National Water Model Version 3.0.0 Implementation Instructions

1. Building and installation on WCOSS2

a. Prerequisites

i. Access to VLAB National Water Model(NWM) repository, https://vlab.noaa.gov/svn/chps-wrf-hydro/tags/v3.0/
ii. NWM parameter set. On WCOSS2 it is available at /lfs/h1/owp/nwm/save/nwm_parm.v3.0_to_NCO
iii. USGS real time streamflow WaterML 2.0 datafiles, /lfs/h1/ops/prod/dcom/usgs_streamflow
iv. USACE real time stream flow XML datafiles /lfs/h1/ops/prod/dcom/usace_streamflow
v. RFC real time stream flow PI XML forecast timeseries /lfs/h1/ops/prod/dcom/RFC_data/Reservoir
vi. Canadian real time stream flow CSV files /lfs/h1/ops/prod/dcom/can_streamgauge

b. Procedures

i. Enter into a working directory,
    1. cd /path/to/packages/
ii. Check out the source files from the NWM Subversion repository
    1. svn checkout https://vlab.noaa.gov/svn/chps-wrf-hydro/tags/v3.0/nwm.v3.0.0
iii. Copy in the parameter files (these are too large to reside in the svn repository)
    1. cp -rpf /lfs/h1/owp/nwm/save/nwm_parm.v3.0_to_NCO/* ./nwm.v3.0.0/parm/.
iv. Copy ./nwm.v3.0.0/ecf/model_envir.h ./nwm.v3.0.0/ecf/***test***/.
v. Edit ./nwm.v3.0.0/ecf/test/*.ecf files and define the correct paths for “$PBS -o” and ”$ECFTESTDIR/model_envir.h " entries.
vi. Edit ./nwm.v3.0.0/ecf/test/model_envir.h to define the correct paths for “COMROOT”, "DCOMROOT", “PACKAGEROOT”, and “DATAROOT” in case “para|test) block”.

vii. The Forcing Engine, Streamflow and Coastal Models have a waiting time threshold value that is set in the top level ex-script (../scripts) for testing without use of ECFLOW. This value specifies how long the Forcing Engine and Model are allowed to wait for incoming NWP data. However, in NCO Operations, the system will be triggered by ECFLOW and so the waiting time in the top level scripts should be set to 0 by changing the waiting variables under nwm.v3.0.0/scripts
1) **exnwm_forcing_*.sh** - change **waitTimeInput=####** and **numFiles** to **0**
2) **exnwm_model.sh -** change **waitAtmForcing=###** to **0**
3) **exnwm_coastal.sh** - change **waitTime=### to 0**

viii. Initializing the model (Conus, Alaska, Hawaii and PuertoRico Analysis jobs) for the first time or initializing after a parameter file change or spin-up: the model can be initialized via two methods:

1) Utilizing an existing compatible set of restart files--standard restart files from the previous cycle hour, generic restart files from the current day or climate restart files from a period further back in time that were generated with the same parameter data sets.
2) Using a "cold-start" initialization not requiring restart files.

Note that for implementing v3.0, OWP will provide restart files (it is located at /lfs/f2/t2o/ptmp/nwm/Zhengtao.Cui/test/com/nwm/v3.0) to NCO. They can be used via Method 1 below.

Method 1 is greatly preferred as method 2 will produce extremely degraded model results until the model has had time to "spin-up"--this can take years for the NWM. Thus #2 should only be used in a test mode or in a catastrophic situation where no compatible restart files of any kind are available.

Method #1 (Preferred): Using a set of existing restart files from an external source

1. This process should not be performed between the 00Z and 03Z cycles. Make sure this is performed during the 04Z to 23Z period.
2. Ensure that no model jobs have been submitted, are running or are in the queue.
3. There are two options to follow at this step. Both have the same effect. You can use either one.
   Option 1:
   a. If you are initializing the model for the very first time, create the genericRST sub-directory:

$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart/genericRst,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_no_da/genericRst,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}/genericRst or
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alask,hawaii,puertorico}_no_da/genericRst

