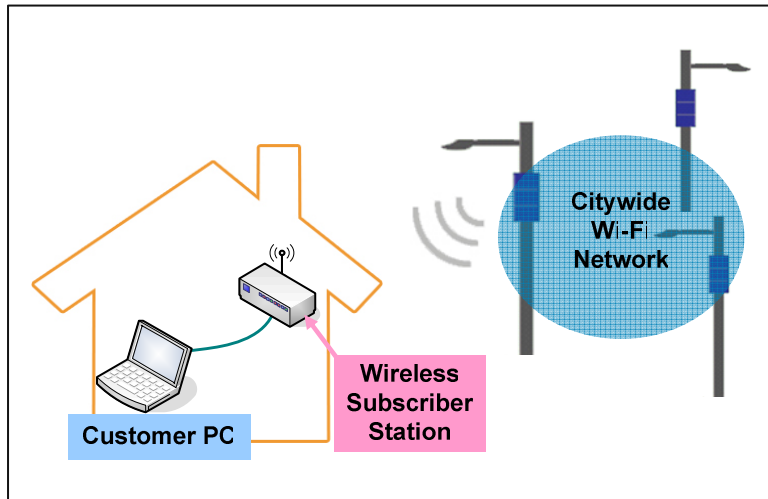


The Importance of Wireless Subscriber Stations to Successful Citywide Wi-Fi Deployments

Introduction

As citywide wireless networks proliferate, service providers and network operators are quickly realizing that wireless subscriber stations – small devices that enhance communication between customers' computers and Citywide Wi-Fi networks – will play a central role to successful service deployment.



A wireless subscriber station enhances communication between a user PC and the Citywide Wi-Fi Network.

With fewer than 20% of all Internet users having access to "wireless ready" laptop PCs¹, providing a wireless subscriber station as part of a wireless service offering is crucial to successfully achieving a sufficient addressable market size, healthy take rates, and universal adoption.

Further, a well-designed wireless subscriber station facilitates a positive customer experience through immediate benefits such as enhanced signal quality and coverage, a clear service demarcation point, and instant service activation.

This white paper discusses the role that a wireless subscriber station can play in offering service, two major categories of subscriber stations, and how the differences between them can make or break a successful service offering.

Capturing Wireless Market Share

With all of the recent press and hype around Wi-Fi, WiMax, and other wireless technologies, many people assume that simply "offering Wi-Fi service" will lead to large numbers of subscribers. Yet, there is a relatively small installed base of consumers with computers that have simple Wireless capabilities, let alone newer technologies. Thus, in order to attract subscribers and capture market share, service providers/operators must address the needs of the large proportion of potential customers who are without Wireless capabilities.

Wireless-enabling Devices

The following are the main types of devices currently available to provide wireless capability to existing customer PCs (i.e. Wireless-enabling devices):

- Wireless PC card / USB Dongle Devices
- Wireless Bridge Devices
- Wireless Subscriber Stations

¹ Pew Internet Project Data Memo, "28% of American Adults are Wireless Ready", May 2004.

The following sections provide an overview of each type of Wireless-enabling devices and highlight the respective advantages and drawbacks.

Wireless PC Card / USB Dongle Devices

Wireless devices of this type are small, simple devices that plug directly into either the PC Card or USB slot on a laptop or desktop computer, and enable the computer to send and receive data on a Wi-Fi network.

While wireless PC card / USB dongle devices are generally simple and low-cost, there are drawbacks to this approach, as summarized below:

Wireless PC Card / USB Dongle Devices	
Advantages	Drawbacks
<ul style="list-style-type: none"> • Low cost • Readily available through retail channels 	<ul style="list-style-type: none"> • Under-powered, and poor ability to receive/send signals • May not work with all computers, especially older PCs and operating systems • Requires installation of software drivers • Difficult to troubleshoot: when an issue arises, is it because of the computer or the wireless service? • Enables only one computer • Difficult to monitor and/or manage from a central location the service quality • Little or no security

Wireless Bridge Devices

Wireless devices of this type are standalone devices that connect at one end to one computer via an Ethernet cable, and at the other end to a Wi-Fi network via wireless signals.

