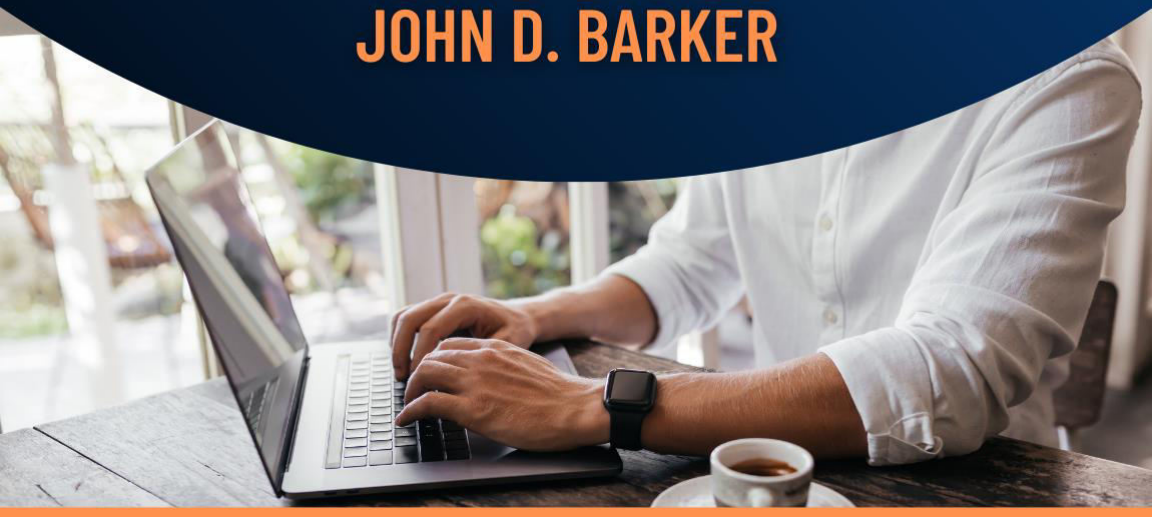
BUSINESS SOLUTIONS SERIES

SELL WIFI INTERNET FOR ANY TYPE OF BUSINESS

Learn how to sell a WiFi Internet service to visitors, guests, customers or residents using any type of Internet Service Provider

JOHN D. BARKER



KINDLE EDITION

Business Solutions Series

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For any type of business

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John D. Barker

Internet Technology Answers Inc. – Kindle Edition

Sell WiFi Internet

Published by: Internet Technology Answers Inc., Miami, Florida, USA.

Internet Technology Answers Inc. publishes its books in English and Spanish and in formats that include printed and a variety of electronic formats.

Description: 1st edition. | Miami, Florida, USA : Internet Technology Answers Inc., [2024]

Subjects: LCSH: Technology to provide Internet for a community | Internet access with selected ISP's | Sharing one Internet service with many users | Managing the Internet service

Cover Design: Internet Technology Answers Inc.

FOREWORD

This book was written to share information about two issues that people seek to solve; how to sell WiFi Internet access to others, and how to provide WiFi Internet in locations where there is no Internet service.

The locations that don't have Internet are rural areas with little or no communications infrastructure. All countries have rural locations that have no Internet service. Some poorer countries have not been able to develop telecommunications infrastructure therefore have a large part of the population without an Internet service. Richer countries have small areas with no Internet service that includes remote homesteads and businesses located in wilderness areas, such as campgrounds and RV parks.

The opportunity to make money by selling access to the Internet provides the incentive for individuals or businesses to invest in communications infrastructure. A campground or RV park has pressure from guests to invest in infrastructure that will provide a good WiFi Internet service. The business will charge guests for the Internet service, as there may not be other services, such as mobile phone towers, in remote areas. Remote rural areas in poorer countries might have an individual who invests in the development of Internet infrastructure with the expectation that people will pay for Internet access. The member of a remote rural community cannot afford the quality of Internet provided by businesses in urban areas, and so a basic service will be provided at a low cost to the user.

Hospitality businesses that must offer free WiFi Internet can provide a low speed free service and charge for a high speed Internet service to recover the cost of the Internet connection.

The reader will find all these scenarios and many more presented in the pages of this book.

CONTENTS

1. Methods of selling WiFi Internet

1.1. What is needed to charge business guests and customers for a WiFi Internet service?

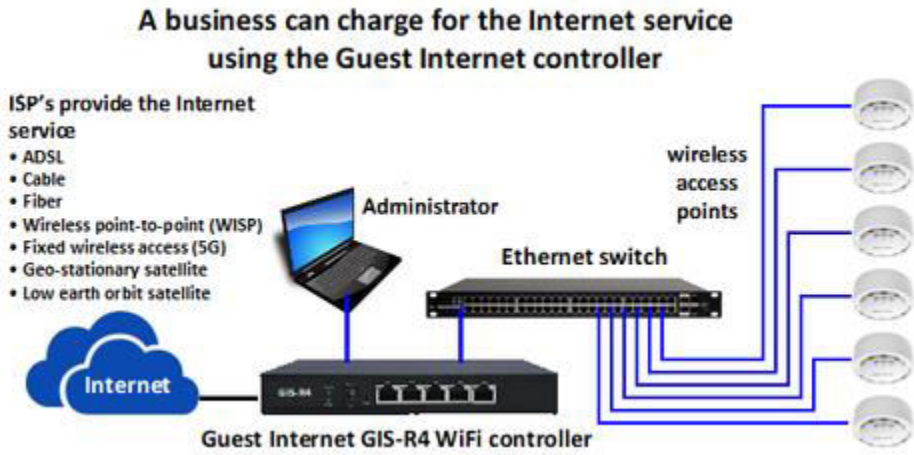
The WiFi service for a business requires an Internet Service Provider (ISP) to provide the connection to the Internet. The ISP charges for the connection according to several parameters, such as speed and the method of data connection. There are several technologies that ISP's use to provide the Internet connection for a business.

- ADSL
- Cable
- Fiber
- Wireless point-to-point (WISP)
- Fixed wireless access (5G)
- Geo-stationary satellite (example: HughesNet)
- Low earth orbit satellite (example: Starlink)

The ISP service connects to a router inside the building, such as a Guest Internet controller. Several wireless access points connect to the router to provide WiFi coverage throughout the business premises.

When a business wishes to charge customers for the WiFi Internet service then one additional item is added to the installation, this is the WiFi billing controller, which in this example is a Guest Internet GIS-R4 Internet controller.

The following diagram shows the installation of a Guest Internet billing controller installed in a business network between the ISP router and the wireless access points.



Why should businesses charge for the WiFi Internet they provide for guests and visitors?

Businesses in several categories provide WiFi Internet to attract customers. This is the case with the hospitality industry where businesses offer free WiFi to attract guests and many reservation decisions are based on the availability of a good WiFi Internet service. Providing WiFi Internet for guests and visitors is a cost for businesses; the initial cost of installing the WiFi and network infrastructure, and the recurring cost of the monthly ISP service and network maintenance. The ISP cost varies according to the location of the business and the type of service provided.

For example, a hotel in an urban area has several ISP alternatives and can get a high-speed connection such as fiber for a relatively low cost. The urban hotel is not in a position to charge for WiFi as there are other alternatives such as 5G for guests to use, and guests have an expectation that the WiFi will be free. For a hotel that caters to International visitors the WiFi Internet is essential as people from other countries will probably not have access to the 5G phone service and will need to use the WiFi service.

Compare this with an RV park in a wilderness area that has no access to a fiber or cable connection and there is no 5G access. The business has to install a satellite Internet service where the monthly charge is high and the business will also pay for the data used by guests. The RV Park in a remote location with no 5G services can charge for the WiFi Internet and no one will complain, as they are happy to have access to the Internet service.

The first approach to charging for the Internet service, the Internet Service Provider (ISP) subscription method

Internet Service Providers (ISP) and Wireless Internet Service Providers (WISP) sell an Internet service as a monthly subscription. The ISP or WISP connects the subscriber to the Internet and then bills the customer for the service each month. The subscriber provides the ISP or WISP with contact and billing information before starting the service contract. The service contract may require the subscriber to use the service for a minimum of 1 year.

The ISP or WISP builds a computer network that connects the customers to a wholesale Internet supplier through a product called a Broadband Network Gateway (BNG) that is managed by a software billing system service that is usually cloud based and may be provided by a third party software company.

The Internet service provided is determined by the rate plan; this is the money charged for the data speed and optionally a data volume. An ISP or WISP might offer several rate plans to subscribers, two examples of rate plans are:

- Rate plan 1: $20 per month for a 20Mb/s data connection speed with a monthly data cap of 5GB.
- Rate plan 2: $50 per month for a 100Mb/s data connection speed with a monthly data cap of 10GB.

The second approach to charging for the Internet service, the Internet on demand method implemented by Guest Internet controllers

A business that has an Internet connection can share that ISP service with guests and customers using a Guest Internet controller. The business charges guests or customers for the use of the Internet service for the time that they need it but has no information about the person purchasing the service. The

business sells an access code generated by a Guest Internet controller that has several parameters.

- Maximum time that the code may be used, for example 1 day, 1 week, 1 month, etc.
- The maximum download and upload data speeds that are available with the code, this is done so that the Internet connection can be shared with the guests or customers.
- The maximum download and upload data quantity that can be used with the code, this is necessary when the business pays the ISP for data use.

The business connects the guests or customers to the Internet service provider through a Guest Internet controller that is used to generate and authenticate the access codes that are sold to the guests and customers. The Guest Internet controllers are described in this article to illustrate how the system of charging for Internet use is accomplished.

For people who want to understand how the subscription model works, lease see other sections that explain the ISP and WISP methods of charging for Internet access.

Which businesses charge guests and customers for the Internet service?

There are many types of businesses that charge guests and customers for access to the Internet using WiFi. A few of these businesses are listed below.

- Cruise ships and ferries. All cruise ships and many ferries provide WiFi Internet for guests. The Internet connection is via a Satellite service. VSAT was a popular service to get an Internet connection for many years. Most ships have switched to the Starlink Marine service which offers a much fast speed at a lower cost compared with VSAT. The

cruise and ferry companies include the cost of the Internet as part of the fees charged. A popular cruise line offers Internet WiFi services in the range of $20 to $30 per day and uses the Starlink Marine service.

- Campgrounds, RV parks might have several options for connecting to the Internet. The preferred connection is fiber cable that can be used for Gbit data speeds, however the maximum distance of a cable is about 70 Km to the nearest distribution location and the installation of the cable is expensive. There may be a Fixed Wireless Access (FWA) connection available for the campground or RV park when the location is in the range of a 5G tower or a WISP antenna tower. The final option for the business is a satellite connection using a geo-stationary satellite service (HughesNet) or a low earth orbit (LEO) satellite service (Starlink).
- Communities, homeowner associations and homes or high-rise buildings that are part of an association. Often the association will contract a high speed Internet service and then share this service with the residents. The cost of the Internet service is charged as part of the monthly association fees. The communities might be located in urban areas where it is possible to get a high-speed fiber connection to the Internet. There are also remote communities in rural areas around the world that have no access to telecommunications infrastructure and so the only method of Internet connection is using a satellite service. The community may share the cost of the service or else charge individuals for their use of the service.
- Marinas are often in remote locations that are convenient for boats and access to telecommunications services such as fiber cables or Fixed Wireless Access (FWA) is limited or not available. Often marinas use satellite services to provide WiFi Internet for the boat owners who stay at the

marina. Boat owners have a big demand for Internet access because they need communications such as email and voice over IP (VoIP). The boats also need a connection to the Internet because modern electronics requires downloading weather information, updating maps for chart plotters and firmware updates for various types of equipment that range from engine management systems to VHF communications systems.

- Almost all airports provide a WiFi Internet service for travelers. The Internet is essential as travelers need to access flight information, hotel information and taxi services. Travelers also need to provide updates to business colleagues and to family members. Many airports have a 3-tier WiFi Internet system. The airport provides 30 minutes of Internet access for free within a 24-hour period, but the service has a slow data speed that is not suitable for streaming videos. When the free service expires the traveler can purchase Internet access in increments of 1-hour using a credit card. Many airports also provide integration with a subscription service such as Boingo where a subscriber can use the subscription credential to access the Internet. Airlines now offer WiFi Internet during a flight and they charge travelers for this service. Aircraft WiFi use one of the satellite Internet services.
- Hotels and resorts provide free WiFi for guests to use. The free WiFi is set for a slow data speed in order to share the ISP service between many guests. Many hotels and resorts also charge for high speed Internet access, either paid online by credit card or else charged to their room account.
- Temporary events that need WiFi Internet for staff and visitors. The type of events varies widely but all are characterized by short duration with limited access to the

location, limited setup and takedown time. Some examples of events are a music concert and festivals, an agricultural show, a tradeshow, a wedding or an outdoor publicity event. There are businesses that specialize in providing temporary WiFi Internet at any location.

- Industrial workers in remote locations such as mines or oil rigs. Often the company will install a WiFi Internet service for employees using a satellite service such as Starlink, and employees can access the Internet by purchasing WiFi vouchers with access codes.

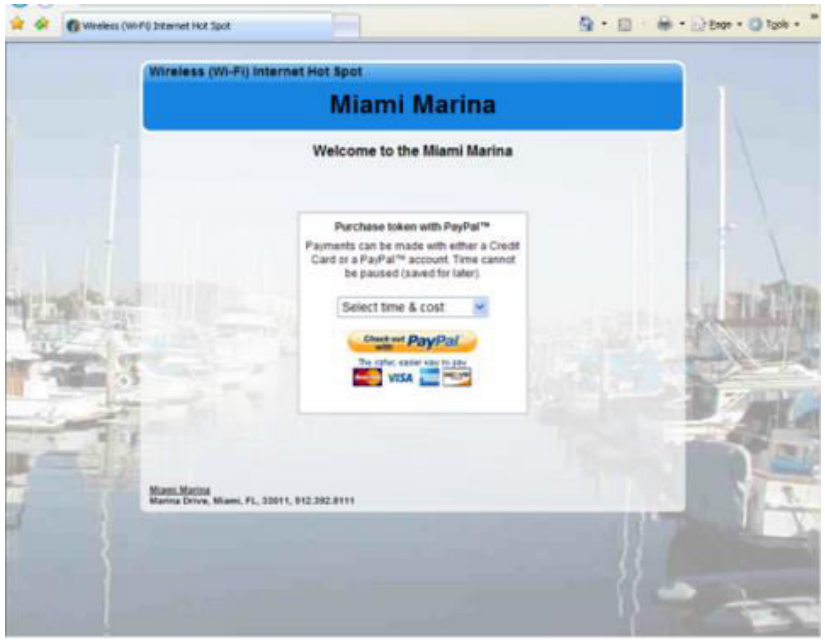
The list of businesses above is not complete; there are other applications where a charge is made for WiFi Internet access. New opportunities can be identified by businesses to recover the cost of an Internet service or to make a profit charging for Internet access.

How is access to the Internet controlled and access sold?

The universal method of charging for temporary access to a WiFi Internet service is through the sale of an access code. There are three steps to connect a mobile device to a WiFi service using an access code, these are:

- Connect the device wireless to the WiFi broadcast name; this is the SSID.
- Open a browser then type a command to display the login page of the WiFi service.
- Type the access code into the space provided on the login page. If the code is valid then the mobile device will get access to the Internet, this is called the authentication process.

A typical login page is shown in the next figure.



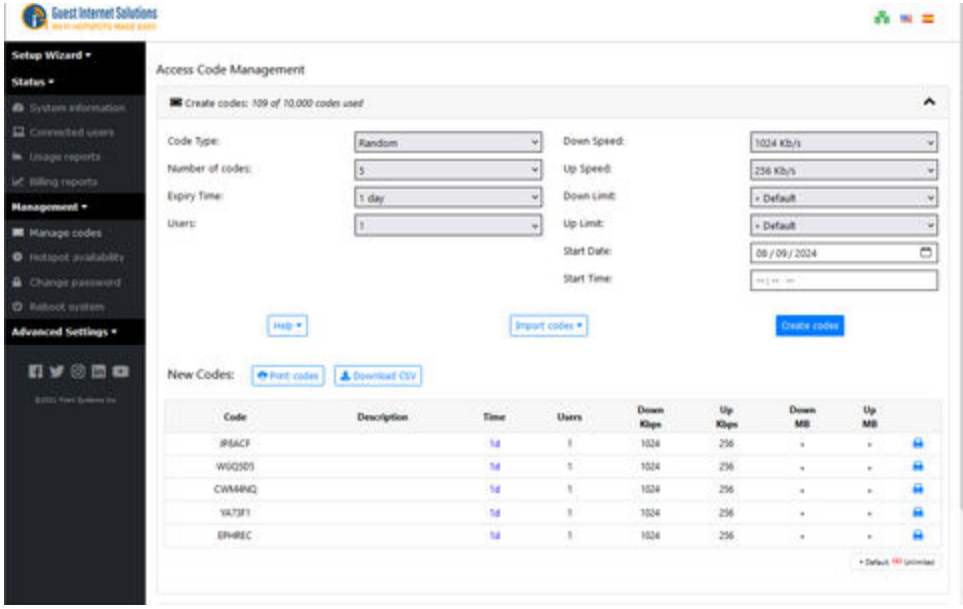
How are access codes generated?

Each access code is created with parameters that determine when and how the access code is used. Some of the access code parameters that can be generated by the Guest Internet controllers are listed below.

- Duration that the access code can be used before it expires.
- Allow the access code to be stopped and started to extend the time that it can be used.
- Date after which the access code can be used.
- Maximum download and upload data speed permitted for the code.

- Maximum download and upload data volume permitted for the code.
- Allow the access code to be used on only one device, or allow use on any device, this prevents people sharing access codes.
- Allow the access code to be used by only one person, or specify the number of people who can use the access code.

Access codes and their parameters are created very quickly using the Guest Internet software. Login as the administrator and then select the codes page in the menu. Select the code parameters then click the “create codes” button.



Up to 10,000 access codes can be generated at one time and provided for customers in several different formats, as explained in the next section.

What are the methods that businesses can use to charge for Internet access?

The different methods of charging for the WiFi Internet service all use the same access procedure; the guest or customer gets access to the Internet via a login page that accepts an access code that the guest or customer purchased.

The guest or customer connects to the WiFi network and then opens a browser page. The browser page displays the WiFi service login page, which has a box to enter the access code. The login page can also show several methods of access purchase, such as an optional credit card purchase. Some of the methods that Guest Internet products have to provide access codes for sale are listed below.

- Print vouchers with access codes, the vouchers are customized with text and a logo; sixteen vouchers are printed per letter page and then cut up into vouchers. This is a very low cost method of distributing access codes.
- Print scratch-off cards with access codes. A file of up to 10,000 codes can be downloaded and sent to a firm that prints scratch-off cards.
- Point of sale for codes on demand. The Guest Internet products have PoS software that displays up to 10 buttons on a tablet display. Each button has unique characteristics, for example each button has a different duration for Internet access. The Guest Internet GIS-TP1 printer is connected to the Guest Internet controller to print vouchers with the access codes with the selected parameters. The GIS-TP1 can connect to a cash drawer. This is ideal for Internet cafes.
- Guest Internet controllers provide the service to purchase an access code using a credit card using the service owner's PayPal business account. Up to ten different charges can be displayed on the login screen. The owner of

the service receives a message with the details of each credit card transaction. The Guest Internet controller maintains a report of credit card sales for comparison with the credit card billing company statement. Guest Internet provides a gateway for a Paypal business account; a service that is available in 65 countries where Guest Internet products are installed.

- Guest Internet controllers can interface with any type of billing system using the Guest Internet Application Program Interface (API's). Integrations completed by customers include hotel property management systems, campground reservation systems and retail point of sale systems. The third-party systems charge customers for the WiFi services together with other purchases that the customer makes from the business. The API's permit any type of sales system to be implemented for any WiFi sales business application.

Each business might have a preferred method to charge for the WiFi Internet service and the Guest Internet API's offer a method to proceed with whatever system that the business wants to use.

Provide a combination of WiFi Internet services

Businesses can offer a combination of payment methods and type of service. Some of the methods that Guest Internet controllers can be used with are listed below.

- An RV park provides two payment methods; purchase the WiFi Internet service on-line or purchase a WiFi Internet voucher at the park store, printed on demand using the Guest Internet PoS service.
- A hotel provides free slower data speed WiFi Internet service. Guests can purchase a faster data speed WiFi Internet service on-line using a credit card.

- An airport offers free slower speed WiFi Internet with duration of 30 minutes in a 24-hour period. Travelers can purchase additional WiFi Internet access in 1-hour increments by purchasing on-line with a credit card. In addition subscribers of the Boingo service can use the Boingo credentials to access the Internet after authentication of the credential.

The examples listed were chosen by businesses for their specific requirements. The Guest Internet controllers can adapt to any business requirement.

How to protect your business from risks when providing WiFi access to guests and customers

When a business provides Internet access for guests and customers there are risks that the business can be exposed to. Some of these risks are listed below.

- A guest is sharing copyrighted material. The copyright owner will complain to the ISP under the DMCA (Digital Millennium Copyright Act) who will then send a warning message to the customer followed by termination of the Internet service. The Guest Internet controller can be configured to block peer-to-peer (P2P) file sharing protocols.
- A guest is accessing websites that might attract the attention of law enforcement. The Guest Internet controller can be configured with the OpenDNS subscription service (Cisco) that will block website categories that should not be accessed.
- A guest has a computer with a virus, such as DDoS, that will disrupt the Internet access for all users, and possibly block access to the Internet. The Guest Internet controller

firewall can be configured to block any devices where a DDoS virus has been detected.

- A business that connects a Guest or customer WiFi service to a computer network where credit cards are processed, such as a point-of-sale (PoS) terminal must isolate the guest network from the business network with a PCI DSS (payment card industry data security standard) compliant firewall. This is a requirement for PCI DSS for compliance with the rules of use. Failure to comply will result in the business losing merchant rights to accept credit card payments. The Guest Internet controller has a PCI DSS compliant firewall to protect the business network from a possible attack via the public network.
- Prevent people who purchase an access code from sharing the Internet service with others, either through giving the code to others, or configuring the mobile device as a Hotspot router. Guest Internet controllers prevent the use of access codes on more than one MAC address; they block MAC spoofing and block devices that are configured as hotspot routers.
- Block website domain names or IP addresses that may expose the business to risk if accessed.
- Block website categories using the OpenDNS subscription service, the subscription permits categories to be selected from a list of hundreds available. This service is provided by Cisco.
- Block any devices that are abusing the service, for example, downloading large volumes of data.

Manage the WiFi service and track Internet sales from anywhere

Guest Internet products include a free cloud management system to offer a number of benefits for a business that provides a WiFi Internet service for guests and customers.

- Manage the WiFi service from anywhere.
- Manage multiple locations as a group.
- Monitor the use of the service.
- Create access codes for any WiFi Internet system in the group.
- Manage roaming between multiple locations.
- Monitor and alert failures.
- View reports of data use and users for each location and also for groups of locations.

Protect the WiFi Internet service with failure monitoring

The Guest Internet controllers and cloud service can monitor all parts of the system for failure and send alert messages describing the problem if a failure occurs. The following parts of the service are monitored for failure.

- The ISP service connection.
- The Guest Internet controller.
- All wireless access points.

Personalize and brand the WiFi Internet service

Businesses that offer a WiFi Internet service for guests and customers can personalize and brand the WiFi Internet service using the Guest Internet controller software.

The login page is seen by all guests and customers and is used to provide information about the use of the service. Guest Internet has four levels of login page branding.

- Login page generated by the set-up wizard that has messages provided for guests and customers.
- Upload a background image that can have any type of photo or graphics for branding.
- Prepare a custom login page using HTML and javascript. The business website HTML code can be used to prepare the login page.
- Create a walled garden which is a customer login page designed using the business website that is integrated with the business website service so that the guest or customer can browse the business website without a code or payment. When the guest or customer attempts to access a different website then a code has to be provided or a purchase made.

In addition to the login page branding, the login page can also be used to provide advertising that the business can charge third parties for. An example of this is a campground that has daily visits from food truck businesses. The food trucks can purchase advertising banners on a custom login page to advise campers when they will be at the site.

The access code vouchers can also be branded by adding the business logo with text. When the vouchers are printed each has the personalized appearance with a unique access code printed on the voucher.

How to get a faster Internet service to provide more guests and customers with WiFi Internet

Businesses that provide WiFi Internet for guests and customers often hear from them that the Internet is slow. The ISP connection has a maximum data speed and that is shared with guests and customers by setting a maximum speed limit for each.

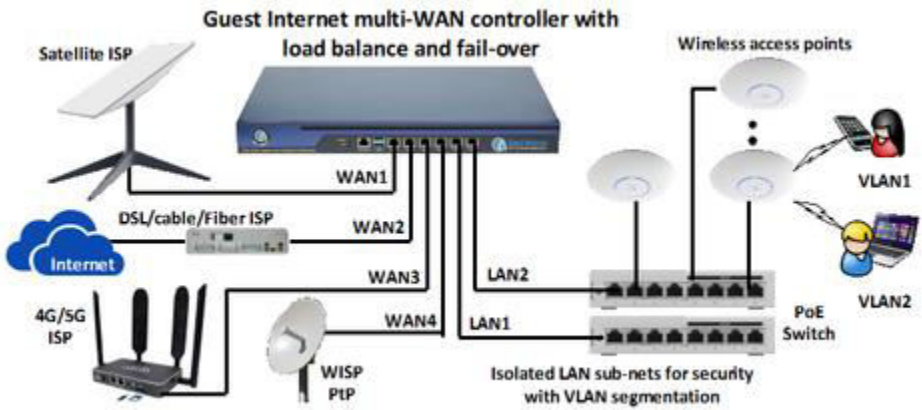
For example, a business might have an ISP connection of 100Mb/s with 50 people expected to connect to the service. The maximum speed per user is therefore set to 2Mb/s. This is a slow data speed but will avoid congestion of the ISP connection.

However, what happens when 100 people connect to the service? As more people connect the service will become slow and eventually network congestion will occur which will disconnect all users from the Internet.

The answer is to request the ISP to provide a faster network data speed. If that is not possible then the business can add ISP's to increase the data throughput. Guest Internet controllers can connect to any type of ISP service. The data speeds of each ISP are summed to get a greater throughput that can connect more people.

The next diagram shows a Guest Internet controller with four ISP connections.

- Fiber/cable/DSL
- Fixed wireless access 5G
- Satellite service
- WISP wireless service



The Guest Internet controller has two important features to enable many people to access the Internet with up to four ISP's.

- Load balance. This means that the four ISP's are shared between the guests and customers so that each has approximately the same Internet speed.
- Fail-over. This means that if one of the ISP connections fails, then the users who were communicating through that ISP connection are moved to other ISP connections. This is important for reliability and redundancy of the service.

Final observations

Business costs have been increasing rapidly with high inflation so those businesses that provide an Internet service for guests and customers should investigate implementing charges for the Internet service so that the cost to the business of providing the service can be recovered through partially or fully charging for the service.

A business that currently offers "free WiFi" can continue with this offer. It might be that the business currently has no data speed

controls for the users of the service. Maybe the WiFi system is open and so the neighborhood is getting free WiFi at the expense of the business. The business should lock down access so that only authorized guests and customers can use the service, and can set the maximum data speed for the free service to a lower value while imposing a charge for the fast Internet service. Many hospitality businesses implement this method with excellent results and are able to recover the cost of providing the WiFi Internet service.

1.2. Four applications for public Internet using Starlink with Guest Internet Managed WiFi

Starlink is a great Internet service for any location like remote locations such as campsites and RV parks that has no alternatives for Internet access. This includes remote and mobile applications.

Starlink has four applications where public WiFi Internet services are provided.

- Many people like to take vacations in wilderness locations and spend time with nature. Services are limited with no type of Internet connection and no 5G. Campsites and RV parks can install a public WiFi service using Starlink. The service also requires one or more high power wireless access points to provide coverage of the area and also a Guest Internet gateway to share the bandwidth, manage the service and optionally charge for the connection using on-line credit card billing.
- Many countries around the world have no Internet or 5G service outside the urban areas, and individual members of the population cannot afford the cost of a Starlink

antenna and the monthly service. Small entrepreneurs have installed WiFi Internet services for communities, villages and small towns using one or more Starlink antennas with high power wireless access points and a Guest Internet gateway to manage the Internet service. One Starlink antenna can provide a WiFi Internet service for 50 to 100 people as the maximum data speed of each user is set to a low limit. People pay a small amount for the Internet service but don't have credit cards to pay on-line. The Guest Internet gateway is used to print vouchers for cash sales. The Internet service can be accessed using a mobile phone and some users have a WiFi receiver (CPE, client premise equipment) installed at a home for fixed wireless access (FWA) communication over a longer distance.

- Since Starlink launched the maritime service for boat owners, it has become very popular for water transport boats such as ferries. Many tens of thousands of ferries are in use around the world to transport the public with a journey time between 30 minutes to several hours. Ferries have begun offering free and paid WiFi Internet by installing a Starlink antenna with the maritime service and wireless access points around the boat to provide good WiFi coverage. A Guest Internet managed WiFi gateway is installed to share the service between many users and also charge for the service with on-line credit card processing.
- Many public Internet services lack Internet bandwidth for the number of people who use the service. This situation arises at hospitality businesses, vacation destinations and events that offer Internet, including trade shows and sports competitions. Businesses may have a DSL or fiber service but only one ISP provides the service and it is not possible to upgrade the service. The bandwidth can be increased by adding wireless Internet services, that include

5G fixed wireless access (FWA) and the Starlink Internet service. When using a Guest Internet gateway to manage the public WiFi service there can be up to four WAN connections, each one connected to a different ISP. The Guest Internet gateway provides the sum of the available bandwidths; a process called load balancing, and also provides redundancy where if one ISP connection fails the users are switched to the working ISP's. this is a process called fail-over.

Starlink Internet is a great service for any individual or business that has to provide an Internet service for the public. Starlink has empowered entrepreneurs to start Wireless Internet Service Provider (WISP) businesses around the world, especially for underserved communities.

1.3. Starlink is missing a multi-billion dollar opportunity

Where is the Starlink market today?

Starlink has acquired many customers that live in remote locations and have no access to the Internet. Developed countries have areas with no mobile phone service and no type of Internet service to homes so Starlink is popular in these locations. The Starlink customers share a common characteristic, they are in a segment of the population that can afford the prices that Starlink charges for the equipment and the monthly service fee and most are able to install the antenna and connect the service. There are people who would like Starlink but can't afford the cost. The high cost is justified because SpaceX has invested billions of dollars to develop the technology and launch satellites.

Starlink has very profitable market segments, and one is the marine market. Starlink has replaced VSAT as the marine data service. One large cruise ship can generate millions of dollars of

income per year for Starlink. However, there are only a few thousand of these customers around the world.

At the same time that SpaceX was developing the Starlink network, telecom businesses in developed countries were busy upgrading mobile phone networks to 5G so that they could provide a service for more customers with more calls and faster data speeds. With the faster data speeds that 5G provides the telecom businesses discovered a new market opportunity of a fixed wireless data service to homes, they called it fixed wireless access (FWA). In urban areas FWA competes with ADSL connections providing 10x the data speed for the same price. In rural areas FWA competes with Wireless Internet Service Providers (WISP's) and with Starlink. The FWA service is about one third the cost of Starlink for a similar data speed.

