CODE B20.0r1.11 LINUX INSTALLATION INSTRUCTIONS

What's New:

1. A change to the level 2 base data format is not backwards compatible with previous RPG releases. To ingest Build 20 level 2 data requires a Build 20 or later RPG.
2. Improved ZDR bias estimates in light rain.
3. Improved radial-to-radial continuity in the specific attenuation rainfall rate within QPE.
4. Implementation of the Vertical Profile of Reflectivity correction algorithm to improve QPE within and above the melting layer.
5. Implementation of a non-operational Rain Rate Classification product.

Concise examples of successful command checklists for installation of the most recent CODE B20.0r1.11 are provided here for your reference.

A "quick install" checklist can simplify your process, and is helpful when you need to quickly make clones of your initial installation. Checklists ensure uniformity of installations. Use of a command set as similar as possible to the one provided above will make it easier for CODE maintainers to provide fast and efficient assistance, by quickly pinpointing where you are in the installation process.

All commands provided are written in the C shell, as that is the required shell for compilation and execution of the ORPG. Understand that these command sets may or may not work "as is" on your system due to possible differences in directory names on your system. Placement of these commands in a single script is not recommended due to execution requirements of the various commands, including occasional need for root privileges.

NWS & PUBLIC EDITIONS

Installation & Configuring Linux for ORPG

Checking Operating System

```
[dev1@dev1 ~]$ more /etc/redhat-release
Red Hat Enterprise Linux Client release 7.4
[dev1@dev1 ~]$ uname -a
Linux dev1 3.10.0-693.21.1.el7.x86_64  #1 SMP
Wed Mar 7 19:03:37 UTC 2018 x86_64 x86_64
x86_64 GNU/Linux
[dev1@dev1 ~]$
```

Modifying /etc/hosts

```
# Do not remove the following line, or various programs
# that require network functionality will fail .
127.0.0.1       localhost.localdomain   localhost
192.168.##.###    dev2 rpg
```

Modifying /etc/sysconfig/network

```
NETWORKING=yes
NETWORKING_IPV6=no
HOSTNAME=dev2
```

Modifying /etc/sysconfig/network-scripts/ifcfg-eth0

```
DEVICE=eth0
ONBOOT=yes
BOOTPROTO=none
NETMASK=255.255.255.0
USERCTL=no
PEERDNS=yes
GATEWAY=192.168.##.#
TYPE=Ethernet
IPADDR=192.168.##.###
```

1. Log into **ANY** account on your LINUX machine.
You are expected to have RedHat Enterprise 7 or CentOS 7, 64-bit version.
Type: **more /etc/redhat-release ; uname -a**
(See e.g. on left). "i386 GNU/Linux" implies 32-bit version, x86_64 implies 64-bit version.

2. If you do not have RedHat Enterprise 7 or CentOS 7, install RedHat Enterprise 7 or CentOS 7 before continuing with this installation. See instructions in **code_b20_0r1_11/pdf_doc/v1_setup_code_b20_0r1_11.pdf** if needed.

3. Make sure the following packages are installed. Type:
rpm -q giflib-devel ; rpm -q ncompress ; rpm -q tcl-devel ; rpm -q tk-devel
rpm -q gsl ; rpm -q gsl-devel ; rpm -q bzip2-devel ; rpm -q openmotif-devel
rpm -q ncurses-devel ; rpm -q pam-devel ; rpm -q libxml2-devel
rpm -q libg2top2-devel ; rpm -q gtk2-devel ; rpm -q libcurl-devel
rpm -q libglade2-devel ; rpm -q cracklib-devel - rpm -q gd-devel
rpm –q gcc-c++

