

Monitoring against another Pompeii

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A wimax-based connection to the internet will enable real-time monitoring of potentially dangerous active volcanoes.

For effective monitoring of volcanic activity, scientists want to know what is happening in real time, not the pattern of events last week. For many remote volcanoes, that has just not been possible. Now, a new system, intended to monitor activity around Mount Vesuvius in Italy and at volcanoes in Iceland, offers a major step forward in real-time communications.

In Iceland, scientists have been driving to their remote volcanic monitoring stations about once a week in order to download the data from the station hard disk and then returning to their laboratories to analyse it. The new monitoring system can deliver around 75 megabits of data remotely per second over a WiMAX wireless connection.

The WiMAX system offers a robust, high-quality connection. Transmitting rich data like this, it is very important not to lose any of it, suggests Enrico Argori, a leading researcher on the WEIRD project that developed the monitoring system. “WiMAX is the cheapest channel... to do this, and it is the channel that can deliver the best quality of service.”

The monitoring system does not swamp the airwaves with useless data. Only when significant activity occurs will the monitoring system communicate data. And critical transmissions can be protected from interference. Bandwidth can be reserved using a protocol called DIAMETER, that identifies data traffic and prioritises information from

the volcanic monitoring centre to ensure communications are not blocked by lower-priority data traffic, such as messaging.

Though far from a new technology, the WEIRD research team has managed to extend WiMAX's resilience and flexibility.

WEIRD agents on the job

The monitoring system includes a series of features that are important for the future integration of WiMAX with other wireless and telecommunications systems we use. The WEIRD team seamlessly integrated WiMAX with a range of other network technologies to enable high-quality, end-to-end communication, regardless of the route it takes.

WEIRD developed software that exploits the advantages of 'next-generation networks'. NGNs layer information, decoupling the applications from the underlying transport stratum. Whatever the underlying network, the volcano monitoring signals will be relayed in full from end to end.

Not all applications are designed to run on next-generation networks. For these, the research team built a series of adaptors – known as WEIRD agents or WEIRD application programming interfaces – that allowed non-NGN applications to take advantage of the boosted quality of service and seamless mobility features of the wireless volcano-monitoring system.

WiMAX is being viewed more and more as a complementary, rather than competing, technology to existing wireless communication access channels, such as wifi and mobile telephony services. So, the successful seamless integration of WiMAX via 'media-independent handover' is an important step forward.

Pan, zoom... trouble

An important feature of WEIRD's monitoring system is not that it is technically possible but that it can be practically applied by non-communications specialists.

Software was developed that hides the complexity of the configuration of end-to-end communication channels, whatever the different equipment or different versions of WiMAX used. It means that a member of the monitoring team can quickly and easily establish an end-to-end communication path without specialist training, allowing them to concentrate on what is vitally important at the time – their monitoring job.

Bi-directionality was also tested in this setting, meaning that the volcano monitors can pan or zoom onto a potential trouble spot with the remote cameras, as well as receive signals from them.

“The main part of our work is to make it easy for end-users [to benefit] from new technologies like WiMAX,” explains another member of the WEIRD research team, Giuseppe Martufi.

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Provided by [ICT Results](#)

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