



News

Press Releases
Event Announcements
CCT Weekly
Grants and Funding
Student News
Archived News

Supercomputers help New Orleans prepare for Hurricane Isaac

(Source: [Computerworld](#))

Computerworld - In the seven years since Katrina struck New Orleans, advances in computer power and storm surge modeling is giving the city detailed data about Hurricane Isaac's impact.

Computer models have already mapped, on a continuing basis as weather data changes, how the storm surge will invade coastal regions and neighborhoods.

The researchers, at university supercomputing centers in Texas and Louisiana, are working to inform emergency planners about what will happen once the hurricane sends water into canals, levees and neighborhoods.

These models are being proven out right now as the storm hits.

In 2005, when Katrina landed, the capability to model storm surge, while good, may be rudimentary compared to what is available today. Back then, Louisiana used computer models with as many as 300,000 "nodes" and it took six hours to run a simulation.

Each node represents a different location on a map where compute algorithms run physics computations that determine what will happen during a hurricane. The number of nodes is somewhat analogous to higher number of dots per square inch in a photograph: the more dots, the more detail that's available.

Today, says Robert Twilley, an oceanographer and executive director of the Louisiana Sea Grant Program, simulations with some 1.5 million nodes can be completed in 1.5 hours.

"It's incredible -- this is just since Katrina," said Twilley.

The computer models, which are being run at the Louisiana State University's Center for Computation and Technology, help to inform emergency planners what roads will flood and neighborhoods cut off.

They are being used to help determine the best staging areas for positioning people and supplies needed for the recovery, said Twilley.

Louisiana is using an unstructured grid that allows it to concentrate the nodes in areas where the analysis is needed, near inland waterways and flood prone areas. This enables them to adjust the detail to where it most needed, making it as precise as 10 meters for certain inland areas, while as much as five kilometers in the ocean. You can see some of this [at their website](#).

About the time of Katrina, the computer models "were much coarser and had minimum resolutions of only 100-200 meters," said Casey Dietrich, a post-doctoral researcher at the Institute for Computational Engineering and Sciences at University of Texas in Austin.

Dietrich has been running compute models at the Texas Advanced Computing Center at the University of Texas to assess the impact of the storm surge on Texas.

Emergency planners in both states take the data generated by the university researchers and incorporate it into geographic information systems.

"They can look down at neighborhood scale and say 'on this street along the levy we're going to have water this high,' and plan accordingly," Dietrich said.

Comparing the capability today with that at the time of Katrina, Dietrich said: "I think we have a very strong understanding of how hurricane wave storm develop and how they can threaten a coastal environment."

The models are now being tested by actual events.

The winds were picking up early last night in New Orleans, said Bred Jacobs, CIO at Loyola University in the city. Jacobs was there for Katrina.

The university suspended operations on Tuesday, and students are sheltering in place. There is ample food and supplies, Jacobs said by email.

"We worked to harden out IT facilities quite a bit since Katrina and are hoping to stay operational in our main data center," Jacobs said. "Tapes we shipped off site and we placed our hot-site on alert as a precaution."

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