CODE B18.0r1.11 LINUX INSTALLATION INSTRUCTIONS

What's New:

- Full support of 64-bit Redhat 7/CentOS 7 operating system.
- Operational support for MESO-SAILS that enables up to 3 extra low level elevation scans in a volume scan.
- Addition of the Hail Size Discrimination Algorithm to the Hydrometeor Classification Algorithm and associated products.
- Addition of atmospheric model data to the level 2 data stream with playback capability.
- Removal of the following legacy products (product codes): 3-bit Reflectivity (16, 17, 18), 4-bit Reflectivity (21), 3-bit Velocity (22, 23, 24), 3-bit Spectrum Width (29), 3-bit Composite Reflectivity (35), 3-bit Cross Section (85, 86), 4-bit Dual Pol (158, 160, 162, 164), SuperOb (136).
- Removal of VCPs 11, 21, 211 and 221 from the WSR-88D baseline. (Playback of archived cases still supported.)
- Addition of VCPs 35 and 215 to the WSR-88D baseline.

Concise examples of successful command checklists for installation of the most recent CODE B18.0r1.11 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_b18_0r1_11/pdf_doc/v1_setup_code_b18_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 - rpg -q gd-devel

   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 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

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
<user18_0r1_11>		code18_0r1_11
<parent_dir>		/home
<home_dir>	<parent_dir>/<user18_0r1_11>	/home/code18_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#.##" <user18_0r1_11>
   (See e.g. on the left).
6. Create a password for the user and write it down somewhere. Type:
   passwd <user18_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**.

Summary of Commands

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

[root@dev2 ~]# useradd -d
/home/code18_0r1_11 -m -g rpg -s /bin/csh -c
"CODE B18.0r1.11" code18_0r1_11

[root@dev2 ~]# passwd code18_0r1_11
Changing password for user code18_0r1_11.
New password:
Retype new password:
passwd: all authentication tokens updated
successfully.
[root@dev2 ~]# chmod +rx
/home/code18_0r1_11
[root@dev2 ~]# exit
```

Installing RPG & CODE Software

1. Login using your new **<user18_0r1_11>** account and password.
2. Obtain the CODE B18.0r1.3 CD, copy folder **code_b18_0r1_11 (for NWS Edition)** or **pub_code_b18_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_b18_0r1_11/files_orpg_sw
   cp -p rpg_b18_0r1_11_nws_src.tgz ~
   If you have the Public Edition:
   cd pub_code_b18_0r1_11/files_orpg_sw
   cp -p rpg_b18_0r1_11_pub_src.tgz ~
5. Copy the CODE configuration file to your home directory. Type
   cd ../config_files
   cp -p code_config_b18_0r1_11.tgz ~
6. Uncompress the RPG source file by typing:
   cd; ls
   If you have the NWS Edition:
   tar xvzf rpg_b18_0r1_11_nws_src.tgz
   If you have the Public Edition:
   tar xvzf rpg_b18_0r1_11_pub_src.tgz
7. Uncompress the CODE configuration file by typing:
   tar xvzf code_config_b18_0r1_11.tgz
8. Go to the env directory and run the env script. Type:
   cd code_config_b18_0r1_11/env; ls
   ./inst_env_config   (answer **y** when prompted)
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.B18
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**.

Modifying orpg_env_cshrc

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

CODE B18.0r1.11 LINUX INSTALLATION INSTRUCTIONS

Compiling & Configuring the RPG

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
```

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **<user18_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 conduct a quick test compile of a portion of the source code, type:
   cd; ls
   test_make_cpc100 $HOME >& test_make_cpc100.out
   After compilation has finished, check for errors. Type:
   grep -e 'Error [1-9]' test_make_cpc100.out
   If there are errors, check the file:
   code_b18_0r1_11/pdf_doc/v1_setup_code_b18_0r1_11.pdf
3. To compile the RPG, type:
   make_rpg $HOME >& make_rpg.out
   After compilation has finished, check for errors. Type:
   grep -e 'Error [1-9]' make_rpg.out
   If there are errors, check the file:
   code_b18_0r1_11/pdf_doc/v1_setup_code_b18_0r1_11.pdf
4. Install the ORPG configuration files by typing:
   cd code_config_b18_0r1_11/orpg; ls
   ./inst_orpg_config   (answer **y** when prompted)
   Note: You need answer '**N**' for NWS Edition or '**P**' for Public Edition when prompted to install the right version of task_tables.
5. If the hostname has been aliased to **rpg**, skip this step. Otherwise variable **Client** needs to point to the hostname or **<ip_address>.** Open **.rssd.conf** from your **$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.
6. To logout, select **Main Menu => Log Out**, then click **OK**.

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

Testing the RPG: Steps 1-9

Using the HCI & play_a2 Tools

```
code18_0r1_11:code18_0r1_3/  43 >hci &
[1] 7278
code18_0r1_11:code18_0r1_3/  44 > play_a2
Playback...
Playing file:
/home/code18_0r1_11/ar2data/KMLB20121026
_120332_V06.gz
Volume date [yyyy-mm-dd] 2012-10-26
Volume time [hh:mm:ss]: 12:03:35
```

1. From the RedHat Welcome Screen, enter your **Username and Password** to login using your new **< user18_0r1_11 >** account and password.
2. Open a terminal for testing the RPG. If errors, check the file: **code_b18_0r1_11/pdf_doc/v1_setup_code_b18_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.

Option 1 – Install CODE software:

Steps 10-14

- **Sample Algorithms**

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

10. Obtain the CODE software archive files from code_b18_0r1_11/files_code_sw
    cd code_b18_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
12. To generate dual pol test products 340-344, 600-605 and 700-705, type:
    cd ~/cfg
    tar xvf dp_test_prod.tar
    cd dp_test_prod
    ./install_dual_pol_test_prod.sh
    The dual pol test products are configured in directory extensions
    cd ../extensions ; ls
13. Re-start RPG, type:
    mrpg -p -v startup
    rpg_ps | grep sample
    rpg_ps | grep dualpol8bit_test
    rpg_ps | grep test_base_prods_8bit
14. Shutdown and cleanup the RPG by typing:
    mrpg shutdown; mrpg cleanup

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

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

Modifying the .cshrc File

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

15. 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;

16. To install archive II data sets, obtain the CODE B18.0r1.11 CD, copy the desired data sets in ar2data directory to /opt/code/data/ar2data.
    exit   (to logout as root)

17. 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.

18. Create a backup of the file, by typing:
    cp .cshrc .cshrc.B18

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

20. Start the ORPG for testing Archive II data. If errors, check the file:
    code_b18_0r1_11/pdf_doc/v1_setup_code_b18_0r1_11.pdf. Type:
    mrpg -p -v startup

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

22. 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.

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

24. Installation is done.

The End