Example from real-time system on Cactus:
lfs/h1/ops/prod/com/nwm/v3.0/nwm.$PDY/restart/genericRst,
lfs/h1/ops/prod/com/nwm/v3.0/nwm.$PDY/restart_no_da/genericRst,
lfs/h1/ops/prod/com/nwm/v3.0/nwm.$PDY/restart_{alaska,hawaii,puertorico}_no_da/genericRst or
lfs/h1/ops/prod/com/nwm/v3.0/nwm.$PDY/restart_{alaska,hawaii,puertorico}/genericRst or
and proceed to step b.

b. If, however, you are initializing a pre-existing installation, locate your most recent restart file directory. Usually it will be defined in your scripts as
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_no_da,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico} or
**$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}_no_da**. You will see "genericRst" and "nwm.rst.$cycle" subdirectories. The goal here is to replace the old "genericRst" files with new restart files and to remove the old nwm.rst* files. Once this occurs, the model workflow will automatically pick up the new restart files from "genericRst" directory and create new nwm.rst* files when the model runs. To do this, remove all of the old restart files (located inside of the genericRst and nwm.rst* subdirectories in
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart/,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_no_da/,
$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restar

t_{alaska,hawaii,puertorico}/or **$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}_no_da/** .)

c. Copy your new desired restart files (a soft link also works) into the "genericRst/" subdirectory. These should include both HYDRO_RST* files as well as RESTART* files.

Option 2 (If you already followed the steps in Option 1, skip this step):

a. Add/modify the `GESINSPINRST` variable in the /jobs/JNWM_MODEL file such that it points to a directory where the restart files will be stored. For example, add the following line to the `jobs/JNWM_MODEL` file,

```
export GESINSPINRST=${GESINSPINRST:-$(compath.py -o $RUN/${nwm_ver})/spin_rst}
```

b. Create the directory where `GESINSPINRST` points to if it does not exist.

c. Copy your new restart files into the `GESINSPINRST` directory.

4. If possible, copy this same set of desired restart files (now in the genericRst directory) to your climate restart file directory, which is defined as $PARMnwm/manualclimateRestart. If this directory does not already exist, create it before performing this copy.

Method 2 (Not Preferred): Cold Starting Model (option of last resort for when no usable set of restart files is available...will produce extremely degraded simulations)

1. Remove all restart files from
    a. $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart/genericRst/, $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_no_da/genericRst/, $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}/genericRst/ or $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}_no_da/genericRst/
    b. $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart/nwm.rst*, $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_no_da/nwm.rst*, /$COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart

_{alaska,hawaii,puertorico}/nwm.rst*/ or $COMROOT/${NET}/${nwm_ver})/${RUN}.${PDY}/restart_{alaska,hawaii,puertorico}_no_da/nwm.rst*/

c. $PARMnwm/manualclimateRestart/

2. This is all that is required. Upon execution the model will determine that no restart files are available and will automatically use pre-defined cold-start conditions

ix. Initializing the model (Analysis_Extend or Analysis_Long) for the first time or initializing after a parameter file change or spin-up:

1. Unlike the Analysis, Analysis_Alaska, Analysis_Hawaii, and Analysis_Puerto_Rico jobs above, along with their no_da counterparts, there are no generic restart files that can be used to start these two jobs. The best (preferred) way to initialize these two jobs is by using a pre-existing restart file from the same job type.

Note that for implementing v3.0, OWP will provide restart files (/lfs/f2/t2o/ptmp/nwm/Zhengtao.Cui/test/com/nwm/v3.0) for the Analysis_Long and Analysis_Extend jobs to NCO.

2. However if restart files are not available, there is a built-in fallback for each job:
   a. If no Analysis_Extend restart files are available the Analysis_Extend job is designed to use a restart file from the Analysis job at 12z the previous day. No manual steps need to be taken in order to initialize this job, beyond ensuring that there is a restart file available from the Analysis job. This will start the model, but is not the preferred method (preferred is to use the restart file from the previous instance of the job)
   b. If no Analysis_Long restart files are available the Analysis_Long job is designed to use a restart file from the Analysis job from 12 Analysis cycles (hours) ago. No manual steps need to be taken in order to initialize this job, beyond ensuring that there is a restart file available from the Analysis job. This will start the model, but is not the preferred method (preferred is to use the restart file from the previous instance of the job)
3. No cold-start option is needed for the Analysis_Long and Analysis_Extend since the fall-backs noted above can provide initial conditions taken from the Analysis job.