The telecom businesses are building more rural towers to extend their areas of coverage and capture more profitable FWA business. Meanwhile the WISP's cannot compete with FWA and many have transformed into fiber ISP's using government loans and grants. The FWA service is eating into the Starlink customer base and is reducing the number of available customers in the developed countries. Many Starlink customers switch to FWA when the service becomes available. There is a thriving cottage industry that is providing 5G modems and Yagi rooftop antennas for 5G customers, permitting a home that has line of sight to a 5G tower to connect over several miles and get a good data speed.

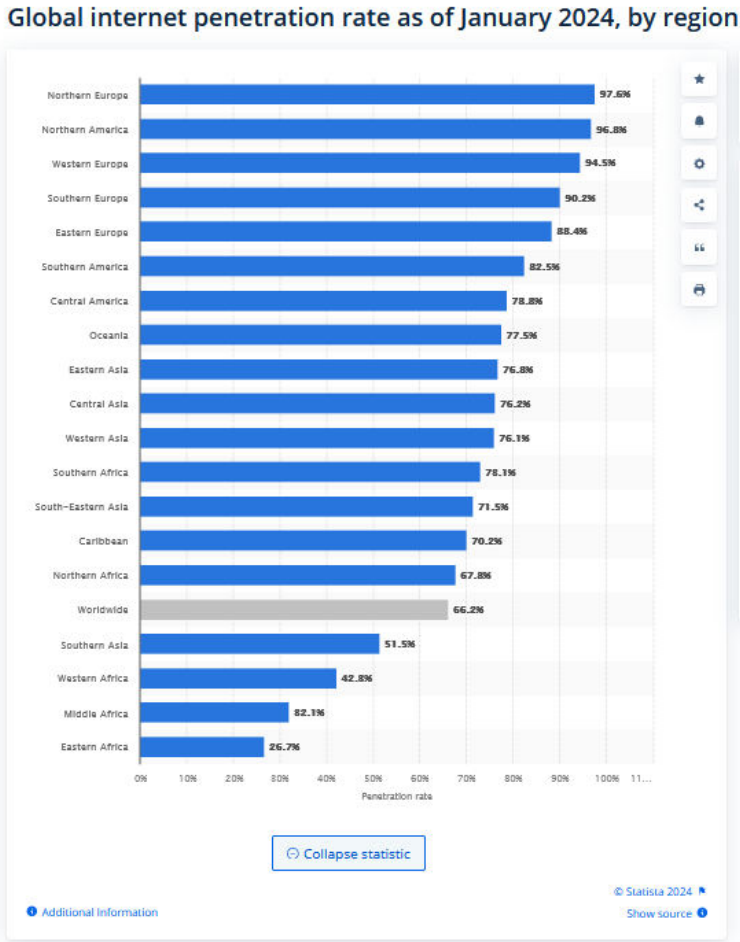
Starlink does have customers in the developing parts of the world but this customer base is limited to a few people who can afford the service. Starlink is also hampered due to having few countries in the African continent that have approved the Starlink service.

The figures for Internet access in world markets

A business intelligence company called Statista has regularly published information about the global availability of Internet

access. Three Statista charts are included here to illustrate the global Internet services situation.

The first chart illustrates Internet access penetration by region. As expected, Northern Europe has the highest penetration rate of 97%. The area of Eastern Africa has a low penetration rate of only 26%, and these customers are in urban areas. The 74% of the population in rural areas has no Internet access.

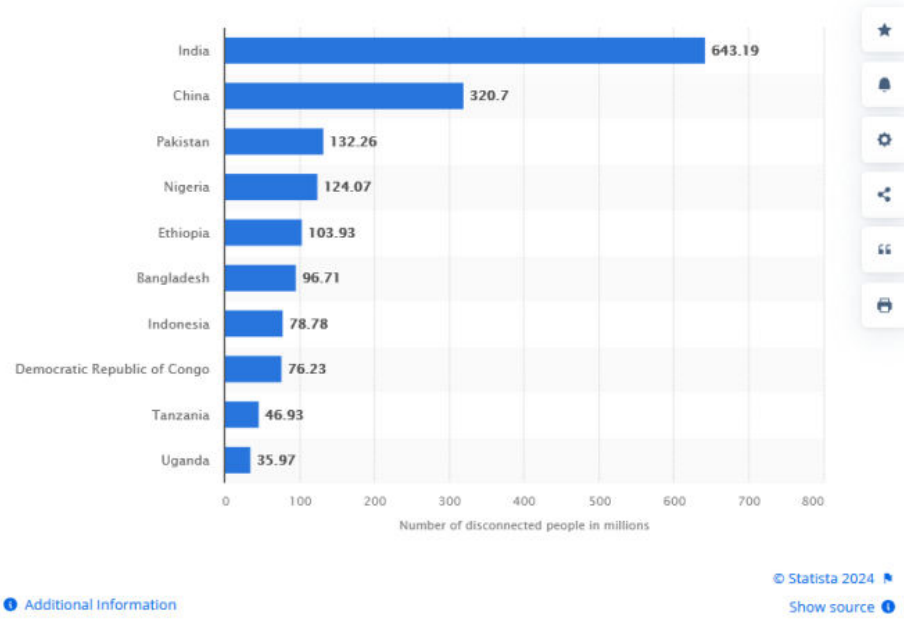


Source: Statista, © 2024

The Internet penetration in the rural areas of many countries in South America, the Caribbean, Africa, Asia and Oceania is low; the Internet services that are available are concentrated in urban areas.

The second chart from Statista shows the ten countries with the highest number of people not connected to the Internet as of April 2024. The total number of people with no access to the Internet in the 10 countries is 1.6 Billion.

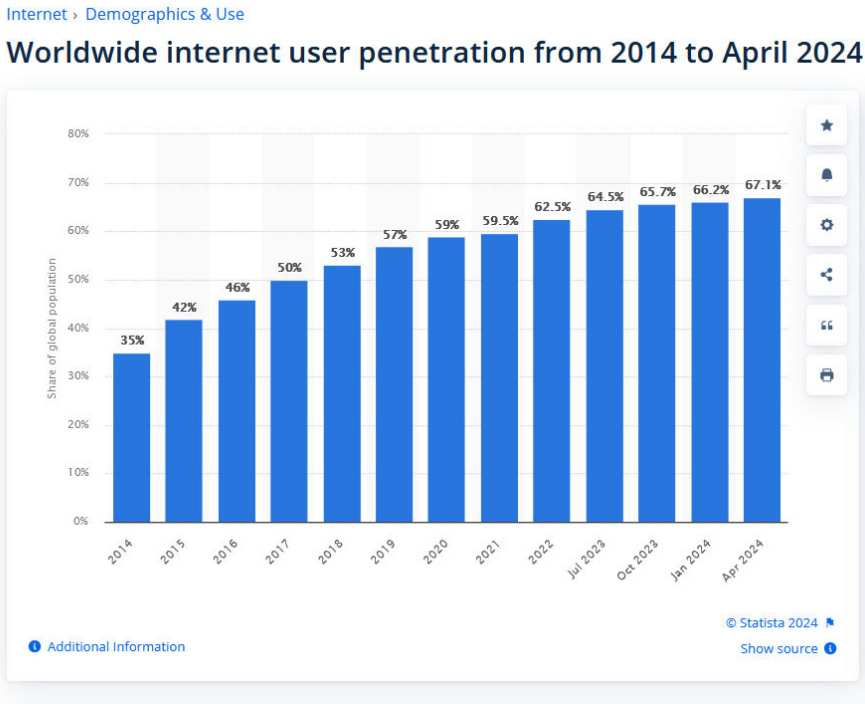
Countries with the highest number of people not connected to the Internet as of April 2024



Source: Statista, © 2024

The final chart from Statista shows the growth of global Internet use where 67% of the global population has access to the Internet in 2024. Statista states;

"In 2024, the number of Internet users worldwide stood at 5.44 billion, which means that around two-thirds of the global population is currently connected to the world wide web."



Source: Statista, © 2024

With a current global population of 8.16 billion people, the remaining one third of the population of 2.72 billion people who don't have access to the Internet are divided into four groups, shown below.

1. Resident in a country where Starlink is not approved.
2. Too young or too old to be concerned about the Internet.
3. Living in poverty and cannot afford an Internet service.
4. Would like access to the Internet and can afford a low-cost service but there is no infrastructure to provide access.

The first three groups are not candidates for any type of Internet service, however group 4 represents potential customers for an economical Internet service. It is hard to identify the number of group 4 people, but an estimate is that this represents up to about 40% of the one third without Internet, this number will be 1.1 billion people. This number will increase as the young members of group 2 get older, and some members of group 3 move up out of poverty.

Many group 4 people have mobile phones. The low cost phones (starting at $20) are used with a pre-payment plan. People travel to an area where there is mobile phone coverage to make calls, maybe the nearby town. In the countries where these people live the mobile phone service uses earlier generation technology, 2G/3G. It is common practice for advanced economy telecom businesses that upgrade networks from 4G to 5G to move earlier generation equipment to countries where the network can be upgraded from 2G or 3G to 4G.

Why do people in remote rural communities want Internet anyway?

Many people in rural communities view the Internet as a benefit that might improve their lives. Here are a few reasons why.

- Communications with others outside the community.
- Access to information, training, etc.
- Access to materials for commerce.

- Access to global markets for commerce.
- Access to social media to share ideas.

Organizations like Rotary International provide funds for communities to develop commerce outside the community and Rotary provides the communications links for the communities. When a community has access to the Internet they depend much less on help from international organizations because they have the Internet tools that will help them.

What is the service delivery model for a low cost community Internet service?

Currently there are tens of thousands of small communities that have an Internet service obtained via a satellite Internet provider, either with HughesNet or Starlink. Starlink is popular for community Internet, as HughesNet satellite antennas have limited coverage of the earth's surface. Currently there are communities in remote locations such as the middle of the Amazon jungle who are using Starlink to provide Internet access for the residents.

The communities build a simple network infrastructure and have help from technical people who sell the equipment in each country. Many communities have no or intermittent power and so they rely on solar power to operate the equipment. Most community WiFi Internet systems control access to the Internet. With the Starlink service it is important to prevent sharing of copyrighted files, prevent excessive data downloading and prevent congestion of the connection.

An Internet controller such as Guest Internet manages the network access efficiently, with the following features.

- Print access codes onto vouchers to give or sell to the residents.
- Set the maximum duration that the code can be used.

- Set maximum download and upload speeds for each code.
- Set the maximum data that can be downloaded and uploaded for each code.
- Set the maximum number of devices that can use a code, this is usually 1.
- Block attempts to share an authorized service connection, such as preventing the use of a phone as a hotspot.
- Block attempts to share copyrighted files by blocking Torrent protocols.
- Block attempts to access the Internet without a code, such as MAC spoofing.
- Monitor the service for failure; send an alert to the owner if something fails.
- Have remote access via a cloud system to monitor use of the service.

Products such as the Guest Internet controller are easy to use by community members and don't require specialist skills, plus there are no other fees.

The community Internet service is funded either by community donations or by an individual who installs the service. In most communities an individual will purchase the equipment and install the service, then charge residents a fee to use the service. The fees charged will correspond to the economic abilities of the community. People in the community may be earning $50 per month. A community member might pay $2 for access to the Internet during a month. The cost can be kept low because the access code is time limited and the speed is limited. The person providing the service can give access codes to 250 people and can ensure that they will not be connecting at the same time due to the limitations of the code. If a community service can generate $500+ per month for the provider then the cost of the equipment

can be recovered and the cost of the Starlink service can be paid. Many residents of the remote rural communities do not have bank accounts or credit cards. They do have cash to pay for the service and so a cash-based voucher charging system is important for the success of the project.

An approximate estimate of the potential of small communities around the world that could install a Starlink antenna to provide a community WiFi Internet service is in the range of 4.5M to 6.5M. There are a large number of people who would like to provide the Internet service for a community and who have the money to install the service, but they have several obstacles that include the following.

- Starlink does not make community use of their service easy, limitations in the terms of use, global distribution limits access to antennas, and restrictions on the location of antennas and the restrictions of roaming plans also limit community use.
- The people that want to provide the Internet service do not have technical training, but have taught themselves about networking. It is essential that people with no formal technical skills can install a community WiFi Internet service. The Guest Internet pre-configured STAR kits go some way towards helping people with limited skills to install a WiFi Internet service.

How can Starlink win the 4.5M to 6.5M small community customers?

The first step is to recognize the potential of the global small community Internet market and be prepared to adjust the services and products to meet the requirements of this new customer category.

Businesses have tried to monetize the developing country small community Internet market and have not been successful yet. The Meta Express WiFi project began in 2018 and was folded in 2022. The cost was high for members of a rural community in a developing country and people were dissatisfied with the service. The service was also limited by the backhaul connection to the Internet. At that time Meta was partnering with VSAT for the Internet backhaul service; Starlink has much faster speeds, much lower cost and has global availability when compared with VSAT. Starlink has largely replaced VSAT for marine Internet access. Starlink has the key component for a rural community Internet that Meta did not have, a high capacity backhaul connection to the Internet that can be deployed anywhere.

With a potential market of 4.5M to 6.5M communities, the income for Starlink can be estimated. First, calculating the low end of 4.5M communities.

- Sales of antennas at $300/antenna = $1.35B
- Monthly income at $200/network = $900M/month, $10.8B annually

For the high-end estimate of 6.5M communities, the numbers are:

- Sales of antennas at $300/antenna = $1.95B
- Monthly income at $200/network = $1.3B/month, $15.6B annually

Starlink will require a strategy to develop the small community opportunity, and a tactical plan to deploy the service. Perhaps Starlink is already looking at this market.

The Starlink current customer base has people who are comfortable with the technology and usually have the skills to set up the antenna and use it. The customers are early adopters of the technology. People use forums and social media groups to share information about Starlink installation and configuration; customers support customers. However early adopters are more

likely to switch to the next best service; they have no brand allegiance. Some early Starlink customers have switched to FWA as the more-affordable service has become available in their region.

The rural communities in developing countries have characteristics that are unlike early adopters. Their technical knowledge is limited, and their buying decision will be made only after a period of lengthy consideration with information from others. They will not make a risky bet on a product that they don't understand. Many technology businesses gain access to such markets through the development of partner programs that include local resellers and installers who receive technical training from the supplier and can interact with the local communities. Currently Starlink has a single tier of distributors who are focused on the high-end applications such as marine and industry. These target segments will give good profits but are limited in size.

Providing a WiFi Internet service for rural communities requires four elements

- The Internet backhaul, this is the Starlink antenna and service.
- WiFi infrastructure to provide wireless access for mobile devices and homes. Similar to a small WISP network design; one long-range point-to-multi-point wireless access point that mobile devices can connect to within a range of tens of meters, and homes with a CPE antenna can connect to the central antenna at longer distances, line of sight.
- Access control that will regulate access to the Internet to share the limited bandwidth between community members while preventing abuse of the service, and also have mechanisms that permit the community members to pay for the service so that the installation cost can be recovered, and the on-going operating cost can be paid.

Without this there is no incentive for anyone to invest in the community installation.

- Support to answer questions about the service, this can be in the form of a forum where users interact and Starlink or distributor specialists provide input for difficult questions.

As the technical knowledge of the community member installing the project will be limited it is important to provide the elements listed above as a pre-configured kit with clear and simple installation and operation instructions plus access to support. The community person who is the technical installer will speak English, as the English language is necessary to learn basic network skills.

What would a Starlink and/or partner product look like to sell to a remote community that will provide the Internet service for residents?

- A marketing plan that communicates in a simple language the benefits for the community and installer, the easy installation and use.
- A data service that accommodates the use of Starlink for a community Internet service. This is a “mini-WISP” service not currently supported by Starlink, where the end user can monetize the service. The service will have charges for data consumed above a threshold.
- A kit of pre-configured components that include the Starlink antenna, the Internet access controller and the outdoor point-to-multi-point wireless access point. The kit has installation instructions with how-to-install videos. The kit explains how to monetize the service with cash voucher sales. In addition there should be an optional pre-configured kit for homes that includes a CPE wireless and a wireless router.

- Have cloud management available for the kit to facilitate the remote management of the services and also have access to information for support.
- Support forum with user generated input, and input from knowledgeable people who can post solutions to difficult problems.
- Expand the present distribution network to include many more businesses that sell network and WiFi products in each target country, and that have the experience to support these products. This will mean lowering the obligations required of Starlink distributors to make stocking Starlink products accessible to smaller businesses.
- Development of a second tier of partners who can work with the distributors and who sell to and support the local communities. These partners will rely on in-country distributors to hold stock and provide products for installation projects. They will need access to technical and business training to help them to deliver the community solutions.

The current state of community WiFi Internet

There are thousands of people around the world who try very hard to install community WiFi Internet, with limited knowledge and limited access to information. They are the pioneers of the community Internet market and all have the characteristics of persistence and a desire to achieve a successful outcome for the community. Their numbers are limited which means that the community Internet market will grow in size slowly. That is until a large company discovers the opportunity to sell products to this market and provides the technical solutions that the communities and installers need.

2. Technology for WiFi public Internet

2.1. What is mobile broadband?

Mobile broadband is an Internet service for mobile devices using the WiFi connection that all mobile devices have. Mobile broadband can be a paid service or offered free by businesses. The service can be purchased with a monthly subscription, or can be purchased as required. A mobile broadband service is appropriate for situations where there is no 4G/5G Internet service available for a mobile phone, or where there is a data cap on the 4G/5G service. Mobile broadband is also used with mobile devices such as tablets and laptops. Some applications for mobile broadband are listed below.

Hospitality

Hotels, motels and resorts must offer free WiFi; that is an important criterion for travelers when choosing a hotel and often the first item that guests review after a hotel stay. Some travelers have data caps on their 5G service, some travelers have no service as they are outside the area of their mobile operator. Hospitality guest WiFi must have a data speed limit for each guest so that one Internet circuit can be shared between many guests. Some hotels offer faster Internet with a credit card payment, this is called 2-tier WiFi.

Airports and flights

Most airports and many flights offer WiFi Internet. International airports have many travelers who don’t have access to a 5G service and there are no 5G services on a plane. Several subscription businesses offer mobile broadband in airports and on flights; Boingo is one of these businesses. It is common for

airports to provide the first 30 minutes with free access then charge at an hourly rate paid on-line with a credit card. Subscribers can login with a password.

Rural areas

In many countries around the world rural areas are underserved, with no Internet and only mobile network voice, no data. Often entrepreneurs fill this demand by providing a WiFi Internet service for mobile phones. The entrepreneur will sell vouchers with access codes that give people a limited time to access the Internet. The entrepreneur can connect the WiFi service to a DSL circuit (usually expensive) or to one of the satellite data services like HughesNet or Starlink. The data speed is limited for each user, but sufficient to send emails or make a Skype call. In Spanish speaking countries this service is called “Internet-por-ficha”.

Guest Internet has the products and know-how to help you build your mobile broadband network. We have a free eBook in English and Spanish that gives a step-by-step guide to building a mobile broadband network, that you can find in our WISPzone main page.

2.2. Providing an Internet service at a remote location

Many businesses purchase WiFi equipment for remote locations, such as campgrounds, RV parks and wilderness parks. People enjoy traveling to remote locations to be with nature, but they don’t want to leave behind their contacts with other people while they travel. Visitors may want to keep in touch with a job and check emails, or may want to upload selfies to social media, and check on the latest weather information. Many people are dependent on the Internet.

Remote locations generally don’t have access to utilities. There may be electrical power but a mobile phone tower installation is

unlikely so there is no access to the Internet or to make calls. Travelers can now purchase a Starlink satellite antenna but the cost is high, and suitable only for people who enjoy RV life and live on the road. Enterprising business people can provide an Internet service at remote locations around the world and charge for the service with hourly or daily rates.

There are two competing satellite services that provide an Internet service. One is the HughesNet geo-stationary satellite service and the other is Starlink low earth orbit (LEO) satellite service. Both services have only partial global coverage and so it is important to check coverage with the vendor before purchasing the plan.

The HughesNet service has several options of data speed and data volume. If the data limit is passed then an extra charge is made. The basic Starlink service costs more than HughesNet and does not have a monthly data cap, after which the data speed is slowed. Starlink does have an expensive business service that gives faster speeds with no data cap.

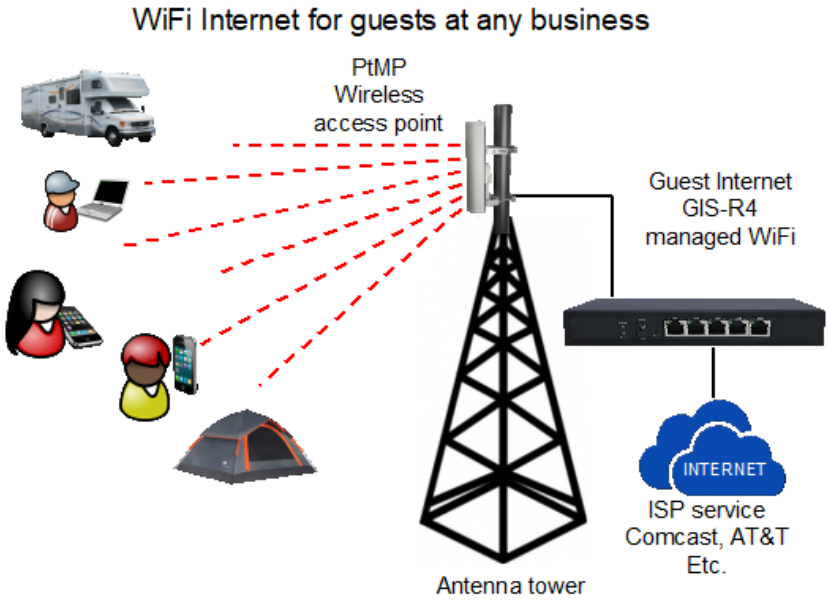
The satellite service that is chosen connects to a Guest Internet gateway. The gateway works like an Internet point of sale to charge visitors for the Internet service. The Guest Internet gateway connects to one or more wireless access points that provide the WiFi for visitors to connect their mobile devices. The wireless access points are mounted on top of a tower to give the maximum area of coverage. The area of WiFi coverage can be extended by constructing several towers and installing mesh wireless units on each tower. Visitors connect to the WiFi and open a browser then see the login page. Options of duration and data speed are displayed and the visitor can purchase the preferred Internet service on-line using a credit card.

If no electrical power is available at the remote site the system can be powered using a combined solar panel and wind turbine generator that charges a battery. The power for the equipment is

drawn from the battery. It is necessary to protect the equipment to prevent damage from animals.

The equipment can be managed remotely using the free Guest Internet cloud service so no one is required at the site to operate the equipment.

The Guest Internet WiFi installation is shown in the next figure.



Important requirements for guest WiFi with Guest Internet

1. Provide free internet or charge for the service
2. A firewall blocks guests from accessing the business computers
3. Give guests access codes, prevent unauthorized use
4. Set maximum data speeds for guests to prevent one using all the bandwidth
5. Block any guest computer with a DoS virus
6. Block any copyright file sharing, avoid a DMCA takedown notice
7. Show reports of use, identify abuse
8. Monitor and alert any failures in the wireless access points, gateway, ISP
9. Remote free cloud management, no need to go on site to give codes

2.3. How far can a WiFi antenna communicate in a community?

Community Internet WiFi

Many rural and remote communities around the world often lack basic infrastructure, and telecommunications services are low on the list. Although many people in these communities have mobile phones they may have to travel to a nearby town to get a connection to the network.

For the past several years some communities have installed an Internet service with a satellite connection and controlling and selling the WiFi Internet access using Guest Internet controller products. People who know how to use a computer can install the WiFi Internet service for a community; no special skills are required. However there are limitations for the installation and that is the subject of this article.

Communication distance

The most common question we get is how far can the WiFi antenna communicate. There are some rules with the design of the WiFi wireless equipment and some rules about the location of the WiFi antenna.

- Wireless equipment design; WiFi equipment has a limited power output and the maximum power is set by the FCC and other government regulatory organizations. The maximum power of a WiFi antenna is less than one hundredth of a mobile phone antenna. This limited power output determines the maximum transmission range. The more powerful mobile phone antenna can transmit much further than a WiFi antenna.

- Wireless equipment location; The WiFi signal is blocked by walls and trees so it is very important that the WiFi antenna in installed on a high point, the roof of a building or on a tower so that the antenna is visible to the people who want to connect to the WiFi service. This is called line of sight visibility.

The frequency of operation is also a factor for the maximum distance of transmission. The WiFi antenna transmits a radio frequency signal that is in a shared band, either 2.4 GHz or 5.8 GHz. Many other WiFi products are also transmitting in the same band, which causes interference. When the interference is greater, the maximum distance is shorter. A WiFi antenna in an urban area has a shorter range of communication than a WiFi antenna in a remote rural area that has no interference. By comparison, mobile phone antennas can transmit further because they use exclusive frequencies that are purchased by the mobile phone company so there is no interference.

The receiving devices

The people who want access to the Internet connect to the WiFi antenna in one of two ways.

- A mobile phone WiFi connection to the WiFi antenna.
- A home antenna connection to the WiFi antenna.

The method that the person uses also determines the maximum distance of communication, as we will see in the following sections.

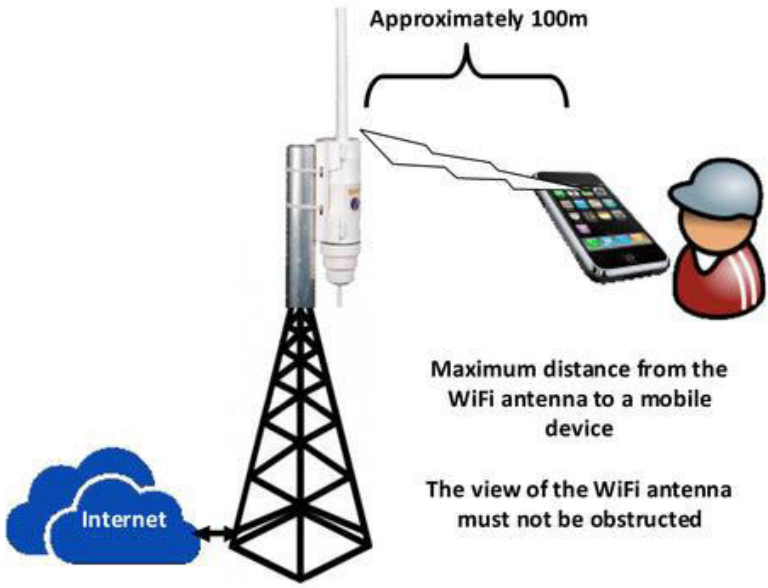
Connecting mobile phones to a WiFi antenna

A mobile phone has three limitations when connecting over a long distance to a WiFi antenna.

- The power output of the transmitter is low.
- The sensitivity of the receiver is low.
- The WiFi antenna in the phone gives a poor signal as it has to work in any orientation when the phone user is moving.

With the WiFi antenna installed at a high point with clear line of sight to the mobile phone the maximum distance is typically 100m. This might be further if the WiFi transmitter has a direction antenna and the phone has the best specification but the distance will not exceed 200m.

The next diagram shows the typical maximum distance between a WiFi antenna and a mobile phone.



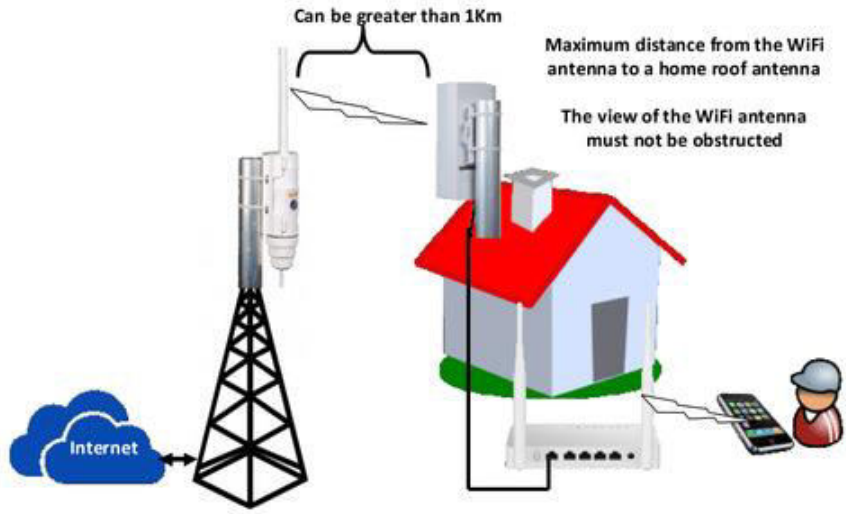
Connecting a home to a WiFi antenna

A home will have a directional antenna and radio installed on the roof with a direct line of sight to the central WiFi antenna. The antenna on the roof connects to a wireless router inside the home. The home residents connect to the wireless router to get Internet access.

The directional antenna and radio installed on the home roof has much better WiFi characteristics when compared with a mobile phone.

- The transmitter power is higher.
- The receiver has great sensitivity.
- The antenna is directional with a high gain.

The directional antenna and radio installed on a home roof can communicate ten times further than a mobile phone can to a central WiFi antenna.

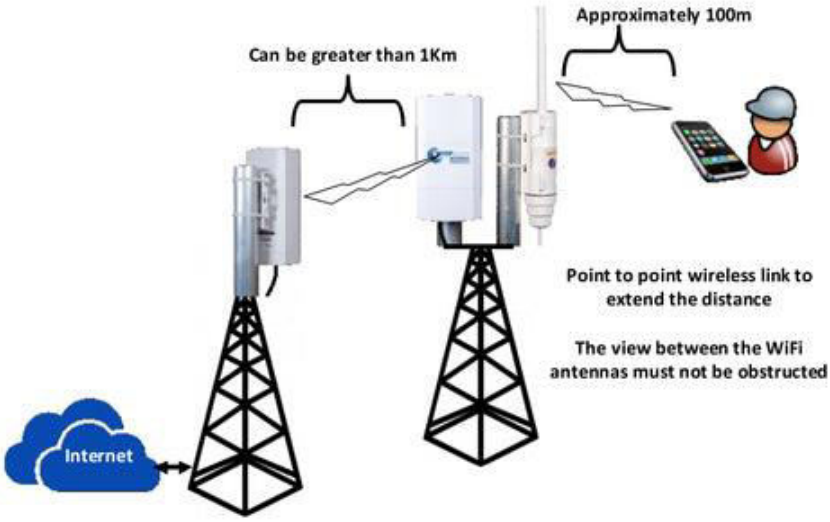


Connecting mobile phones at a further distance from the Internet connection

It is possible to provide a connection for mobile phones more then 1 Km away from the Internet connection. This is done using a point-to-point wireless link. One end for the wireless link (the Host) connects to the Internet; the other end of the wireless link connects to a wireless access point that broadcasts a signal for mobile phones.

The distance that the point-to-point link communicates can be greater than 1Km however there must be line of sight between the antennas any obstruction will block the signal.

One point-to-point link can provide an Internet connection for 10 to 15 people, possibly more. Several point-to-point links can be installed in a community to provide WiFi Internet for mobile phones over a larger area.



What type of Internet connection can be used?

A community can use any type of Internet connection, however it is essential to have a service with a high data speed, the speed is measured in Mb/s. Some typical Internet connections are listed below.