Wireless bridge devices generally possess much higher transmission power than PC card / USB dongle devices, and can be positioned independently from the computer for optimal signal reception. However, wireless bridge devices do not address other issues that arise when connecting to wireless citywide networks, summarized below:

Wireless Bridge Devices	
Advantages	Drawbacks
<ul style="list-style-type: none"> • High-powered • Connects one computer by standard Ethernet • No software or drivers required on the computer 	<ul style="list-style-type: none"> • No easily accessible administration interface • Difficult to troubleshoot – Layer 2 vs. Layer 3 troubleshooting is not simple • Enables only one computer, additional computers require an external router • Difficult to monitor and/or manage from a central location the service quality • Little or no security

Wireless Subscriber Stations

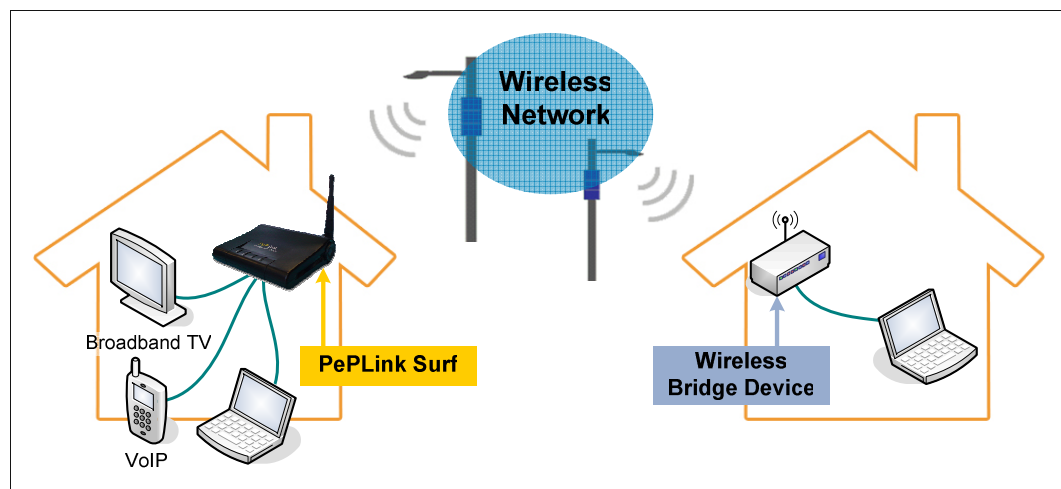
This is a new generation of wireless devices that solves many of the issues that are unaddressed by the aforementioned types of devices.

In addition to connecting the customer with the wireless network, wireless subscriber stations provide the benefits of enhanced security and manageability, ease of use, and multi-user capabilities, outlined as follows:

Wireless Subscriber Station	
Advantages	Drawbacks
<ul style="list-style-type: none"> • High-powered • Connects multiple computers by standard Ethernet • No additional software and/or drivers are required on the PC • Simple web-based administration interface • Simple troubleshooting: Layer 3 demarcation from wireless network • Built-in intelligence for monitoring & managing service quality • Built-in advanced WPA/802.1x/802.11i encryption & security • Built-in NAT & firewall • Supports multiple computers 	<ul style="list-style-type: none"> • Not available – until now

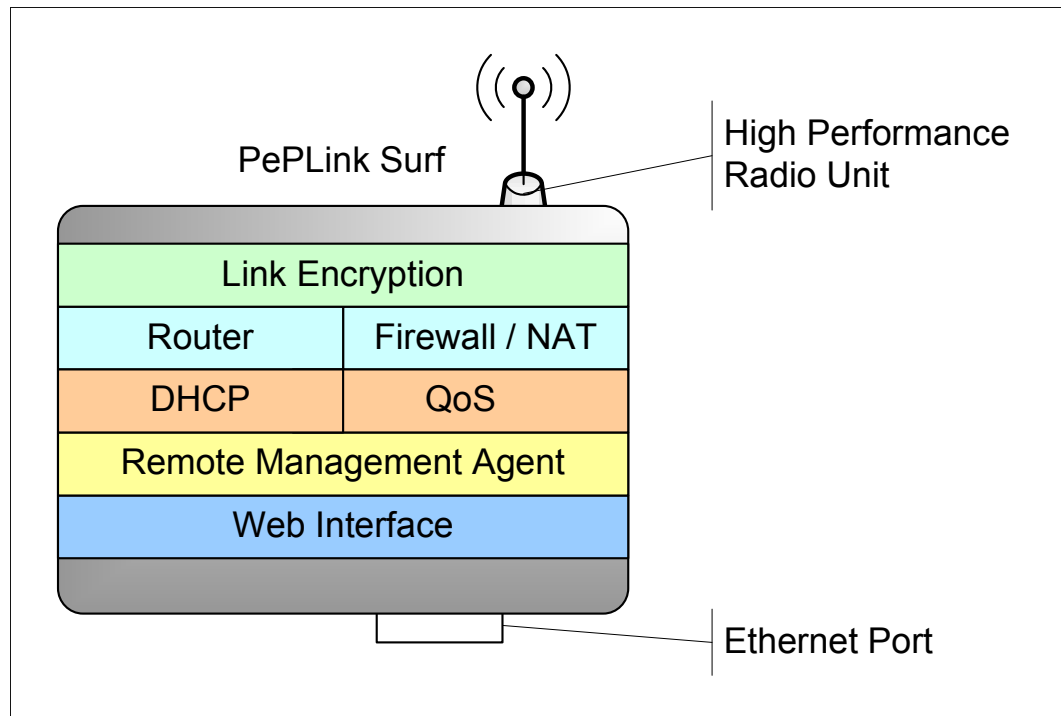
The PePLink Surf Wireless Subscriber Station

