



## Case Study: OCP - Metro scale WiFi Network Helsinki, Finland



### Background

Helsinki, the capital city of Finland, is considered to be one of Europe's most technologically advanced cities. Until recently, the residents of Helsinki only enjoyed partial area wide Wi-Fi connectivity through an assortment of in-building hotspots that were located in cafes, libraries, hotels and private homes. This ad hoc and decentralized approach offered residents and visitors a limited level of access and afforded them spotty Wi-Fi coverage,

To be connected wirelessly to the Internet around Helsinki required the user to subscribe to multiple Wi-Fi service providers. Unfortunately this well intended group of independent providers delivered service levels that were regarded as nothing greater than "best effort" grade. This also meant that Wi-Fi in Helsinki lacked true ubiquitous access, failing to deliver greater mobility to users as they moved around the city, in cars or via public transportation.

Enter OCP, a Metropolitan Internet access provider. OCP took a hard look at the market and set out to change the way Helsinki residents and visitors could connect to the Internet. They postulated that by deploying a Wi-Fi network in the city center, providing continuous coverage to both the stationary and mobile user, a richer overall user experience could be achieved at a far more reasonable cost.

Initially, OCP considered deploying a wireless mesh system, but after conducting in-depth financial analysis it was determined that a mesh network's overall costs of deployment and upkeep would be extremely high. In effect, the cost benefit analysis revealed if OCP deployed a mesh network it would mean risking both the business and the rapid deployment model OCP had developed due to three key factors:

- The Capital Expense (CAPEX) costs to deploy were greater than necessary due to the coverage requirements for installation and deployment of a large number of nodes and access points that were needed to effectively cover Helsinki's densely populated and high concentration of buildings in the city center.
- Ongoing Operating Expenses (OPEX) of these nodes and access points, including the ongoing RF tuning to avoid interference, would cause added complexity and ongoing costs.
- OCP was looking for a full "Broadband over IP" solution that would provide full triple play: data, Voice and video over IP as well as deliver a mobile environment for its planned expansion to mobile users in cars and those riding public transportation. The Mesh system would be limited to stationary "data over IP," in effect providing only a partial solution to subscribers.

As a result of these three issues OCP began looking at other more fiscally prudent and technologically advanced options to the planned mesh network architecture in order to meet their deployment budget and schedule.

## **The Solution**

OCP turned to InspiAir in search of a better solution to what was currently available and deployable.

Using InspiAir's technology, OCP would be able to provide Wi-Fi coverage for Helsinki's city center at a fraction of the cost of a comparable mesh system. This would enable OCP to offer a wider range of next generation network services including a full triple play package of Data, Voice and Video over IP. Within days, OCP was providing Wi-Fi coverage to an area of several square miles around the Helsinki city center. This included heavily traveled main roads, leading hotels, shopping areas and public places.

InspiAir's Access Point is a rugged, weatherproof, outdoor device. Each Access Point connects to a single 60-degree sectoral antenna and is mounted on a mast or rooftop.

Laptops with internal 802.11 cards were able to connect to the system at distances of over one mile. RF considerations were simplified due to InspiAir's VTM algorithm, which allows all InspiAir Access Points to operate using the same channel as well as the same SSID's. This ability was also a major determining factor of OCP, as the technology has unique anti-RF collision interference avoidance technology enabling wireless providers to use the license-free band on a large Metro scale.

OCP also deployed InspiAir's Centralized Management System, allowing it to monitor, manage, control and offer provisioning as well as billing to large customers including other wireless providers who want to offer OCP's services to their customers.

The InspiAir system's fast roaming speeds deliver hand-offs in less than 7 milliseconds, with almost zero packet loss. This enables the use of applications and devices including Wi-Fi ready phones for VoIP calls and Wi-Fi capable PDAs and PCs for viewing and listening of streaming media content throughout the coverage zone.

Using InspiAir's technology, OCP is now able to offer municipal area Wi-Fi coverage throughout Helsinki's city center. In addition to significantly lower capital outlay and operational costs the quality of service delivered is at a level not possible from competing technologies.

In essence OCP offers a true broadband wireless solution in the municipal area to its customers. This is made possible due to OCP now having the benefit of a truly scalable wireless network that provides the opportunity to offer and deliver a true triple play (data, voice and video) solution with mobility, penetration into homes and buildings as standard features and at no additional cost.

## Performance

**System range:** InspiAir's VTM extends the range of 802.11 without exceeding EIRP limits. OCP successfully measured the following distances using an internal laptop 802.11 card:

- In Near Line of Sight– 1 mile
- In Line of Sight – 2-3 miles.
- At one point, a maximum of 5 miles was reached

**Throughput:** 802.11 devices are able to connect at the maximum throughput; effective throughput was recognized at being equal to 802.11b standards – about 6Mbps per Access Point.

**Latency:** Average system wide Latency is 3msec. Since InspiAir's system is essentially a 'one 'hop' network, every user is always only one hop away from the backbone.

**Handoff times:** Every connected computer, PDA or Wi-Fi phone can be associated to several AP at the same time. This means:

- Mobile users experience a 5-7-millisecond handoff time between Access Points.
- During handoffs, there is minimal packet loss, allowing applications like VoIP to function perfectly providing an enterprise or campus like experience to a metropolitan wide Wi-Fi zone.

"Professors in Helsinki University said this is against the laws of physics... **Now that they see the system's performance, and they support me.**" Antti Tapio, Chief Executive Officer, OCP

## Summary

- InspiAir was the preferred choice for OCP due to its superior performance and cost effectiveness. OCP examined different alternatives, but after testing and evaluating them, InspiAir was the solution of choice due to its high performance that delivered extended coverage, required the lowest number of installed Access Points (APs), provided fast roaming without dropped connections, and delivered an overall lower total cost of ownership (TCO).
- Due to its simplicity and reduced number of APs, the network was deployed in a matter of days. InspiAir's system instantly allowed users to connect to the OCP Network over Access Points deployed around Helsinki, using their laptops, and even while mobile from distances of one mile or more.
- Users also enjoyed consistent low latency. This enabled them to use VoIP applications; as well as PDA's and SIP based mobile phones while wandering throughout the city center.
- Only 15 AP's were required to cover the entire city center. The system also uses the same parameters for the RF channel and SSID throughout the coverage footprint.

## **Conclusion**

In conclusion, OCP was able to rapidly deploy and deliver to Helsinki residents, and visitors, a Wi-Fi network that exceeded the company's business plan's goals due in part to InspiAir's low total cost of ownership (TCO) and its advanced, easy to install and maintain, Wi-Fi technology.

As a result of the success in Helsinki OCP is now planning system expansion to provide similar service to additional cities, on trains for passengers and marina for sailors.

## **About InspiAir**

InspiAir develops and markets a family of innovative 802.11 based wireless solutions. InspiAir overcomes the traditional challenges of mass WiFi deployment, enabling an extended range of up to 5 kilometers from a single Access Point. Using standard Wi-Fi 802.11b/g, operating in the unlicensed 2.4 GHz band and compatible with standard CPE equipment, InspiAir's system is the ideal platform for providing a wireless Metropolitan Area Network (MAN).

Headquartered in Herzliya, Israel, InspiAir currently has dozens of municipal WiFi deployments worldwide. InspiAir is a privately owned company.

