

Case Study:

Free Wi-Fi Access in Silicon Valley



“The Silicon Valley deployment demonstrates MetroFi’s commitment to working with municipalities to make ubiquitous wireless broadband access a reality for residents, businesses and city government employees. If we can make free, ad-sponsored access successful throughout the heart of tech-savvy Silicon Valley with SkyPilot as a partner, there is no doubt we will be equally successful in other communities.”

*Chuck Haas, Co-founder
and CEO of MetroFi*

Wireless ISP MetroFi needed a Wi-Fi mesh solution that provided the performance, high availability, end-to-end security, low total cost of ownership, and ease of deployment and operation needed for its business model of offering free, ad-supported Wi-Fi access.

MetroFi (www.metrofi.com), the leader in designing, building and operating municipal Wi-Fi networks, is delivering on the long-standing promise of ubiquitous wireless access in the very heart of tech-savvy Silicon Valley, California. Residents of Cupertino, Sunnyvale, Santa Clara, Foster City and downtown San Jose now enjoy free, ad-sponsored wireless Internet access at broadband data rates of up to 1 Mbps—the equivalent performance of some DSL services at absolutely no cost! Users also have the option to pay \$19.95 per month to have a faster service with no advertising. The same service is also available to businesses, government agencies and visitors. The successful implementation, with over 500 SkyPilot mesh nodes operating throughout a 40 square mile area that passes 250,000 households, will serve as model for future deployments by MetroFi in major cities throughout the U.S.

MetroFi’s founders have extensive experience in building carrier-class DSL networks, and believe that a similar approach is required to make wireless municipal networks successful. “We know the only way to design a wireless mesh network is to make it holistic—on a community-wide basis—from the very outset,” commented Chuck Haas, MetroFi’s co-founder and CEO. “And for that, we needed a carrier-class solution.”

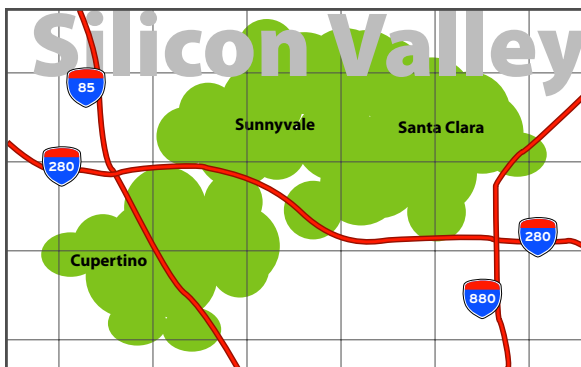
To evaluate available offerings, MetroFi established five criteria encompassing performance, high availability, end-to-end security, low total cost of ownership, and ease of deployment and operation. After an extensive investigation, MetroFi found only one solution able to fully satisfy all five criteria: SkyPilot’s Synchronous Mesh Network solution. Three aspects of SkyPilot’s design particularly appealed to MetroFi. The first is the use of different radio frequencies for access and backhaul. According to Haas, “separating these two distinct tasks—building fully-meshed node-to-node links and providing client access—on two distinct frequencies is absolutely essential to minimizing interference and maximizing performance. Anything less is destined to fail as the network scales.”

The second feature is an intelligent, high-power eight-antenna array that employs orthogonal frequency-division multiplexing (OFDM). The use of an array mitigates interference, and substantially enhances network scalability and flexibility by allowing each node to communicate in a directional, sectorized fashion. This also helps the network form a more scalable and fully self-healing mesh topology. “Directionality in a mesh topology is the best way to overcome line-of-sight obstructions, minimize the effects of interference and deliver peak performance,” Haas noted.

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Third is the use of a third-generation synchronous mesh protocol to further minimize interference and, thereby, further increase the overall throughput. SkyPilot's Synchronous Mesh protocol, together with the multiple radios and directional antenna array, maximizes the potential for spectral reuse and spatial segmentation throughout the network. "Large, densely-populated metropolitan areas could not be covered adequately without such provisions," Haas added.

MetroFi has been able to leverage additional features of the SkyPilot solution. Synchronization and fast packet processing combine to keep latency below MetroFi's aggressive goal of 60 milliseconds round trip across five hops through the mesh. Robust security based on the 128-bit Advanced Encryption Standard (AES) protects both the network infrastructure and the growing number of subscribers. And centralized management gives MetroFi the ability to monitor and control the entire network from a single console. MetroFi also expects to utilize Virtual LANs (VLANs) to keep public Internet traffic and private data traffic separate, along with various Quality of Service (QoS) provisions to add public safety, video surveillance and Voice over IP (VoIP) capabilities to each of its networks.



To make an ad-sponsored business model work, cost-effective deployment and operation is critically important to MetroFi.

"Our philosophy is that we design, build and operate highly scalable networks that must function well in the real world," commented Haas. "In other words, we don't want to manually engineer radio or backhaul links; we want the radios themselves to deal with the realities of an ever-changing RF environment."

Based on this initial success, MetroFi is forming plans to expand its footprint throughout the San Francisco Bay Area, as well as to deploy networks in other metropolitan areas across the U.S., beginning with Aurora, Illinois and Portland, Oregon.



SkyPilot Solution

The third-generation Synchronous Mesh Network solution from SkyPilot™ Networks combines standards-based Wi-Fi access with a high-performance, scalable and self-healing wireless mesh backhaul network using:

- SkyGateway™ nodes to interface with the Internet
- SkyExtender™ DualBand™ nodes that integrate Wi-Fi access and mesh backhaul
- SkyControl™ and SkyProvision™ software for centralized management

Benefits

Exceptional performance and dependability based on the multi-radio design and the advanced SyncMesh™ architecture that synchronizes and load-balances all backhaul traffic throughout the mesh topology

Unparalleled scalability and spectral reuse with high-power eight-way antenna arrays that increase range, mitigate the effects of self-interference and readily overcome line-of-sight obstructions

Low total cost of ownership based on a combination of ease-of-deployment to eliminate the need for complex RF planning and ease-of-operation with intuitive centralized management

Virtually unlimited flexibility based on support for 2.4 GHz access, sophisticated traffic management and provisioning capable of supporting VoIP and video surveillance, and the robust security provisions that are essential in a multi-use wireless municipal network



Leading the Mesh Revolution

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