PePLink Surf is a sophisticated wireless subscriber station purpose-built for citywide wireless networks. The following diagram illustrates the scenarios with PePLink Surf vs. a wireless bridge device.



The PePLink Surf wireless subscriber station connects multiple devices; whereas a wireless bridge connects one device.

The PePLink Surf is an intelligent Layer 3 device that incorporates a high-performance wireless radio unit, an integrated home gateway router, as well as built-in security and remote-management capabilities.



PePLink Surf supports a wide range of functionality.

The advantages of this PePLink Surf are summarized below:

Easier Troubleshooting via Clear Demarcation

The subscriber station clearly identifies a Layer 3 service demarcation point (or service boundary). In case of a connectivity problem, it is much easier to identify and address the cause. There are no dependences on customers' computer hardware, software, or drivers to complicate troubleshooting.

Better Coverage and More Reliable Service

Most desktop and laptop computers, PC cards, and USB dongles are designed for indoor use and low-power wireless signals. As a result, they often cannot receive signals from an outdoor Wi-Fi network; or if they can, they lack sufficient transmission power to send signals back. PePLink Surf is built with a high-performance radio unit that has very high receive sensitivity, as well as the transmission power to punch through where other devices cannot.

Simpler Setup via True Plug-and-play

PePLink Surf eliminates all user-side computer configurations to provide a true plug-and-play experience through a standard Ethernet connection and a web-based configuration interface. No additional software or drivers on the customers' computers are required.

Network and Data Security

PePLink Surf supports advanced 802.1x/WPA/802.11i authentication and encryption mechanisms to authenticate users and networks, as well as to securely encrypt user data.

User authentication protects the network from rogue users.

Network authentication protects users from malicious attempts to masquerade as the service provider's network. The malicious attempts, when successful, can hi-jack the users' connection and enable the theft of the users' personal, financial, and/or other valuable information.

Computer Protection

According to research studies², an un-patched Windows PC directly connected to the Internet lasts on average for about 20 minutes before it is compromised by attacks, worms, or viruses. Therefore, protection from direct exposure to the Internet is desirable.

PePLink Surf has a built-in stateful firewall and performs NAT (Network Address Translation) to shield customer computers against attacks and other risks that originate from the Internet. Customers enjoy a secure service, which results in fewer support calls.

Support for Multiple Computers

PePLink Surf can provide a subscriber with access to the wireless network service through all of their home computers. The integrated gateway router and automatic client IP address assignment capabilities of PePLink Surf allow multiple computers to simultaneously access the Internet.

