



Ingesting Geospatial Data into Hazard Services' Database for National Weather Service Flood Alerts

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ABSTRACT

Statistically, flooding is the most devastating natural disaster not only in the US, but in the world. Of the many different severe and normal weather events, floods typically cause the most casualties and damage. Within Hazard Services of the National Oceanic and Atmospheric Administration, software is being developed and improved for use by the National Weather Service to help prevent such disasters. Because flooding is a worldwide event, the new program produced by this Hazard Services project was created with the intention of being used anywhere for the safety of the public. Time is of the essence in a flooding event and forecasters need to have all relevant information readily available. This project's work provides a script that gives forecasters the tools to issue quick and efficient warnings by creating a catalog of flood prone areas, customized for the regions that each forecast office covers.

By ingesting unique geospatial data all at once with a merged file in the form of dams, rivers and burn scars into a relational database, forecasters can simply choose and deploy within the Advanced Weather Interactive Processing System (AWIPS) software. Having access to pre-set outlines of dam-break outflow, burn scars, and river inundation is much more efficient than the freehand shape drawing of an area that is expected to flood. Thus, not only does the new program allow faster issuance of alerts, but it has left less room for error and more room for geospatially accurate alerts.

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FLOODING



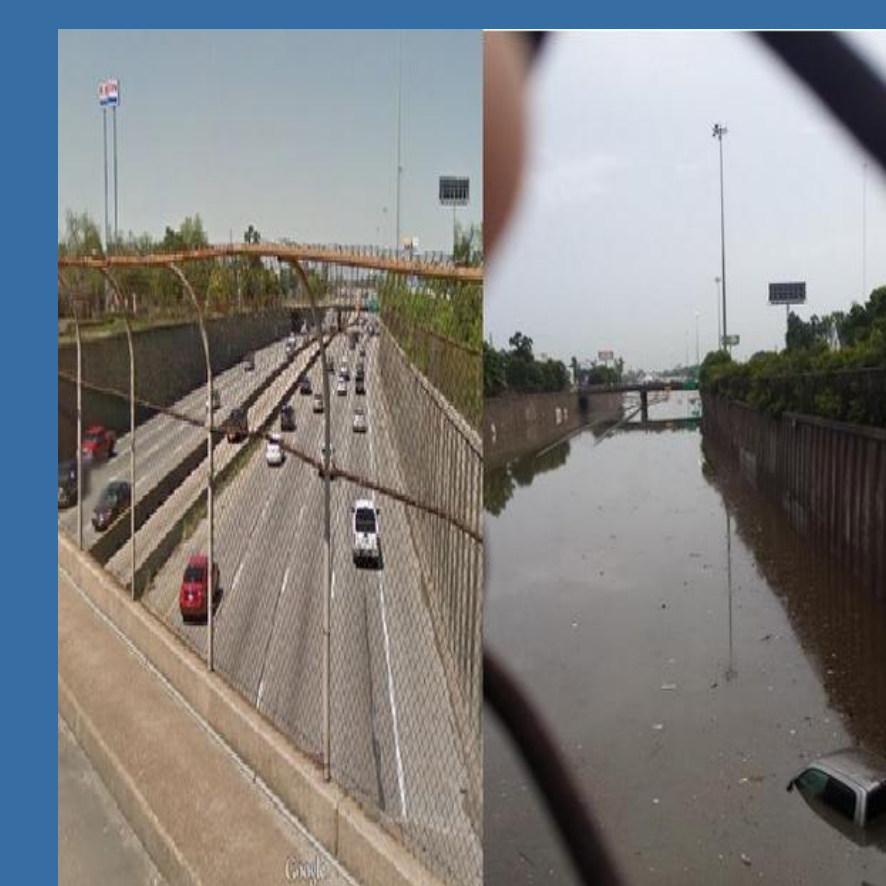
Hurricane Katrina (2005)
1,836 Deaths
\$105,840,000,000 in damages.

Flooding is the most deadly, disastrous, and destructive natural disaster there is. However, this is frequently overlooked because flooding can be so commonplace. While tornadoes, hurricanes, and lightning may cause more immediate danger, flooding is actually responsible for more deaths than all of those severe weather events combined. The majority of hurricane casualties are those of flooding, rather than the hurricanes winds, for example. It is important to know the dangers of flooding as it can save the lives of people everywhere, especially since there aren't many places where flooding does not occur.

Hurricane Floyd (1999)
73 Deaths
\$9,225,000,000 in damages.



- Flooding averages \$5,000,000,000 a year in damages in the U.S.
- Flash flooding is responsible for approximately 200 deaths per year.
- Flooding is the only natural disaster that can take place in ALL fifty states, and anywhere around the world!