If any of these packages are not installed, use yum to install them. As root:

yum -y install giflib-devel	**yum -y install ncompress**
yum -y install tcl-devel	**yum -y install tk-devel**
yum -y install gsl	**yum -y install gsl-devel**
yum -y install bzip2-devel	**yum -y install openmotif-devel**
yum -y install ncurses-devel	**yum -y install pam-devel**
yum -y install libxml2-devel	**yum -y install libgtop2-devel**
yum -y install gtk2-devel	**yum -y install libcurl-devel**
yum -y install libglade2-devel	**yum -y install cracklib-devel**
yum -y install gd_devel	**yum –y install gcc-c++**
yum -y install xorg-x11-fonts-ISO8859-1-100dpi	

Install all available updates.
yum -y update

4. The ORPG requires that TCP/IP networking be configured; it is not compatible with DHCP. A common configuration error involves the hosts file. Open **/etc/hosts** with the editor of your choice and modify it to add the name and IP address of your PC. Be sure to alias the hostname to **rpg**. (See e.g. on left).

5. Open **/etc/sysconfig/network** with the editor of your choice and modify it to add the Hostname of your PC. (See e.g. on left).

6. Open **/etc/resolv.conf** with the editor of your choice and modify it to add the Nameserver. If you are not sure what it is ask your local SA. An example is:
nameserver 140.90.###.##

7. Open **/etc/sysconfig/network-scripts/ifcfg-eth0** with the editor of your choice and make sure it has been customized. (See e.g. on left). The eth0 file is the configuration file for the primary or only network interface card. The entries that must be customized for the workstation are: **IPADDR – the IP address; GATEWAY – the default router address; NETMASK – 255.255.255.0; ONBOOT – should be yes; and DEVICE – the filename.**

8. Logout from root. Type:
exit

9. Reboot your system by typing:
reboot

Creating a New Account

Summary of Commands

```
[root@dev2 ~]# grep  rpg  /etc/group
[root@dev2 ~]# groupadd rpg

[root@dev2 ~]# useradd -d /home/code20_0r1_11 -
m -g rpg -s /bin/csh -c "CODE B20.0r1.11"
code20_0r1_11

[root@dev2 ~]# passwd code20_0r1_11
Changing password for user code20_0r1_11.
New password:
Retype new password:
passwd: all authentication tokens updated
successfully.
[root@dev2 ~]# chmod +rx home/code20_0r1_11
[root@dev2 ~]# exit
```

1. From the RedHat Welcome Screen, enter your **Username and Password** to log into **ANY** account on your LINUX machine.

2. Open a terminal and type:
    su **(**login as root with root password)

3. Determine your new user account name, parent directory, home directory, data directory, group name, etc. then write them down. **Whenever you see a command with < > brackets around it, refer to the table below.** Here are some suggested examples. Add your own names:

COMMANDS	DEFINED	EXAMPLES
<user20_0r1_11>		code20_0r1_11
<parent_dir>		/home
<home_dir>	<parent_dir>/<user20_0r1_11>	/home/code20_0r1_11
<group_name>		rpg
<ip_address>		192.168.##.##

4. Check to see if the group already exists. (See e.g. on the left).
    grep <group_name> /etc/group
    If it does not exist, type:
    groupadd <group_name>

5. Create a new account by using the useradd command. In your terminal type:
    useradd -d <home_dir> -m -g <group_name> -s /bin/csh
            -c "CODE B##r#.##" <user20_0r1_11>
    (See e.g. on the left).

6. Create a password for the user and write it down somewhere. Type:
    passwd <user20_0r1_11>
    Enter new password when prompted twice.

7. Change modifications for home directory. Type:
    chmod +rx <home_dir>

8. Logout from root. Type:
    exit

9. To logout of the account you are in, select **Main Menu => Log Out**. Then click **OK**.

Installing RPG & CODE Software

1. Login using your new **<user20_0r1_11>** account and password.

2. Obtain the CODE B20.0r1.11 CD, copy folder **code_b20_0r1_11 (for NWS Edition)** or **pub_code_b20_0r1_11 (for Public Edition)** to your home directory.