x. Open loop configurations

1. There are 11 open loop configurations that are named by appending a '_no_da' suffix to the ECFlow filenames. These configurations include
    a. Analysis assim open loop (jnwm_analysis_assim_no_da.ecf)
    b. Extended analysis assim open loop (jnwm_analysis_assim_extend_no_da.ecf)
    c. Long range analysis assim open loop (jnwm_analysis_assim_long_no_da.ecf)
    d. Medium range open loop (jnwm_medium_range_no_da.ecf)
    e. Analysis assim Hawaii open loop (jnwm_analysis_assim_hawaii_no_da.ecf)
    f. Short range Hawaii open loop (jnwm_short_range_hawaii_no_da.ecf)
    g. Analysis assim Puerto Rico open loop (jnwm_analysis_assim_puertorico_no_da.ecf)
    h. Short range Puerto Rico open loop (jnwm_short_range_puertorico_no_da.ecf)
    i. Analysis assim Alaska open loop (jnwm_analysis_assim_alaska_no_da.ecf)
    j. Extended analysis assim Alaska open loop (jnwm_analysis_assim_extend_alaska_no_da.ecf)
    k. Medium range Alaska open loop (jnwm_medium_range_alaska_no_da.ecf)
2. These open loop configurations run in a similar way as their normal counterparts, except that they use the channel output of their normal counterparts as their input forcings. Therefore they are always scheduled to run after their counterparts have done. The restart files for these configurations are located in the '*_no_da' directories.

xi. Coastal model initialization

1. In SCHISM's terminology, the restart files are called hotstart files. In this section, we always use 'hotstart' files to refer to 'restart' files.
2. The coastal models don't allow cold starts. The only way to initial the coastal models is to use a given SCHISM hotstart file.
3. For NWM v3.0 implementation, the hotstart files can be found at *(/lfs/f2/t2o/ptmp/nwm/Zhengtao.Cui/test/com/nwm/v3.0).*The hotstart files of all domains(Atlantic Gulf, Pacific, Hawaii, and Puerto Rico) are located in the directory nwm.${PDY}/restart_coastal.

4. The analysis assimilation hotstart file has the naming convention of **`hotstart_analysis_assim_coastal_{atlgulf,pacific,hawaii,prvi}_ana_${PDY}_${CYC}00.nc`**
5. The extended analysis assimilation hostart file has the following naming convention, **`hotstart_analysis_assim_extend_coastal_{atlgulf,pacific}_ana_${PDY}_${CYC}_1200.nc`**
6. Example from real-time system on Cactus: **`/lfs/h1/ops/prod/com/nwm/v3.0/nwm.$PDY/restart_coastal/`**
7. To initialize the coastal model, copy the corresponding hotstart files to the current PDY directory, `nwm.${PDY}/restart_coastal`.
8. The coastal models can be initialized between cycles 0z to 2z if preferred. However, remember that for analysis assimilation, the start time goes back 3 hours from the current cycle, which is actually the previous day. Therefore, the restart file should be dropped into the previous PDY directory when initializing the model between cycle 0z and 2z.
9. If the hotstart file for the current cycle is not available, there is a build-in fallback procedure for each job
    a. For analysis assimilation jobs, and forecast jobs including short range and medium range, and all domains, the workflow code will search for a replacement hotstart file used by the previous cycle. If the previous cycle hotstart file is still missing, it will continue looking for the previous cycle again and so on, until a hotstart file has been found or the searching has passed 24 times, that is 24 cycles back from the current searching cycle. If a hotstart file is found within 24 cycles from the current search cycle, this hotstart file will be used. A warning like, "`WARNING: NWM ${CASETYPE} ${PDY} ${cyc} is missing hotstart file, use the previous hotstart file {hotstart filename} for cycle ${CYC}.`", will be sent by email. If no hotstart file is found within the past 24 cycles, the job will fail and an error message like, "`ERROR: cannot find previous hotstart file for $PDY$cyc. Exiting ...`" will be thrown.
    b. For an extended analysis assimilation job, if the hotstart file for the current cycle is missing, it will first check if the hotstart file for the normal analysis assimilation of the same cycle exists, if it finds a normal analysis assimilation hotstart file, it will send a warning message, like "`WARNING:`