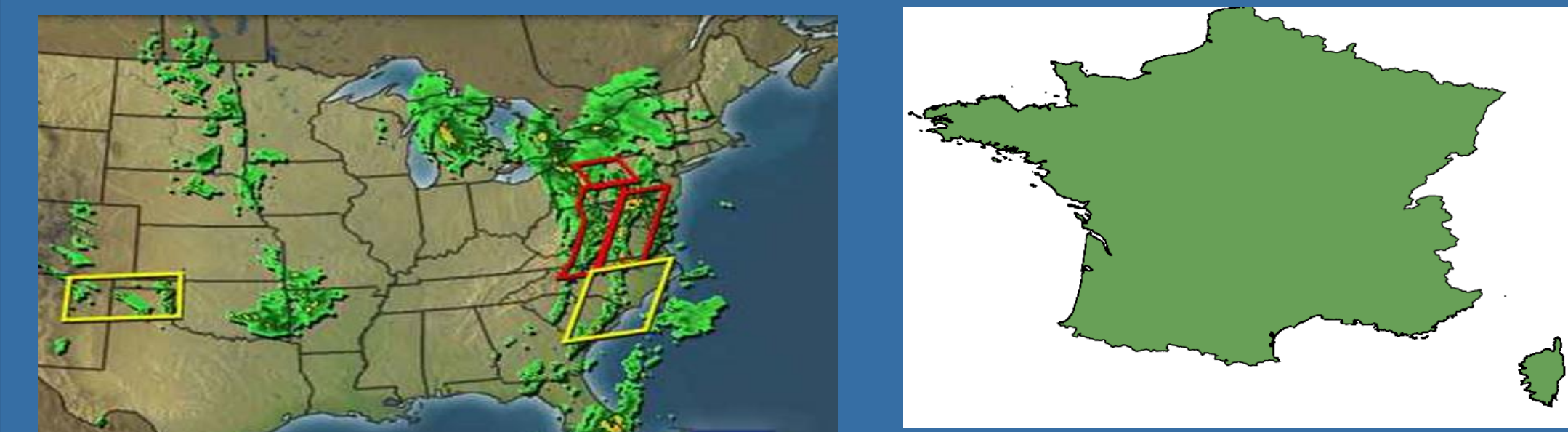


(Before and after photo by Richard Lewelling.)

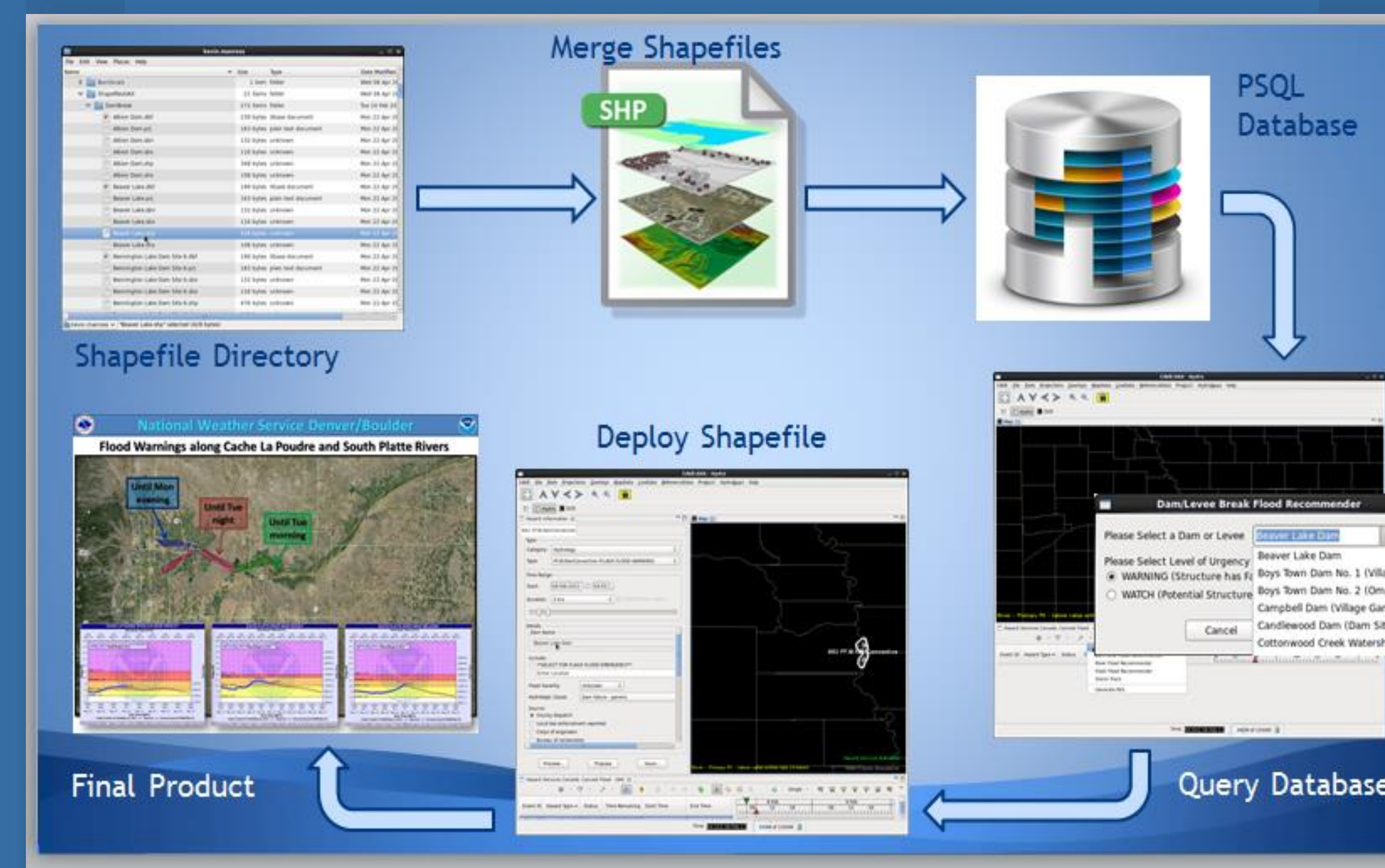
Texas Floods (2015)
25+ Deaths
\$30,000,000+ in damages.