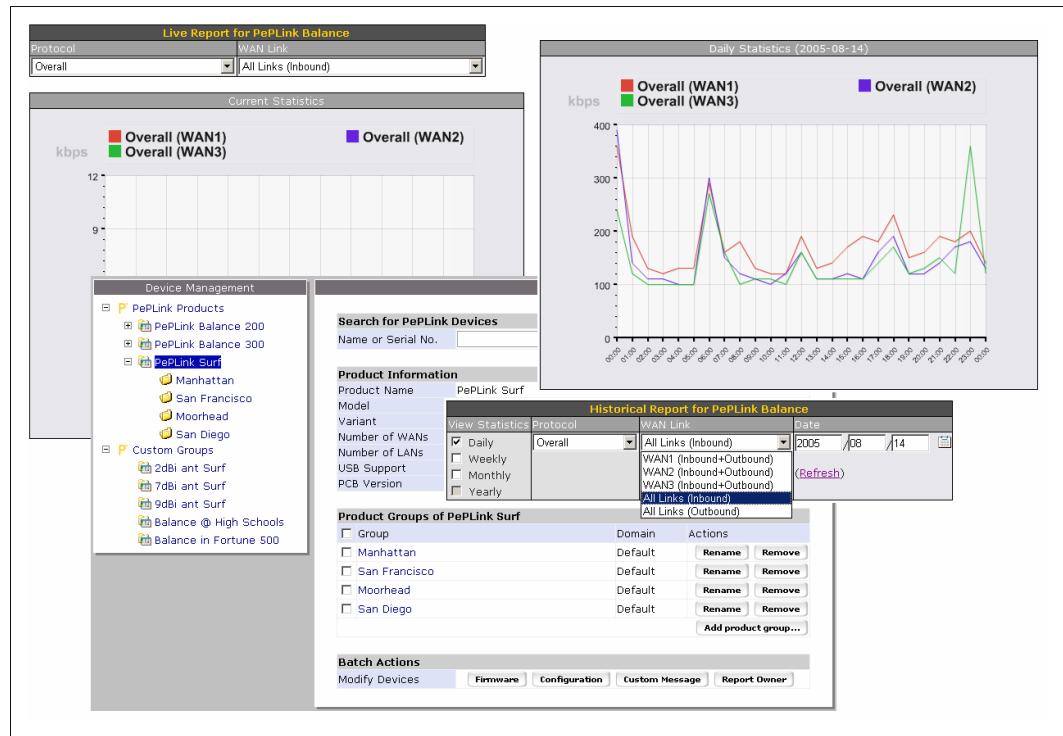
Quality of Service

With the increasing use of the Internet to carry delay-sensitive traffic such as VoIP and high-quality audio and video, the ability to prioritize user traffic becomes important. PePLink Surf stands out from the rest by supporting the proposed Internet standard 802.11e to achieve higher throughput and maintain low jitter and latency for applications (such as VoIP) that require high-quality data streams.

² Source: SANS Institute, www.sans.org

Remote Manageability

PePLink Surf can be remotely managed by PePLink Central Management System (PCMS).



Screenshots of PePLink Central Management System (PCMS)

PCMS is a carrier-grade provisioning, management, and reporting solution for large-scale deployment of home and business services that utilize subscriber station such as the PePLink Surf.

A highlight of features of PCMS follows:

1. Provisioning
 - Auto-discovery and setup
 - Content pushing
2. Management
 - Firmware updates
 - Device configuration parameters
 - Firewall/security policy
3. Reporting
 - Device status, usage, uptime, customer behaviors
 - Security alerts on attacks

Summary

Recent initial experiences with citywide Wi-Fi have revealed the need and, more importantly, the benefits for the Wireless Subscriber Station, which until now has been the missing link for a successful citywide Wi-Fi service.

Summarized below are the many benefits that the Wireless Subscriber Station class of devices brings to both the network operator and subscribers:

Wireless-enabling Devices Comparison Summary				
Functionality & Benefits	PePLink Surf	Wireless Bridge	PC Card / USB Dongle	Built-in Wi-Fi
Easy Troubleshooting / Clear Demarcation	✓	✓ / ✗	✗	✗
Better Coverage / More Reliable Service	✓	✓	✗	✗
Easier Setup / True Plug-and-play	✓	✗	✗	✗
Network & Data Security	✓	✗	✗	✗
Computer Protection	✓	✗	✗	✗
Multiple Computer Support	✓	✗	✗	✗
Quality of Service	✓	✗	✗	✗
Remote Manageability	✓	✗	✗	✗

Being the first device to comply with the Tropos TMCX specification, PePLink Surf is a proven solution for citywide networks, where uninterrupted carrier-grade service is a no-compromise requirement.

Contact / About Us

PePLink is a subsidiary of one of Asia Pacific's most experienced and respected network integration houses founded in 1991.

Headquartered in Hong Kong (China), PePLink is the leading manufacturer and marketer of broadband devices, integrated solutions, and embedded platforms. PePLink's products have been deployed by various leading Service Providers, Small and Medium Businesses, System Builders and Tech-savvy Users throughout the world.

For further details on how PePLink Surf can fit into your citywide Wi-Fi plans, please contact us via the information at www.peplink.com/contact_us.php.

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