`${CASETYPE} is missing hotstart file, but a normal hotstart file is found. Use the normal AnA hotstart file, ${hotstartfile}, for ${CASETYPE}.`". If a normal analysis assimilation hotstart file is still missing, the extended analysis assimilation job will send an error message, "`ERROR: ${CASETYPE} could not find either the extended hotstart file or a normal hotstart file. Exiting …`". Then by design, instead of failing the job, the job will be marked as complete. In addition, a warning message will be sent by email, saying that "`Extended coastal job ${CASETYPE} ${PDY} ${cyc} did not complete normally but set to COMPLETE automatically to allow for runs tomorrow. No products from jnwm_${CASETYPE} are produced.`"

c. At 19z, for the atlantic gulf and the pacific domain, the analysis assimilation jobs will use the hotstart files at the 16z that are produced by the extended analysis assimilation jobs. This is the same as the water model 19z analysis assimilation jobs. At 19z, the analysis assimilation job will first check the 16z extended analysis assimilation hotstart file, if it finds the file, the job will continue as usual, otherwise, the job will try to use the 16z hotstart file from the normal analysis assimilation and follow the same fallback procedure as described in item a). In the meanwhile, a warning message will be send by email, saying "`WARNING: There is no Extended Analysis Asssim Coastal hotstart file $hotstartfile available for cycle $cyc, use the normal Analysis Assim hotstart file.`"

xii. Build and install the binaries

1. cd ./nwm.v3.0.0/sorc
2. ./build_install_all.sh
3. Check that the NWM Streamflow and Coastal executable files were successfully built

$cd ../nwm.v3.0.0/exec/; Should see
combine_hotstart7
combine_sink_source
gpmetis
metis_prep
nwm.exe
pschism_wcoss2_NO_PARMETIS_TVD-VL

2. Configure triggers to run the system automatically using

1) the NCO ecflow/cron blended triggers (note new Coastal trigger guidance located above in section “3”/”b”/”vil” and, as with previous NWM versions, general information is contained in the flow diagram and job dependency document indicating how all of the NWM jobs are related for NCO ecflow trigger design)

or

2) a non-NCO cron-only approach in sections a, b, c, d and e below. This cron-based approach is used by OWP for testing the NWM in real-time.

Note: The yellow highlighted are the updated and new configurations.

a. USGS, ACE, CANADA, RFC and Merge_USGS_CA real time streamflow time slices

i. Run this python script every 15 minutes:

```
10,25,40,55 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_usgs_timeslices.ecf | qsub

10,25,40,55 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_ace_timeslices.ecf | qsub
```

```
10,25,40,55 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_canada_timeslices.ecf | qsub
```

```
10,25,40,55 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_rfc_timeseries.ecf | qsub
```

```
9,24,39,54 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_merge_usgs_ca_timeslices.ecf | qsub
```

b. Forcing engine

i. Analysis-assim forcing engine (hourly a 30 minutes past hour, except 01z and 13z which are 45 minutes past the hour)

```
30 00,02-12,14-23 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_forcing_analysis_assim.ecf | qsub
```

```
45 01,13 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date
+\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim.ecf |
qsub
```

ii. Short range forcing engine (hourly a 30 minutes past the hour)

```
30 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_forcing_short_range.ecf | qsub
```

iii. Medium range forcing engine (4 times per day a 45 minutes past 10z, 16z, 22z and 04z)

```
45 10,16,22,04 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "4 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_forcing_medium_range.ecf | qsub
```

iv. Medium range Blend forcing engine (4 times per day a 45 minutes past 10z, 16z, 22z and 04z)

```
45 10,16,22,04 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "4 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_medium_range_blend.ecf | qsub
```