WHY THIS PROGRAM?

For the safety of the public, it is important that forecasters have the tools to issue weather warnings and alerts in a timely manner. The script produced for this project allows forecasters to store geospatial data (known as shapefiles) in a database for quick retrieval through the Advanced Weather Interactive Processing System (AWIPS). These shapefiles can be very intricate and unique polygons, thus drawing them out can take more time than it takes a flash flood to strike and destroy a community.



(Top) Difference between normal shapefiles and dam/river/burn scar shapefiles. (Bottom) Flowchart of the overall project.



WHO?

Hazard Services is an ongoing NOAA project to produce and develop more efficient and user-friendly weather alert/forecast software for the National Weather Service.

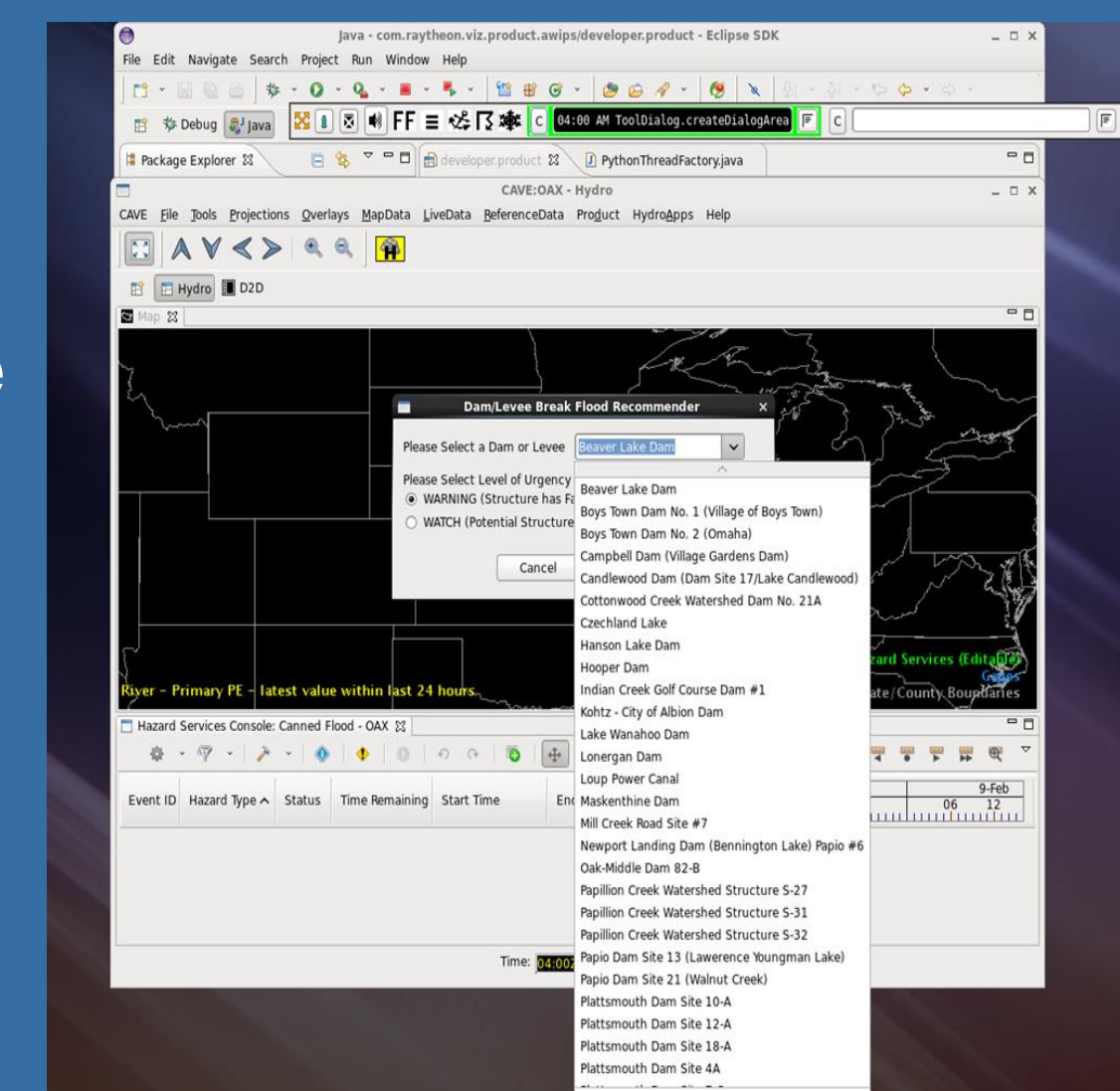


