

FireGrid

An Integrated Emergency Response System for the Built Environment

www.firegrid.org



Retrospective analysis of every fire emergency poses the recurrent question: was the response adequate? Almost invariably the answer is that access to better information would have led to a more effective response. Key sources of such information include:

- Data from sensors (for example, smoke detectors, CCTV, and air conditioning systems) within the building/structure.
- Forecast results from fire models or human behaviour simulations.
- Predicted scenarios from emergency service experts and active response systems.

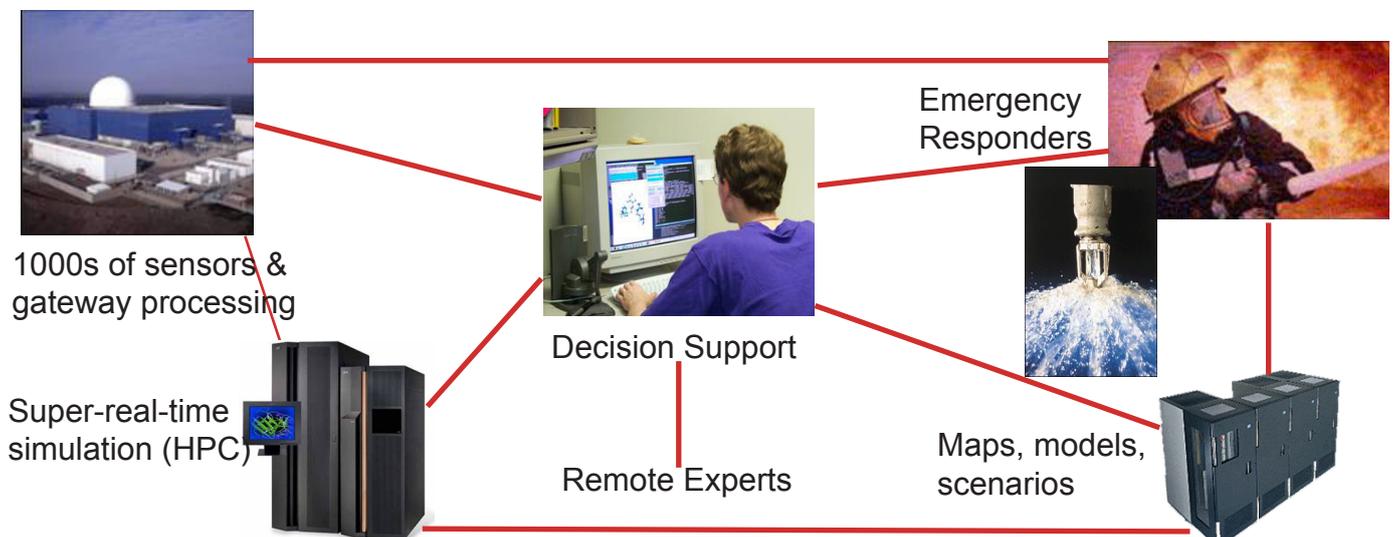
FireGrid aims to integrate these systems to significantly improve building design, fire safety training and emergency response.

At the heart of FireGrid are complex computer models. These simulate the spread of fire in buildings, the effect of fire on those buildings, and the way people behave in emergencies.



FireGrid will use Grid technologies to run coupled and ensemble simulations in parallel. These will be guided by input from sensors and linked to a knowledge-based decision support system.

The focus of our initial work is to demonstrate that input from sensors can be used to trigger simple fire models in real time. HPC versions of more sophisticated fire models will be developed, allowing them to be added to the FireGrid system.



FireGrid will operate in several modes:

Design mode: Fire simulations linked to knowledge-based evacuation models will enable the design of safer buildings.

Training mode: Fire simulations linked to a knowledge-based decision support system will allow trainees to try different responses

Support mode: In the event of a real fire, data from sensors will provide input to a decision support system, including graphical presentations of the state of the fire and analyses from stored scenarios.

Response mode: In this enhancement of support mode, super-real-time simulations, guided by sensor-input, will provide further information, including “what-if” scenarios to evaluate response options.



The current FireGrid project is an investigation into the Grid-enabled integration of the component technologies, while identifying the key areas for further research.

The component technologies are:

- The CFD and FE models and simulations of fire
- Resilient sensors and wireless sensor networks for extreme conditions
- Knowledge-based decision support systems
- Knowledge-based evacuation models
- Sensor guided simulation management
- Distributed data management, e.g. of simulation results



This project is led by BRE and supported by the DTI. Academic work is undertaken by the University of Edinburgh (School of Engineering and Electronics, NeSC, EPCC and AIAI). Project management is by Ove Arup limited and other industrial partners include Abaqus, Ansys-CFX, Vision Systems (Europe) and LFEPA.