- ADSL: data speed of 10Mb/s to 20Mb/s.
- Fiber: data speed of 100Mb/s to 1000Mb/s.
- Geo-stationary satellite (HughesNet): 20Mb/s to 100Mb/s.
- Low earth orbit (LEO) satellite (Starlink): 100mb/s to 200Mb/s.

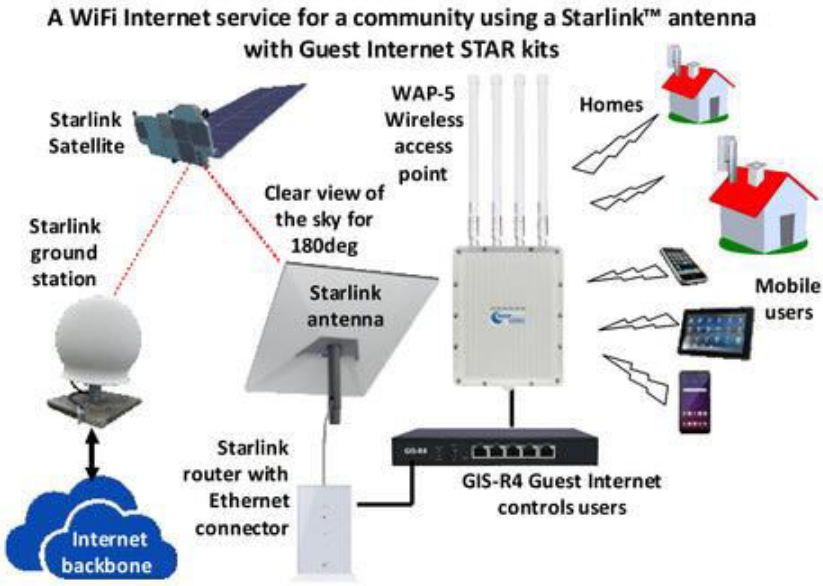
A service such as ADSL or fiber requires a cable that connects the community to a central hub provided by the telephone company, called the Internet Service Provider (ISP). Very few remote rural communities have this type of service and so the only option for many communities is to use a satellite service. The Starlink service has global coverage and can be used in countries that have an agreement with Starlink to operate the service.

The Starlink service has several data plans available; each plan has a maximum speed. The basic residential plan should maintain less then 1TB per month of data use. There are plans that permit a high volume of data to be transferred for an additional fee. The community should evaluate which Starlink plan best meets the needs of the community.

The Starlink terms of service do place some restrictions on the use of the service. Excessive use by causing network congestion due to many people connecting to the service causing consistent high volume data use might be considered a breach of the terms of service and Starlink may suspend the service to that antenna.

Using Starlink to provide an Internet service for a community with STAR kits

When a Starlink antenna provides a service for many homes then network congestion may occur due to excessive data volume. It is therefore necessary to manage the community Starlink service so that the community members can enjoy the Internet service without concern that the service may be interrupted due to abuse. Many communities have installed Guest Internet controllers to share Starlink and other satellite services because they are very easy to install and use. The Guest Internet controller provides rules for Internet access so that the Starlink service can be shared with many people. All Internet services set rules for maximum data speed and data volume.



How can the community control and sell the Internet access?

Guest Internet controllers manage the WiFi Internet service for a community by imposing rules on individual use so that each person gets a good Internet connection, plus ensuring the Starlink service is not abused. Each person that wants to connect to the Internet service is given an access code that determines how that person can use the service, the access code has the following parameters;

- The length of time that the person can remain connected to the Internet, or the user can be connected permanently.
- The maximum download and upload data speeds.
- The maximum download and upload data byte count permitted.
- The maximum number of people who can use the code, usually 1.

- Optionally blocking services like Torrent that might be used to share copyrighted files.
- Optionally blocking services that require a consistently high bandwidth.

Each member of the community receives or purchases an access code that provides access to the Internet for a period of time with the data speed and data limits assigned to the code. The access time starts counting after the first use and once the code time has been used the code is deleted from the controller. The access codes are printed onto vouchers using the Guest Internet software. The person providing the service customizes the voucher design, adding a logo and text to the voucher design. A voucher is shown in the figure.

The vouchers are printed using a computer with a letter size printer. Sixteen vouchers are printed on each sheet of paper and up to 10,000 vouchers can be printed at one time. The Guest Internet software makes voucher printing very easy. This is shown in the figure.

How many people can connect to the Internet service?

The number of people that can connect to an Internet service depends on two factors.

- The data speed of the Internet service in Mb/s.
- The maximum data speed allowed for each user.

Sharing one Internet connection between many people is simple math.

For example, the Internet service has a speed of 100Mb/s. The maximum speed for each user is set at 5Mb/s. The number of people that can connect to the service is 100/5 = 20 people. We can connect more people because not everyone will be using the Internet at the same time so this number can be increased to 30. With an Internet service of 200Mb/s and a maximum speed per user of 2Mb/s we can connect 200/2 = 100 people.

We can increase the number of users by putting a time limit on each user.

We have to take care that the Internet service data volume is not exceeded and so we should put data limits on each user of the Internet service.

2.4. Here is a plan to ensure that no one complains about the WiFi Internet

Your holiday guests are arriving and they will ask for WiFi access

Many of us will receive visitors to stay over the holiday season. What our guests want besides the great food is access to the WiFi. We need a plan to ensure that no one complains about the WiFi.

The first step is to ensure that we have good WiFi coverage around the property. There will be dead spots without a signal, there will be spots where the signal is low and so Internet access is very slow.

A great way to check the WiFi signal strength is to install a phone app. WiFi Analyzer is a great app that can measure WiFi on bands, 2.4 GHz and 5.8GHz.

What can we do in the case of dead spots?

The only solution is to add wireless points, however there is no Ethernet in other parts of the property to plug in a wireless access point. The answer is to upgrade the WiFi to a mesh network. This extends the range of the WiFi by connecting several wireless access points using wireless.

Give your guests access to the Internet WiFi but keep it secure

“What is the WiFi password” is a question that you will hear many times. It is not a good idea to remove the password, as the neighborhood will have free Internet, which will slow the Internet even more for your guests.

A good idea is to temporarily change the WiFi password from the alphanumeric string of characters to the name of your dog or cat, or some easy to remember name.

The WiFi password is changed by connecting to the WiFi router. Look for the wireless router model number then Google the manual and follow the instructions. This will require you to open a browser then open a tab using a specific IP address.

Finally use the default username and password in the manual to open the router configuration page. Make a note of the current WiFi password before changing to a simple name. While you are logged in it is a good idea to change the login password to a more secure one and note it on a Post-it then stick on the underside of the router. Remember to change the WiFi password back to the previous jumble of letters and numbers after your guests leave as your dogs name is easy to hack.

2.5. Five rules when installing WiFi networks

There are several factors to consider when planning the installation of a wireless network

Any WiFi installation plan requires expert help in order to get good results. A good result means that all users get a good WiFi signal with a good download speed. All too often a user has a low WiFi signal, which results in a slow download speed and intermittent network disconnections. So, let's talk about these important rules.

1. What WiFi technology to use?

WiFi products come in two types, wired and mesh. Wired products connect back to a central switch using cat6 Ethernet cable so the cost of the cable installation will be higher than the cost of the WiFi equipment. Mesh wireless requires only one product to be connected to the Internet router with an Ethernet cable; all other WiFi units connect to the first one using WiFi. Mesh saves on wiring installation cost but a user will connect to

the Internet through several mesh 'hops' and each hop will reduce the speed of the connection so the range or radius of the mesh coverage is limited to 4 or 5 hops.

2. What type of WiFi antenna to use?

The choice of antenna is very important. An omni directional antenna is installed in the center of a space and radiates in a circle around the product and is good for the center of a building ceiling but not good for the top of a mast as the strongest signal will be high above the head of a guest. A directional antenna gives a stronger signal in one direction so it is good for the corner of a building or for the top of a mast with a down tilt. Beamforming antennas are expensive but give the best results.

3. What type of WiFi equipment to install?

There are many types of WiFi equipment on the market. Low cost equipment will have a shorter wireless range and will connect fewer people, maybe as few as 30. Expensive equipment will have a longer range, especially if it has a beam forming antenna, and can connect many people, maybe as many as 300. The expensive equipment gives better results and fewer products are necessary to cover a larger area. When considering the cost of the project remember that more low cost products will be required, and fewer expensive products, so expensive wireless access points may work out cheaper for a big project.

4. How to install WiFi products?

This depends entirely on the location where the WiFi will be installed. An open plan office space is easy; install WiFi wireless access points on the ceiling. A hotel might install WiFi wireless access points along the ceiling of each corridor, spaced so that

one wireless access point covers 5 to 10 rooms. An RV park requires one or more wireless access points to be mounted high up on an antenna mast so that all the guests have line of sight to the antenna.

5. Where to install WiFi products?

The location of WiFi wireless access points cannot be guessed. A WiFi engineer has to make a site survey which means taking a portable wireless access point and measuring the signal strength around the location. The customer has to pay for a site survey. A building with internal sheetrock walls will allow a WiFi signal to pass through. A building with internal concrete block walls with rebar will block a WiFi signal. When the location of wireless access points is guessed instead of measured then rework will be necessary as users will complain about a low signal strength, so what was initially a cheap project becomes more expensive than paying for the site survey at the start of the project.

3. Sell WiFi Internet in hospitality businesses; hotels, motels, resorts

3.1. Some motels and hotels are losing business and don't know why

Many motel and hotel owners and managers don’t realize that a good WiFi Internet service is important to attract guests

Hotels that provide poor or no WiFi for guests will lose bookings. Guests who stay at a hotel post reviews, and people looking for a hotel to stay read reviews before making a decision about which hotel to choose.

The quality of the WiFi is high on the list of facilities reviewed. A poor WiFi review equals lost bookings and lost returns. There are still many motels and hotels that fall into the category of poor WiFi Internet.

All motel and hotel owners and managers should read a blog posted by travel expert Samantha Brown, Samantha is an important influencer of travel and hotel choices.

> https://www.islands.com/1590983/free-hotel-service-wifi-samantha-brown-travel-expert-trust/

The hotel that provides guest WiFi in the lobby area only will lose bookings and return reservations because guests are unhappy with the WiFi service. Worse; that wireless router is connected to the hotel network without protection, giving any hacker free access to the hotel computers and PoS. The credit card companies are not happy when the hotel connects a wireless router to the hotel network as the guest WiFi is not in compliance with PCI DSS, the Payment Card Industry Data Security Standard. Any thief with

hacking skills can steal the guest credit card information from the business computers.

How bad reviews from guests can cost hotels more than just bookings

In summary, a motel or hotel that provides only a WiFi router in the lobby for guests has two risks.

- Unhappy guests will post bad reviews, which will persuade potential guests to book a different hotel, plus the guest who posted the review won't return.
- The hotel is at risk of data theft, if credit card information is stolen then the motel or hotel faces a big financial loss, plus loss of merchant rights.

Installing a professional WiFi Internet system throughout the property so that each guest has WiFi Internet in the room is a big investment, but one that translates into increased returns with an increase of new bookings.

The return on investment (ROI) for a good motel or hotel WiFi Internet system is short as a few months, and results in increased sales and profits for the motel or hotel owner.

Why do guests need WiFi Internet?

First let's answer the question, why do guests need WiFi Internet? Don't they have a mobile phone and can connect to the Internet using that?

To answer that question, first be aware that there are two types of guests, business travelers and vacationers. Then there are national travelers and international travelers.

Business guests travel with laptops and tablets that connect to WiFi. Business guests have to work in the room at night,

answering emails, downloading proposals, editing documents, etc. Without WiFi they can't work so won't book a motel or hotel.

3.2. Hotel WiFi for guests

Guests are complaining that the hotel WiFi is slow! What can I do?

The quality and speed of the guest WiFi service that many motels, hotels and other hospitality businesses offer, depends on the type of Internet circuit that the hotel has installed.

Hotels in urban areas often have the choice of two or three ISP's and access to a fast fiber data connection. Many motels are located in rural or semi rural areas and have limited Internet options, maybe only one ISP and maybe not the latest fastest Internet connection. Slow ADSL data connections are still common in rural areas where fiber has not been installed.

There are several alternative wireless technologies that a motel or hotel can get access to in order to provide a faster Internet service for guests.

- Fixed wireless access (FWA) from a 5G mobile tower within range of the antenna, speed can be over 200Mb/s.
- Point-to-point (PtP) wireless connection provided by a Wireless Internet Service Provider (WISP). Data speed can be in the range 100Mb/s to 12Gb/s depending on the wireless technology installed.
- Satellite data connection, there are two options. Geo-stationary service (HughesNet) where a dish communicates with a satellite in a fixed orbit, and a Low Earth Orbit (LEO) service (Starlink) where a flat panel antenna communicates with a constellation of many satellites. The LEO service provides a faster data speed in the range of 100Mb/s to 200Mb/s.

The motel or hotel can retain the present data connection (maybe ADSL) and add a second or third wireless connection. Different Internet connections are shared with the motel and hotel guests by a load-balancing controller that can also manage the service for the hotel guests.

A suitable controller is the Guest Internet GIS-R20 for two Internet connections, and the GIS-R40 for up to four Internet connections.

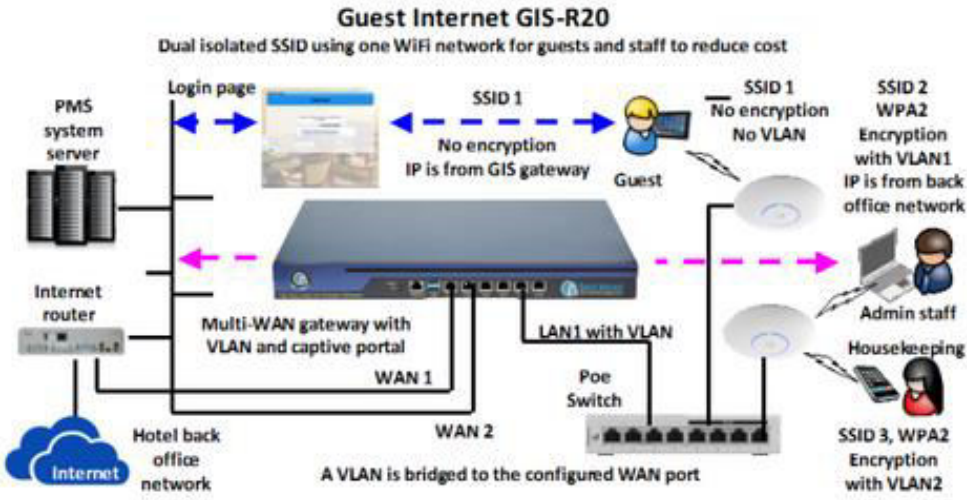
The data speed available for guests is the sum of the data speeds provided by the ISP connections.

The Guest Internet products also have fail-over, which means that if one Internet connection fails then the guests are automatically switched over to the working Internet connection, improving the reliability of the Internet service.

The diagram shows a GIS-R40 connected to four ISP's that might be available at many rural motel locations.

- ADSL or cable copper connection.
- 5G modem connection, Fixed Wireless Access (FWA)
- Starlink satellite antenna
- WISP point to point wireless link

The connections listed above can provide the guest network with over 500Mb/s, adequate for a 200 to 300 room motel.



The Guest Internet controller ensures that the WiFi Internet service provides a good speed for all guests because of the following features.

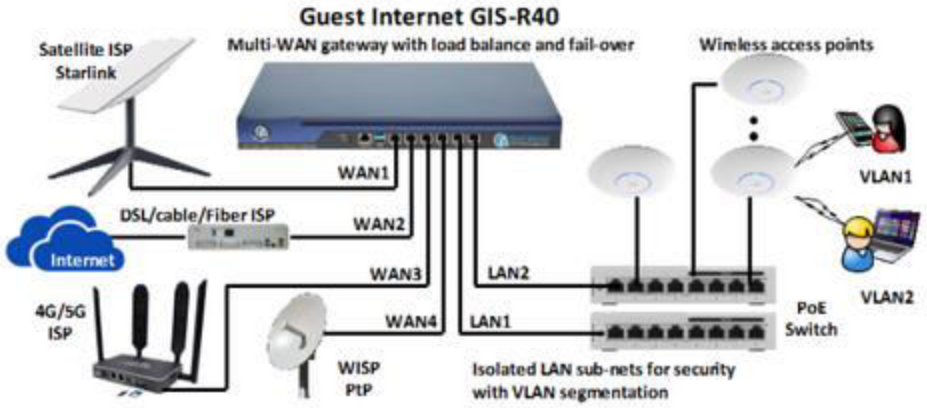
- Increase the Internet speed by adding more ISP connections, as described above.
- Limit the access to the Internet service by giving guests an access code, when the WiFi has open access then many more people will connect and slow the service for guests.
- The available bandwidth is shared by setting data speed limits for each guest, if not then one user can slow the Internet for everyone.
- Optionally set data limits for everyone when the ISP charges data per GB.
- Block abuse of the Internet service as the business will be responsible for copyrighted file sharing or access to illegal websites.

- Block computers with viruses, such as DDoS, that will slow the network data speed.
- Protect the business computers and PoS with a firewall, prevent access from public WiFi.
- Use the customer WiFi login to advertise business services.
- Monitor the WiFi service for failure, get an alert if any problem occurs.
- Have only one WiFi network for guests and staff, isolate with a VLAN.
- Optionally charge for the WiFi service with credit cards and voucher sales or offer a 2-tier system, provide free Internet at a slower data speed and charge for a faster speed service.

In addition to the advantages that a Guest Internet controller provides to improve the performance of the guest WiFi Internet service, Guest Internet also provides an upgrade cost reduction opportunity for the business.

Using the Guest Internet virtual-LAN, or VLAN feature, one wireless network can be configured to provide WiFi for both guests and staff. While the guest WiFi service is open, the staff WiFi is encrypted. The guest WiFi and staff WiFi are isolated so that one cannot see the information of the other. Guests see only the login page and can connect to the Internet; they have no access to the business computers. Staff has access only to the business computers, and if desired staff access to the Internet can be blocked.

The next diagram shows the Guest Internet controller with a dual use WiFi network that provides isolated WiFi for both guests and staff.



Many travelers consider the hospitality WiFi Internet service to be a very important factor when selecting a motel, hotel or resort. Often travelers will read reviews that other travelers post when making a selection, and most reviews include observations about the properties WiFi Internet service.

A WiFi service upgrade with Guest Internet will pay the business back very quickly with good reviews, more returns and more reservations.

3.3. Hospitality streaming content over WiFi

Hotels are always looking for ways to enhance their guests' experience, and one way to do that is by providing enough bandwidth so guests can enjoy streaming content over WiFi. With the rise of streaming services, guests expect to have access to their favorite shows and movies while traveling. So, what aspects do we need to take into consideration?

Easy to use WiFi service, easy to connect

The hospitality WiFi service must be easy to use. Not everyone knows how to use public WiFi Internet, different from using the WiFi in the home. There are three factors that must be considered:

- The connection and login process should have clear simple instructions available for guests in every room and at locations where guests might use the WiFi, in the lobby, etc.
- The wireless access point name used for the WiFi (called the SSID), make it simple, easy to recognize and use the same name for all the wireless access points.
- The login process to connect with the Internet should be easy and simple to use, this may be a login page that requires a codes provided to the guest at check-in.

With these three factors there is no need for the guest to get frustrated and to call the front desk.

Exclusive access for guest, letting anyone access will limit streaming

Open public WiFi Internet allows anyone to connect to the Internet with a mobile device. As more people connect the Internet service gets slower for everyone until it is impossible to connect to the service. All hospitality businesses, including motels, hotels, RV parks and campgrounds have to provide a great WiFi Internet service for guests. It is essential that the service can only be used by guests to ensure that the service has good performance. The hospitality business can give guests an exclusive access code that permits the guest to connect to the Internet. A person who is not a guest can see the login page but cannot connect to the Internet. Products such as Guest Internet control access to the Internet with codes.

Strong WiFi wireless signals for all guests

Many hospitality businesses hear guests complain that they cannot connect to the WiFi, usually because the signal is too weak. Walls can block WiFi inside buildings and so a large number of wireless access points have to be installed. Ideally install a wireless access point in each room. Large outdoor areas like RV parks and campgrounds have a different set of challenges. The WiFi signal is weak and has a limited range. Obstacles such as trees will block WiFi signals. It is important that the guest can see the wireless access point antenna, called line-of-sight. It will be necessary to install the wireless access point antenna on a tower that is higher than the tree tops so that guests can see the antenna. Don't forget to install lightning protection on the tower. RV parks and campgrounds can sell a WiFi wireless receiver to guests that will extend the connection range. Some RV's have this equipment installed with an antenna on the roof.

Insufficient Internet bandwidth, add more with Starlink

A common guest complaint that many hospitality businesses hear is that the Internet is slow. If the hotel is in an urban area then it may be possible to get an optical fiber connection with a 1Gbit data speed. Unfortunately most hospitality businesses don't have access to a high-speed fiber connection. The common type of connection is ADSL over a phone line with a speed in the range of 10Mb/s to 50Mb/s. The ADSL speed slows, as the business is further away from the DSL hub. The solution is to add a second ISP however most businesses don't have that option. Now that Starlink is available it is easy to add a second ISP. Starlink is a satellite Internet service that works anywhere. Using a Guest Internet product that has two ISP connections (called dual-WAN) the ADSL and Starlink services are connected to one product. The Guest Internet provides the sum of two bandwidths. If the ADSL has 20Mb/s and the Starlink has 200Mb/s then the total

speed available for guests is 220Mb/s. The Guest Internet product also has fail-over which means that if the connection with one ISP is lost then all guests are switched to the ISP that is working.

Manage the available bandwidth to share between guests

The Internet bandwidth or circuit speed that is available for guests is limited by the services that are available to the businesses. Guests always want more bandwidth as many people want to watch video streaming services such as Netflix, that require a lot of bandwidth. Using a Guest Internet product each guest can have a data speed limit so that the available data speed can be shared between all guests. If there are a lot of guests then a two-tier method of allocation the Internet service might be appropriate. A two-tier service means that the free Internet service has a very slow speed and the guest can pay on-line for a faster service speed. When there are too many guests for the available service the business might choose an access method that many airports have installed, provide a guest free Internet for a limited period, say 30 minutes, each 24 hour cycle, then charge for the Internet service. Guest Internet products can provide such a system.

Monitor the service quality; identify any failures in the network quickly

One of the problems with a WiFi network that has many wireless access points is that there is no indication if a wireless access point has failed. The business begins to get customer complaints for a specific area but does not have the means to identify the problem. Managed WiFi products like Guest Internet have a free cloud management service that can monitor all wireless access points for failure and send an alert message to the manager when one fails, informing which wireless access point has failed. This will give the manager time to replace the failed access point before the guests start complaining.

3.4. When streaming turns into a copyright nightmare

Understanding the intricacies of copyright protection

In the United States, owners of copyright material are protected against theft of their property. Copyright material includes computer data with pictures, music, videos, games and also physical goods that have copyrighted designs.

The Congress passed the Digital Millennium Copyright Act (DMCA) in October 1998 and the law became effective in October 2000. The DMCA law has been incorporated into the Copyright Act (Title 17 of the U. S. Code).

People in the USA who share or sell copyright material have suffered the consequences of these unlawful acts. Europe has similar copyright laws that protect copyright holders. Other countries around the world have either basic copyright laws or no laws, and many of those countries that have laws don't enforce them.

Sharing copyright materials over the Internet

Regarding sharing copyright files over the Internet, the Internet user shares copyrighted files using one of many software's or services, many use a version of the Torrent protocol. Many people may have heard of services like Pirate Bay that promote illegal file sharing.

How does Starlink know when copyrighted material was downloaded?

The copyright holders can identify the IP address of the person sharing the information. The copyright holder then communicates with the ISP and the ISP has to advise the customer to stop

sharing copyright information or else the Internet service will be terminated.

The copyright owner continues to monitor the illegal sharing of its property. If the sharing continues then the copyright owner requests the ISP to terminate the customer's service. The ISP has a legal obligation to terminate the service of the person illegally sharing the copyright material.

The enforcement of copyright laws has been the responsibility of ISP's in the USA and Europe. Elsewhere in the world, the ISP enforcement of copyright has been patchy, depending on local laws. This means that many people in these countries have been sharing copyright material for many years without knowledge that they are stealing property that is owned by a US or European company.

Global Starlink users face unexpected consequences

Now people around the world are beginning to use the Starlink Internet service and many are surprised that they receive copyright infringement notices and then have their service terminated.

Starlink is a US company that has to comply with US laws, including DMCA. The copyright holders can track what Starlink customers are sharing and identify the IP addresses if people are sharing their property illegally.

Even when the Starlink customer is in a country that has no or few copyright laws that person has to comply with the US DMCA law. This means that if Starlink customers are sharing copyright material they will receive a copyright infringement warning (in English) and if they continue to share copyrighted material, their Internet service will be terminated.

Many Starlink customers not located in the USA or Europe are surprised when their Starlink accounts are terminated for copyright violations.

4. Sell WiFi Internet in campgrounds and RV parks

4.1. There is a big demand for WiFi Internet at campgrounds and RV parks

Campgrounds and RV parks have a constant demand to provide a WiFi Internet service for many different groups of guests. Guest Internet managed WiFi is the best method to deliver a great service, and it will make money for the business.

- Vacationers who post photos and messages on social media for friends and family, and also enjoy watching Netflix, playing games and live chats.
- Tourists from abroad without mobile phone Internet access who need to check information such as maps, emails and communicate with family and friends.
- Digital nomads who work using a computer while traveling the country.
- People who are moving into campgrounds or RV parks as a temporary or permanent way of living.

Vacationers will use a 5G connection if available to access the Internet from a mobile phone. However many wilderness campgrounds and RV parks have no 5G wireless coverage. The WiFi service is a decision factor for many groups of guests and they will choose a location based on WiFi availability and quality, and frequently they check reviews about the campground WiFi service.

Digital nomads and remote workers rely on having great WiFi access and so they choose campground and RV park locations based on the availability and quality of WiFi and avoid locations without WiFi, which means that some businesses are missing on

the opportunity to attract even more people. Some digital nomads have purchased a Starlink antenna with roaming for RV's so that they can work from anywhere, but this service is expensive, only available for those that can afford it. Campgrounds and RV parks that do not have WiFi for guests will not have access to the digital nomad customers.

Campgrounds and RV parks that provide a good managed WiFi Internet service will make guests happy, they will come back more often, recommend the business to family and friends, but also post on their social media accounts ensuring that many people know about the business; a fantastic way to promote the business brand. In addition, campgrounds and RV parks can charge for the service. People are willing to pay for more bandwidth to enjoy the luxury of watching their favorite programs online (YouTube, Netflix) do some work and their kids can enjoy playing games. When more people enjoy the WiFi service, the more free marketing for the campground or RV park business.

What types of Internet service can campgrounds and RV parks use, if available, to provide a WiFi service for guests?

- A DSL connection over a phone line, the data speed is slow and unsuitable to share between guests, this is suitable only to connect the campground or RV park reservation system.
- An optical fiber connection will have a high-speed data and can provide a good guest WiFi service, fiber connections are available up to 1Gb/s speed which can provide a WiFi Internet service for hundreds of guests.
- Satellite connection; HughesNet offers a geo-stationary satellite service with sufficient speed, however there are surcharges for high data use, Starlink LEO satellites offer a higher speed suitable for a shared WiFi service and there are different options for businesses.

Very few campground and RV park locations have access to fiber and so the only viable service is satellite, with Starlink providing the best service for the guest WiFi.

Any type of service has limited speed and so if many people connect to a single service the performance will deteriorate and people will complain. It is essential that the WiFi service be managed properly and efficiently to ensure that all guests have a good quality WiFi service, and that's exactly what Guest Internet Managed WiFi does. Guest Internet has a range of different products to suit every campground needs, from small to big campground and RV sites. Many campgrounds, RV parks, resorts, glamping sites, caravan parks and similar hospitality business use Guest Internet products.

When campgrounds and RV parks provide a good WiFi service they can charge for the service with daily and weekly rates. Guests can make the payment on-line and the campground or RV Park can also print Internet vouchers and sell them at the site store, such as using the Guest Internet GIS-TP1 ticket printer.

The campground of RV Park can easily cover the cost of the Starlink Internet service by charging guests for use of the WiFi. People who visit campgrounds and RV parks are accustomed to pay a reasonable fee for the WiFi service if they need it and most visitors do use the WiFi. Families with children are also WiFi users as younger people enjoy playing on-line games and WiFi is essential for that.

The best option today for a campground or RV park to provide WiFi for guests is a Starlink service. The first consideration is which Starlink service to choose:

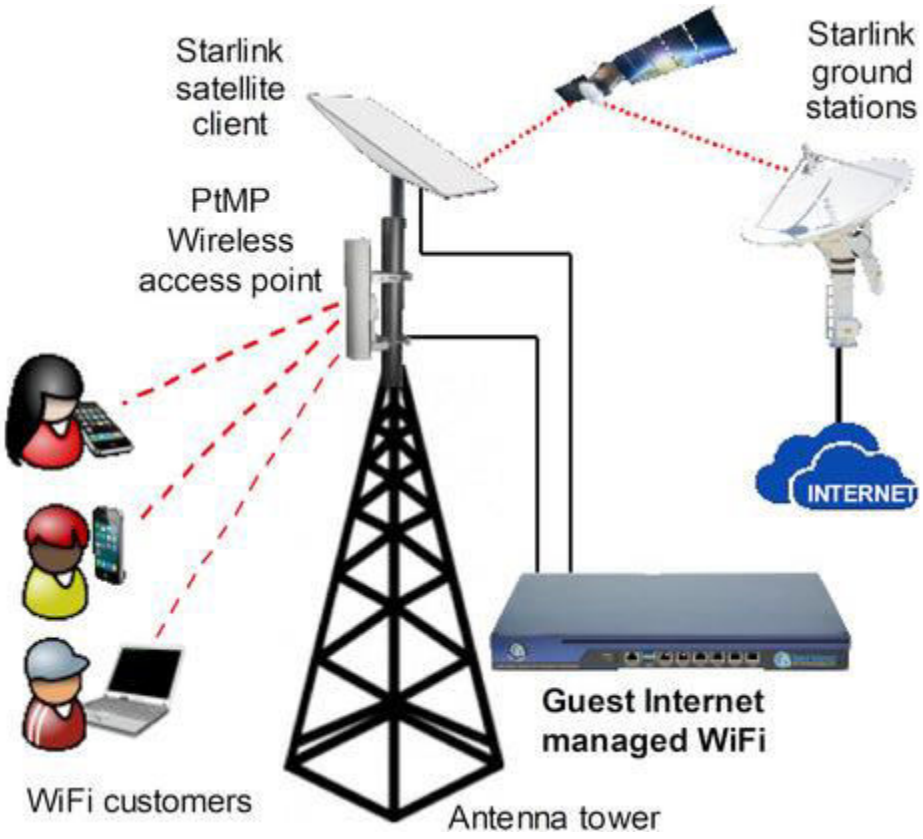
- Residential service: The antenna costs about $500 and the monthly service is about $150, but these change frequently. The data speed is up to about 150Mb/s however the service has a monthly data cap so this is not suitable for a guest WiFi service.
- Business service: The antenna costs $2500 and the monthly service is about $500. The data speed is up to about 500Mb/s. The data speed is sufficient for 100+ guests.

