Demo Fact Sheet

Disaster Management:
Information Technology that Helps Save Lives

SAN FRANCISCO, Sept. 12, 2011 – On the eve of the Intel Developer Forum, scheduled for Sept. 13-15, Intel Corporation is showcasing the roles played by diverse types of computing in the field of disaster management. Moderated by Keri Carkeek, Intel's eco-technology strategist, the panel session centers on the phases of disaster management. Joining Carkeek are real-world, on-the-ground experts, including:

- Perry Olson, IT risk and security management, Intel
- Michael Bowers, senior director of strategic response and global emergencies, Mercy Corps*
- Frank Schott, senior global program director, NetHope*
- Bob Marshall, president and CEO, Earth Networks*

Carkeek kicks off the day with an introduction to disaster management, common terminology associated with it, and the different phases and provide an overview on how it's the beneficiary of many innovations in computing. The phases of disaster response; mitigation, preparedness and response will be covered by Carkeek as well as the expert guest speakers prior to the opening of the Tech Showcase.

The Tech Showcase includes over a dozen demonstrations related to the area of disaster management, from warning and response to evacuation and traffic management. The following descriptions are a guide to explore the research projects on display.

Mitigation

Sixty percent of businesses that lose their data fail within 6 months following a disaster[1]. The research featured focuses on "business continuity" and how to increase resiliency against disasters by planning ahead.

Extreme Event Simulation for Disaster Preparedness

Virtual environments have typically been used for gaming, but Intel researchers have developed a new software architecture that when combined with a cloud computing model, allows applications to scale user experiences far beyond existing limits. Intel's "Distributed Scene Graph" is a cloud-based, rich 3-D visualization that allows thousands of people to participate in a simulated disaster scenario. The virtual experience helps communities understand what is likely to happen at a large scale using immersive serious game play. Although the game simulates only a fraction of the issues faced during a disaster (for example, limited communication and transportation failures), the framework can be extended to add many different simulation engines. The use of large-scale Internet gaming extends participation across the Internet for a fraction of the cost of existing training exercises. Participants' natural reactions within the safe confines of the simulated environment can be observed and studied by experts who can then create better decision-making and community-training tools.

Continuous Sensing for Disaster Warning and Response

In this area, visitors can explore several specific examples that bring to life the role that real-time, low-cost sensors can play in disaster management, including:

- **Real-time traffic management:** This battery-assisted RFID tag is used for automatic vehicle identification; placed in cars it helps show traffic patterns and could be used in town planning and traffic congestion management, equally its outputs can be studied to provide vital data for routing and evacuation planning. Unique to the platform is its high level of security and cryptographic protection.
- **Chemical and particle detection**: This wireless sensor platform is used to detect airborne particulates and chemicals for building security applications. Vital information on what is sensed is used to trigger investigations of abnormal conditions. For instance the vapor and particle detection boards can be used to detect chemicals in everything from airport security breaches to burning buildings.
- **Fireball:** The ability to provide first responders timely and accurate information is vital. This sensor capability collects information in a fire setting, allowing the responder to assess situation prior to sending in human life. The enclosure is made to survive harsh conditions such as fire while enabling the platform to send information including temperature, free-volatiles and air quality. The low-cost Fireball sensor can detect the hottest spot along with the chemical composition of a fire and send back initial readings to the first responder trucks; information from the truck is sent to both the firefighters' smart phones and the backend offices.
- **Water Quality:** The water quality sensor is designed to sense 16 parameters of chemical conditions continuously. The low-cost platform is constructed with an easy to navigate user interface, which enables one to clearly see all 16 parameters and easily assess the situation.
- **Oil Rig Structural Stability:** Using accelerometers, gyroscopes, magnetometers and gravimeters, a small, easily installable sensor was designed and developed that tracks the motion of structures for stability. The offshore oil rig structure is the harshest application Intel found to test the platform.

<u>Preparedness</u>

Government economists estimate that as much as a third of the U.S. economy – approximately USD$4 trillion in 2008 – is sensitive to the weather[2]. With more than 2.5 billion people worldwide dependent on agriculture for their livelihood, weather is a matter of economic survival. The research featured in this area centers around pervasive sensing and high-performance modeling in preparing for disasters. For example, being able to predict a tornado touching down by a few minutes can mean the difference between life and death.

- **Evacuation Traffic Management through Crowd-Sourcing**: In-vehicle sensors allow real-time modeling to aid evacuation management.
- **Always On Disaster Warnings for Mobile Devices**: Always reachable mobile devices maintain network connectivity to the cloud in a low-power state. The technology enables delivery of messages to the device, including disaster warning and updates even when the devices are asleep. For mobile devices to be used in disaster warning they must have these capabilities.
- **Earth Networks***: Earth Networks**** provides weather-related, state-of-the-art storm prediction to inform and alert consumers, enterprises and government around the world.

Earth Networks***** provides advanc**e**d environmental intelligence for decision making and safety.

Response

Immediately following a disaster the initial need for geospatial mapping of the disaster area is critical to understand what the area looks like to determine what and where resources are needed. Researchers will demonstrate how open-source platforms for collecting and sharing crowd-sourced information can aid in disaster response.

- **Connectivity Provisions for Disabled Networks**: A common challenge in disaster areas is the availability of reliable network connectivity, due to damage to traditional network power infrastructures. This greatly impedes rescue and recovery efforts, slowing response times and requiring resource intensive manual solutions. Intel's platform has been tested in a variety of hostile environments. It's designed for quick and easy deployment to provide Internet-like services where there is no or limited Internet connectivity and a lack of power. The mobile access point runs on a low-powered Intel® Atom™ processor, and supports a variety of services including web server, email server and delay tolerant networking. The platform can be powered from a variety of sources, and in this demonstration it uses photo voltaic, but can be easily configured for electro-generation stoves or other sources. To connect to the Internet again the platform can easily be configured to the most appropriate backhaul from intermittent GSM networks, satellite or WiMAX, to data mules carried, for example, by a person. Intel used helicopters in the trials conducted in northern Sweden.
- **Reliable High Quality Video for Remote Medical Providers**: A processor that seamlessly switches between multiple channels such as WiFi and 3G to get and maintain a signal or the strongest most reliable signal available. This delivers seamless online video. It could be used for a video chat between specialists who cannot get to a remote or disaster stricken area to those in the area in need of specialized expertise. For example this could be used to perform highly specialized remote surgeries.
- **Airborne Radar for Emergency Traffic Management**: This demonstration shows how operators in an emergency response center can monitor evacuation route traffic as a hurricane is bearing down on a city at night. In this simulation, the storm has grounded police helicopters, but data from an airborne radar plane flying high above the clouds is being fed to an Intel® Xeon™ processor-based server. Within seconds the advanced radar algorithm determines the exact location, speed and direction of all vehicles within the area.
- **Energy Management for Distressed Power Grids**: This demonstration shows how in the future it would be possible to manage energy usage during electricity rationing conditions.

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* Other names and brands may be claimed as the property of others.

[1] Boston Consulting Group, Nerds Backup, and Data Restoration Services
[2] "What Every CFO Needs to Know About Weather Risk Management," sponsored by the Chicago Mercantile Exchange and StormExchange, written by business journalist Randy Myers, July 8, 2008
[3] http://www.worldvision.org/content.nsf/learn/ways-we-help-agriculture?Open&lpos=bot_txt_Agriculture-and-Environment

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