

AAPP, OPS-LRS, and Metopizer containerized build and run instructions for DBNet operators  
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```
AAPP version: 8.10          # NOAA-18/19 and Metop-A/B/C AVHRR/ATOVS Level 1 processing and BUFR conversion
OPS-LRS version: 8.4       # Metop-A/B/C IASI Level 1 processing
Metopizer version: 3.51    # Metop-A/B/C EPS Level 0 conversion
```

## 1. OVERVIEW

This guide and the associated scripts and files show how to build, package, and run AAPP, OPS-LRS, and Metopizer in a way that is recommended for DBNet operators. The workflow described in this document uses Apptainer to build these packages in a container. This results in a highly portable AAPP/OPS-LRS/Metopizer software package that is easy to deploy and run on a variety of Linux distributions (e.g. Red Hat, CentOS, Fedora, Ubuntu, SUSE, Debian, etc.).

## 2. REQUIREMENTS

To run AAPP, OPS-LRS, and Metopizer in a container:

- Intel or AMD host computer running a recent version of 64-bit Linux (this workflow was tested on CentOS 7.9)
- Apptainer 1.1.5 or higher

To build AAPP, OPS-LRS, and Metopizer in a container:

- In addition to the requirements listed above, the user must have 'sudo' permission to run Apptainer.

NOTE: Apptainer is needed on the host computer in order to build or run AAPP, OPS-LRS, and Metopizer. However, sudo permission is only needed in order to build the software. When the software is deployed for operational use, it can be run in Apptainer by a regular user.

## 3. SOURCE CODE

The AAPP, OPS-LRS, and Metopizer source code is required to build the software. The required tarfiles are not included in this package.

The tarfiles may be downloaded from these sites:

```
AAPP and OPS-LRS: https://nwp-saf.eumetsat.int/site/software/aapp/download/
Metopizer: https://www.eumetsat.int/website/home/Data/DataDelivery/Software/
```

The required tarfile names are:

```
AAPP_8.10.tgz          # AAPP v8.10
OPS_V8.4-AAPP-l-20211216.tgz # OPS-LRS v8.4
metopizer-3.51.1.tar.gz # Metopizer v3.51.1
```

## 4. BUILD

The build process involves downloading scripts, building AAPP, OPS-LRS, and Metopizer in a Apptainer container, and creating a deployable software package. The steps are shown below.

```
cd $HOME
mkdir AAPP_BUILD
cd AAPP_BUILD
curl -O https://bin.ssec.wisc.edu/pub/gumley/dbnet/aapp/aapp_8.10_build.tar.gz
tar -xvf aapp_8.10_build.tar.gz
cd build
mkdir tarfiles
# Move the AAPP, OPS-LRS, and Metopizer tarfiles to the 'tarfiles' directory before you proceed with the scripts below!
./download_8.10.sh # Downloads the AAPP build and update scripts
./build_8.10.sh   # Builds AAPP, OPS-LRS, and Metopizer (sudo permission is required)
./makedata_8.10.sh # Creates data directory for AAPP and downloads lookup tables
./package_8.10.sh # Creates deployable ready-to-run AAPP/OPS-LRS/Metopizer software package
```

## 5. DEPLOY AND RUN

To deploy and run the AAPP, OPS-LRS, and Metopizer software, just copy the packaged tarfile (aapp\_8.10.tar.gz) to the deployment host.

Note that the deployment host must have Apptainer 1.1.5 or higher installed (sudo permission is not required).

Unpack the software and set the environment as shown below.

```
cd $HOME
mkdir AAPP_DBNET
cd AAPP_DBNET
tar -xvf aapp_8.10.tar.gz
export AAPP_INSTALL_DIR=$HOME/AAPP_DBNET/aapp_8.10
export PATH=$AAPP_INSTALL_DIR/scripts:$PATH
source $AAPP_INSTALL_DIR/scripts/aapp_station_config.bash
```

The following commands are used to process NOAA and Metop direct broadcast data and create DBNet-compliant BUFR files.

```
aapp_station_config.bash # Station-specific settings for DBNet BUFR files (edit for your station; this script must be 'source'd)
```

```
aapp_noaa_level1.bash # Process a NOAA-18 or NOAA-19 HRPT file to create Level 1B and 1C output for AVHRR, AMSU-A, MHS, HIRS
aapp_noaa_buf_r.bash # Create DBNet BUFR files from NOAA AMSU-A, MHS, and HIRS Level 1C files in current directory
```

```
aapp_metop_eps.bash # Creates a directory containing EPS Level 0 files with each sensor stored in a separate file
aapp_metop_level1.bash # Process a directory of EPS Level 0 files to create Level 1B and 1C output for AVHRR, AMSU-A, MHS, HIRS, and IASI
aapp_metop_buf_r.bash # Create DBNet BUFR files from Metop AMSU-A, MHS, HIRS and IASI Level 1C files in current directory
```

```
aapp_update_aux.bash # Update IASI auxiliary files needed by OPS-LRS (this should be run weekly)
aapp_update_cal.bash # Update AMSU-A, MHS, and HIRS calibration files needed by AAPP (this should be run weekly)
aapp_update_tle.bash # Update two-line elements needed by AAPP (this should be run daily)
```

```
aapp_run.bash # Run a command in the AAPP/OPS-LRS/Metopizer container (normally not needed for regular users)
```

## 6. TESTING

Test data for NOAA-18/19 and Metop-A/B/C can be downloaded as shown below and used to test the deployed software package.

NOTE: The test case assumes that the software environment has been configured as shown in step 5 "DEPLOY AND RUN".

```
cd $HOME
cd AAPP_DBNET
curl -O https://bin.ssec.wisc.edu/pub/gumley/dbnet/aapp/aapp_8.10_test.tar.gz
tar -xvf aapp_8.10_test.tar.gz
cd test
./aapp_test.bash
```

Examine the test script to see how to run the AAPP scripts.