v. Long range forcing engine runs (4 times per day at 10 minutes past 02z, 08z, 14z, and 20z with 4 ensemble members)

```
10 08,14,20,02 * * * cd LOGDIR; for i in $(seq 1 4); do sed -e "s/\%CYC\%/$(date -d "8 hour ago" +\%H)/" -e "s/\%MEM\%/0"$i"/" -e "s/nwm_forcing_long_range_mem\%MEM\%/nwm_forcing_long_range_mem"$i"/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_long_range.ecf | qsub; sleep 1m; done
```

vi. Extended Analysis and assimilation forcing engine runs (daily at top of hour 18z for MPE and 20 minutes past 18z for extend forcing Analysis)

```
00 18 * * * cd LOGDIR; sed -e "s/\%CYC\%/12/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_mpe.ecf | qsub

20 18 * * * cd LOGDIR; sed -e "s/\%CYC\%/16/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim_extend.ecf | qsub
```

vii. Hawaii forcing engine runs (Analysis-assim hourly a 25 minutes past the hour; and Short-range twelve-hourly a 55 minutes past 02z and 14z)

```
25 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim_hawaii.ecf | qsub

55 02,14 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_short_range_hawaii.ecf | qsub
```

viii. PuertoRico forcing engine runs (Analysis-assim hourly a 25 minutes past the hour; and Short-range twelve-hourly a 50 minutes past 08z and 20z)

```
25 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim_puertorico.ecf | qsub
50 08,20 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_short_range_puertorico.ecf | qsub
```

ix. Alaska forcing engine runs (Analysis-assim hourly a 20 minutes past top of hour; Extended AnA daily a 30 minutes pass 20z; Short-range three-hourly a 15 minutes past 01,04,07,10,13,16,19 and 22z; Medium-range and MR Blend 6-hourly a 05 minutes past the 11,17,23 and 05z)

```
20 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim_alaska.ecf | qsub

30 20 * * * cd LOGDIR; sed -e "s/\%CYC\%/20/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_analysis_assim_extend_alaska.ecf | qsub

15 01,04,07,10,13,16,19,22 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_short_range_alaska.ecf | qsub

45 10,16,22,04 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "4 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_medium_range_alaska.ecf | qsub

45 10,16,22,04 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "4 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_forcing_medium_range_blend_alaska.ecf | qsub
```

c. Model flow

i. Analysis and assimilation model runs (hourly a 35 minutes past hour except 01z and 13z that are 50 minutes past hour)

35 00,02-12,14-23 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim.ecf | qsub

50 01,13 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim.ecf | qsub

ii. Long-range analysis and assimilation model runs (4 times per day at hourly at 35 minutes past hour 00z, 06z, 12z and 18z)

35 00,06,12,18 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_long.ecf | qsub

iii. Extended Analysis and assimilation model run (daily at 30 minutes past 18z)

30 18 * * * cd LOGDIR; sed -e "s/\%**CYC\%/16**/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend.ecf | qsub

iv. Short range model runs (hourly at 40 minutes past the hour)

40 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range.ecf | qsub

v. Medium range model run (4 times per day at 15 minutes pass 11z, 17z, 23z and 05z with 6 ensemble members)

15 11,17,23,05 * * * cd LOGDIR; for i in $(**seq 1 6**); do sed -e "s/\%CYC\%/$(date -d "5 hour ago" +\%H)/" -e "s/\%MEM\%/"$i"/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range.ecf | qsub; sleep 1m; done

vi. Medium range Blend model run (15 minutes pass 11z, 17z, 23z and 05z)

15 11,17,23,05 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "5 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_blend.ecf | qsub

vii. Long range model runs (4 times per day at 45 minutes past the 08z, 14z, 20z and 02z with 4 ensemble members)

```
45 08,14,20,02 * * * cd LOGDIR; for i in $(seq 1 4); do sed -e "s/\%CYC\%/$(date -d "8 hour ago" +\%H)/" -e "s/\%MEM\%/"$i"/" -e "s/nwm_long_range_mem\%MEM\%/nwm_long_range_mem"$i"/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_long_range.ecf | qsub; sleep 1m; done
```

viii. Hawaii Model runs (Analysis and assimilation hourly a 30 minutes past the hour; and Short range twelve-hourly a 59 minutes past 02z and 14z)

```
30 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_hawaii.ecf | qsub
```

```
59 02,14 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_hawaii.ecf | qsub
```