3. Go to the home directory to make sure the folder has been downloaded by typing:
   cd; ls –al

4. Copy the RPG source file to your home directory. Type:
   If you have the NWS Edition:
   cd code_b20_0r1_11/files_orpg_sw
   cp -p rpg_b20_0r1_11_nws_src.tgz ~
   If you have the Public Edition:
   cd pub_code_b20_0r1_11/files_orpg_sw
   cp -p rpg_b20_0r1_11_pub_src.tgz ~

5. Copy the CODE configuration file to your home directory. Type
   cd ../config_files
   cp -p code_config_b20_0r1_11.tgz ~

6. Uncompress the RPG source file by typing:
   cd; ls
   If you have the NWS Edition:
   tar xvzf rpg_b20_0r1_11_nws_src.tgz
   If you have the Public Edition:
   tar xvzf rpg_b20_0r1_11_pub_src.tgz

7. Uncompress the CODE configuration file by typing:
   tar xvzf code_config_b20_0r1_11.tgz

8. Go to the env directory and run the env script. Type:
   cd code_config_b20_0r1_11/env; ls
   ./inst_env_config   (answer **y** when prompted)

Modifying orpg_env_cshrc

```
# in order to simultaneously run multiple instances of the ORPG on a
# single platform, RMTPORT must differ.
setenv RMTPORT 51000
```

9. If more than one installed ORPG is going to run at the same time on a single workstation, open **orpg_env_cshrc** from your **$HOME** directory with the editor of your choice and manually change the defined value of **RMTPORT** on each account. It is recommended that the first account have a value of 50000, the second 51000, etc. Create a backup of the file if changed. Type:
   cd; cp orpg_env_cshrc orpg_env_cshrc.B20

10. Remove all tar files:
    cd ; rm *tgz   (answer **y** when prompted)

11. To logout of the account you are in, select **Main Menu => Log Out**. Then click **OK**.

Compiling & Configuring the RPG

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **<user20_0r1_11>** account and password. Open a terminal console and verify your environment variables. Make sure your $HOME is set to the correct paths. Type:
   env | grep -e HOME

2. To compile the RPG, type:
   make_rpg $HOME >& make_rpg.out
   After compilation has finished, check for errors. Type:
   grep -e 'Error [1-9]' make_rpg.out
   If there are errors, check the file:
   code_b20_0r1_11/pdf_doc/v1_setup_code_b20_0r1_11.pdf

3. Install the ORPG configuration files by typing:
   cd code_config_b20_0r1_11/orpg; ls
   ./inst_orpg_config   (answer **y** when prompted)
   Note: You need answer '**N**' for NWS Edition or '**P**' for Public Edition when prompted to install the right version of task_tables.

4. If the hostname has been aliased to **rpg**, skip this step. Otherwise variable **Client** needs to point to the hostname or **<ip_address>.** Open **.rssd.conf** from your **$HOME** directory with the editor of your choice. Modify the **Client** variable to be the **<ip_address>** of your machine. Save the file **.rssd.conf** and exit.

5. To logout, select **Main Menu => Log Out**, then click **OK**.

Modify the .rssd.conf file

```
# RPG Development Workstations
#Client: rpg
Client: 192.168.##.###

# Pathnames
#            [$ORPGDIR]
Path: ORPGDIR

# NEW B9
Path: HOME/save_logs

# NEW B12x1.206
Path: HOME/security_logs
```

Testing the RPG & Installing CODE Software (1 of 2)

Testing the RPG: Steps 1-9

Using the HCI & play_a2 Tools

```
code20_0r1_11:code20_0r1_11/ 43 >hci &
[1] 7278
code20_0r1_11:code20_0r1_11/ 44 > play_a2
Playback...
Playing file:
/home/code20_0r1_11/ar2data/KMLB20121026
_120332_V06.gz
Volume date [yyyy-mm-dd] 2012-10-26
Volume time [hh:mm:ss]: 12:03:35
```

Option 1 – Install CODE software:

Steps 10-14

- **Sample Algorithms**

- **Dual Pol Test Products**
  340-344
  600-605
  700-705

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **< user20_0r1_11 >** account and password.

