



Lawrence Berkeley National Laboratory Discovers Pervasive Cellular Coverage

CASE STUDY

CHALLENGE

Lawrence Berkeley National Laboratory (LBNL) has been a leader in science and engineering research for 75 years. Located on a 200-acre site in the hills above the University of California's Berkeley campus and overlooking San Francisco Bay, Berkeley Lab is the oldest of the U.S. Department of Energy's National Laboratories. LBNL was founded by Ernest O. Lawrence, Nobel prize-winning inventor of the cyclotron, which pioneered new areas in atomic and subatomic research.

LBNL's main site now consists of more than 100 buildings where some 3,800 research, engineering, student, and administrative personnel conduct unclassified scientific research in a variety of disciplines. The lab's research areas include fundamental studies of the universe, quantitative biology, nanoscience, new energy systems and environmental solutions, and the use of integrated scientific computing as a tool for discovery. The Lab is also home to four DOE national user facilities.

The problem is that the hill-and-valley topography of the site leads to inconsistent and sometimes nonexistent cellular coverage: buildings on hilltops receive good coverage, while buildings located in the valleys (and sometimes built into hillsides) have little or no coverage. "It's a large campus, and many of our employees have offices in one location and then spend a lot of time in labs at another location, so cellular phones had become the primary method of communications," said Stephen Nobles, a project manager in the IT Infrastructure department at LBNL. "We had to find a way to make sure those phones worked."



In 1999, LBNL asked the area's cellular carriers to propose a solution to the problem. Cingular Wireless (previously Cellular One and AT&T Wireless) proposed installing an InterReach in-building wireless system. After the IT staff determined that the in-building system wouldn't interfere with sensitive scientific instruments such as electron microscopes, Cingular got the go-ahead to install it.

DEPLOYMENT

The plan was to roll out the system gradually, focusing on the buildings with the greatest need first and then moving ahead. Building sizes ranged from portable trailers to facilities of 150,000 square feet. Not all buildings needed in-building systems, as some had coverage from nearby outdoor cell towers. The initial deployment covered ten buildings. "The deployment wasn't disruptive at all," says Nobles. "It was pretty painless."

Cingular first deployed a micro base station in LBNL's data center along with a Main Hub, Expansion Hubs, Remote Access Units (RAUs), and antennas. Today, the deployment spans 10 buildings and includes 4 Main Hubs, 13 Expansion Hubs, and about 100 antennas. The Main Hubs are linked by fiber with the Expansion Hubs, and then wireless signals are carried to the RAUs and antennas via Cat-5 cabling.

BENEFITS

When the system went live, users discovered that their phones worked in many places where they hadn't worked before.

"We found how much users liked it when the system had an outage at one point," says Nobles. "People had become accustomed to it, and we really heard from them when it stopped working. I came in one Monday morning and got one call after another about how the service wasn't working."

While most of the users rely on voice or text messaging, some are also using Cingular data cards in their laptops to get Internet access over Cingular's EDGE data network.

FUTURE

Based on its success so far, LBNL plans to continue rolling out the system to more buildings where coverage needs enhancement, up to a total of about 30 buildings. Currently underway is a newly-built, 100,000-square foot Molecular Foundry, a nanoscience facility that will house some 150 workers. The finished building was dedicated in March, 2006. In addition, Cingular is also planning to wire a cluster of five mobile office units that house the facilities engineering and support staff.

Better coverage means more productive communications between researchers, staff, and students at America's oldest laboratory campus serving the U.S. Department of Energy. LBNL is discovering a way to provide reliable, high-performance cellular links for its workers.



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