Here is a simple example of cost vs. income calculation.

A campground or RV park that has 50 WiFi users who pay $2/day ($14/week) will generate an income of $3000 per month. This will cover the cost of the business antenna monthly service and pay for the Starlink business antenna in the first month of service.

The installation of the Starlink antenna together with the WiFi antenna is shown in the next diagram. Both antennas are installed on a mast. The Starlink antenna requires a view of the sky from horizon to horizon and so must be installed higher than the treetops. The WiFi antenna also has to be installed higher than the tree tops so that all guests have a line of sight view to the WiFi antenna, trees will block the WiFi signal. A large campground or RV park will require additional WiFi repeaters, or a mesh wireless network to provide good WiFi coverage for all guests. If all this

sounds complicated, do not worry, we have other books that will help you out. Call us for the download links.



There is one additional essential part of this installation, that is the Guest Internet managed WiFi gateway, installed between the WiFi antenna and the Starlink antenna. The Guest Internet gateway is a unique product that has all the managed WiFi features needed to provide a great and unique WiFi service for guests.

Campgrounds, RV parks and resorts can use the following Guest Internet products to managed their WiFi network:

- Guest Internet GIS-R6: High-performance, multi-functional, speed of 200Mb/s, FREE and PAID Internet access.
- Guest Internet GIS-R10: High-performance, multi-functional, speed of 400Mb/s, FREE and PAID Internet access.
- Guest Internet GIS-R20: High-performance, multi-functional, speed of 600Mb/s, FREE and PAID Internet access.
- Guest Internet GIS-R40: High-performance, multi-functional, speed of 1.000Mb/s, FREE and PAID Internet access.

A managed WiFi controller is essential for the following reasons:

- Share the Internet connection between many guests so that each guest has a great Internet service.
- Provide a differential service for special customers if required.
- Provide a login page with several options for access and payment. For example the campground or RV park may decide to give 30 minutes free access per day and then have a fixed daily charge for guests who need additional Internet access.
- The login page can be customized and advertise additional services that the business provides.
- Online credit card billing for guests who want to purchase Internet access.
- Voucher printing for Internet access to sell vouchers in the site store.
- Protection mechanisms to ensure that the Internet service is not abused.
- Reports showing Internet use to monitor the Internet service.
- Cloud management so that the service can be managed from a distant location, this is also ideal for a business that has several campgrounds or RV parks, the WiFi for all sites can be managed through one computer screen.
- Failure monitoring of each wireless access point and the Guest Internet controller, an email alert is sent to the business owner and IT person if a failure occurs or if there is a loss of the Starlink Internet service.

How you benefit from Guest Internet Managed WiFi products:

- Very easy to install, plug and play, no need for a technical expert.
- Guest Internet offers free cloud management, while many competitors charge for this service.
- Guest Internet doesn't charge any subscription fee, different from many competitors.
- You get free customer support from real experts during the product's life expectancy, Guest Internet products are reliable, robust and last for years. You also get FREE consultations about how to improve your network.
- Free software upgrades, so you get the latest features.
- The Guest Internet products allow your staff to have a separate WiFi access from the campground visitors, keeping your WiFi network organized and safe.
- There is no limit of users, you can add as many people as you need.
- We have 7 different login procedures where you can customize it to promote and increase awareness of your brand, announce new events, special offers, promote other business partner services and etc.
- You can charge for Internet access via credit card or use the GIS-TP1 to print out Internet access vouchers with Internet codes.
- Guest Internet protects your business with cybersecurity protection to avoid cyber attacks into your network. This is important as people access many different websites, download files and click on suspicious emails which increases the chances of an attack when you don't have the proper cyber protection.

- With Guest Internet you can make your WiFi network family-friendly by blocking unwanted websites, also avoiding Internet abuse.
- A range of special reports are available to help you monitor and analyze the WiFi user traffic, helping you make better and appropriate changes to your WiFi service so it works the way you want.
- Guest Internet products monitor the WiFi service for failures, and when there is one an alert message is sent immediately to the business owner or the IT department so problems can get fixed quickly.

All campgrounds and RV parks benefit tremendously by providing a great managed WiFi service for guests to use during their stay, and Guest Internet products help visitors and staff have a great experience.

Guest Internet makes it easy for guests to post on social media, which will advertise the business and they will give great reviews after their stay. People love sharing the fun moments they have with loved ones and the world and when they tag your business, you don't just get known by the friends and family, but by the world.

4.2. Provide a great WiFi Internet service at a remote campground or RV park

Attract guests with a great WiFi Internet service

A great WiFi Internet service has become an important decision factor for people making reservations with campgrounds and RV parks. Some guests are families where the children want to play video games at night while their parents upload the day’s photos to social media. Other guests are digital nomads who combine

working with travel, and good Internet access is essential for them to work.

Many campgrounds are in remote locations because that is where their guests want to go. Remote locations don't have mobile phone coverage and don't have easy access to the Internet because the distance to run a DSL or even a fiber connection is too great.

Internet technology has developed to a point now where any location can provide WiFi Internet for guests using the Starlink satellite Internet service and the products needed to provide the guest WiFi service are easy to install and operate. The campground or RV park owner can install a Starlink antenna and the WiFi and guest controller products; no need to call in a specialist to do that.

There are several options for the RV Park or campground owner to cover the cost of the WiFi Internet and Starlink installation, three are listed below.

- Provide free WiFi Internet with predetermined conditions of use and include the cost with the site rental.
- Have guests who want the Internet service purchase access on-line using a credit card, with up to 10 purchase options.
- Print and sell Internet vouchers in the campground or RV park store that have login codes which are used to access the Internet.

Most businesses prefer to have guests purchase the Internet access so that the site rental cost is not increased. In this case the two options of purchase on-line with a credit card and purchase Internet vouchers in the store can be easily provided.

There are also other important points to consider when providing a WiFi Internet service for guests.

- Customize the WiFi login page to brand the service and also push advertising for other services that the business offers.
- Set rules for Internet access that limit the time connected, the data speed and data volume for each user so that one Starlink or other Internet connection can be shared between many people.
- Install a firewall that connects the guest service to prevent guests getting access to the business computer and point of sale terminal.
- Monitor the Internet service and the WiFi equipment to get an alert if there is any problem or failure.
- Protect the network from some types of guest computer virus that can block the network for others, such as a DDoS virus.
- Prevent copyrighted file sharing by guests, Starlink will terminate the Internet service if this occurs.
- See status reports at any time about who is using the network and about the operation of the network.
- Ensure that the Internet use complies with the Starlink terms of service, ensure that the Starlink connection is not overloaded with large data volumes, and ensure that the monthly data quota is not exceeded.
- The list above shows a lot of requirements that have to be met to provide a great WiFi Internet service for guests, with the following objectives.
- The guest is happy with the WiFi service; it is fast and easy to use.
- The business is safe from any cyber attack attempt from the guest network.

- The business complies with the terms and conditions of the Internet service provider, in this case Starlink.

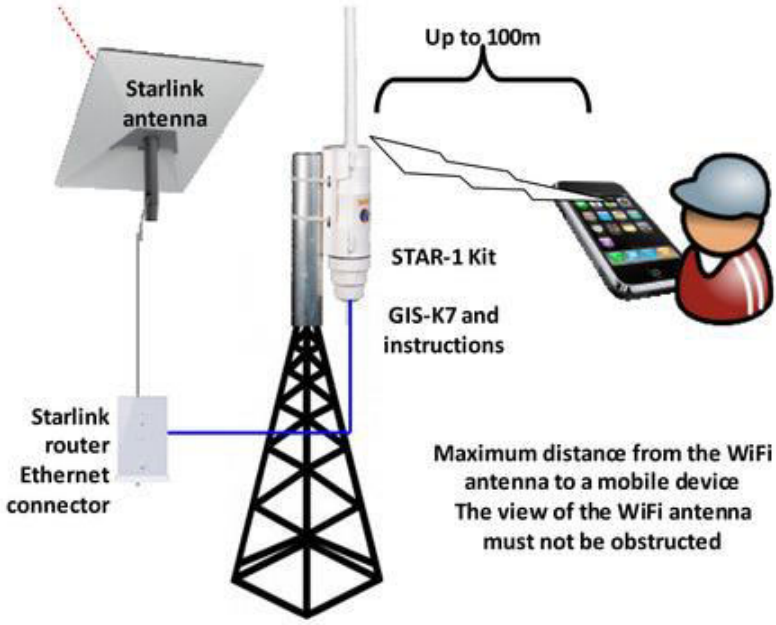
Campgrounds and RV Parks have a solution that meets all the requirements and more of providing a WiFi service for guests; this is the Guest Internet controller product that is designed for any business that has to provide WiFi Internet for guests and visitors. A Guest Internet controller has all the features listed above, and features that permit a business to charge for the WiFi Internet service so that the cost of the network infrastructure and operation can be recovered. Guest Internet can connect to any Internet Service Provider (ISP), including Starlink.

How do Guest Internet STAR kits manage and deliver the WiFi Internet service for guests?

Guest Internet manufactures a range of Internet controllers, which are designed for every type of business that has to provide Internet for guests; from the smallest coffee bar to the largest international airport; and includes hotels, campgrounds, resorts and RV parks. Guest Internet products have all the controls listed previously to provide the best possible WiFi Internet service for guests while preventing any abuse of the service.

Guest Internet has a range of WiFi kits that include all the parts needed to start the WiFi Internet service when connected to a Starlink antenna. Guest Internet kits are easy to install and operate by the campground or RV park owners, no need to call a technical specialist to install and operate the guest WiFi Internet system.

The STAR-1 kit is a good example of how the kits are installed. The STAR-1 kit combines a wireless access point with the Guest Internet controller, and can print vouchers for sale and collect credit card payments for Internet access.



The Guest Internet GIS-K7 connects to the Starlink router through the GIS-K7 power supply. The GIS-K7 should be installed at a high point, on a building roof or on top of a tower. Mobile phones can connect to the GIS-K7 using wireless up to a distance of about 100m, providing there are no obstructions with buildings or trees in the path. Laptop computers can connect over longer distances. After a simple setup procedure the GIS-K7 is ready for use. The kit includes instructions to connect the GIS-K7 and to work through the simple initial steps.

The Guest Internet controller makes it easy to manage users and to sell Internet access; it is easy for users to get Internet access. Guests connect to the wireless name (called the SSID) and then open a browser to see the login page. Depending on the configuration that the WiFi Internet service provider chooses, the guest might have limited free access, might enter a code from a

voucher that was purchased, or purchase an access code on-line using a credit card.

Guest Internet controllers provide three methods to print vouchers with access codes.

- The Guest Internet GIS-TP1 receipt printer, this thermal printer connects to the GIS-K1, and the GIS-R2 to GIS-R40 controllers. The GIS-TP1 works like a point of sale terminal, up to 10 buttons are configured on the computer screen and clicking a button prints the receipt with the access code.
- Print vouchers using the Guest Internet controller, all Guest Internet controllers have software that is used to design the voucher and print sheets of vouchers, 16 vouchers per sheet up to 10,000 vouchers. The vouchers can then be cut up and sold.
- Print vouchers using the free Guest Internet cloud service. The advantage of using the cloud is that many controllers can be added to a cloud group and the access codes

printed for that cloud group will be accepted by any controller in the group.

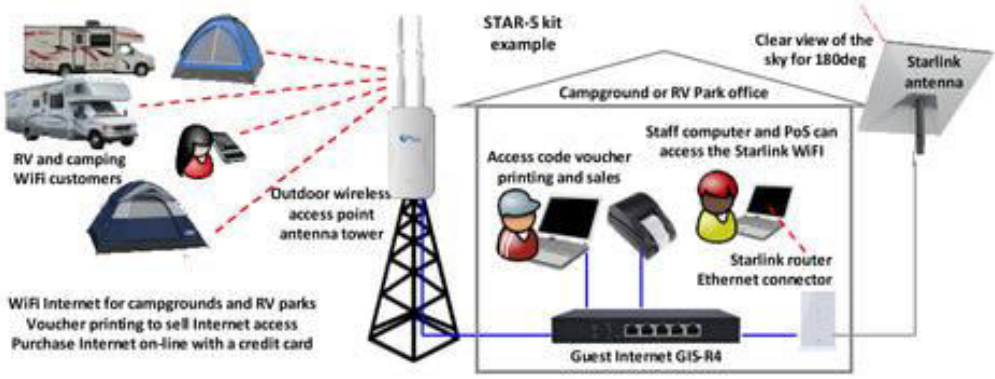
Installing the Guest Internet and wireless equipment

Guest Internet makes the task of installing a guest WiFi network in a campground or RV park easy by providing kits with easy installation instructions. The installation of the network depends on the size of the property and the location of the guests within the property.

If the Internet service is provided by a Starlink antenna then that has to be installed at a high point with 180-degree visibility of the sky. The Starlink antenna can be installed on the campground or RV park office roof. If there are many trees around the property the Starlink antenna may have to be installed on a mast. Business staff and equipment such as a point of sale terminal can connect to the Starlink router WiFi. A Guest Internet controller connects to the Starlink router LAN port with an Ethernet cable. The Guest Internet controller manages the WiFi service for the guests so that

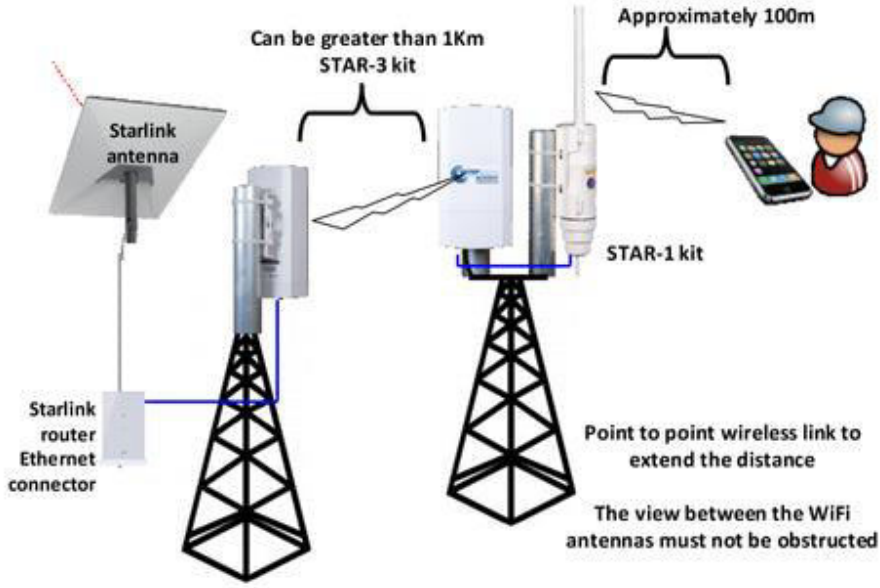
the business can charge for the service, and ensures that the service is not abused, that the business point of sale computer cannot be accessed from the guest network, and that the terms and conditions of Starlink use are met. The campground or RV park business can implement the method of charging guests for WiFi Internet, this might be on-line credit card billing and also a receipt printer that issues receipts with access codes for guests who want to pay cash. The Guest Internet controller connects to a wireless access point that is installed outdoor at a high point. It is important that guests can see this wireless access point antenna; buildings and trees will block the signal.

The network installation is represented in the next diagram. The diagram shows how the equipment is connected. Each campground or RV park location is different and will require planning for the equipment installation.



The campground or RV park owner can install the equipment shown in the diagram by following the detailed instructions that are included with the kit. The range of the wireless access point is limited to a few hundred meters; a laptop computer can connect over a longer distance than a mobile phone.

Campgrounds and RV parks that are very large can extend the range of the wireless using a point-to-point link, however this type of network will require a specialist to plan and install. Equipment that will extend the range of the WiFi connection is shown in the next diagram.



Help with the WiFi service installation

The Guest Internet STAR kits offer an easy method of providing campground or RV park guests with a good WiFi service that will get the business excellent reviews. Guest Internet has engineers who can give advice about installations.

Businesses that provide technical services for campgrounds and RV parks can also benefit by installing STAR kits for their customers. Guest Internet provides training for installers and can provide on-line support to answer questions.

4.3. A plan for campgrounds, RV parks and caravan parks to provide a great Internet service for visitors

There are two problems that vacation businesses such as campgrounds, RV parks and caravan parks have to provide WiFi Internet for visitors:

- The first is the WiFI coverage.
- The second is managing the WiFi service.

WiFi technology is designed for short-range use indoors. WiFi technology can be adapted for outdoor use over long distances and Wireless Internet Service Providers (WISP's) do this.

There are several requirements however:

- Provide a very tall tower to install the antennas, this must be over the tree tops and must have a line of sight visibility for all parts of the park.
- Install very powerful outdoor wireless access points with directional sector antennas, such products are made my Ubiquiti. These wireless units and antennas look like the antennas that mobile phone companies put on their towers.
- Provide wireless receivers for sale or rental so that guests can use with Internet TV's and similar devices. Many RV'ers already have these wireless devices installed in their vehicles.

The WiFi service must be managed to ensure that guests get a good Internet service. A managed WiFi controller is available from Guest Internet and has the following features:

- Access control with a login page to ensure only authorized guest use the service. If many people have access the service will degrade.

- Share the Internet bandwidth between many guests, prevent any guest hogging the service.
- Add multiple Internet connections to increase the bandwidth available, for example have fiber plus a 5G connection plus a Starlink antenna, Guest Internet products can connect to multiple providers and share the bandwidth, they also switch users to a working circuit if one fails.
- Have features to prevent abuse and monitor the use of the network.
- Monitor all the network components for failure and get an alert, repair the problem before the guests complain.
- Have cloud management so that the network can be managed and monitored from anywhere.

Guest Internet products have been installed by thousands of campsites, RV park and caravan park owners to provide the best possible Internet WiFi service for guests.

4.4. Installing and managing a WiFi Internet service for campground and RV park customers

Campgrounds and RV parks all have a demand for WiFi Internet access

Campers and RV'ers all look for Internet access when they are making camping or RV park reservations. Families want WiFi for social media and entertainment, and remote workers want WiFi so that they can work. A campground or RV park that does not have an Internet service will have fewer bookings than businesses that do provide Internet.

A campground or RV park needs an Internet Service Provider (ISP) to provide the Internet connection. The preferred method of connection is using fiber as that service provides the highest data speeds. If fiber is not available then a Fixed Wireless Access (FWA) connection to a 5G tower may be possible. The business can connect to a 5G tower, using a modem and then share the service with guests. When there is no terrestrial Internet connection available the remaining method is connecting to the Internet via a satellite service, with Starlink providing the faster Internet service that can be shared with guests.

When a business shares an Internet service with guests an Internet controller is essential to prevent abuse of the service

For example, Starlink has several requirements that should be observed.

- Prevent sharing of copyrighted files.
- Don’t use excessive monthly data, or else get a data plan where additional data is paid for.
- Don’t cause Starlink network congestion by connecting too many people without controls.

Guest Internet controllers have features that prevent the Starlink service being abused.

- Block file sharing services such as Torrent that is used to share copyrighted files.
- Generate access codes for the WiFi that are given only to guests, prevent neighbors getting free Internet.
- Set data limits with each code to prevent exceeding monthly data quotas.

- Set download and upload data speed limits with each code to share the available bandwidth and prevent network congestion.

Guest Internet controllers have the access code management described above, and have many other features that add value to the campground or RV park business. Other essential features are listed below.

- Simple to install by anyone who can use a computer, full instructions are provided.
- A branded and customized login page that can be used for advertising the business activities and also sell advertising space to other businesses such as food trucks.
- On-line credit card billing to charge for the Internet service.
- Access code voucher printing and also a Point of Sale (PoS) service to sell Internet access in the campground or RV park office.
- Monitoring all the network components and the ISP service for failure, and send out an alert if a failure occurs.
- A cloud management system to manage the WiFi Internet service remotely, and also manage multiple sites if required by a franchise business.
- Reports monitor use of the Internet, check for ISP connection overload, and used to block anyone abusing the service.
- A powerful firewall that prevents sharing of the service with others, blocks any attempted unauthorized access, and has a PCI DSS compliant firewall to protect the business PoS terminal from attack.

The installation of the WiFi Internet system depends entirely on the geography of the location.

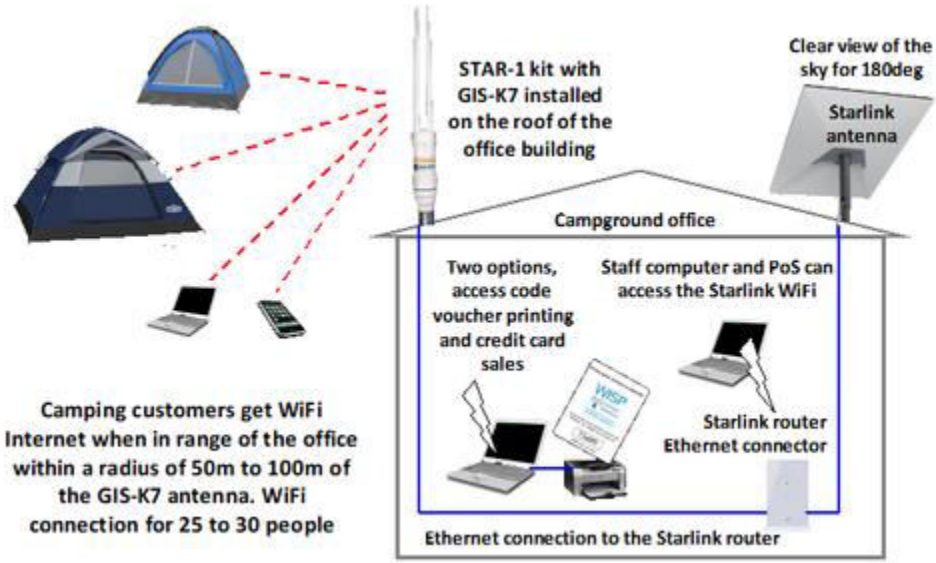
Three methods of providing WiFi Internet for guests

1. Provide Internet WiFi in a radius around the office building

Install the Starlink antenna on the roof of the office building. Install the Guest Internet STAR-1 kit wireless controller, the GIS-K7 on the roof of the office building to provide a WiFi service around the building.

Connect the GIS-K7 Ethernet cable to the Starlink router. This installation will provide up to 100Mb/s bandwidth that can be shared with 25 to 50 people depending on the data speed set for each person's access code.

Access codes can be generated using the GIS-K7 and printed as vouchers. The kit has full instructions and can be installed by the campground or RV park owner.

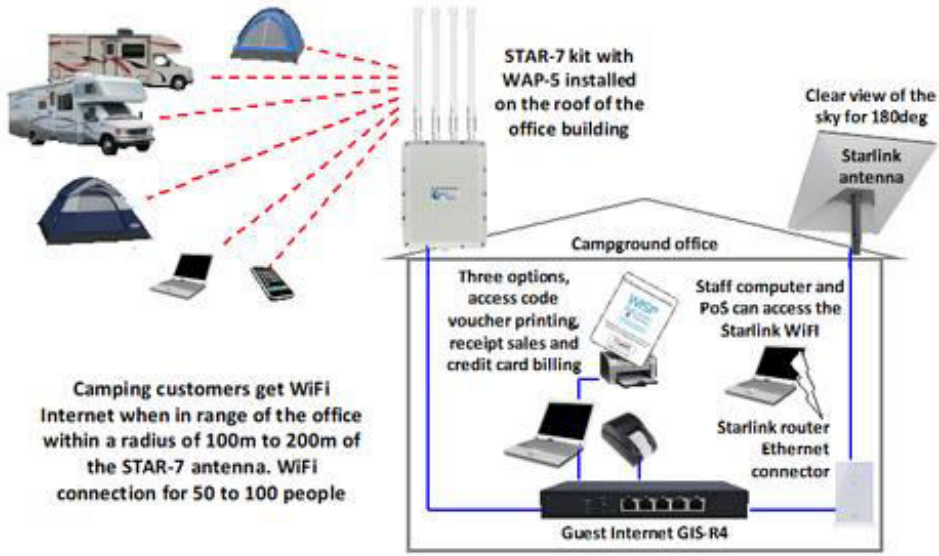


2. Provide Internet WiFi in a much larger radius around the office building for more people

Install the Starlink antenna on the roof of the office building. Install the Guest Internet STAR-7 kit, which includes the GIS-R4 Internet controller inside the building and the powerful WAP-5 wireless access point on the roof of the building to provide a WiFi service around the building.

The WAP-5 provides a much greater WiFi connection range than the GIS-K7. This installation will provide the maximum data speed of the Starlink antenna for guests (up to 200Mb/s bandwidth or higher with the priority Starlink service) that can be shared with 50 to 100 people depending on the data speed set for each persons access code.

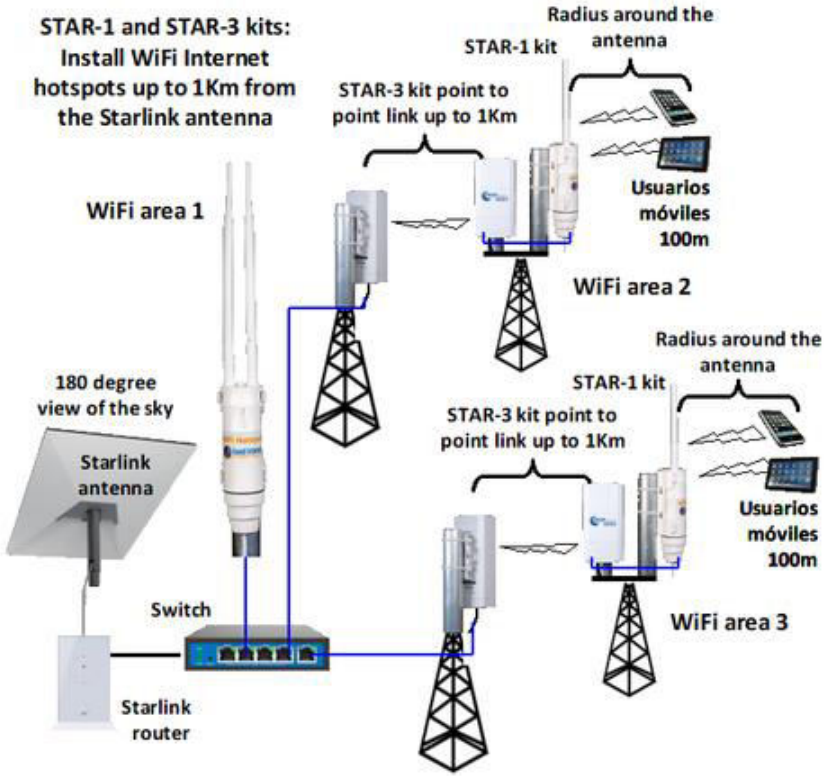
The GIS-R4 can provide credit card billing, can print access code vouchers and can also install the point of sale terminal using the Guest Internet GIS-TP1 ticket printer. The kit has full instructions and can be installed by the campground or RV park owner.



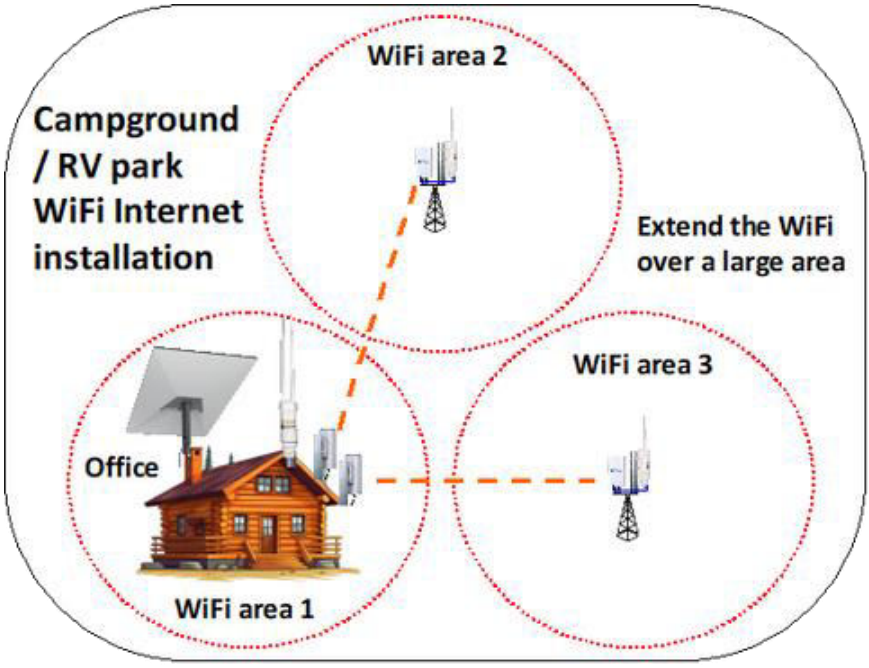
3. Provide Internet WiFi at several points around the property

A large wireless network can be built to provide WiFi Internet around a large property. The wireless network becomes more costly and complicated as the size of the area to be covered increases.

The example shown in the figure has the Starlink antenna installed on the office roof connected to an Ethernet switch. A STAR-1 WiFi kit is also installed in the office. Two of the Guest Internet STAR-3 kit point-to-point wireless links connect to the switch and the wireless links connect to two locations inside the campground or RV park. At the end of each point-to-point wireless link is a Guest Internet STAR-1 kit, this is a GIS-K7 connected to the point-to-point link client. The campground or RV park owner may need to call a network specialist to help with this type of installation.



A plan view of the campground wireless installation is shown in the next diagram. Each WiFi Internet installation in a campground or RV park is different.



4.5. How to sell WiFi Internet in Campgrounds

Campgrounds can attract more guests and have guests stay longer by providing a great WiFi Internet service

There are many reasons why every campground should offer a great WiFi Internet service for guests. A campground that has no WiFi Internet or a poor WiFi Internet service may not achieve the best possible sales potential. Eight of the most important reasons are listed below.

- Attract digital nomads, people who have a lifestyle that combines Internet work with travel, but they can only stay and work at locations that have a good Internet service.
- People who post reviews about a campground generally give a high priority to the quality of the Internet service, and this is an important deciding factor for people who read the reviews.
- People who stay at campgrounds want to post their adventures on social media via the Internet service; social media posts may be seen by hundreds of people and are free marketing for the campground, attracting more customers.
- Campgrounds in wilderness areas are very popular but there is no 5G service; guests can only communicate with family using the campground WiFi Internet service that connects via a satellite.
- Most campground owners see WiFi Internet as another cost on the business, but in fact WiFi Internet can generate a profit for the business by charging for the Internet service, or charging for some Internet service options.
- A WiFi Internet service is a channel that can be used by campgrounds to market additional paid activities to campers who connect to the service, increasing sales and revenue per guest.
- A campground can charge 3rd party vendors, such as mobile food trucks and food delivery businesses, for advertising spots with website access on the campground WiFi service.
- Families with children rely on the WiFi Internet service to entertain their children, especially on rainy days, with Netflix movies, online games and communicating with friends.

In this section we will be presenting the many aspects that are involved in implementing an Internet service in a remote location such as a campground, and why campground owners should consider offering a WiFi service with multiple options for campers.