ix. PuertoRico Model runs (Analysis-assim hourly at 50 mins past the hour; Short-Range twelve-hourly a 58 minutes past 08z and 20z)

```
50 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_puertorico.ecf | qsub
```

```
58 08,20 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_puertorico.ecf | qsub
```

x. Alaska Model runs (Analysis-assim hourly at 25 mins past the hour; Extended AnA daily at 45 minutes past 20z; Short-Range three-hourly a 35 minutes past 01, 04, 07..22z; Medium-Range Blend 6-hourly at 35 minutes past 11, 17,23 and 05z; Medium-Range at 50 minutes pass 11z, 17z, 23z and 05z with 6 ensemble members)

25 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_alaska.ecf | qsub

45 20 * * * cd LOGDIR; sed -e "s/\%**CYC\%/20**/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend_alaska.ecf | qsub

35 01,04,07,10,13,16,19,22 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_alaska.ecf | qsub

35 11,17,23,05 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "5 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_**blend**_alaska.ecf | qsub

50 11,17,23,05 * * * cd LOGDIR; for i in $(**seq 1 6**); do sed -e "s/\%CYC\%/$(date -d "5 hour ago" +\%H)/" -e "s/\%MEM\%/"$i"/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_alaska.ecf | qsub; done

d. Open-loop (no data assimilation (“no_da”))Model runs

i. Analysis and assimilation with non-DA (hourly at 58 minutes past the hour, except 02z and 14z that are 05 minutes past hour)

58 00,02-12,14-23 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_no_da.ecf | qsub

05 02,14 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_no_da.ecf | qsub

ii. Extended Analysis_assim with non-DA (daily at 25 minutes past 19z)

25 19 * * * cd LOGDIR; sed -e "s/\%CYC\%/16/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend_no_da.ecf | qsub

iii. Long Range Analysis_assim with non-DA (4 times per day at 58 minutes past 00z, 06z,12z and 18z)

```
58 00,06,12,18 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_analysis_assim_long_no_da.ecf | qsub
```

iv. Hawaii forecast with non-DA (Analysis and assimilation hourly at 40 minutes past the hour; and Short range twelve-hourly a 35 minutes past 03z and 15z))

```
40 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date
+\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_analysis_assim_hawaii_no_da.ecf | qsub
```

```
35 03,15 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "3 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_short_range_hawaii_no_da.ecf | qsub
```

v. PuertoRico forecast with non-DA (Analysis-assim hourly a 58 minutes past the hour; Short-Range twelve-hourly a 15 minutes past 09z and 21z)

```
58 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date
+\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_analysis_assim_puertorico_no_da.ecf | qsub
```

```
15 09,21 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "3 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_short_range_puertorico_no_da.ecf | qsub
```

vi. Medium_range Forecast with non-DA (10 minutes pass 13z, 19z, 01z and 07z)

```
10 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_medium_range_no_da.ecf | qsub
```

vii. Alaska forecast with non-DA (Analysis-assim hourly a 50 minutes past the hour; Extended Analysis-assim daily at 55 minutes pass 20Z; Medium-range 20 minutes top of hour at 12z, 18z, 00z and 06z)

50 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_alaska_no_da.ecf | qsub

55 20 * * * cd LOGDIR; sed -e "s/\%**CYC\%/20/**" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend_alaska_no_da.ecf | qsub

20 12,18,00,06 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "6 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_alaska_no_da.ecf | qsub

e. Coastal Model runs

i. Atlgulf and Pacific Analysis and assimilation (hourly - top of hour)

00 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_coastal_pacific.ecf | qsub

00 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "1 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_coastal_atlgulf.ecf | qsub

ii. Atlgulf and Pacific Extended Analysis and assimilation (daily at 10 minutes past 19z)

10 19 * * * cd LOGDIR; sed -e "s/\%**CYC\%/16**/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend_coastal_atlgulf.ecf | qsub

10 19 * * * cd LOGDIR; sed -e "s/**%CYC\%/16**/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_extend_coastal_pacific.ecf | qsub

iii. Atlgulf and Pacific Short-range (hourly - top of hour)

