18.3 National Weather Service River Forecast Center Forecast Simulations Using the WES Simulating Hydrologic Activities During Real-Time Events (SHARE)

Eric Jones *, Amanda Roberts, Dave Reed
Lower Mississippi River Forecast Center

1. Introduction

The Warning Event (WES) computer provides National Weather Service meteorologists the capability to simulate forecast operations during a severe weather event. Forecasters are required to complete WES training sessions before each significant weather season (NWS Directives System Procedural Directive 20-101). In its initial implementation, the WES was not established to provide simulations of NWS River Forecast Center(RFC) model operations and RFC personnel were exempted from NWS Directive 20-101.

With the implementation of the RFC Archive Computer (AX) at RFCs and the NWS Southern Region implementation of a workstation that can be used at a remote location by an RFC to perform backup RFC operations, all major components were available to effectively utilize the WES to simulate RFC forecast operations. The Lower Mississippi River Forecast Center has integrated these components together to effectively perform RFC model simulations. This project is named Simulating Hydrologic Activities During Real-Time Events (SHARE).

2. Archival and Case Creation

The archive data needed to execute SHARE is stored on the RFC's AX server. Data needed for to run a hydrologic simulation includes National Weather Service River Forecast System (NWSRFS) fs5files, multisensor precipitation estimates in NWSRFS readable format (xmrg), Standard Hydrometeorlogical Exchange Format (SHEF) files, and Hydrometeorlogical Prediction Center (HPC) quantitative precipitation forecast files in N-AWIPS (vgf) format.

Data is archived on AWIPS at predefined intervals. All data is archived on a 28-31 day moving range. Case studies created from this data can range from 1 to 31 days in length. Case studies can be transferred to the WES workstation either by ftp or CD/DVD.

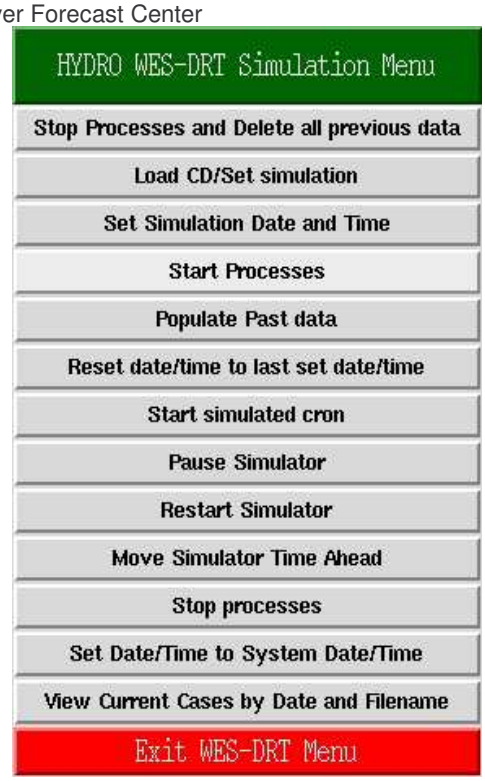

Figure 1

3. WES Setup

SHARE runs on Redhat Linux 7.2-7.3 operating system which is standard on all NWS WES computers. SHARE assumes the NWS WES software is installed. SHARE also requires that all nationally supported hydrologic programs used for AWIPS operations are installed on the WES workstation. Nationally supported programs such as NWSRFS, XNAV, XSETS, XDAT, SHEF decoder and NMAP can be easily installed on the WES workstation.

Along with operational programs, IBM Informix 7.31 and its associated hydrologic databases must be reinstalled. These databases are needed for proper decoding and storage of hydrometeorological data.

4. Run SHARE Simulation in WES

All simulations are started and controlled from SHARE's main menu (Figure 1). The Stop Processes and Delete Previous Data option stops all hydrologic decoders and processes and deletes all of their resultant log files.

The SHARE case is then loaded from CD/DVD or ftp file. The user sets the starting date-

* Corresponding author address: Eric Jones, 62300 Airport Rd, Slidell LA, 70460, (985) 641-4343, eric.jones@noaa.gov

time of the simulation. All hydrologic decoding processes are then started. The user then has the choice of how many days of data they want stored prior to the start of the simulation.

SHARE has the ability to pause and restart a simulation. This is useful if a user wants to study the current hydrologic simulation before moving forward. This also allows a trainer to pause the simulation to assess the knowledge of the student. SHARE also has the ability to move ahead a specific number of hours and continue a simulation.

5. Levels of Simulation.

Like the WES, RFC's may want to perform simulations on various levels and for specific functions at the RFC.

5.1 Interactive Forecast Program (IFP) simulations.

At a specific starting time for the simulation, all hydrologic data that would be available at that time would be loaded into the Informix database. The NWSRFS datafiles at that specific starting time would be used as the initial conditions. Once the simulation is started, scripts would then provide SHEF products at appropriate times for processing. All NWSRFS functions to make the data available to NWSRFS and IFP would be run. Xmrg files would be made available to the forecaster at the simulation time when they were created. Forecasters would go through the simulation and make forecasts as needed. Forecasts would be compared with the actual forecasts issued by the operational forecaster during the event and against observed data.

5.2 Hydrometeorological Analysis and Support (HAS) simulations.

HAS simulations would be similar to hydrologic simulations. However, instead of providing canned xmrg files, the Digital Precipitation Array (DPA) products would be placed in the appropriate directory for decoding. Case studies could focus on operational problems, such as the HAS removing anomalous propagation or correcting bad gages. HAS and Hydrologic forecaster interaction could be replicated by combining HAS and IFP simulations.

5.3 WES simulation.

Another layer of simulation could be added to the HAS and IFP simulations. Using the capabilities already available to the WES for meteorological simulations, forecasters could perform HAS or IFP simulations with a limited set of meteorological data.

5.4 Post storm review.

By archiving all hydrologic jobs executed during an event, a RFC could reconstruct the actions that took place during a flood event. RFCs could use this to evaluate actions taken during the flood and determine if additional actions might have improved forecasts.

6. Future Plans

SHARE could also be run in a Weather Forecast Office (WFO) environment. WFO specific application would have to be installed on the WES workstation but all data flow and decoding would be identical to a RFC.

The ability to remove revisions to data that the forecaster made during the time of the event will be added to future versions. The removal of revisions will add the option of being able to run a simulation with unedited hydrologic data.

7. References

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