Many campgrounds are located in wilderness areas because that is the environment that attracts people to campgrounds. In today's digital age, campers seeking solace in the great outdoors also crave the convenience of staying connected. People rely on great and stable connectivity for many tasks that include remote work, stream videos, check emails, shop online, participate with conference calls, and other types of online activities. Campground owners also rely on the Internet for their business activities that include marketing and reservations.

Campgrounds that offer reliable Internet access have become a sought-after amenity, allowing many nature enthusiasts to seamlessly blend their love for adventure with the comforts of modern technology. While some campgrounds see Internet access as an extra cost, it is actually an investment that can bring great benefits for both the campers and the campground owners.

Reasons that might prevent a campground installing and providing a WiFi service

Some of the many reasons why a campground cannot offer a WiFi Internet service for guests are listed below.

- The campground is located in a place where cable and fiber are not available.
- The natural terrain with trees can obstruct or weaken the WiFi signal leading to a poor WiFi connection.
- Some campground owners may think that because guests stay temporarily it's not necessary to offer a WiFi service.

- It is expensive to implement Internet access, as it requires expertise; many campgrounds lack the resources needed such as access to an IT person to install and operate a WiFi service.
- IT expertise is an extra expense for campground owners with charges for visits and monthly fees.
- Networking equipment can be expensive; guidance from experts is required to help with a WiFi Internet installation.

There may be other reasons why campgrounds can't implement an Internet connection.

It is essential to prepare a WiFi Internet site survey that will prepare a cost estimate and installation plan, and identify possible issues within the location. Compromises are always necessary for any successful WiFi Internet installation.

The issues with providing the campground WiFi Internet connection that the campground owner should be aware of

A USA campground that has a good 5G mobile phone service does not need an Internet WiFi service for customers from the US. However customers from outside the USA will either not have roaming on their phones, or else the cost of roaming is very high, and they will need WiFi Internet. For example, many campgrounds in the US south get visitors from Canada in the winter and they need WiFi Internet. Most campgrounds however have poor or no 5G coverage and campers depend on the campground's WiFi Internet service.

There are several types of Internet connection that a campground can use to provide WiFi Internet for guests.

- ADSL connection: the distance is limited to about 3Km from a hub. If the campground has ADSL then it will

probably have a good 5G mobile coverage. The data speed of ADSL is also too low to share with guests.

- Cable connection: this is the cable TV service with Internet and the distance is limited to about 3Km from a hub. The data speed is also low and not suitable for sharing with guests.
- Optical fiber connection: limited in distance to about 70Km from a central hub but has a good data speed to share with many guests. This is a newer technology and will have a high cost to connect a fiber service to the campground.
- 5G fixed wireless access (FWA): even when mobile phones have no 5G signal at the campground it is possible for the campground to have a 5G modem with high gain antennas that can connect to a tower several miles away providing that there is line of sight to the tower. The Internet data speed can be over 200Mb/s and then shared with guests through a WiFi service.
- Geo-stationary satellite service (HughesNet): services such as HughesNet have been in use for many years and are very reliable. Data speeds can be high enough to share with guests through a WiFi service. There may be charges for using large amounts of data.
- Low earth orbit (LEO) satellite service (Starlink): services such as Starlink provide excellent data speeds and can be shared with many guests, but with limited data use. In many cases it will be necessary to select a priority data plan and pay for additional data use when guests are using high bandwidth Internet services such as Netflix and gaming.

Remote locations have no access to ADSL, cable, fiber or FWA. The alternatives are one of the satellite services. Starlink offers the highest data speed and is therefore suitable for sharing with

guests, however the cost of the Starlink service is high, especially when using large data volumes with the priority data plan.

The campground needs a WiFi infrastructure to provide guests with WiFi Internet access. This can be a wireless router in the campground office; people go to the office to access the Internet. The next step up is to install a powerful outdoor wireless access point on the roof of the office or on an adjacent tower for more height. When the antenna is higher it will cover a greater area. The ideal height is the height of a mobile phone tower. Any buildings or trees will obstruct the WiFi signal. The ideal WiFi installation is a network of wireless access points that covers the whole area of the campground so that anyone in the campground area can get access to the Internet. This is obviously the most

expensive installation and requires a knowledgeable person to design the installation and install the network.

Problems that can arise by sharing an ISP service, such as Starlink, with many guests

All ISP's, including Starlink, have rules about how their service can be used. If the rules are abused then the ISP may terminate the Internet service. Most have three rules that must be observed.

- Don't share copyright material
- Don't exceed monthly data quotas
- Do not congest the data connection

Most copyrighted material, music and videos, are owned or controlled by a small group of companies. These companies monitor their materials carefully and they know what IP addresses are sharing the information that they own. They then file a complaint with the ISP and the ISP has to alert their customer before terminating the Internet service. The termination of the Internet service for sharing copyright material is a legal requirement of the Digital Millennium Copyright Act (DMCA), this is not a rule created by ISP's.

Many ISP's have monthly data quotas that are set for typical home use of the Internet. Sharing the Internet service with campground guests will exceed the quota that the ISP has determined for the account. If the data quota is exceeded then the ISP might slow the data service, or else might charge for the additional data used.

Data congestion occurs when many people are downloading or uploading a lot of data from one ISP Internet connection. When the demand exceeds the bandwidth of the data circuit then the connection becomes congested or blocked and cannot transfer

data. Users are then disconnected from the Internet and have to reconnect.

The requirement of sharing an ISP data service with many campground customers is that the Internet service is managed to prevent copyright material sharing, limit monthly data use and prevent data congestion when many people are connected. A product that manages the WiFi service efficiently as described is an Internet controller manufactured by Guest Internet.

What are the costs of providing a campground WiFi Internet service?

There are two types of costs when providing a WiFi Internet service, *investment costs* and *operating costs*. This is either a cost that the business absorbs, reducing the profit margin, or else a cost that the campground recovers by charging campers for using the Internet. The costs are summarized below.

Initial investment costs:

- The ISP connection, for example a Starlink antenna.
- The Internet management controller, described in the previous section, that will prevent overload of the ISP and other features such as selling Internet services.
- The WiFi network products include the wireless access points, equipment such as cables, switches and power to operate the equipment.
- The services and labor to install and configure the equipment ready for use.

If the plan is to charge customers for the WiFi Internet service then consideration must be made to amortize the initial investment as part of the charge so that the investment can be recovered.

Monthly operational costs:

- The ISP monthly service charge.
- ISP charge for additional data used during the month.
- Services to provide the campers with information to connect to the Internet.
- Maintenance of the network, repairs to cables or equipment.

The monthly operational costs are variable with the use of data and the support and maintenance services required.

Both initial investment and operational costs can be minimized if the installation uses a pre-configured kit such as Guest Internet STAR kits, and if the equipment is very easy to use and does not require an IT professional to operate it. There are Internet WiFi systems available that are successfully installed, operated and maintained by campground owners.

How to recover the cost of providing the WiFi Internet service

As described in a previous section, an Internet management controller is required to prevent copyright material sharing, to limit data use and to prevent network congestion. The Guest Internet controllers can also be used to charge guests for using the WiFi Internet service.

Guests can be charged for the Internet service by purchasing a WiFi Internet access code. Anyone who uses hotel WiFi systems is familiar with using an access code to login to the WiFi Internet service. Access codes are usually short alphanumeric codes with 6 characters. Guest Internet controllers have software installed that helps campground owners select multiple parameters.

Each access code has several parameters that are selected when the access code is created.

- Type of access code, can be a short random alpha-numeric sequence, a custom name, a description, or a device MAC address used when connecting a TV to the Internet.
- Duration of the Internet access, this can be from minutes to months.
- Optional start date for the Internet access, the Internet is available only after this date.
- The maximum download and upload data speeds permitted, this is essential to prevent network congestion.

- The maximum download and upload data volume, this is essential to prevent excessive use for data.
- The number of people that can use one code, set to 1 person but can be increased.
- Optional start and stop of the code duration to extend the use.
- Methods of charging for the Internet service are;
- On-line purchase of an access code using a credit card.
- Point of sale purchase in the campground store using a receipt printer to print the access code, with 10 button options for access time, data speed and data limit.
- Print vouchers with access codes for sale in the campground store.

The campground owner can also make a decision about how a guest is charged for the WiFi Internet service; some of these options are listed below.

- A daily or weekly charge which is the same for all guests.
- Give each guest 30 minutes of free access each day, charge for a full day access.
- Have a low charge for a slower data speed and then charge a higher price for a faster data speed.
- Combinations of the above, or create more options.

Charges for the guest WiFi Internet service are determined by factors such as limited or no 5G access and also the types of guests that the campground attracts or wishes to attract. The campground WiFi Internet service availability and quality should be a prominent feature of the campground advertising.

Other essential features that the Guest Internet management controllers have

The Internet management controller has other essential features that ensure all guests have a good WiFi service and that the service is not abused by anyone. Some of the essential features are listed below.

1. Firewall

The firewall provides a means of applying controls on the use of the Internet service, in several areas.

- Blocking Torrent data packets to prevent sharing of copyright material.
- Block devices that have viruses, which will disrupt the Internet service, for example DDoS viruses.
- Block access to private address ranges, this is part of the PCI DSS compliance requirements to protect the campground point of sale (PS) from attack and possible credit card theft.
- Blocking routers to prevent a mobile phone being used in the hotspot mode to provide Internet for others without payment.
- Blocking network access attempts by duplicating an allowed device MAC address obtained through “packet sniffing”, this method is called MAC spoofing or MAC cloning.
- Domain or IP address block list, blocks access to the listed website.
- Domain or IP address white list, allows access to a website without login or payment.
- MAC address allowed list, any device MAC address in this list is allowed access to the Internet however firewall rules

are applied. This is complementary to the MAC access code described previously.

- MAC address blocked list, any device that attempts to breach a firewall rule is added to this list. Any device can also be manually added to this list.

2. Cloud management

A cloud service that permits remote access to one or more Internet management controllers to monitor what is happening and remote configure some parameters. The cloud service has the following features.

- The cloud services permits remote monitoring of a location, the campground owner can manage the WiFi when traveling or can hand over WiFi service management to a remote business.
- Use of the ISP connection (WAN connection) over a period of time (hours to weeks) to monitor ISP data use and to identify any points of network congestion so that the WiFi access parameters can be changed.
- Monitor the number of people who are connected to the WiFi network and using the Internet service. Identify users who are consuming excessive volumes of data if necessary.
- Remotely update the login page to add community messages, announcements and advertising.
- Monitoring of equipment performance.
- Add Internet controllers to groups so that a group of locations can be monitored and the performance measured.

- Create access codes for Internet controller groups so that any Internet controller in that group can authenticate the code.
- Print group codes onto vouchers for sale, print up the 10,000 vouchers at one time.

3. Failure monitoring

Three parts of the WiFi Internet system should be monitored for failure with an alert sent to the campground owner to request an immediate repair. Monitoring is a feature of the Guest Internet controllers combined with the cloud management system.

- The ISP service: monitor for a connection failure.
- The Internet management controller: monitor for product failure.
- The wireless access points that provide the WiFi service: monitor of a failure of any one.

4. Integration of the campground WiFi service with other software systems

Many campgrounds rely on online reservations systems to sell campground space to customers, with some customers making reservations over a year in advance. The reservation system might send out the gate key code to allow the customer to enter any time of the day or night. Some reservations systems also work with the campground Internet controller to send a WiFi Internet access code to the guest when the reservation is made. Reservation systems integrate with the Internet controller using an application-programming interface (API). There are two types of API that can be used.

- The API provided by the campground Internet controller that is accessed by reservation software installed at the campground. The reservation system fetches the access code to send to the guest.
- The API is provided by the cloud management system so that a company that develops and operates reservation systems for a number of campgrounds can access the cloud to fetch an Internet access code for a specific campground of for a group of campgrounds and then send the code to the customer who made the reservation.

Reduce installation and operating costs of the campground WiFi Internet service

Installation and operating costs of a WiFi Internet service are a barrier for many campgrounds that prevent them from providing the service. The campground owners hear the requests of campers for WiFi Internet, but are reluctant to spend an unknown amount of money with something that they don't understand. They reason that the system they contract may not work, and the initial costs will spiral out of control.

The concerns that campground owners have about a WiFi Internet investment have been minimized by manufacturers that are providing products which are easy to install and easy to use.

The connection to the Internet can be made using a Starlink antenna that requires no special technical knowledge to setup and operate. Starlink has made the process of installing and operating the antenna very easy using a phone app that has all the essential features to align the antenna and connect to the Internet. The Starlink priority plan provides a great service for campgrounds where the data speed is higher than the basic plan and the campground customers can have unlimited data because the campground can purchase additional data that will be charged to the customer.

Simplifying a WiFi service using pre-configured Guest internet STAR kits

The installation and operation of the guest WiFi system that connects to the Starlink antenna can be simplified by installing a pre-configured Guest Internet kit that includes the Internet controller and the WiFi wireless access point. The Internet controller requires a simple setup that uses a quick start wizard to install the login page. The generation of access codes and voucher printing is explained with comprehensive documentation that comes with the kit. The Guest Internet cloud service is free to use and Guest Internet provides free support via the website.

The combination of the Starlink antenna with the Guest Internet management and WiFi kit is suitable for the campground owner to install and operate. The campground can sell vouchers to campers for access to the WiFi Internet, or the campers can purchase Internet access online using a credit card. The Guest Internet campground kit is identical in operation to the Guest Internet system for airport WiFi Internet that many International airports have to provide WiFi Internet for travelers.

Many campground owners around the world already use the Guest Internet system to provide and sell a WiFi service to guests and are very happy with the reliability and simplicity of the system, it just works.

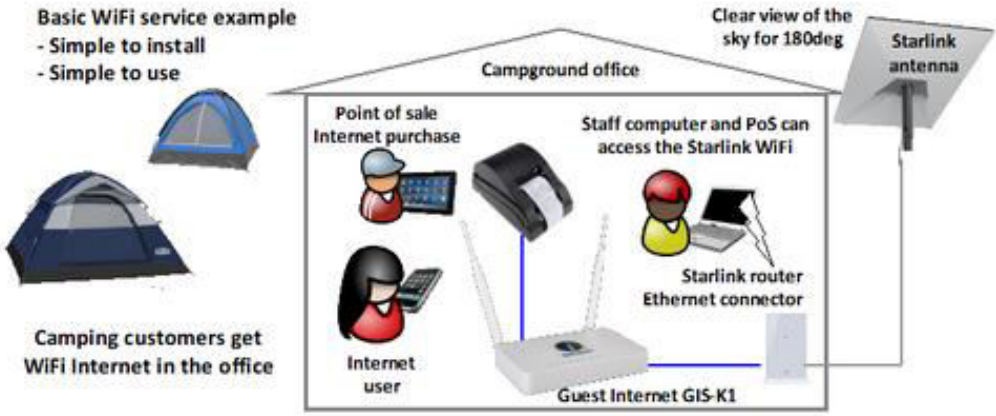
Three methods of providing WiFi Internet for campgrounds

There are several methods of installing and operating a campground WiFi service. A simple installation will not provide WiFi coverage of area that guests would like to have, while a WiFi service that covers the whole campground area will cost more and have some technical challenges.

Three methods are described here that differentiate in terms of cost and area of coverage for the guest.

Method 1: Point of sale (PoS)

A very simple method of providing WiFi Internet and charging the guest is to install a WiFi point of sale in the campground office. The guest goes to the campground office to connect a mobile device to the Internet and purchases the access from the point of sale system. This system is shown in the diagram.



The WiFi point of sale is a Guest Internet product and has a WiFi wireless controller (the Guest internet GIS-K1) with a thermal receipt printer (the Guest Internet GIS-TP1). The GIS-K1 combines a wireless access point with the Internet controller in one product. There is no limit to the number of people that can connect to the GIS-K1, however for good Internet performance the number should be less than 25 people.

The GIS-K1 connects to the Starlink router Ethernet port for the Internet service. The Gen 1 and Gen 2 Starlink antennas require the purchase of the optional Ethernet port. The Gen 3 Starlink antenna includes the Ethernet port in the router. The GIS-TP1 can connect to an automated cash drawer if required. A computer or a tablet connects to the GIS-K1 point of sale (PoS) software with

up to 10 buttons on the screen; each button represents a duration of access, a data speed and a cost.

The guest chooses the type of service that they want to use and the campground staff taps a button on the display. A receipt is printed with the access code for the WiFi internet. The guest can then connect the mobile device to the WiFi and enter the code into the login page. The guest then has Internet access for the duration of time and the data speed specified by the access code. The campground owner can easily install the GIS-K1 and GIS-TP1 products and also configure and operate the system to issue the receipts.

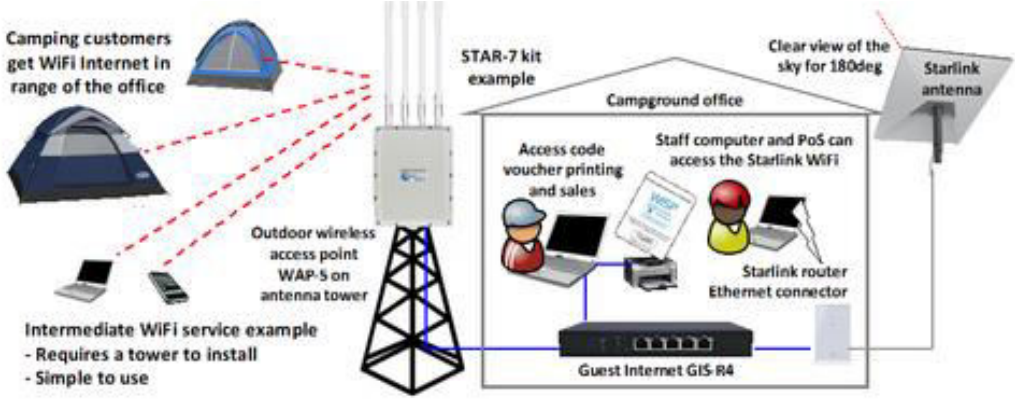
Method 2: Covering a larger area with Guest Internet STAR-7 kit

Campgrounds can enlarge the WiFi service area around the campground office by installing a Guest Internet STAR-7 kit. The Star-7 kit has two parts.

The Guest Internet GIS-R4 controller (black box) connects to the Starlink router for Internet access. The GIS-R4 can charge guests for the WiFi service via on-line credit card payments to the campground account.

Alternatively the campground owner can print vouchers with access codes for sale in the campground store. The WiFi access codes can be printed via the software installed in the Guest Internet controllers. The GIS-R4 connects to the powerful outdoor wireless access point WAP-5 (white antenna) that is installed outside the campground office; either on the office roof or on an adjacent tower.

The connection range is improved when the wireless access point is at a height above the treetops, the higher the better. The next figure shows the STAR-7 kit installation.



The installation of the STAR-7 kit requires some construction work to install the WAP-5 wireless access point high enough to have a good range. The configuration and operation of the system once installed is explained in the document that is included with the kit and does not require any network expertise.

Regarding the range, with no obstructions and the WAP-5 installed in a high tower, a mobile device might communicate

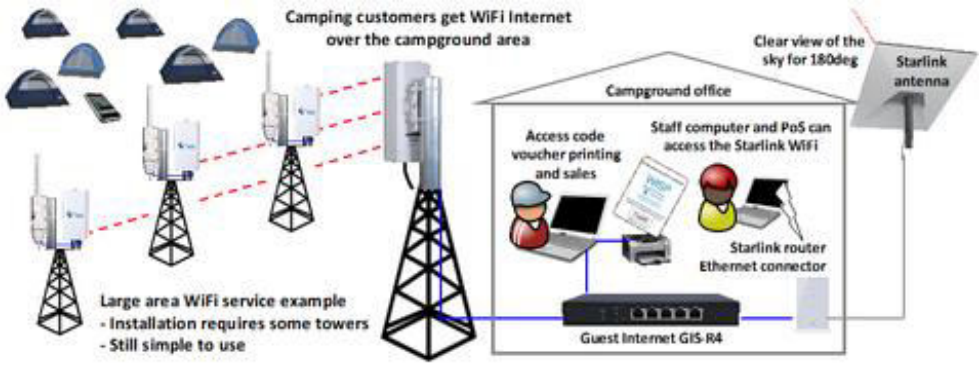
within a range of 100 meters. It will depend on the WiFi technology of the mobile device trying to connect and any obstructions such as buildings or trees will weaken or block the signal.

Method 3: Extending the WiFi range for the whole campground

Installing wireless access points throughout the campground area can extend the range of the WiFi. Each wireless access point is connected back to the campground office with a point-to-point wireless link. This installation requires computer-networking expertise to design and install. Each campground requires a unique project developed by a company that is specialized with the installation of outdoor WiFi networks.

The next diagram illustrates the network installation that will provide WiFi access over the whole campground area.

The design depends on the *size of the area*, the *type of terrain* and *the obstacles* that will block the WiFi signal, such as buildings and trees. The campground can call a network specialist company to prepare a design and estimate the cost of the installation.



When planning a project of this scale the campground owner must analyze the investment and potential income that can be generated by the WiFi system to ensure that there is a return on the investment. After analysis it may be necessary to scale down the project design to reduce the cost.

Of the three levels of project describe here the project that will give the best results is the Guest Internet STAR-7 kit. The range is limited and so guests that are further away from the antenna location may not be able to connect to the WiFi, however the investment is low and the project installation is simple so that the campground owner can install without calling a technical specialist.

The process to print vouchers with access codes

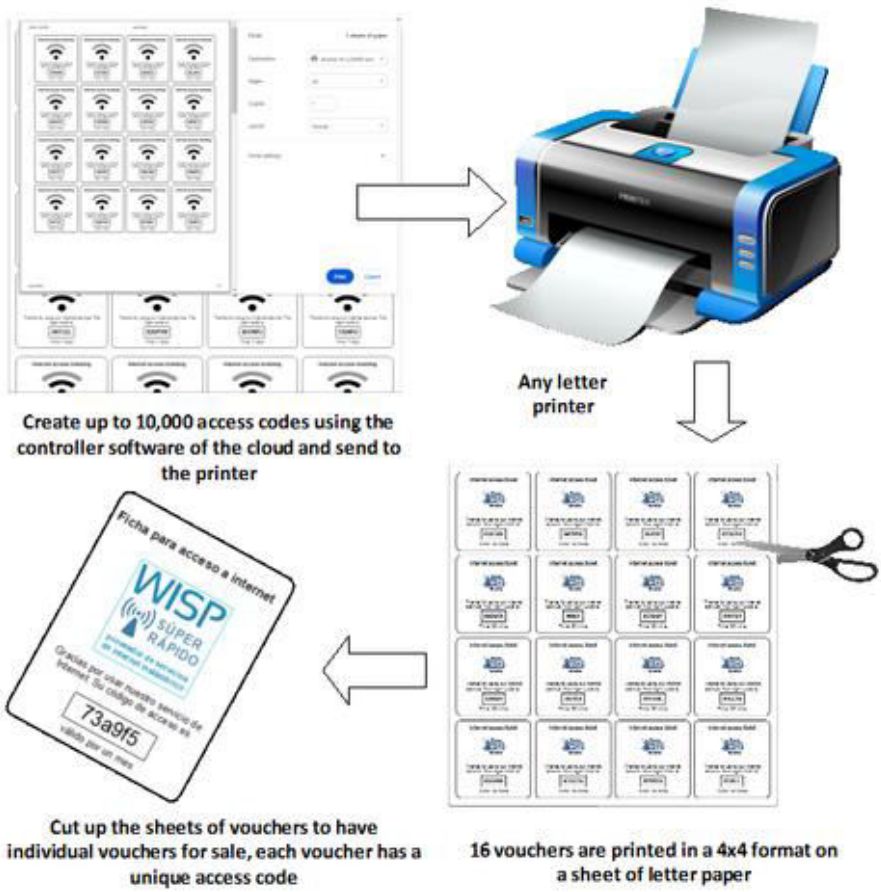
Vouchers with access codes can be printed using the Guest Internet controller for use with that controller, or printed using the Guest Internet Cloud to provide codes for a group of controllers.

- Access code vouchers that are printed using the Guest Internet controller can only be authenticated with that controller.
- Any controller in the cloud group can authenticate access code vouchers that are printed using the cloud for a group of controllers.

Before printing any vouchers, the voucher template must be prepared in the controller or the cloud. All the customization is done by logging in to the Guest Internet customer account, which is created once a Guest Internet controller is purchased. The text that will be printed on the voucher is uploaded to the template along with the business logo in JPG format.

The procedure to print vouchers is illustrated in the next diagram. Access codes are created using the controller software or the

cloud group. Then the button to print the codes as vouchers is clicked. Vouchers are sent to the letter printer attached to the computer. The printed pages are then cut into vouchers and the vouchers can be sold to campground guests.

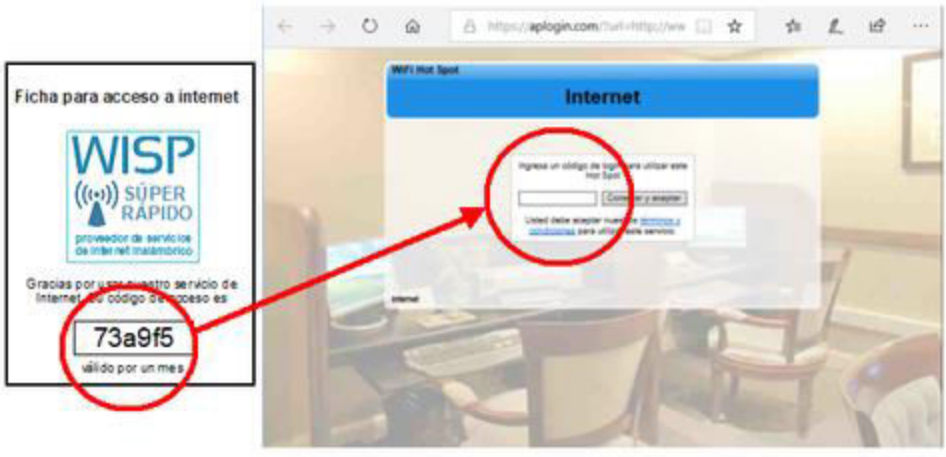


The procedure for the guest to access the Internet

The camper who wants to connect a mobile device to the WiFi Internet service must first get a voucher with an access code from the campground. The camper can connect the mobile device WiFi

to the wireless antenna by selecting the name of the WiFi (the SSID) using the mobile device.

The next step is to open a browser to see the login page, an example of a login page is shown in the next figure.



The code on the voucher is typed into the login page then the button is clicked. If the code is valid then the person gets access to the Internet with the duration and data speed specified by the code.

Guest Internet makes the process of managing, controlling, monitoring and selling WiFi easy. The Internet controllers are easy to operate, and there is a demo available to see how it works.

4.6. Charge for the WiFi Internet service at your campground or RV park

Campground voucher printing for Internet WiFi access

Hospitality businesses such as campgrounds are getting more people wanting to have access to better Internet speeds.

Campgrounds and RV park businesses are often at remote locations where 5G mobile coverage is limited. The business may have an Internet service that will provide guests with WiFi Internet. If no Internet service is available at the business location then the Starlink service can be used.

The installation of the WiFi system plus the monthly service charges are an expensive cost for the business. However the business can charge guests for the WiFi Internet service and make a profit with the installation.

Sharing an Internet connection with everyone at a campground means that everyone will be experiencing some type of problem: Internet is too slow, too many signal interruptions and some will not be able to connect.

Why does this problem happen? Because some people will consume more of your Internet speed than others, and neighbors that are not suppose to connect will be enjoying your Internet connection.

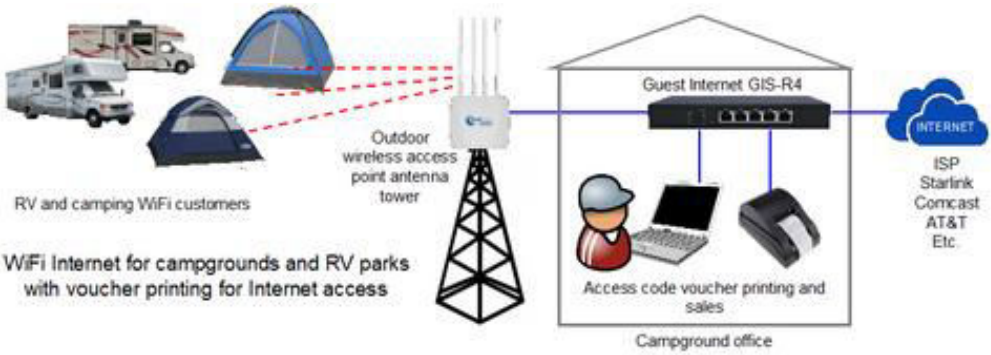
How to solve the Internet WiFi access problem?

Connect a Guest Internet controller such as Guest Internet GIS-R4 to your Internet connection, add a Guest Internet GIS-TP1 ticket printer to print out the WiFi access codes and give a code to each guest when they arrive.

There are two methods of charging for the WiFi Internet service when a Guest Internet controller is installed.

- Print vouchers with access codes in the office and sell vouchers to guests.
- Guests can pay online for the service using a credit card.

The diagram below shows how the WiFi Internet service is provided for guests. The Guest Internet controller manages the service. A wireless access point can be installed in the office for guests and staff to use. An outdoor long-range wireless access point is installed at a high point, on the building roof or on a mast so that it is visible from all points of the campground or RV park. When guests connect to the WiFi they will see a login page. Then they enter the voucher code that they purchased to get access to the Internet.



With Guest Internet you can specify the duration of the code, how much speed people can use to make sure they don't abuse the service and stay connected. It's a great way to keep your Internet service organized and safe.

You can either sell the codes if you want to monetize from your Internet connection or you can give the codes and include the cost in the campground or RV park fee.

The advantages of using a Guest Internet controller, besides organizing how your Internet connection works for guests are:

- The neighbors will not have access to your Internet connection, which improves the bandwidth for everybody else trying to connect.
- It adds layers of protection against malware, preventing your computer network from being infected costing you lots of money to repair.
- You can manage everything remotely, you don't have to be at the site to control how your WiFi service works.

4.7. How to end campers' frustration with WiFi in a campground

Camping has become increasingly popular in recent years, with more and more people seeking to reconnect with nature and enjoy the great outdoors. Campgrounds are getting creative and are diversifying their activities to attract more people. However, one persistent issue that many campers face is the challenge of getting a proper and reliable internet connection via a campground WiFi.

What do campers want?

As more people want to stay connected while away from home, they expect to have high-speed internet while away, and that includes campsites. What is supposed to be an important amenity, has become a frustration for many people leading them to complain about the unreliability, and most often the service is not adequate for their needs.

These are the most common complaints:

- The speed is too slow.
- Overcrowded network, too many people connected at the same time.
- The connection is unreliable, often disconnecting people.

Why do campers need to have Internet access?

Campers may need to do video conferencing, access certain applications that are only available online, distance learning, download and upload files and may also want to stream videos during their leisure time. If a campsite doesn't have the Internet infrastructure to provide for the demands, people will move to a different location so that they can have a reliable Internet connection.

To be able to provide a better WiFi service is necessary to add a Guest Internet controller, which is a network product that has all the features necessary for a campground to offer a managed WiFi service. Guest Internet shares the Internet connection between many people and sets rules to prevent abuse of the service. Without a Guest Internet controller, the campground WiFi fails to deliver the necessary bandwidth and speed to everyone staying at the location.