00 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_coastal_pacific.ecf | qsub

00 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_coastal_atlgulf.ecf | qsub

iv. Atlgulf and Pacific Medium-range (top of hour at 13z, 19z, 01z and 07z with ensemble member 1 only)

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s/\%**MEM\%/1/**" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_coastal_pacific.ecf | qsub

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s/\%MEM\%/1/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_coastal_atlgulf.ecf | qsub

v. Atlgulf and Pacific Medium-range Blend (top of hour at 13z, 19z, 01z and 07z)

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e "s/\%MEM\%/1/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_medium_range_blend_coastal_pacific.ecf | qsub

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s/\%MEM\%/1/" -e "s|\$ECFTESTDIR|ECFDIR|"ECFDIR/jnwm_medium_range_blend_coastal_atlgulf.ecf | qsub

vi. Hawaii Coastal (Analysis and assimilation hourly a 45 minutes past the hour; and Short range twelve-hourly a 40 minutes past 03z and 15z)

45 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_analysis_assim_coastal_hawaii.ecf | qsub

40 03,15 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "3 hour ago" +\%H)/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|" ECFDIR/jnwm_short_range_coastal_hawaii.ecf | qsub

vii. Puertorico Coastal (Analysis and assimilation hourly a 55 minutes past the hour; and Short range twelve-hourly a 15 minutes past 09z and 21z)

```
55 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date +\%H)/" -e "s/\%STIME\%/$(date
+\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_analysis_assim_coastal_puertorico.ecf | qsub

15 09,21 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "3 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_short_range_coastal_puertorico.ecf | qsub
```

viii. Psurge Atlgulf Coastal (Short-Range hourly a 5 minutes past the hour; Medium-Range and Medium-Range Blend every 6 hours top of hour at 13, 19, 01 and 07z)

```
05 * * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "2 hour ago" +\%H)/" -e
"s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_short_range_coastal_atlgulfc_psurge.ecf | qsub

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e
"s/\%MEM\%/1/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/test/jnwm_medium_range_coastal_atlgulf_psurge.ecf | qsub

00 13,19,01,07 * * * cd LOGDIR; sed -e "s/\%CYC\%/$(date -d "7 hour ago" +\%H)/" -e
"s/\%MEM\%/1/" -e "s/\%STIME\%/$(date +\%H\%M)/" -e "s|\$ECFTESTDIR|ECFDIR|"
ECFDIR/jnwm_medium_range_blend_coastal_atlgulf_psurge.ecf | qsub
```

3. Testing NWM software

Setup the NWM software using canned (old) data then follow steps below. Otherwise use NCO ecflow/cron blended setup. **Note**: Steps **a** and **b** below can skip if already done section "***b. Procedures***" above.

a. Check out the NWM installation script
   svn export
   https://vlab.noaa.gov/svn/chps-wrf-hydro/tags/v3.0/nwm.v3.0.0/doc/install_NWMsoftware.sh **.**
b. Run the NWM installation script
   Note: For testing NWM software setup, don't need to ***run*** via crons, so use option "-i"

./install_NWMsoftware.sh **-i** -a <packageInstallDir> -o <testOutputDir> -q <queuename>

Example: *./install_NWMsoftware.sh* ***-i*** *-a /lfs/h1/owp/nwm/noscrub/$USER/test/packages -o /lfs/h1/owp/ptmp/$USER/test -q <yourqueue>*

c. Comment out lines below.
scripts/exnwm_forcing_mpe.sh:129: *#ecflow_client --event warning*
scripts/exnwm_forcing_analysis_assim_extend.sh:85: #ecflow_client --event warning
ush/combine/combine_qpe_mpe.sh:87: *#ecflow_client --event warning*

d. Prepare data and run a cycle for most configurations to ensure the setup works properly.
   i. This step should be done after the installation steps above. It assumes the met data directory is */lfs/h1/ops/prod/com*, the testing output directory is */lfs/h1/owp/ptmp/$USER/test/com/nwm/v3.0*, and the package source directory is */lfs/h1/owp/nwm/noscrub/$USER/test/packages/nwm.v3.0.0*.

