City Implements Disaster Recovery Plan to Keep Citizens Connected

City of Hayward connects public safety and emergency operations via Cisco 802.11 wireless bridging and microwave channels

EXECUTIVE SUMMARY

CITY OF HAYWARD

- State and Local Government
- Hayward, California, USA
- 151,300 Citizens

BUSINESS CHALLENGE

- Close proximity to potentially destructive Hayward Fault Zone
- Need to establish business continuity for city in the event of major earthquake

NETWORK SOLUTION

- Connecting Cisco routers through citywide 802.11wireless bridge point-to-point backbone
- Erected new towers throughout the city that house a Cisco wireless and public safety radio network, and interlink via specialized microwave channels

BUSINESS RESULTS

- Interconnected 19 different geographical locations and city sites robust wireless bridging network backbone
- Smooth network transference to wireless bridging network with only quarter of a second delay
- Enhanced day-to-day wireless capabilities and increased data bandwidth for city offices and buildings, creating more collaborative and mobile workforce

Business Challenge

The City of Hayward, also known as the “Heart of the Bay” because of its central and convenient location, is located in the East Bay of Alameda County, California. It is the sixth largest city in the San Francisco Bay Area and is located between San Lorenzo and Union City. The current population of Hayward is 151,300 and is expected to grow to 171, 800 by 2030.

The Hayward Fault is a geologic fault zone about 37 miles long that lies mainly along the western base of the hills east of the San Francisco Bay. Parallel to its more famous (and much longer) neighbor to the west, the San Andreas Fault, the Hayward Fault is capable of generating significantly destructive earthquakes right through the center of Hayward. “The Fault is on a 150 year cycle of large earthquakes, with the last one occurring approximately 152 years ago,” says Clancy Priest, chief information officer of the City of Hayward. “With this delay in the Fault’s pressure release, we are well overdue for a major earthquake in our city. We had to look at the business continuity of our city in the event of a major earthquake. How would the city stay connected? How would we function? When I became CIO in 2002, I became dedicated to answering these questions.”

Network Solution

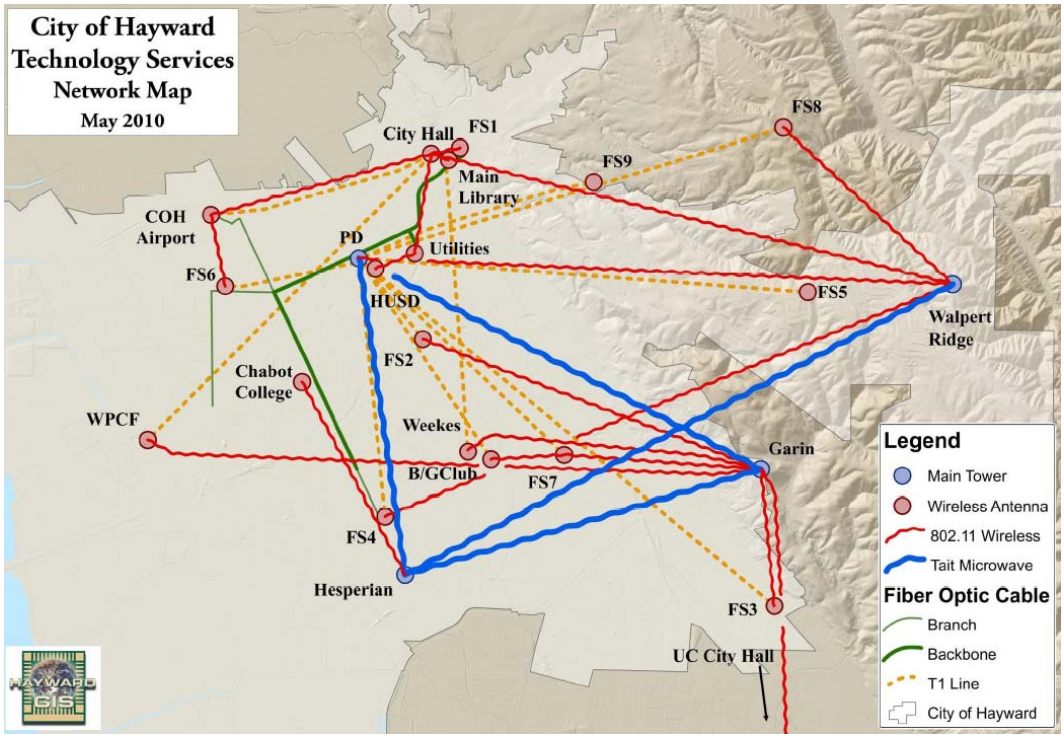
An engineer by background, Priest began to determine the most effective way to connect city sites via an 802.11 wireless bridge in the event of a natural disaster, such as future earthquakes in the Hayward Fault. After saving additional funding from an initial infrastructure upgrade, Priest researched how to connect routers and enable a citywide 802.11 wireless bridge backbone. Priest was able to target 19 different geographical locations and city sites, starting at the bay and heading into the hills. These sites, which included nine fire stations, the city library, local school district, and police department, would be able to provide wireless bridge connectivity once connected.