The increase in WiFi service complaints and the demands of campers looking for places with WiFi service is leading campground owners to look for solutions.

Campground owners and similar hospitality businesses should consider offering a managed WiFi service at their premises as many campers only consider staying if there is a reliable, high-speed Internet connectivity. Having access to the Internet has become an essential part of a camping experience.

The campgrounds struggle

Many campgrounds struggle to provide a satisfactory WiFi service to campers and some have been neglecting to do it because:

- Don't know how to do it.
- Have a limited budget.
- Get frustrated with all the technology involved.
- Afraid of how much the implementation is going to cost.
- Confused with different advice.
- Don't want to be tied up with an IT firm to run the WiFi service.

There are two ways that campground owners can provide a WiFi service

Invest in an expensive solution which involves buying products, contract an IT company to manage the WiFi service, pay extra for support and changes needed in product configuration, firmware upgrades and other costs involved.

OR

Install a Guest Internet controller with all the features already available for the campground that is ready to use and any

campground owner can configure the service by selecting the preferred options with a click of a button. With Guest Internet products campgrounds can monetize from their WiFi service helping them to get back some of the money invested in the infrastructure and pay for the Internet costs. Guest Internet provides free support, firmware upgrades, cloud management account to manage the WiFi service remotely.

Guest Internet products empower campground owners, so they can manage the entire service without depending on third parties to do it for them, and can save a lot of money when managing the service themselves. Guest Internet support team works together with campgrounds to help with any modification in the service if necessary at no extra cost.

Campground owners are finally free from unnecessary costs, saving more money to invest in the property!

Guest Internet controller installations in campgrounds

The first diagram shows the Guest Internet service connected to an ISP where an Internet service is available.

The second diagram shows the Guest Internet service connecting to a Starlink antenna so the campground can provide WiFi Internet when there is no local service.

Guest Internet can improve the Internet performance where an ISP connection is available by adding a Starlink satellite connection. This adds the data speed of both networks with the added benefit of extra reliability; if one network fails then all users are moved to the working network automatically.

What can Guest Internet controllers do for a campground and similar hospitality businesses?

A Guest Internet controller can do many things, it has hundreds of features that are very valuable to property owners wishing to offer a WiFi service, and the main ones are listed below.

- Controlling and maintaining a WiFi service has never been so easy.

- There is no extra cost after purchase of the Guest Internet controller.
- It's designed for campground owners, easy management.
- Make an internet connection totally reliable.
- Prevents unauthorized access by giving everyone a WiFi access code.
- Promote your business via the login page, boosting your social media engagement.
- Ends campers frustration, everyone is satisfied with the WiFi service and they can recommend it to others.
- Connects more than 1 ISP, adding up the bandwidth so there is more bandwidth available to everyone.
- Isolate your campground WiFi from the campers, its better and safer.
- Has a powerful firewall to protect against malware and cyber attacks.
- Offer FREE or PAID WiFi access.
- Determine the speed for uploads and downloads, WiFi access duration, etc.
- It tells you when some other component of your network fails so you know what to do.
- It breaks you free from being tied up with an IT company just to run the WiFi service.

Conclusion

Campground owners can easily and confidently manage a WiFi service, make changes when necessary without paying for IT visits. Guest Internet products ensure that campers can stay

connected, feel productive and entertained while they are enjoying the outdoors of a campground. As the campground industry continues to evolve, WiFi services are becoming crucial to attend demanding campers who need better connectivity to perform tasks. By addressing the root causes and working together with campgrounds, we can ensure the success and satisfaction of campground owners and similar hospitality businesses.

4.8. Six steps to improve the WiFi service in campgrounds

A public WiFi service is essential for vacation destinations like RV parks, glamping and campgrounds.

The WiFi Internet is in demand at remote locations because often 5G services are difficult to access or cannot be reached. Vacation locations face unique challenges for public WiFi Internet, and some are listed below.

1. Improve WiFi wireless coverage for a large open outdoor area.

2. Provide wired Internet connections for RV parking pads as part of the services.

3. Improve the performance of the guest WiFi Internet service when guests complain that the Internet is slow.

4. How vacation destinations at remote locations can provide a WiFi Internet service for guests.

5. Vacation destinations can provide Internet access when guests arrive at any time of the day or night.

6. Hospitality businesses and vacation destinations can keep guests informed about benefits and events.

Technical solutions are available to solve the WiFi Internet issues that guests often complain about. Let's look at each of these.

1. Improve WiFi wireless coverage for a large open outdoor area

Many large outdoor vacation destinations such as RV Parks, Glamping sites and campgrounds provide a WiFi Internet service for guests and visitors. WiFi is essential for all visitors, especially where there is a poor or no 5G mobile service. People want to upload photos and videos to social media to share with friends. This is important for any vacation business as it represents free marketing so it is in the businesses best interest to ensure that guests get a great WiFi service. Most vacation destination business managers see the Internet service as a cost, however it is a valuable marketing resource that can be exploited in three ways.

- A great Internet service gets great reviews, attracting digital nomads, remote workers and other people that need the connectivity.
- Guests using the Internet to interact with social media are providing free advertising for the business.
- The Internet service can be used to advertise a range of services and benefits provided by the vacation business.

The WiFi coverage of a large outdoor area can be improved by understanding the rules of WiFi technology, four important steps that can be taken are listed below.

- WiFi communication is line-of-sight, this means that the guest has to see the WiFi antenna in order to get a good signal, trees and buildings will block the WiFi signal. It is important to put the WiFi antenna on top of a tall tower, above trees and buildings to ensure that guests get a good line of sight connection.

- Popular omni-directional or stick antennas disperse wireless power in directions that are not needed. Better range can be obtained by exchanging omni-directional antennas for directional antennas that point in the direction where guests will be using the Internet.
- WiFi technology is low power, much lower then a mobile phone tower and has a range of a few hundred feet. Most of the wireless WiFi units have much less power than is permitted by the FCC. Large areas require more WiFi antennas to be installed to get good coverage.
- There are a few high power WiFi wireless products that provide the maximum power allowed by the FCC, that have special directional antennas, called sector antennas. Sector antennas are installed on top of mobile phone towers. Upgrading existing WiFi antennas to the more expensive high power wireless and antenna configurations will increase the range of the WiFi.

Vacation businesses that provide the best WiFi Internet service will see the benefits of their WiFi investments in new customers, extended stays and return business.

2. Provide wired Internet connections for RV parking pads as part of the services

RV parks provide services at each RV pad that include water, electricity and sewer. Often the Internet connection will be overlooked and a WiFi service will be provided. Connecting each RV pad with a fiber optic data cable can provide a much better Internet service. Copper Ethernet cables are not suitable to connect pads as they have a limited distance of 300 ft maximum, whereas fiber has a maximum distance of 45 miles.

Many RV Parks provide pad services through underground channels that have space for additional cables and so a site can be

upgraded for a fiber RV connection. Fiber Internet is definitely a marketing plus as all RV'ers want good Internet access. During the planning phase for a new RV Park the installation of fiber data cables is as important as the water and electrical connections. An RV park that cannot be upgraded to provide optical fiber cables but provides WiFi Internet has an alternative to improve the Internet service. This alternative is to provide guests with a WiFi receiver with a good long-range antenna. WiFi receivers with good antennas are frequently purchased by RV customers.

3. Improve the performance of the guest WiFi Internet service when guest complain that the Internet is slow

If a hospitality business or a vacation destination can install a multi-gigabit optical fiber Internet connection then there will be ample bandwidth for hundreds of guests. For most businesses however the availability of high-speed Internet circuits is very limited. Many businesses are using an ADSL Internet connection as that is the only service available. Some locations have optical fiber but data speeds can be limited when a fiber distribution network has many customers with limited Internet connection capacity. Hospitality and vacation businesses in rural areas have fewer options available and guests may complain that the Internet is slow. A business has two actions that it can take to improve the Internet speed for each guest.

- Manage the service to limit access to authorized guests and manage the bandwidth for each guest. This means providing authorized guests with access codes and limiting each guest bandwidth so that a few guests downloading fast data streams don't make the service slow for everyone else. If necessary data caps can be added to the service.
- Add a second or third Internet service provider so that the sum of the Internet speeds is available for guests and if

one connection fails the guests will fail-over to the working connection, improving reliability. A second or third Internet connection can be a 5G data service or a Satellite service such as Starlink.

Guest Internet managed WiFi gateway products manage both the guest Internet connection and also manage the number of connections to the Internet to share the service. Different Guest Internet models can connect two or four Internet service providers to give guests the total bandwidth of the providers.

4. Vacation destinations at remote locations can provide a WiFi Internet service for guests

Many vacation destinations such as campgrounds and RV Parks are located in wilderness areas because that is what attracts guests and visitors. The problem with a remote area is lack of services. Water can be obtained from a well; electricity can be transported hundreds of miles over cables or generated locally, however a connection to the Internet is a problem for all remote locations. The maximum distance for DSL is about 3 miles from the central switch. Optical fiber can have a distance up to about 45 miles however it is very expensive to install. The only viable alternative for many remote locations is a Satellite connection. HughesNet provides a popular satellite Internet service that is suitable for homes but does not have the bandwidth for guests at a vacation destination to use. Starlink is a more recent development that does have the bandwidth to share for a guest WiFi Internet service. The basic Starlink service has a data speed in the range of 150Mb/s to 200Mb/s. Starlink also has a fast service for businesses with a data speed up to 500Mb/s. Guest Internet products have the features to share the Starlink service between many guests, as listed below.

- Ensure that only authorized people are using the service; provide a login code.

- Optionally charge for the service to recover some or all of the costs with a slow free plus fast charged service.
- If providing a free plus charged service consider blocking high data volume websites such as Netflix from the free service.
- Set maximum data speeds for users so that the available bandwidth can be shared.
- Prevent abuse of the service that will degrade the Internet performance for everyone.

Guest Internet products will ensure that guests and visitors are delighted with a WiFi Internet service using Starlink.

5. Vacation destinations can provide Internet access when guests arrive at any time of the day or night

Most vacation destinations have on-line reservation systems. Some destinations like campgrounds and RV parks don't have staff available 24 hours of each day, and the entrance may be staffed from 8am to 5pm.

Many reservation systems send a gate access code when the reservation is made so the guest can arrive at any time of the night and get access to the campground or RV Park. Some reservation systems also provide the access code for the WiFi Internet together with the gate code so that guests who arrive at night can connect to the Internet to receive and send messages.

Guest Internet products have two types of application programming interface (API) that permits a software business with reservation and property management systems to provide the Internet access code for guests at the time of making the reservation.

6. Hospitality businesses and vacation destinations can keep guests informed about benefits and events

A public WiFi Internet service for guests and visitors can be provided with a login page, which is a great method of communicating with the public. The login page is a good location to provide information about the business; an RV park can list the rules about littering for example.

Businesses can offer additional services and provide a link to a web page that provides more information. Another example is a campground that can advertise and sell nature treks, kayaking and campfire cooking lessons.

Businesses can also offer advertising space for other businesses that want to sell to the guests and visitors. For example an RV park can sell advertising for food trucks that visit the park or for a mobile dog grooming service for the visitors' pets.

The login page is a great tool to recover the costs of the Internet service by using it for marketing. Guest Internet products provide three easy methods of creating powerful login displays, which can include any feature that is available for the web site designer.

When a campground or RV park provides a great Internet service the results will be a higher occupancy rate, extended stays and return bookings. Many people who stay at campgrounds and RV parks are working while traveling; they are called digital nomads or remote workers, and can only stay at locations with a good Internet service. They read the visitor reviews and make reservation decisions based on the availability of a great Internet service.

5. Sell WiFi Internet in rural communities

5.1. Access to the Internet is essential for rural communities

About two thirds of the world population has access to the Internet. The one third that does not have Internet access is the 2.6 billion people who live in remote rural communities and people with limited economic means.

People want to connect to the Internet. The Internet will give them access to communication, access to information, and opportunities to trade over a larger area or internationally. Many see the Internet as a means to improve their situation economically.

Many countries have developed economically in urban areas but development has been very limited for rural areas so that basic infrastructure is not available to that part of the population living in rural communities. Such countries are located in Central and South America, the Caribbean, Africa and parts of Asia. Lack of infrastructure means no telecommunications services, intermittent or no electrical power, and limited access to clean water. Even with such difficult conditions the younger community members will make sacrifices to get access to the Internet.

Starlink brought hope to rural communities who need access to Internet

Satellite Internet services, such as Starlink, can be installed in rural areas that have no infrastructure but the cost is high, well outside the ability of one member of a rural community to afford the service. However some communities have been proactive to

combine resources so that they can purchase a Starlink antenna to share the Internet service.

Many communities have been using Guest Internet products for the past 10 years to implement sharing of an Internet service, starting with the HughesNet geo-stationary satellite service, and now with the Starlink low earth orbit satellite service.

If 100 families share a Starlink service then the data speed for each family is very low by the standards of North America and Europe, however the data speed is sufficient to get access to communications and the information that can initiate a cycle of economic improvement for the community. If 100 families share the cost of the Starlink service then each can afford their fraction of the service.

What is required to share a Starlink service between 100 families?

The answer is to limit and control access for each member of the community by providing a unique access code for each person. The access code sets limits on the Internet use by imposing the following restrictions.

- Limit the duration of access to the Internet, programmed into each code.
- Prevent codes being shared between community members by assigning each code to a device MAC address when first used.
- Set the maximum download and upload speeds, this is the speed of the Internet service approximately divided by the number of access codes issued. If many people connect to a service without an individual speed control then the service will suffer network congestion and people will get disconnected from the Internet. The ISP will flag this as abuse of the service.

- Limit the maximum data that can be downloaded, many ISP services don't have an official data limit but will flag a customer for excessive data use, and in the worst case suspend the service.
- Prevent the sharing of copyright material; if the copyright owner complains to the ISP and provides an IP address then the ISP has a legal obligation to suspend the service to that customer; this requires blocking Torrent and similar file sharing applications.
- It may be necessary to block access to some high data volume websites in order to ensure that the total data use of the service does not exceed a monthly expectation.

It is also essential that the Internet service data link be monitored to ensure that the Internet connection is not reaching saturation which will lead to network congestion, and that the total monthly data volume is not exceeded. The administrator can make adjustments to the service to keep the parameters within limits. The administrator can also identify the individuals who are using excessive data volumes and restrict or deny service to those individuals.

Print WiFi access codes to distribute in a community using Guest Internet controllers

The access codes are printed onto vouchers for distribution to community members. In order that the cost of the service is shared fairly between individuals, a charge can be made for each voucher; the person who uses more data pays more for the service.

The community has to build the WiFi infrastructure so that each home has an Internet connection. The cost of the WiFi products is low however members of the community must learn how to install and configure the products. Guest Internet makes this

process easy by providing written materials in Spanish that make what might be a technically complicated process into an easy to understand process.

Many rural communities with intermittent electrical power have installed solar panels, batteries and chargers to power the satellite antenna and WiFi equipment. People in the rural communities connect to the WiFi Internet using low cost mobile phones; the mobile phone has become the accessible personal computer.

The satellite service providers will benefit by providing rural community infrastructure and support. The opportunity worldwide is big. Of the 2.6 billion people who do not have Internet access it is possible that 500 million people who live in rural communities can financially support the satellite receiver and infrastructure investment, and monthly service fees. This might represent 5 million communities, which will add 5 million accounts to the satellite provider portfolio. In order for this to happen the satellite service providers have some gaps to bridge.

- Improve global logistics to deliver receivers to remote areas.
- Accept payments through regional payment methods, most rural community members do not have credit cards, much less international credit cards, however many countries have payment methods that are cash based.
- Provide support in many languages with videos that explain the installation process.
- Offer community infrastructure components bundled with the satellite antenna.

It is not necessary for the Satellite provider to make the investments listed above, but the provider can seek partnerships with country-based businesses that can provide communities with products and services. The partner can receive monthly service

payments from customers using local payment methods then pay a consolidated fee to the satellite service provider.

It is likely that the Satellite providers are not aware about a business opportunity that could add 5 million accounts. It might be possible that the satellite companies are aware of the opportunity but prefer to dedicate their efforts to the high-income customers with ships and businesses.

5.2. How to share and sell Internet for a community

Some locations have many Internet providers who sell to the Internet service and some locations have no providers. This list explains methods of connecting to the Internet.

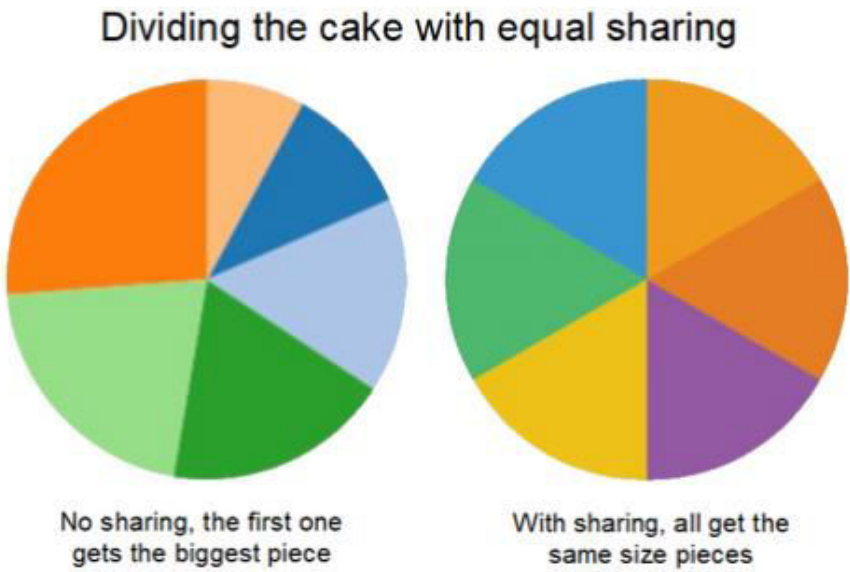
- Data via ADSL over twisted pair telephone wire, useful distance is 3Km from the central office.
- Data over coaxial TV cable, useful distance is 3Km from the central office.
- Optical fiber, GPON provides 2.5Gb/s down and 1.25Gb/s up and a single fiber can connect up to 70Km.
- LTE /5G mobile Telco, point to multi-point (PtMP), data rates can exceed 250Mb/s for 5G. The customer antenna must have line of sight to the antenna tower.
- WiFi WISP point to point (PtP), data rates can be up to 1Gb/s. The customer antenna must have line of sight to an antenna tower.
- Wireless geo-stationary satellite (HughesNet), data rates of 50Mb/s+ are available. Distance ground to satellite is 22,000 miles so latency is high.
- Wireless LEO satellite (Starlink), data rate exceeds 100Mb/s+. The antenna must have a 180 degree view of

the sky. Distance from ground to satellite is approx. 300 miles so latency is low.

Where there are no local Internet providers then the only method of connecting to the Internet is Starlink. However the cost of Starlink is too expensive for most of the earth's population; the antenna costs over $500 and the monthly charge is nearly $200. Many people in remote rural locations are already installing community Internet by sharing the cost of the Starlink antenna and service between many people. The service is shared between many people using Guest Internet gateway products. More about sharing the Internet service in the next parts of this series.

Sharing the Internet service

Sharing an Internet service from any provider between many people is like sharing a cake with many people, everyone should have an equal slice.



Without sharing, the first person to slice the cake gets the biggest piece, and there is nothing left for the person who comes last.

The Guest Internet gateway shares the Internet service between many people, just like slicing the cake into equal slices. Guest Internet shares the Internet access by giving each person an access code; access codes have the following parameters for each person.

- Type of code, usually random letters and numbers.
- Duration of access, from 30 minutes to unlimited.
- Maximum download and upload data speed in Mb/s.
- Maximum download and upload data volume in Mbytes.
- Number of people who can use the code, usually 1 person, can be more.
- Start date and start time, the code can only be used after this date.

If desired, Guest Internet can give a bigger slice of the Internet to one person.

The codes are printed onto vouchers using any printer, 16 vouchers per page are printed. The vouchers can then be cut up and given to people or sold to people to recover the cost of providing the Internet service.

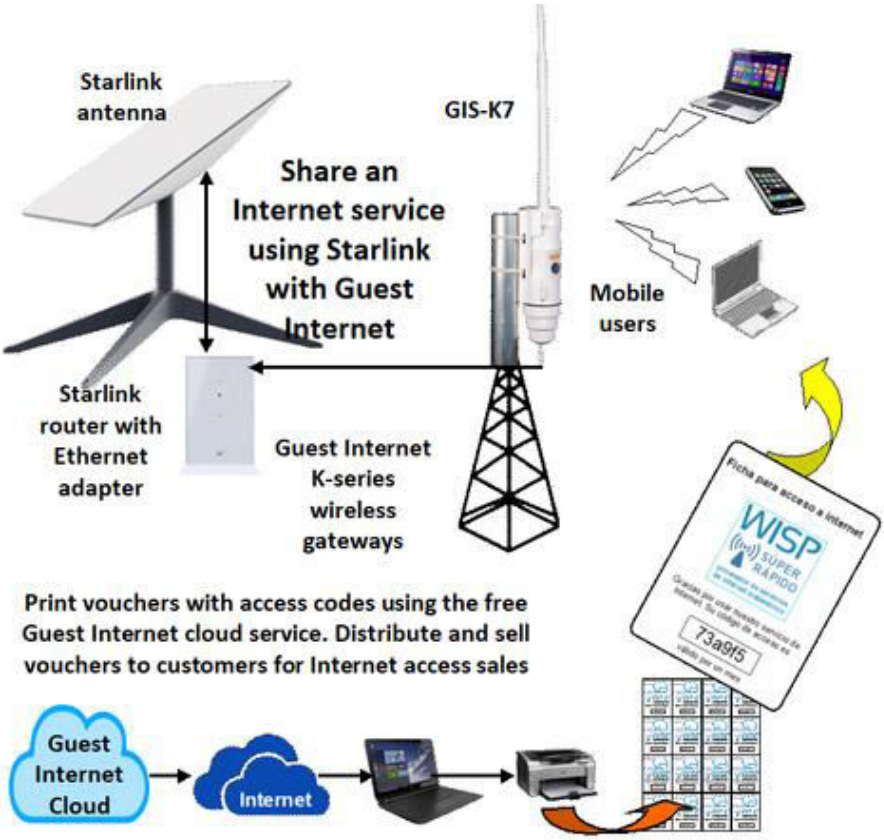
A simple system to share Starlink Internet

The simplest way of sharing an Internet service such as that provided by Starlink is using a Guest Internet K-series product. The diagram shows the GIS-K7 product, which is a powerful wireless access point combined with the gateway features that share the Internet service and print the access codes onto vouchers.

Check with the Internet service provider, such as Starlink, that your planned use of their service is within their terms and conditions of use.

The Starlink antenna and router needs the optional Ethernet connector. The GIS-K7 Ethernet port connects to the power supply and then to the Starlink Ethernet connector. Print the access code vouchers.

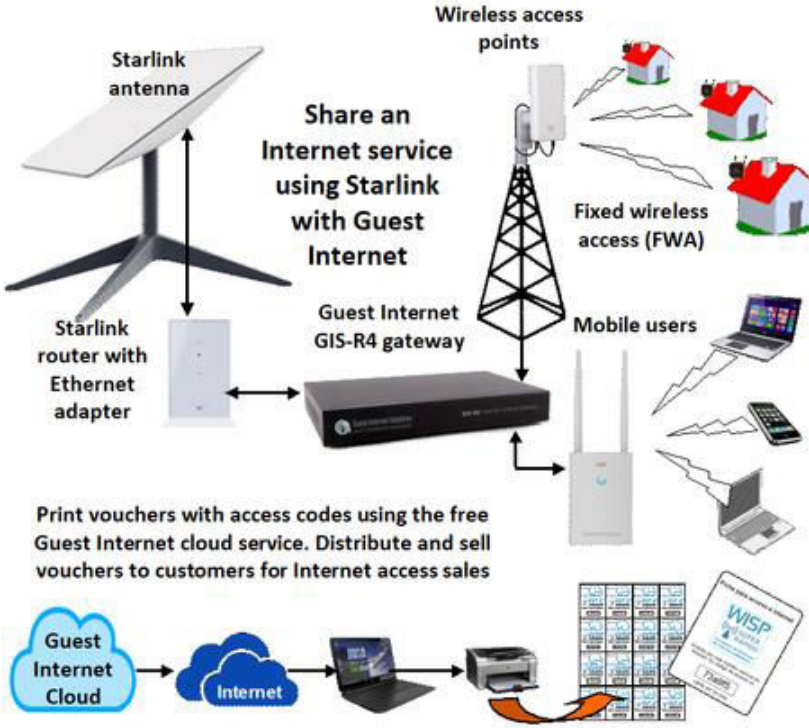
The GIS-K7 has no limit for the number of people who can connect to the WiFi but limit the connections to 25 or 30 to ensure that each user gets a good Internet service.



A high performance system to share Starlink Internet

Any Internet service such as that provided by Starlink can be shared using a Guest Internet GIS-R4 product. The diagram shows the GIS-R4 product, which is a powerful gateway with features that share the Internet service and print the access codes onto vouchers. One or more wireless access points are connected to the GIS-R4 to provide Hotspot access for mobile devices, and fixed wireless access (FWA) to homes.

The Starlink antenna and router needs the optional Ethernet connector. The GIS-R4 WAN port connects to the Starlink Ethernet connector. Print the access code vouchers using the Guest Internet cloud service, which is free to use. The GIS-R4 has no limit for the number of people who can connect to the WiFi. Starlink suggests that the number of users should not exceed 100 however limit the connections to about 50 to ensure that each user gets a good Internet service with a maximum speed per user of 2Mb/s.



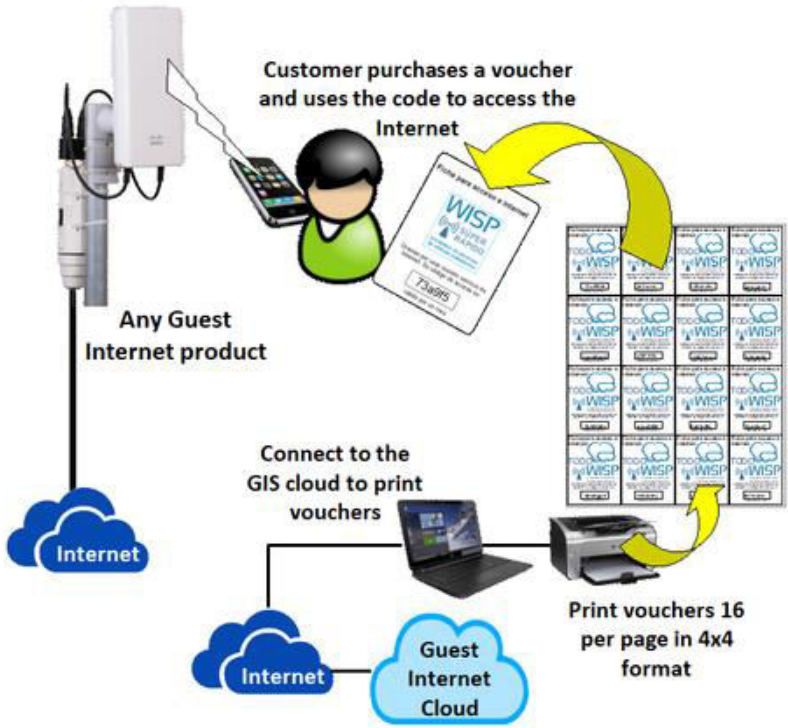
Co

Connect to the Internet WiFi service using vouchers

An Internet service that is provided by businesses such as Starlink can be shared between many people if controls are in place to prevent one person getting a large share of the bandwidth. Guest Internet products provide the controls that permit many people to share one Internet connection.

The community service provider should install the Guest Internet product together with the Internet service, which can be Starlink, and install a wireless access point to broadcast the WiFi signal.

The community service provider should use the Guest Internet free cloud service to print vouchers using the parameters the permit sharing of the service. A person can connect a mobile device to the WiFi antenna when in range and use the code from the voucher to access the Internet. The diagram illustrates the voucher printing and use process.



Connection process using the Internet access voucher codes

The person who wants to access the Internet first has to connect the device to the wireless network then open a browser. The browser will show a login screen like the one in the figure. The code is obtained from the voucher and entered in the box on the login screen then the button is clicked. The browser then has access to the Internet for the time allowed by the code.

The code determines the conditions of connecting to the Internet.

- Duration, how long a person is allowed to use the WiFi with the Internet access code.
- Maximum data speeds.
- Data download limit.
- Earliest date that the code can be used.

The parameters are selected when the code is generated. Many access codes are generated with the same parameters when vouchers are printed.

Provide Internet WiFi for mobile devices: mobile broadband

Internet access can be provided for mobile devices over a small area of radius 100m to 200m providing that the wireless access point is visible to the mobile device. The mobile device installation is suitable for a location where people frequently visit, such as a town square or a supermarket.

Ensure that there are no obstructions between the wireless access point and the mobile device. Obstructions that include walls, buildings and trees will block the WiFi signal.

The distance between the wireless access point and the mobile device is limited due to the limitations of the WiFi antenna in the mobile device.

Provide Internet WiFi for homes: fixed wireless access (FWA)

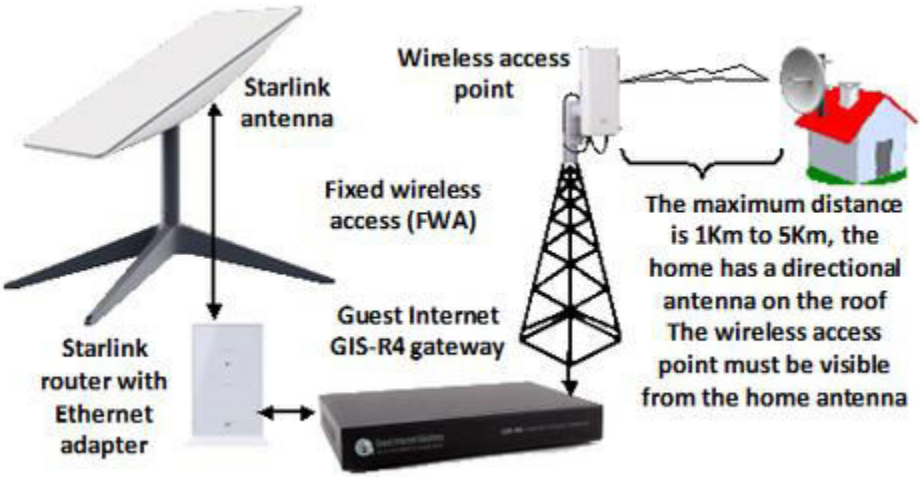
Internet fixed wireless access (FWA) can be provided for homes over a small area of radius of 1Km to 5Km providing that the home has a high gain antenna on the roof such as parabolic

antenna. The wireless access point is visible to the antenna on the home roof.

The fixed wireless access installation is suitable for a location where the wireless access point can be installed on a high point such as a hill or tall tower.

Ensure that there are no obstructions between the wireless access point and the home roof antennas. Obstructions that include walls, buildings and trees will block the WiFi signal.

The distance between the wireless access point and the home roof depends on the gain of the antenna and the visibility between the two antennas.