   ii. Create directories and copy data for testing by doing the following:
      a. Choose a day for the test (i.e. PDY=***20230502***). Note: If the desired date is not selected, the test scripts below will run the current day at 00Z cycle and need to be started after 09Z to wait until upstream source is available (i.e. GFS and CFS data).
      b. cd /lfs/h1/owp/nwm/noscrub/$USER/test/packages/nwm.v3.0.0/doc
      c. **./copyData.sh** ***20230502***
      d. Wait for about an hour for the jobs to finish

   iii. Run the timeslices/timeseries jobs (*Note: this step can run as the same time with step ii*)
      a. cd /lfs/h1/owp/nwm/noscrub/$USER/test/packages/nwm.v3.0.0/doc
      b. **./Timeslices.sh** ***20230502***
      c. Wait for the jobs until all jobs are done

   iv. Run some forcing engine and hydro model jobs
      a. cd /lfs/h1/owp/nwm/noscrub/$USER/test/packages/nwm.v3.0.0/doc
      b. **./runNWM.sh 20230502**
      c. Wait for the jobs until all jobs are done. It takes about 3 hours for all jobs to finish.

v. Check the NWM final outputs and logs (timeslice data, forcing engine, and model runs)
    a. cd /lfs/h1/owp/ptmp/$USER/test/com/nwm/v3.0/***20230502***
    b. cd /lfs/h1/owp/ptmp/$USER/test/com/nwm/v3.0/***20230502***/logs
    c. cd /lfs/h1/owp/ptmp/$USER/test/com/logs

4. Switching machines (migrating jobs between machines)

In a case where the jobs need to be migrated to a new machine such as when there is a prod/dev machine switch, a set of restart files and forcing files (detailed below) should be copied over to the new machine in order for the new jobs to resume.

a. USGS, USACE, Canadian and RFC timeslices/timeseries
    i. Copy current and previous day USGS, USACE, Canadian and RFC timeslices/timeseries to the new prod machine (directories are `usgs_timeslices`, `usace_timeslices`, `canada_timeslices`, `rfc_timeseris`, and `merged_usgs_and_ca_timeslices`)
b. Obtain a list of restart, forcing and intermediate files to be copied.
    i. A software tool, `resum_forecast.py`, is developed to facilitate getting the list of files to copy.
    ii. This software can be found at `ush/resume_forecast/resume_forecast.py` after checking out the NWM code from the repository.
    iii. Use the following arguments to invoke the program
        1. `-d`: the NWM software directory, such as `/lfs/h1/ops/prod/packages/nwm.v3.0.0`
        2. `-m`: the root of where the ${COM} locates, for example, `/lfs/h1/ops/prod`
        3. `-t`: the ${PDY}, for example, `20230425`
        4. `-c`: the starting cycle, for example, `12`
        5. `-l`: tells the program to list all files that need to be copied to the new machine. A value for this argument is not necessary.
    iv. Once the values of the arguments are determined, the program can be executed. After execution, the program prints a list of files that need to be copied to the new machine for the given PDY and cycle to start with. This list can be redirected to a shell script that can then be invoked to transfer the files in the list to the new machine.
    v. Here is an example usage of the program.

```
./resume_forecast.py -d /lfs/h1/ops/prod/packages/nwm.v3.0
-m /lfs/h1/ops/prod -t 20230425 -c 12 -l
```

The screen output looks like this, (Just list a few files here for demonstration p;ropose)

```
/lfs/h1/ops/prod/com/nwm/v3.0/nwm.20230425/restart_coastal/
hotstart_analysis_assim_coastal_atlgulf_20230425_1000.nc
/lfs/h1/ops/prod/com/nwm/v3.0/nwm.20230425/restart/nwm.rst.
09/HYDRO_RST.2023-04-25_09:00_DOMAIN1
/lfs/h1/ops/prod/com/nwm/v3.0/nwm.20230425/nwges/nwm/analys
is_assim_alaska/2023042509/202304250900.LDASIN_DOMAIN1
```

vi. The program can be run on either the new machine or the old machine. Just remember that the files are always copied from the old machine to corresponding directories on the new machine..