2. Open a terminal for testing the RPG. If errors, check the file: **code_b20_0r1_11/pdf_doc/v1_setup_code_b20_0r1_11.pdf**. Type:
   mrpg -p -v startup
   Note: User should ignore below error message about syslog.lb. At the RPG startup with option –p, syslog.lb is deleted first thus cannot be opened. It will be re-created by the RPG.
   18:40:10 mrpg: ORPGDA: RSS_orpgda_lb_open $(ORPGDIR)/mngrpg/syslog.lb failed (ret = -43)
   18:40:10 mrpg: ORPGDA_write ORPGDAT_SYSLOG failed (ret -43)

3. To check for running tasks type:
   rpg_ps

4. To make sure the human computer interface will run, type:
   hci &

5. Ingest default Archive II data into the HCI by typing:
   play_a2

   When you are confident that data is being ingested into the HCI properly, press **Ctrl C** to end play_a2 then close the HCI. (See e.g. on left).

6. Check CVT version, **Version 4.4.3**. *Type*:
   cvt version

7. Launch CVG by typing:
   cvg

8. The title on the CVG window should show CODEview Graphics **9.2**. Close the CVG window by clicking File → Exit.

9. If everything works as expected, your CODE installation is complete. You can shutdown and cleanup the RPG by typing:
   mrpg shutdown; mrpg cleanup
   Remove all tar files:
   rm ~/src/*tar

If you do not want to install the below options, you are done.
10. Obtain the CODE software archive files from code_b20_0r1_11/files_code_sw
    cd code_b20_0r1_11/files_code_sw
    cp -p code_alg_1_22a.tar ~/src
    cp –p dp_test_prod.tar ~/cfg

11. To configure the CODE sample algorithms and copy the snippets, type:
    cd ~/src; ls
    tar xvf code_alg_1_22a.tar
    cd cpc305
    ./install_sample_alg

**Testing the RPG &
Installing CODE Software
(2 of 2)**

Option 3 – Install level II data:
Steps 15-23

12. A suggested location to install all of the desired CODE Archive II data sets is **/opt/code/data/ar2data**. Your local procedures might establish a different location. Check for the ar2data directory by typing:
    cd /opt/code/data/ar2data
    su   (login as root with root password)
    If the directory has been created already, **go to next step**. (This directory might be different on your machine). If the directory has not been created, create the directories. Type:
    cd /opt; mkdir code
    cd code; mkdir data
    cd data; mkdir ar2data
    cd ar2data;

13. To install archive II data sets, obtain the CODE B20.0r1.11 CD, copy the desired data sets in ar2data directory to /opt/code/data/ar2data.
    exit   (to logout as root)

Modifying the .cshrc File

setenv AR2_DIR **/opt/code/data/ar2data**

14. Check the **.cshrc** file to see if AR2_DIR has been set already. Type:
    more ~/.cshrc | grep AR2_DIR
    If the $AR2_DIR has not been set to /opt/…. directory, open **.cshrc** from your **$HOME** directory with the editor of your choice. Modify the **setenv AR2_DIR** line to point to **/opt/code/data/ar2data**. (See e.g. on left). Save the file **.cshrc** and exit the editor that you used.

15. Create a backup of the file, by typing:
    cp .cshrc .cshrc.B20

16. For each console that is opened, type:
    source .cshrc

17. Start the ORPG for testing Archive II data. If errors, check the file:
    code_b20_0r1_11/pdf_doc/v1_setup_code_b20_0r1_11.pdf. Type:
    mrpg -p -v startup

18. To start the human computer interface, type:
    hci &

19. Ingest default Archive II data into the HCI by typing:
    play_a2 -d f_load
    (If you downloaded another directory from the CD, replace f_load with the name of the downloaded directory). When you are confident that data is being ingested into the HCI properly, press **Ctrl C** to end play_a2 then close the HCI.

20. Shutdown and cleanup the RPG by typing:
    mrpg shutdown;   mrpg cleanup

21. Installation is done.

The End