WHAT DOES IT DO?

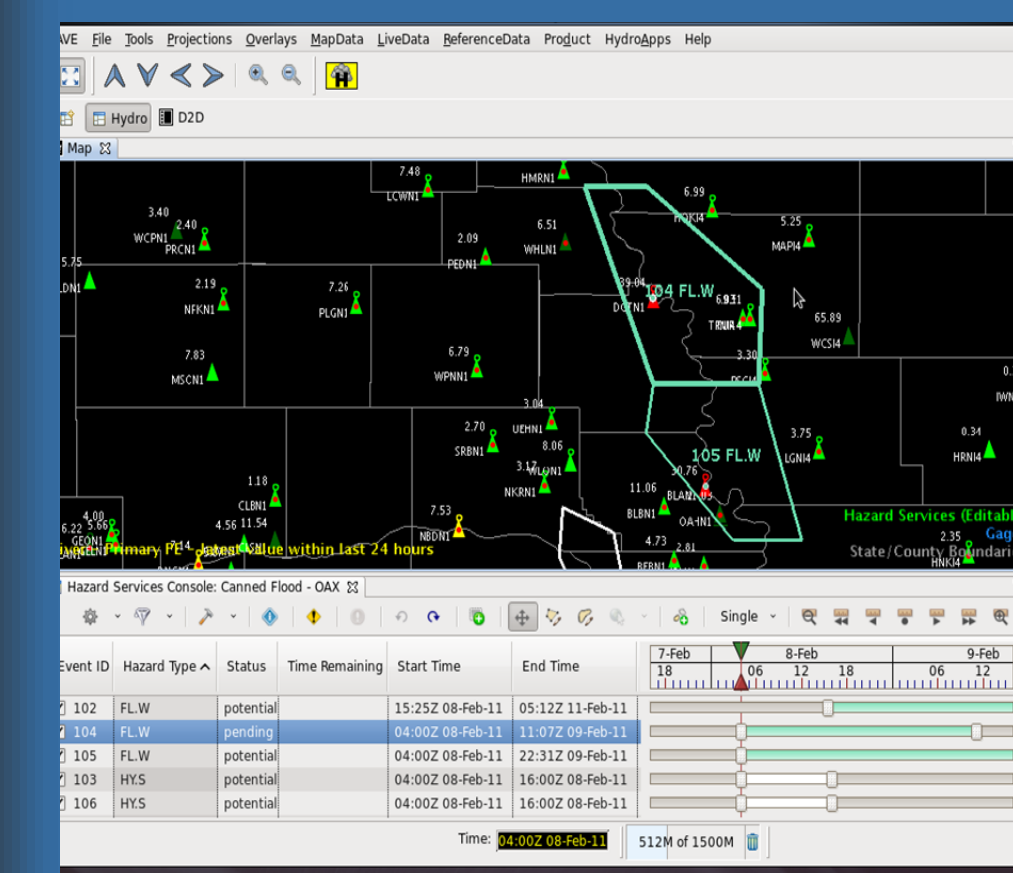


The program, known as "ingestshapefile", places the merged geospatial data into a database known as PostgreSQL.

The merged shapefile is composed of individual features that can be separated at request. These individual features are the individual shapefiles. The script then inserts the merged file into the database. In the forecasting software (AWIPS), the user can access and deploy it.



Once deployed, the user can assign the severity of the alert in the shapefile region— advisory, watch or warning. After specifying the time range of the alert, the user can then issue the warning.



(Left) The forecasters perspective of the final result in AWIPS. (Right) What the public will see.

ACKNOWLEDGEMENTS

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