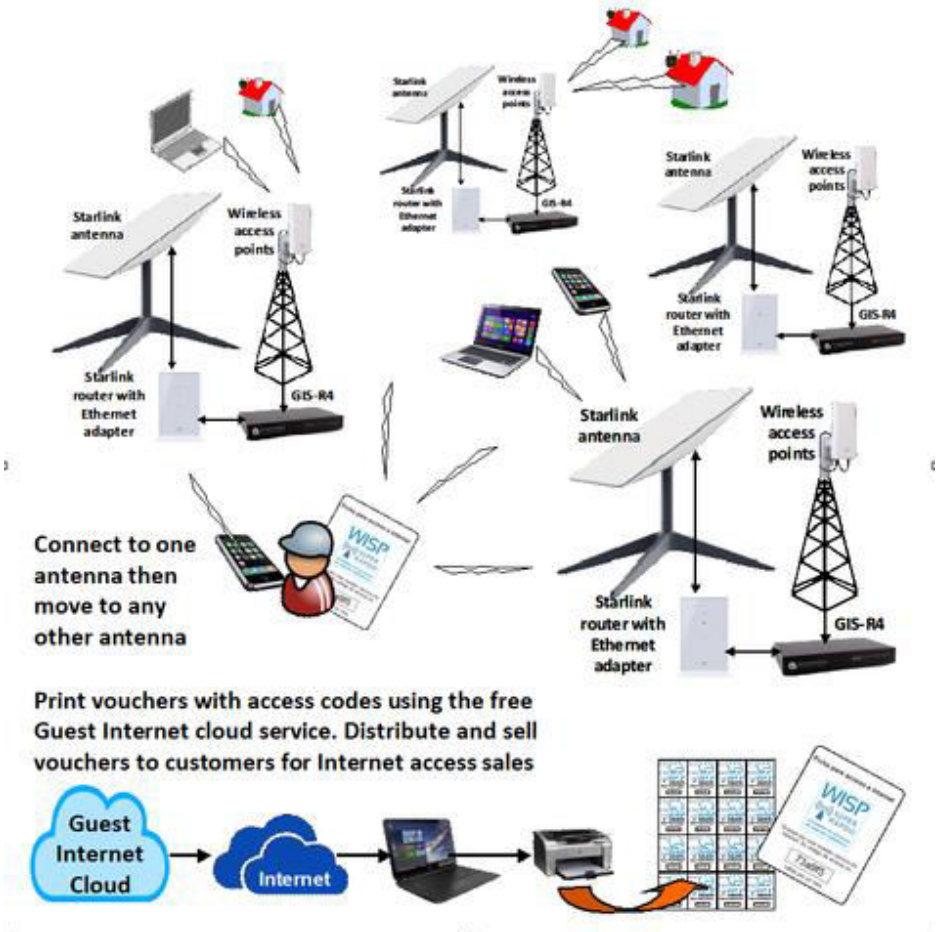


Build a large community network using Starlink

A small community can provide Internet access for the people with one antenna. However a larger community such as a town may require several Starlink antennas with Guest Internet gateways and wireless access points to provide a good Internet service for all. A good estimate is to have 50 Internet users for each antenna. As people will not be constantly connected to the

Internet then one Starlink antenna might serve a population of 250 people of which 50 will be using the Internet. A town of 1000 inhabitants might require 4 or more Starlink antenna locations.

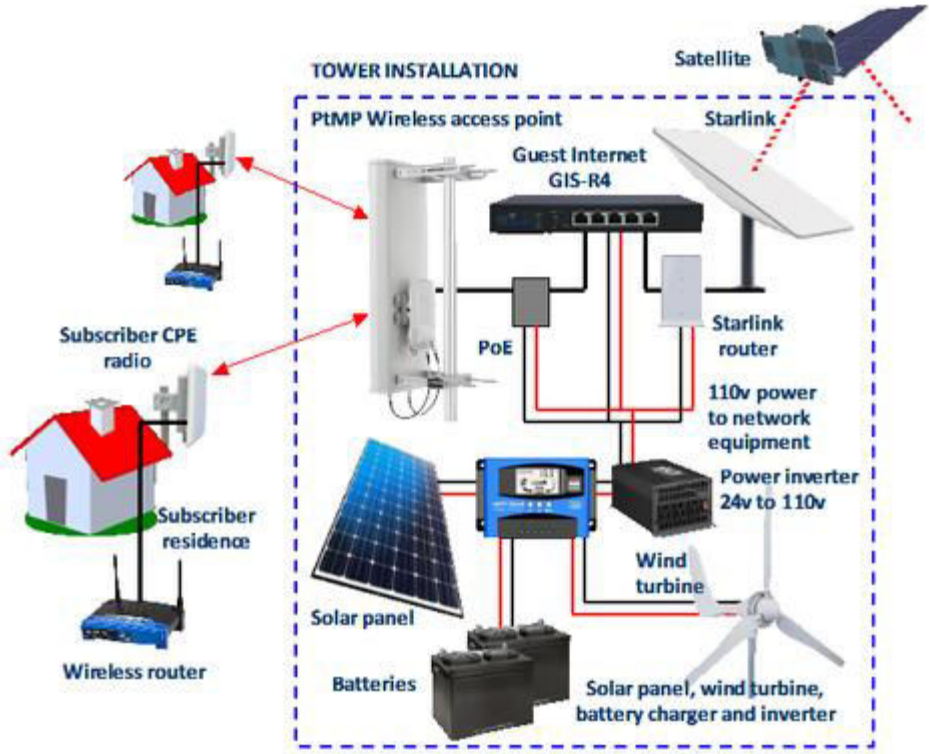
The Guest Internet cloud can manage multiple antenna locations as part of a group. A voucher code can be used to login to any of the antennas and after login the user can move from one antenna to another, this is called roaming. There is no limit to the number of Guest Internet gateways that can be part of a group. The diagram shows 4 Starlink antenna sites with roaming between them.



How to power the Internet equipment in a remote community

Rural communities that have no or limited electrical power can have an Internet service using Starlink by powering the equipment from solar and wind. The diagram shows an installation that shares the Internet service with homes in a community. The antennas are mounted on a tower and the equipment is installed in a waterproof enclosure at the base of the tower.

The equipment list to power Internet network equipment that is shown in the diagram is listed after the diagram.



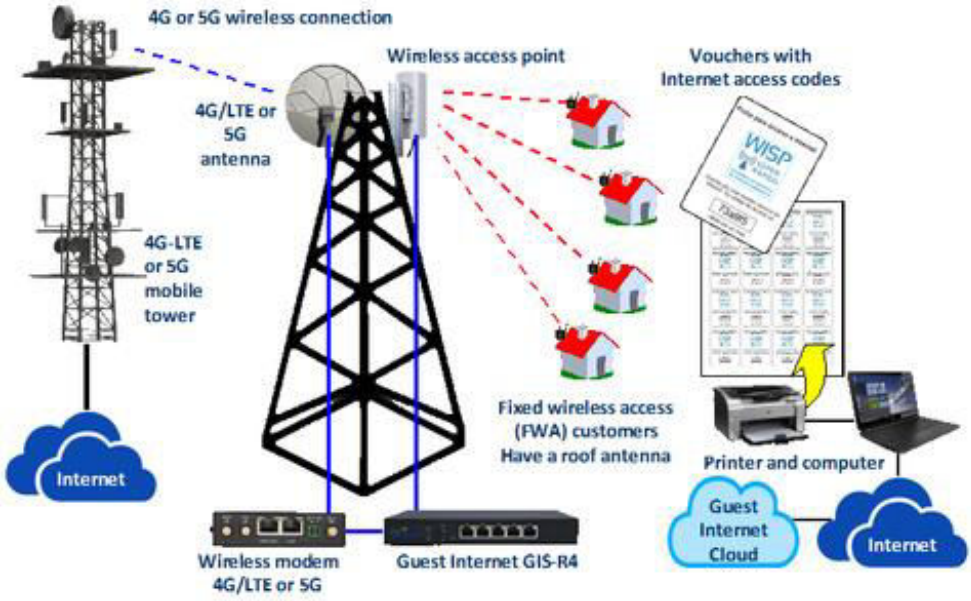
- Solar panels (minimum 250 Watts).
- Wind turbine.

- Solar battery charge controller.
- Two vehicle batteries for 24 volts.
- Inverter, 24volts to 110volts.

Most network equipment is low power and consumes less than 10 Watts. The Starlink antenna consumes 100 Watts. Power generation should be 250W to 500Watts so that the batteries are charged and can continue to power the equipment at night and without wind.

How to provide Internet using a mobile network

In locations with a good 4G/LTE or 5G mobile phone service that that has a data contract, a data connection can provide low cost Internet for a rural community.



When a 4G/LTE or 5G mobile data service is available:

- Install a 4G/LTE or 5G modem with a directional antenna that has line of sight to the mobile tower.
- Connect the modem to a Guest Internet GIS-R4 to share the service.
- Connect the GIS-R4 to a wireless access point to broadcast the WiFi signal.
- Install a WiFi receiving antenna on each home roof with line of sight to the WiFi antenna.
- Provide users with a voucher code to access the service.

A 4G/LTE or 5G data service will cost less than a satellite service with the same speed.

5.3. What is required to provide a shared WiFi service for homes in a community?

Rural communities can share one Internet connection where Internet access vouchers are given or sold to manage the sharing process.

The vouchers have access codes with time and data speed limits. It is important to prevent excessive use of the Internet connection as this will cause a problem called network congestion.

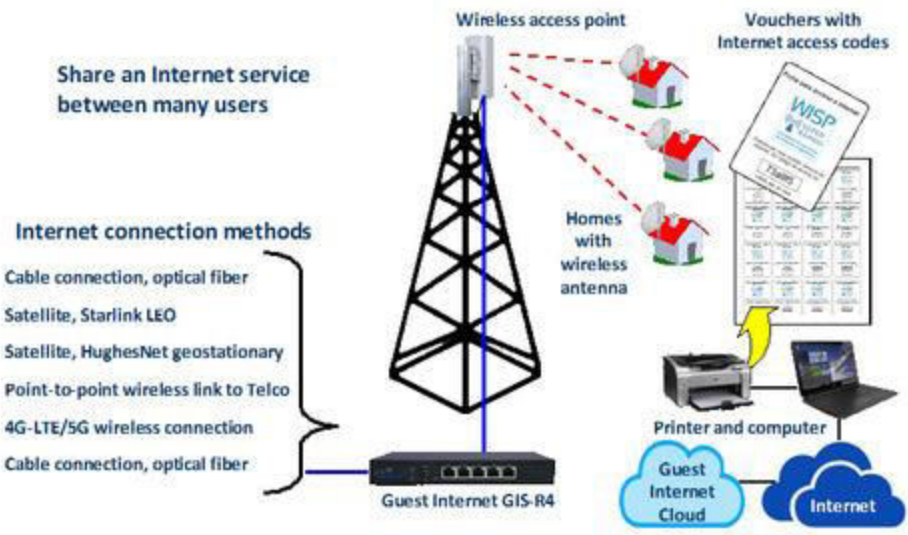
This is described in recent posts in the Guest Internet Instagram account. An Internet service with fast Internet access is essential. A fiber connection to a telecom company is ideal but usually not available for rural communities. This leaves two satellite options.

Starlink service is available everywhere on the planet with a basic plan starting at over 100Mb/s and a business plan over 250Mb/s. Installation in a rural community will usually require a more

expensive roaming account. Starlink is a low earth orbit (LEO) service so many satellites provide access for the antenna.

HughesNet service is available in a few countries and the customer can select the data speed plan up to 100Mb/s. The HughesNet antenna communicates with one geo-stationary satellite that is shared by all antennas. The satellite antenna beams are directed to only a few countries.

If the use of the Internet by the community is not managed and congestion occurs then the provider will limit or suspend the service.



When the Internet service has been contracted then the rest of the system can be installed, as shown in the diagram above. The following items are required:

- The Guest Internet GIS-R4 gateway to manage the Internet service with the voucher software.

- A powerful wireless access point to broadcast the WiFi signal.
- A WiFi receiver is install at each home, called the client premise equipment (CPE).
- A computer and printer to print the vouchers using the Guest Internet cloud.

The items are connected as shown in the diagram. Guest Internet has a video and slide presentation that describes the installation.

5.4. How to provide an Internet service for a community using Starlink with Guest Internet STAR Kits

Guest Internet has launched several STAR kits to help provide Internet in a community using Starlink

This article is split in many parts and has the objective to help people understand how to provide an Internet WiFi service for a community.

The Guest Internet STAR kits have the essential equipment needed to build the infrastructure in communities, in residential and commercial buildings, and different types of businesses that need to share and charge for Internet WiFi access.

This section will help you understand how the service works, the benefits for Internet service providers and the users of this system.

Internet satellite services

Almost all populations living in urban areas around the world have the possibility of connecting to the Internet, although there are economic barriers. Many rural and remote communities around the world often lack basic infrastructure, and telecommunications

services are low on the list. Although many people in these communities have mobile phones they may have to travel to a nearby town to get a connection to the network.

For the past several years a few communities have had Internet service by installing a geo-stationary satellite system like HughesNet and controlling and selling the Internet access using Guest Internet controller products. Geo-stationary services have data speed limits that in turn determine how many people can connect to the service. Geo-stationary services are limited in geographical coverage; for example, the HughesNet service is available in only six countries in Latin America.

More recently, low earth orbit (LEO) satellite services have been launched and the most popular is Starlink. Geo-stationary satellites are located 22,000 miles above the earth with one satellite providing the data bandwidth for several countries; LEO satellites are 300 miles above the earth, with newer data transmission technology and many satellites for each country. The result is that Starlink has a faster data service with lower latency than HughesNet, but at a higher price.

The Starlink service

Each Starlink customer has an antenna that can scan across 180 degrees of the sky to locate satellites that pass overhead. The antenna technology is called beam forming and is an electronic method of pointing the antenna towards a moving satellite. The satellite relays the customer's connection to a ground station and then to the Internet. This is shown in the next diagram.

The Starlink service has two limitations;

- The data speed is limited by the service plan and how many other customers are in the same area.

- The basic residential plan has no official data limit however the residential plan should maintain less than 1TB per month of data use.

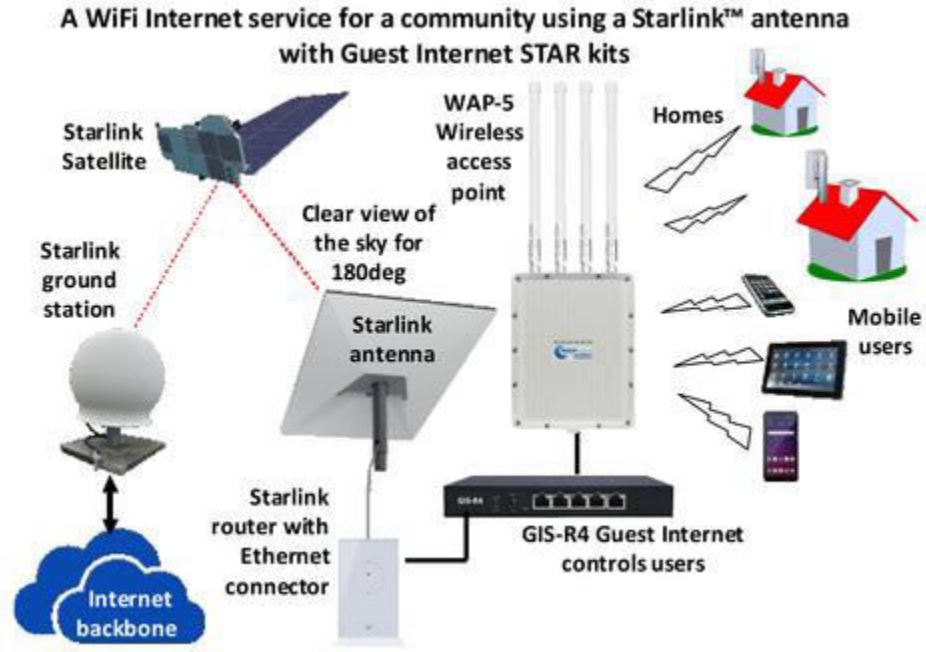
The Starlink terms of service do place some restrictions on the use of the service. Excessive use by causing network congestion due to multiple simultaneous device connections and consistent high volume data use might be considered a breach of the terms of service causing Starlink to suspend the service to that antenna.

The great benefit of Starlink is that it can be installed in any country that has approved the Starlink service.

Use Starlink to provide an Internet service for a community with STAR kits

When a Starlink antenna provides a service for many homes then network congestion may occur due to excessive data volume. It is therefore necessary to manage the community Starlink service so

that the community members can enjoy the Internet service without concern that the service may be interrupted due to abuse. Many communities have installed the Guest Internet controller to share the Starlink service. The Guest Internet STAR kits provide a range of benefits. See the next diagram that shows how the STAR kit is installed.



Guest Internet controllers manage the WiFi Internet service for a community by imposing restrictions on individual use so that each person gets a good Internet connection, plus ensuring the Starlink service is not abused. Each person that wants to connect to the Internet service is given an access code that determines how that person can use the service. The access code has the following parameters.

- The length of time that the person can remain connected to the Internet, or the user can be connected permanently.

- The maximum download and upload data speeds.
- The maximum download and upload data byte count permitted.
- The maximum number of people who can use the code, usually 1.
- Optionally blocking services like Torrent that might be used to share copyrighted files.
- Optionally blocking services that require a consistently high bandwidth.

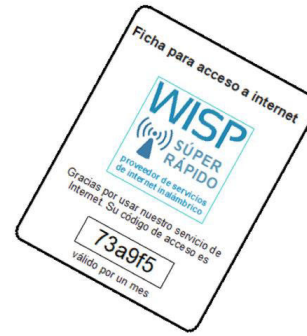
The Guest Internet controller provides rules for Internet access so that the Starlink service can be shared with many people. All Internet service providers set rules for maximum data speed and data volume.

Guest Internet controllers are already in successful use by many communities that get Internet access through Starlink and HughesNet satellite services because they are very easy to install and use.

How the Internet access codes are distributed

Each member of the community receives an access code that provides access to the Internet for a period of time with the data speed and data limits assigned to the code. The access time starts counting after the first use and once the code time has been used the code is deleted from the controller.

The access codes are printed onto vouchers using the Guest Internet software. The person providing the Internet service customizes the voucher design. A logo and text is added to the voucher design. A voucher is shown in the figure.



The vouchers are printed using a computer with a letter size printer. Sixteen vouchers are printed on each sheet of paper and up to 10,000 vouchers can be printed at one time. The Guest Internet software makes voucher printing very easy. This is shown in the figure.

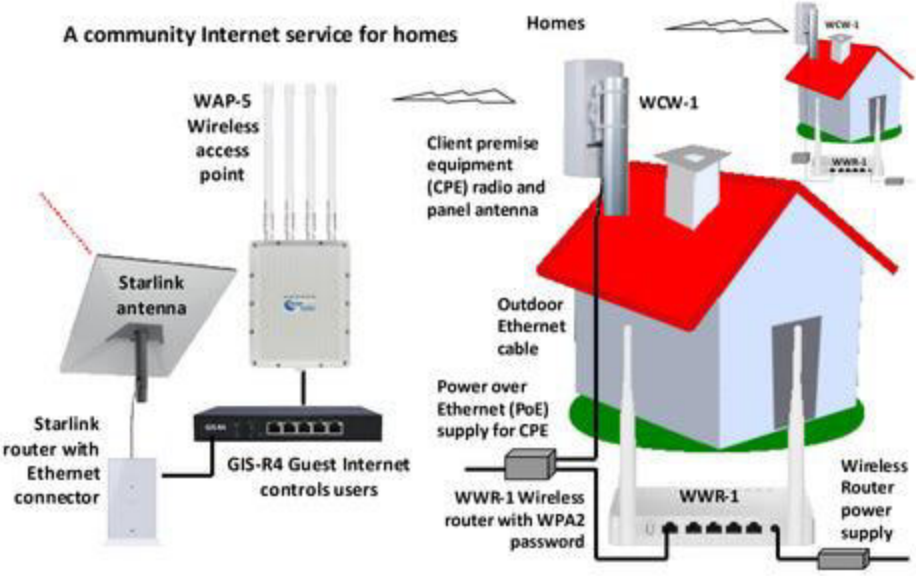
How community members connect to the Starlink Internet service

When the Starlink antenna is installed in the home then computers and mobile devices connect to the Starlink wireless router that is included with the antenna. A computer can only connect to the Starlink router inside the home. The Starlink wireless router cannot be used to connect the homes in a community. A WiFi connection with a long range is required; this is called the wireless infrastructure and is provided by the Guest Internet STAR kits, explained in a later section.

To connect the community homes a powerful WiFi outdoor antenna is located close to the Starlink antenna, which connects to the Starlink router through the Guest Internet controller using an Ethernet cable. The WiFi outdoor antenna has to be located at a high point so that it is visible to all the homes in the community. The installation can be on a building roof or on a tower. It is

important that each home can see the WiFi outdoor antenna as buildings and trees will block the WiFi signal. This type of wireless connection is called line-of-sight.

Anyone with a mobile device can connect to the outdoor WiFi antenna provided they are close to the antenna, within a radius of 200m. Homes further away from the WiFi outdoor antenna have a directional antenna on the roof that connects via wireless to the central WiFi outdoor antenna. The antenna on the home roof is called the Client Premise Equipment (CPE). The wireless connection from the home directional antenna to the central antenna must be line of sight and can exceed 1Km in distance. This is illustrated in the next diagram.



The home roof antenna is connected to a wireless access point inside the home. The home residents connect to the wireless access point to get the Internet service. The first time that a resident connects to the wireless access point they will have to enter a code to activate that connection. After that other people

in the same location who have the wireless router password can connect to the wireless access point but they all share the parameters that are determined by the access code. If the access code has a maximum speed of 5Mb/s then all residents in the home have to share this speed. With several people connected the speed for each user will be less than 5Mb/s.

How the community members connect to the Internet

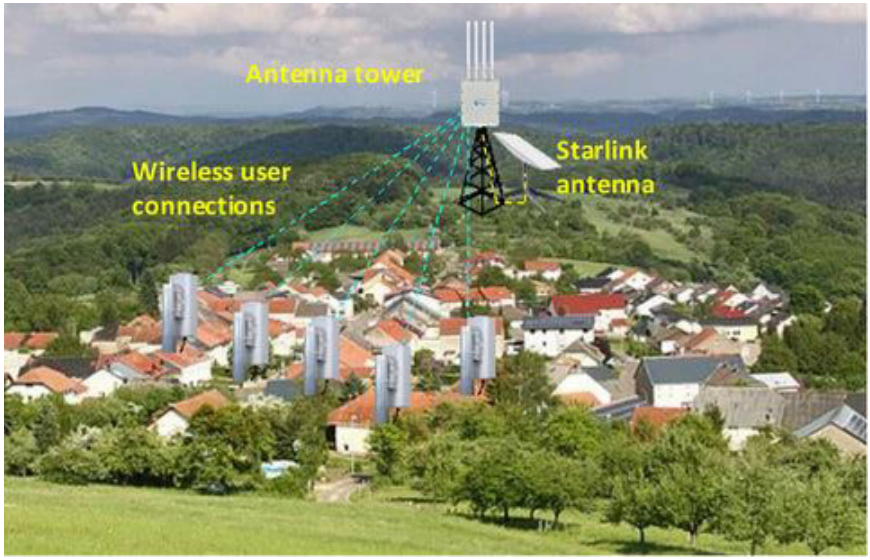
The community member will purchase a voucher with an access code. Next connect the computer or mobile device to the WiFi that is connected to the Guest Internet controller. Open a browser then type the login page name;

aplogin.com

The login page will open like the page shown in the next figure. The access code from the voucher is then typed into the login page. Finally click the connect button to connect to the Internet. The code duration starts the first time that the code is used. The computer will stay connected to the Internet until the code expires.

The community WiFi Internet service in operation

The wireless WiFi Internet network for a community will be similar to that shown in the next figure.



People always ask how many homes can connect to a Starlink antenna. This depends on the data speed limit for each home. A Starlink antenna might provide a throughput of 100Mb/s to 200Mb/s, an average of 150Mb/s. Assume that each home has an allowed data speed limit of 4Mb/s. The number of homes that can be connected to the Internet service might be 150/4 = 37.5 homes.

Not all homes will be using the Internet at the same time. In addition the access code for each home might be time limited and so the home will not have continuous Internet access. In this case we can double the number of homes that can have service from one Starlink antenna to 75 homes. In the case where each home has a limit of 2Mb/s then the number of homes can be increased to 150.

It is not possible to connect 75 to 150 homes to one Starlink antenna without the use of a Guest Internet controller. The Guest Internet controllers are essential to manage the community Internet service and ensure compliance with the Starlink terms of use.

In the expanding world of community Internet, Guest Internet STAR kits are poised to revolutionize the way communities are connecting to the Internet. The innovative solutions of the Guest Internet STAR kits make providing Internet access to a community a breeze. Prepare to be amazed as we delve deeper into the transformative potential of these game-changing kits.

6. Sell WiFi Internet in marinas

Marinas have a constant demand for fast WiFi Internet from boat owners, how can they deliver?

Marinas provide a unique service for their customers with regard to WiFi access to the Internet, however face several types of pressures that no other business has.

- Marinas are at remote locations that may not have a 5G mobile service and so the WiFi service might be the only method of Internet access.
- Marina customers who need Internet access will pay the price for a good WiFi service.
- Boats have a lot of technology and need constant access to the Internet to update weather forecast information, fish tracking information and maintenance information such as updating maps for chart plotters.
- Marinas require a carefully planned WiFi project to ensure that one or more powerful outdoor wireless access points can provide coverage over the large docking area, where small boats may be behind big boats which will block the WiFi signal.
- Marinas want to charge for the WiFi service and make a profit, marina customers expect to pay a fee for Internet access, provided that the Internet service has a good speed that allows them to do what they need.
- Marinas are located at remote waterfront locations, the location is determined by the access to lakes or to the sea, and the location may not have access to fiber cables that access the Internet. The only Internet access may be via a satellite service such as Starlink.

- A big data bandwidth is required for a large number of users, plan for 5Mb/s for each of the boats docked in the marina, 100 boats requires 500 Mb/s of bandwidth for the Internet connection.

Many marinas already provide a WiFi Internet service for boaters but in many cases the range of the WiFi is limited to a small area around the marina buildings so boaters have to go ashore to access the Internet, and the service is also limited to the number of people who can connect to the Internet service at any time.

Three important issues when planning a marina WiFi installation

Marinas have to grapple with several issues to provide a great WiFi service for boaters in their boats. Marinas have a big advantage that no other businesses have regarding WiFi for the public; for marinas cost is not a problem because they can charge a price for the service that will pay the investment back quickly.

What are the considerations for a marina that wishes to install a WiFi service for boaters, or upgrade an existing service that has poor performance and causes boat owners to complain?

- Fast access to the Internet is essential. The ideal type of connection is a 1Gb or faster fiber connection. That type of Internet connection is usually not available for a marina. It may be possible to get a point-to-point wireless connection from an Internet service provider. The last alternative is a satellite service, and Starlink provides the fastest satellite data service. One antenna can provide a data speed of up to 200Mb/s and with a priority account can reach 250Mb/s. It is possible to have several Starlink antennas connected to a load balancing router to get a faster service. For example, cruise ships have several Starlink antennas to get fast Internet service for guests. A marina can install up to four Starlink antennas with a priority service to get a 1Gb/s Internet access when the antennas are connected to a load balancing router.

- Wireless WiFi coverage for the dock area of the marina requires careful planning and measurement so that boaters can get WiFi access on their boats. Many boaters install an external WiFi antenna on the boat that is connected to a router inside the boat so that they can connect to a shore based WiFi antenna.
- A WiFi management controller such as Guest Internet is required that has several tasks, the tasks include sharing the available bandwidth between boaters, charging for the Internet service and blocking the use of services that might get the Starlink account terminated, such as sharing copyrighted material without authorization.

The high-speed Internet connection alternatives that a marina can install

If the marina has access to a fast fiber connection of 1Gb/s to the Internet then that is the best and lowest cost method of access. If no fiber connection is available then the marina should investigate the possibility of getting a wireless point-to-point link provided by a Wireless Internet Service Provider (WISP). The current wireless technology can provide a link speed of 1Gb/s. The wireless point-to-point link will cost more than the fiber connection.

If the two methods of high-speed Internet access listed above are not available then the Starlink service can be installed. Starlink is a much more expensive technology than fiber or wireless, however the Starlink technology works very well and the marina will charge the boat owners for the service and so the investment and operating costs can be recovered.

A Starlink antenna will provide a data speed up to 200Mb/s and with the priority service can provide 250Mb/s. Starlink also has a more expensive high performance antenna that can provide faster speeds. When the data speed of one antenna is not sufficient

then more Starlink antennas can be added to sum the speeds of the antennas installed. When more than one Starlink antenna is installed they are connected to a load balance router to share the available bandwidth between the users.

The next section describes the Guest Internet GIS-R40 controller that permits up to four Starlink antennas to be connected to the WiFi service.

An important point to note is that the marina can begin with one Starlink antenna and then add Starlink antennas as the demand for the WiFi service increases, spreading the investment cost.

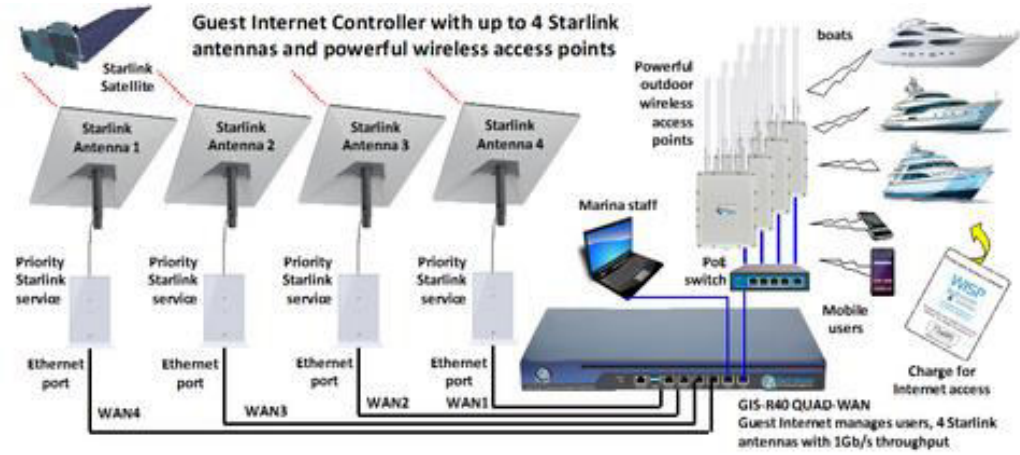
The Guest Internet WiFi controller is the central part of the Internet service installation

The Guest Internet WiFi controller is an essential part of the marina WiFi system and it has five important tasks.

- Share access to one or more Internet connections, as described in the previous section.
- Connect to one or more wireless access points and monitor the health of each wireless access point, alerting any failure.
- Ensure that each boat crew gets a great WiFi service with algorithms that ensure a fair share of the available bandwidth.

- Protect the business from misuse of the WiFi service by anyone with criminal intent that might use the WiFi to steal information or money from the marina.
- Protect the business from illegal use of the WiFi service when copyright protected information is shared or when users are connecting with illegal websites. The marina is responsible for any illegal use of the Internet connection by the customers.

The diagram shows how a marina WiFi system may be configured with up to four Starlink antennas and with multiple wireless access points using the Guest Internet GIS-R40.