Simultaneously, Hayward’s public safety radio system was failing and needed multimillion dollar repairs. This radio system is crucial to Hayward’s overall emergency preparedness efforts because

it allows emergency response teams to quickly and efficiently assess and address a crisis. Partnering with the city's public safety communications manager, Priest began building new towers throughout the city that would house both a wireless bridge and public safety radio networks. "We looked to Cisco as our end-to-end product manufacturer, not only because they are the best in the business, but also because the equipment was able to interlink into the major tower sites via a specialized microwave channel," says Priest. "We needed 802.11 wireless bridging technologies that seamlessly functions with our radio network and addresses each tower's particular caveat. Basically, we needed a line drawn between public safety and emergency operations."

The project took a mere two years, during which time Cisco was used exclusively for the network build-out.

Figure 1. City of Hayward technology services network map



Business Results

Today, each of the wireless towers is interconnected via antennas and lives on a robust Cisco® network backbone. "I was floored with the stability of the new Cisco 802.11 wireless bridge network after we conducted point-to-point testing of each site," says Priest. "In the middle of a weekday, during peak work hours, we unplugged the fiber to one of the police stations. The entire network seamlessly transferred over to the wireless bridge network with only a quarter of a second delay. We switched from the land network over to the wireless network five times to solidify the testing; no one could even tell. You could pull the plug on Hayward, and I guarantee we would stay in business."

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> **—Clancy Priest, Chief Information Officer, City of Hayward**

Buildings and offices throughout the city use the network for general, day-to-day wireless activities, creating a more collaborative and mobile workforce. “The fire and police departments, airport, library, and water pollution control plant are just a few of the sites that currently leverage the city’s wireless network,” says Priest. “These departments now have access to wider data bandwidth.”

Chief information officers (CIOs) in surrounding communities and across the country are extremely interested in what Priest has accomplished in Hayward. The business continuity of 802.11 wireless point-to-point bridging has become a reoccurring topic of conversation among CIOs in the past several years due to the rise in city immobilization resulting from natural disasters. “Obviously, it is better to be prepared for an emergency rather than wish technologies and solutions had been put into place,” says Priest. “It is irresponsible and negligent for city officials to not address these issues prior to a drastic event occurring. Each site and tower in Hayward is equipped with a generator that can survive for up to 24 hours.”

Although other cities in the United States have deployed wireless point-to-point bridging networks, Hayward approached its emergency preparedness from a holistic standpoint. “Most cities rely on fibers that are in the ground; however, in the event of a major earthquake, we cannot expect land lines, phones, interconnectivity, or fiber to survive,” says Priest. “Hayward’s close proximity to a fault line forced us to create a fully-functioning wireless bridging network.”

Figure 2. Garin water tank site.

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PRODUCT LIST

Routing and Switching

- Cisco Catalyst 6000 Series Switches
- Cisco Catalyst 3750 Metro Series Switches
- Cisco 2811 Integrated Services Router

Security and VPN

- Cisco ASA 5510 Adaptive Security Appliance

Voice and IP Communications

- Cisco IP Contact Center Express
- Cisco CallManager
- Cisco Emergency Responder
- Cisco Unified Presence
- Cisco Emergency Responders
- Cisco Unified MeetingPlace

Outdoor Wireless

- Cisco Aironet 1410 Series Wireless Bridges
- Cisco Aironet 1310 Series Outdoor Access Point/Bridges

Next Steps

Priest plans to deploy a satellite on the roof of Hayward's City Hall that will integrate with the 802.11 wireless bridging backbone. "This self-correcting satellite will include a global position system (GPS) that can alert authorities and the Department of Public Safety if the building shifts during an earthquake or other natural disaster," says Priest.

The city is also considering deploying Cisco TelePresence™ Technology on the network as well in the fire department, emergency operations center, and nine fire stations. "Our goal is to use the advanced video conferencing service for briefings, trainings, and emergency updates," says Priest.

Figure 3. Equipment and tower at Garin.

For More Information

To find out more about Cisco's mobile government public safety solutions, go to: http://www.cisco.com/web/strategy/government/public-safety-mobile.html

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