, or would like to comment on your experience on the DB2 AMI, please send your feedback to askdata@ca.ibm.com, with the name of the DB2 AMI in the subject line.

If you are an ISV and would like to engage our team for technical enablement in creating an embedded solution based on the DB2 AMI, please contact us by sending an email to askdata@ca.ibm.com with subject line “Embed DB2 AMI”.

For technical questions on DB2 9.7, please refer to the DB2 Information Center at http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/index.jsp.



IBM Canada
8200 Warden Avenue
Markham, ON
L6G 1C7
Canada

Printed in Canada
09/2009