WiFi controllers manufactured by Guest Internet have fifteen features that are essential to meet the requirements of a great guest WiFi service for boat owners combined with protection of the marina business. The GIS-R40 shown in the diagram is the Guest Internet controller that can connect 4 ISP circuits such as four Starlink antennas. Other controllers can connect either one such as the GIS-R2, GIS-R4, or two ISP circuits such as GIS-R6, GIS-R10 and GIS-R20.

The 15 essential features are listed below.

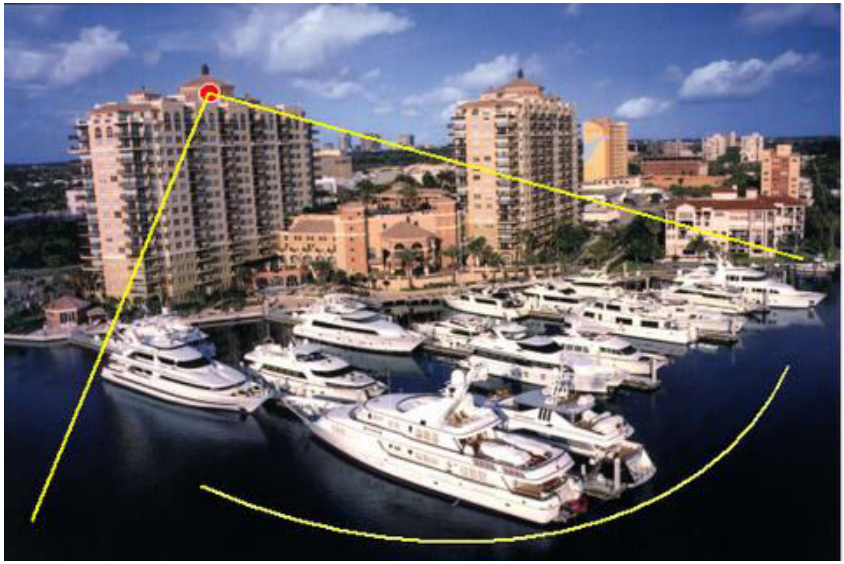
- Limit the access to the Internet service by giving customers an access code. When the WiFi has open access then many more people will connect and slow the service for everyone.
- The available bandwidth is shared by setting data speed limits for each customer, if this is not done then one user can slow the Internet for everyone, or many people will cause network congestion
- Optionally set data limits for guests, this is essential when the ISP charges for data use, or else charge customers for additional data use.
- Prevent abuse of the Internet service as the business will be responsible for copyrighted file sharing or access to illegal websites, the Guest Internet controllers block protocols like Torrent, and can block websites and website categories that are a risk for the business.
- Increase the Internet speed by adding more ISP connections, dual WAN with load balance and fail-over.
- Block customers' computers that have viruses, such as DDoS, that will slow the network data speed for everyone.
- Protect the business computers and point of sale (PoS) with a PCI DSS compliant firewall, prevent access to the business computers from the public WiFi.
- Brand the customer WiFi login experience and advertise additional services that the marina provides for customers.
- Monitor the WiFi service for failure, get an immediate alert if any problem occurs so that a repair can be made quickly.

- Guest Internet provides a free cloud management service with information and reports about the service use; the cloud can be accessed from any location.
- Optionally charge for the WiFi service, there are alternative methods with Guest Internet controllers.
    - Charge for all Internet services with the options of on-line credit card payment or the Guest Internet point of sale at the reception desk.
    - Two-tier charge, provide a slower speed free service and charge for a high-speed data service with a purchase on-line.
    - Time limited access, where the customer has a limited time free access, say 15 minutes, within a 24-hour period, and after the free period expires purchase access at hourly rates, this method is very popular with some customers.
- Have a dual use WiFi network that is accessed by both customers and staff, the customers and staff are isolated with a VLAN; this will reduce the cost of the network installation.
- Allow selected website access before login, for example the marina can allow free access for anyone to open a weather information website without login.
- Auto login of a device using the device MAC address, this is required when the marina has devices that will be connected to the WiFi service, for example TV's.
- Where possible integrate the customer WiFi with the business management systems for ease of use. Guest Internet provides Application Program Interfaces (API's) for integration with billing and reservation systems.

Planning WiFi coverage of the marina dock area

Each marina has unique requirements and the installation of the WiFi wireless access points is determined by many factors. A marina owner who wishes to install a WiFi Internet service for boat owners should call a specialist to prepare a site survey. There are a few rules to follow when planning a WiFi installation in a marina.

- Select the correct type of antenna for the wireless access point. If the wireless access point is located in the middle of the marina then install an omni-directional antenna, such as Omni-WiFi antenna. If the wireless access point is installed at the side or corner of the marina then install a directional antenna.
- Install the WiFi antenna at a high point whenever possible so that the signal can be pointed down at the boats. When a small boat is behind a big boat then it will be the shadow of the big boat and the WiFi signal will be blocked. When the antenna is at a high point then all boats have visibility of the WiFi antenna.



The figure illustrates an ideal installation of WiFi Internet for a marina. The wireless access point is located on a building roof with a directional antenna that is pointing down onto the boats.

Final notes about a marina WiFi Internet installation

Most marina use is seasonal, busy during summer and little business in the winter. It is desirable to have a flexible Internet provider that allows costs to be adjusted according to the seasonal demand. Starlink is excellent in this respect. Each antenna account can be suspended for a period of time if desired which reduces operating costs. The network installation example shown in this article offers this flexibility; have 4 Starlink antennas active during the busy season and then reduce the subscription plans down to one antenna in the quiet season.

7. Sell WiFi Internet in airports

Why is WiFi Internet so essential for travelers in airports?

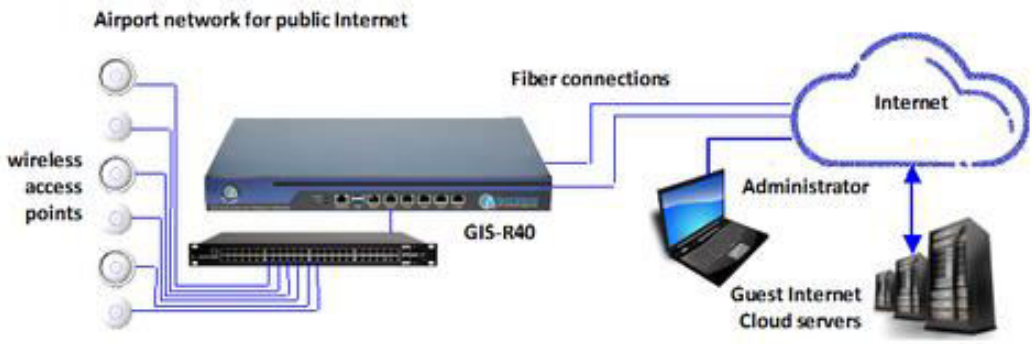
It is hard to find an airport that does not provide WiFi Internet for travelers. People want to see flight schedules, book hotels, reserve taxis, advise those waiting what time they will arrive and advise friends about delays. Plus hundreds more reasons.

An airport may have a high-speed fiber connection to the Internet and may have thousands of people who want to use the Internet daily. Many airports implement strategies to share the Internet service between many people, a popular strategy is listed below.

- Provide 30 minutes of free access every 24 hours at a slow speed to avoid network congestion, usually 1MB/s or less but sufficient to open an airline website or post a message to social media. Too slow however to stream videos. For people who have used the 30 minutes of free service, a charge for Internet access in hourly increments is done, accepting credit card or Paypal payments. The data speed may be faster than the free access speed.
- Provide a subscription gateway for customers of service such as Boingo that charge their subscriber a monthly fee and pay the airport on a per use basis.

In addition several airlines now offer a WiFi Internet service during the flight that is charged using a credit card payment on a per flight basis.

An airport is a large building, or several large buildings. WiFi wireless access points have a limited range so a number of wireless access points have to be installed. Depending on the model and performance of the wireless access point, there may be a limit of between 30 and 300 users per wireless access point.



The connection strategy that the airport wishes to use is implemented with a Guest Internet controller. The Guest Internet GIS-R40 is very popular in airports around the world and is suitable for an Internet fiber connection of 1Gb/s and has no limit on the number of people that can connect to the Internet.

The GIS-R40 provides a customizable login page that can display the connection options that the airport wishes to provide to travelers. The wireless access points are connected back to the GIS-R40 through PoE switches. In addition to the login connection options the GIS-R40 has a long list of valuable features, some of these are listed below.

- Cloud service that can be accessed from any location, and can manage multiple Guest Internet controllers for airport installations that have several terminal buildings.
- Customized login pages that can provide information and also sell advertising for travelers.
- Several reports that show the use and performance of the Internet service in tables and graphically making it easy to identify congestion of the fiber internet connection and adjust the sharing algorithm.
- Credit card billing report to crosscheck with the credit card company statement.
- Failure monitoring of the ISP service, the Guest Internet controller and all wireless access points connected to the Guest Internet controller. An alert message is sent out in the event of a failure to initiate a fast repair response.
- Prevention of sharing of copyright files that use the Torrent protocol and other methods.
- PCI compliant firewall to block access from the traveler WiFi to the back office network.
- A VLAN service that permits the wireless access points to be configured with dual SSID, with one open SSID for travelers and an encrypted SSID for staff, with isolation between the two circuits, reducing installation cost.

The Guest Internet controllers have been chosen by many airports to manage the WiFi Internet service for travelers. For help with a project design and implementation please contact our engineers.

8. Sell WiFi Internet in public community areas, markets

How vendors, visitors and the rural community benefit from a public WiFi Internet service in open air markets

Many countries around the world with less economic development have no or limited Internet infrastructure in rural areas. WiFi Internet can benefit the local community in areas where people gather such as open air markets that are found worldwide in rural areas? WiFi can significantly impact how open-air markets work in several ways, improving vendors operations and enhancing the visitor experience.

In many locations enterprising individuals and businesses provide a WiFi Internet service in public places where people gather such as open air markets, farmer's market or the central area of a town. The local population can benefit much from a WiFi service as communities can get together to do commerce, connect to

people and to potential consumers. It is an opportunity for vendors to do more business through contacts, respond to social media enquiries, provide product information, add new contacts, and expanding the reach of individuals.

How is a WiFi Internet service provided for an open air market?

An Internet connection is needed, such as a Starlink which works very well in any rural location. To provide a WiFi service for many people who share a Starlink connection, a Guest Internet controller is needed and depending on the size of the location

area, one or more wireless access points provide the WiFi signal that users will connect to.

The Guest Internet controllers generate WiFi access codes and print onto vouchers. The person who is in charge of the WiFi service can determine who gets Internet access by handing out vouchers with codes, and can also charge for the WiFi access by selling a voucher with a WiFi code.

The voucher has information such as how long a person can stay connected and instructions on how to use the WiFi, which is printed on the voucher. Demo software is available to illustrate the software that comes installed in the controllers.

The cost of setting up this type of WiFi service is low compared to other types of WiFi systems, making it an affordable option to provide a WiFi Internet service in remote areas.

The connection to the Internet depends on what is available. Maybe a retail store has a DSL connection to share. Maybe an individual has a geo-stationary satellite connection that is being shared. The HughesNet service was popular to provide public WiFi for six countries in Latin America.

There has been a surge with the installation of public WiFi Internet in the rural areas of many countries due to the availability of the Starlink service around the world.

How to provide a WiFi service using Starlink and the Guest Internet controllers

There are a few ready to use products that work with a Starlink antenna such as Guest Internet controllers and the Guest Internet STAR kits to provide a public WiFi service that can be shared between a number of people. Starlink has a limit of data speed and so it is necessary to impose a few rules for public WiFi access.

The Guest Internet STAR-2 kit as shown below is a very popular choice for providing a WiFi service in open-air markets.

The Guest Internet controllers have essential features that share the Internet service:

- Set a time limit for Internet access.
- Set download and upload data speed limits.
- Set a data download and upload limit for each user.
- Although Starlink states that there is no data limit for the standard account it is wise to maintain data use of less then 1TB per month. Putting a data limit on each user of the public service can ensure that the data use is not excessive.

- Avoids network congestion which causes slow Internet speeds, can disconnect people and prevent people connecting to the WiFi service.
- Ensure that people without the WiFi access code cannot use the service. Only people with codes can have access to the WiFi connection.

An important issue when providing a public WiFi service is the prevention of anyone sharing copyrighted material. When Starlink receives a complaint from a copyright holder they will first send a warning message and then terminate the service. This is a requirement of a US law called DMCA (digital millennium copyright act). This surprises people in countries around the world, as copyright laws are not enforced in many countries. However Starlink is a US corporation and must enforce the copyright law.

A further parameter that is essential when using Starlink for public WiFi.

- Block the use of P2P software such as Torrent that is used to share copyrighted files.

Guest Internet controllers provide the requirements of a public WiFi service that will maintain the quality of the service:

- Guest Internet controllers print vouchers with access codes that can be sold to users through retail points. In addition Guest Internet controllers also have a point of sale system and can also accept payment through credit cards.
- Guest Internet controllers block user device viruses such as DDos that will degrade the performance of the WiFi service for all users.
- Guest Internet controllers' block public access to the Starlink router and any computers connected to the Starlink router.

- Guest Internet controllers have failure monitoring to get an alert if there is a problem with devices connected to the WiFi network.
- Guest Internet Cloud monitoring and management permits the service to be managed remotely from anywhere, it is not necessary to go to the location of the WiFi to print vouchers or make other configurations.
- Guest Internet controllers provide reports showing the use of the network, and identify if network congestion might occur and make adjustments.

With the requirements outlined in the points above the Starlink service will not be abused and public users will be happy with the quality of the service.

Guest Internet controller products have all the requirements to provide a secure and reliable public WiFi service, plus many more features that can be beneficial for the community Internet service. Many Guest Internet controllers are installed everyday around the world to keep WiFi services in check.

How a WiFi Internet service looks like with a Guest Internet controller connected to a Starlink

Connection of the Starlink, Guest Internet and wireless equipment is shown in the next diagram. The Starlink antenna is installed in a high position, on the property roof and connected to the Starlink router inside the building. The Starlink router WiFi is not used by the public, but can be used by the owner of the Starlink antenna. There is a difference between the generation 2 and 3 Starlink routers regarding the Ethernet connection. The Guest Internet controller is connected to the Starlink router Ethernet port. A wireless access point is connected to the Guest Internet controller. All Guest Internet products come with easy to follow instructions describing how to connect the components.

All public connections to the Internet WiFi service go through the Guest Internet controller to check access codes, set the duration of the connection, set the maximum data speeds and maximum data used.

The Guest Internet controllers are managed by a cloud account, which is free to use with the purchase of the product. The access codes can be generated by the controller or by the cloud account. One cloud account can manage many Guest Internet controllers when the WiFi service has multiple locations.

Guest Internet makes it easy to manage, control, monitor and generate WiFi access codes in places where a WiFi service is needed. Contact us for more information on how to provide a WiFi service in your location so our team can give you the best recommendations on approach and products to use specifically for your needs.

9. Sell WiFi Internet in private rentals, Airbnb

WiFi is essential for Airbnb rentals and Guest Internet products have the tools you need to protect hosts from risks

When Airbnb advertises a property the listing includes a classification of the property WiFi. Airbnb considers a WiFi hotspot service to be an essential requirement for all properties, and classifies WiFi speeds into categories. Airbnb provides an app for hosts to measure the WiFi Internet speed and allows each host to publish the WiFi Internet speed at the property. Airbnb has a feature called “Verified WiFi,” which lets renters check the WiFi speed in a property before booking. The table of Internet download speeds shown below is taken from the Airbnb website. The table does not show the upload speed or the latency (delay) of the WiFi service.

WiFi download speed only	What it means for you
No speed shown	• The host has not specified the speed details for their space.
1 - 6 Mbps	• Basic WiFi speed. • You can check messages and browse the web.
7 - 24 Mbps	• Solid WiFi speed. • You can stream HD videos.
25 - 49 Mbps	• Snappy WiFi speed. • You can stream 4K videos and join video calls.
50+ Mbps	• Wow! Fast WiFi speed. • You can stream 4K videos and join video calls on multiple devices.

Any hospitality service, motel, hotel, B&B or Airbnb will benefit from having a good WiFi service available as most guests consider WiFi to be very important. Hotels have a higher occupation rate when good WiFi is available, and when a guest posts a review on the Internet the quality of the WiFi is generally at the top of the list. The same applies to an Airbnb rental; good WiFi availability will attract more guests and increase the revenue for the host.

However the Airbnb host has several risks when providing WiFi for guests.

- If the guest is sharing copyrighted files then the Airbnb owner will become a target for a DMCA takedown notice. This means that the copyright owner has identified the IP address if the Internet service and has issued a complaint to the ISP. The ISP then has to advise the customer that sharing of copyrighted material must stop or else the Internet service will be disconnected.
- Giving the same encryption key to each guest will eventually mean that key is shared with the neighborhood, providing free Internet for all at the expense of the Airbnb host.
- Ensure that guests do not have physical access to the Internet router or WiFi equipment, keep in a locked closet. Eventually a guest will reset the equipment to factory defaults and can then login and configure the equipment.
- The guest may tamper with the Internet router for malicious reasons such as installing router software with code that collects and forwards information from subsequent guests. Hackers use software called openWRT that can be installed on most wireless routers and can be easily modified for malicious purposes. This can be done without the knowledge of the Airbnb host.

- If a guest has tampered with the WiFi equipment then subsequent guests are at risk of having information stolen, which is turn is a risk for the host as the information theft may result in a lawsuit for the host.

So it is essential that the host provides WiFi for guests, but the host is at risk when providing WiFi. However there is a compromise, the host can provide a managed WiFi service that will protect both the guest and the host.

Managed WiFi requires the installation of a low cost Internet Hotspot equipment between the guest and the Internet service. The Internet Hotspot equipment has the following features.

- Provide remote cloud management so that the host can manage and monitor the WiFi service without going to the property, essential for hosts that have multiple properties as all properties can be managed through one cloud account.
- Create a unique WiFi access code for each guest that is valid only for the guest stay. This code is generated remotely via the cloud service and then sent to the guest email after booking confirmation. The access code is in addition to the encryption key.
- Hosts can manage the WiFi service using many control parameters; for example they can determine how many people can use the service, or set the maximum data speeds per user.
- The host can customize the login page and use it to sell advertising to local stores, pizza delivery, etc.
- A firewall blocks guest access to the Internet router to prevent tampering. The firewall also blocks Torrent software that guests use to share copyrighted files.
- The host can monitor the guest Internet use, including the number of devices connected. Monitoring is remote using

the cloud account to check for abuse, and can block a guest access to the Internet if necessary.

- The host can monitor the Internet equipment and Internet connection for failure, and receive an alert if a failure occurs and the guest has no Internet access.
- The host can get a second ISP circuit and share the guest Internet access between two circuits. This increases the Internet speed for the guests and also improves the Internet reliability because when one ISP circuit fails the guest continues with Internet over the second circuit.

Any Guest Internet product can be installed to provide the managed WiFi service and protect both guests and host. Guest Internet has wireless products that can be installed, remember to disable the Internet router WiFi. Alternatively the host can install a Guest Internet gateway that has two WAN connections for two ISPs and can have several wireless access points connected. Remember to log the Internet and WiFi equipment in a closet or cupboard to prevent physical tampering of the equipment.

10. Guest Internet STAR kits; pre-configured starter kits to sell WiFi Internet

Guest Internet launches STAR kits to help people start a WiFi service and sell WiFi access

Guest Internet has prepared eight different kits to help people to provide an Internet WiFi service to others using a Starlink antenna or an Internet connection of similar performance.

It is recommended that you have a speed of 100Mb/s or more if you want to sell access to other people. If you have less than this, the WiFi service is not going to be great and people will complain about the service.

The Guest Internet STAR kits can help you give a WiFi service in a range of 100 meters to mobile devices or up to 1 kilometer to homes that have a STAR-4 kit installed.

How to choose the right STAR kits for a WiFi service?

The STAR kits are all pre-configured to be used together as explained in the installation documentation. The number of kits and which kits to use in a WiFi service will be determined based on the current Internet speed you have, the number of people that you want to connect and the distances you want to provide Internet access.

Each STAR kit plays an important part in the WiFi network design, called the infrastructure.

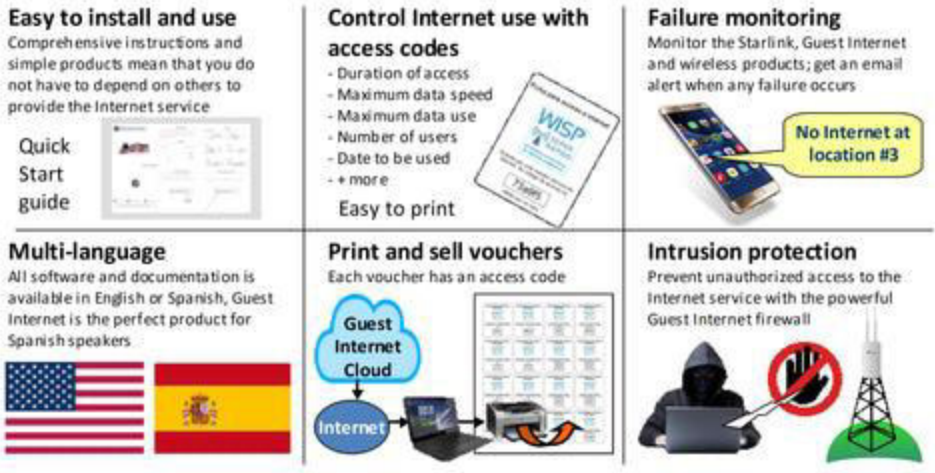
Guest Internet STAR kits make providing community Internet very easy

Guest Internet manufactures the controllers that make it possible to share a Starlink Internet service with many people and many homes. People with limited technical knowledge want to provide the Starlink community Internet service and so Guest Internet has prepared a number of easy to install kits so that a non-technical person can install and operate the WiFi service.

Guest Internet kits are very easy to install and operate when the person knows how to use a computer and how to change the settings on a wireless router. There is no need to have a technical specialist install and operate the service. Any person can follow the Guest Internet instructions to install the products and manage the service. Guest Internet has a lot of information for people who want to provide the Internet service.

Guest Internet offers seven STAR kits that extend the range of the Starlink antenna to provide wireless Internet for people around the antenna and homes in the community. The STAR kits with Guest Internet software print the access code vouchers and monitor the service. The STAR kits are described in the next sections.

A summary of the important STAR kit features is provided in the next table. For more information about the kits, data sheets for each kit can be downloaded from the Guest Internet website.

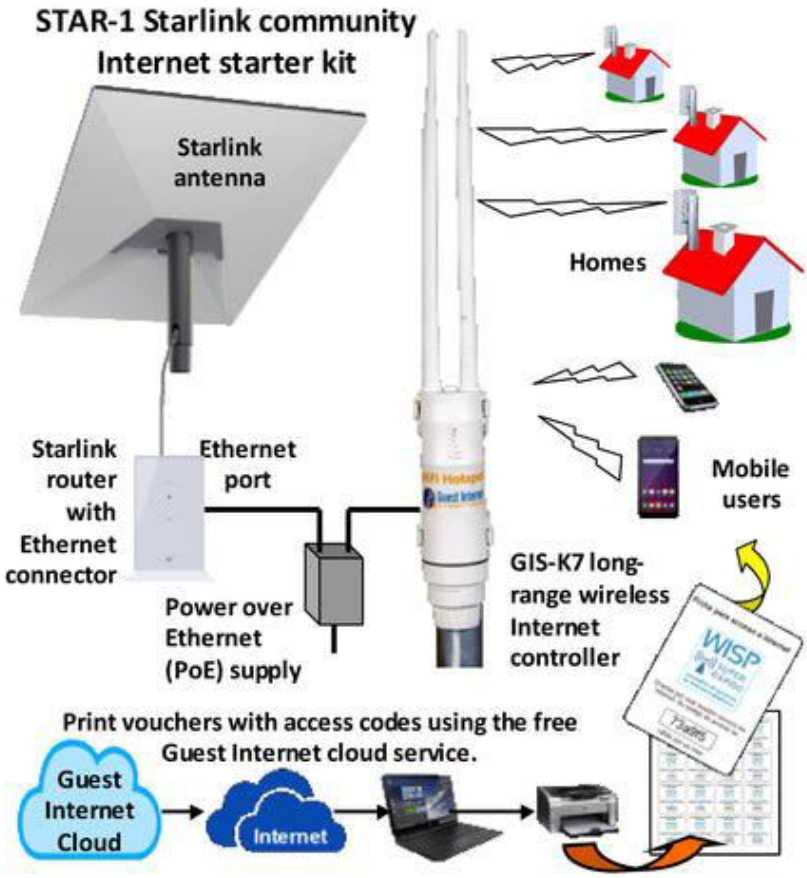


Guest Internet STAR-1 Kit

The Guest Internet STAR-1 kit provides the lowest possible cost to begin providing WiFi Internet for a community. The kit uses the Guest Internet GIS-K7 wireless product that combines a wireless access point with omni-directional antenna plus an Internet controller. Access codes and vouchers for users can be customized and printed using the GIS-K7 software or using the free Guest Internet Cloud software. The STAR-1 data throughput is limited to 100Mb/s.

The GIS-K7 is installed outdoors at a high point, a building roof or tower so that all users can see the antenna. Internet WiFi is available for mobile devices within a radius of 200m around the antenna. Homes can be connected to the STAR-1 kit at greater distances using the STAR-4 home installation kit. The free Guest Internet cloud can be used to monitor the community Internet

service remotely and is also used to monitor the GIS-K7 and the Starlink connection for any failure. The STAR-1 kit is shown in the figure, the Starlink antenna is not included with the kit.

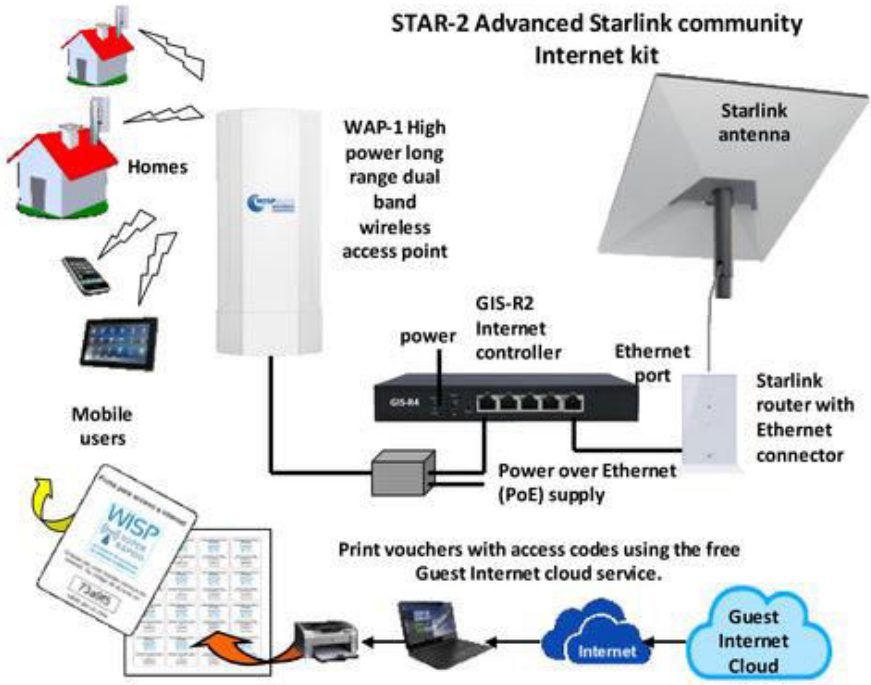


Guest Internet STAR-2 Kit

The Guest Internet STAR-2 kit is low cost and has double the data throughput of the STAR-1 kit. The STAR-2 kit uses the Guest Internet GIS-R2 controller connected to the Starlink router. A powerful outdoor wireless access point, WISPzone WAP-1 is

connected to the GIS-R2. The WAP-1 wireless access point has an omni-directional antenna. Vouchers with access codes can be generated using the GIS-R2 software or with the free Guest Internet Cloud software.

The WAP-1 wireless access point is installed outdoors at a high point, a building roof or tower, so that all users can see the antenna. Internet WiFi is available for mobile devices within a radius of 200m around the antenna. Homes can be connected to the STAR-2 kit at greater distances using the STAR-4 home installation kit. The free Guest Internet cloud can be used to monitor the community Internet service and is also used to monitor a failure of the Guest Internet controller, including the GIS-R2, the WAP-1 wireless access point or the Starlink connection. The STAR-2 kit is shown in the figure, the Starlink antenna is not included with the kit.



Guest Internet STAR-3 Kit

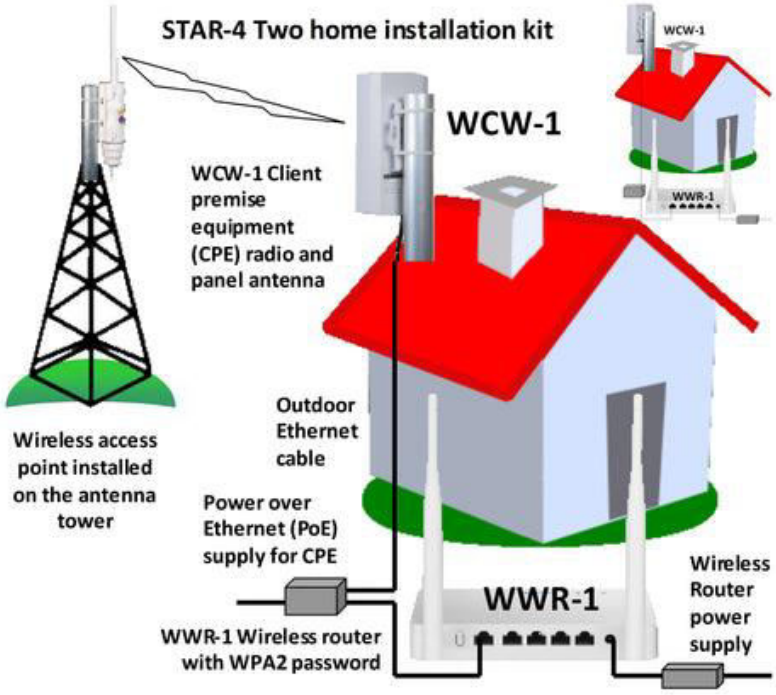
The STAR-3 kit has two antennas, WISPzone WCW-1, called the Host and Client, that are used to install a point to point wireless connection over a long distance. For example a home can be connected to a STAR-2 kit by connecting the Host WCW-1 antenna to the GIS-R2, and the Client WCW-1 antenna on the roof of the residence. The STAR-3 kit offers two other installation configurations that provide WiFi installation flexibility for other STAR kits. The three STAR-3 product configurations are shown in the next diagrams.

Guest Internet STAR-4 Kit

The STAR-4 kit provides the wireless installation for two homes. The purpose of the STAR-4 kit is to connect homes via wireless to the STAR-1, STAR-2, STAR-6, STAR-7 or STAR-8 kits. Each home installation kit has four products, two products for each home;

- WISPzone WCW-1: a client wireless for the home roof, called the client premise equipment (CPE).
- WISPzone WWR-1: a wireless access point installed inside the home that connects to the WCW-1.

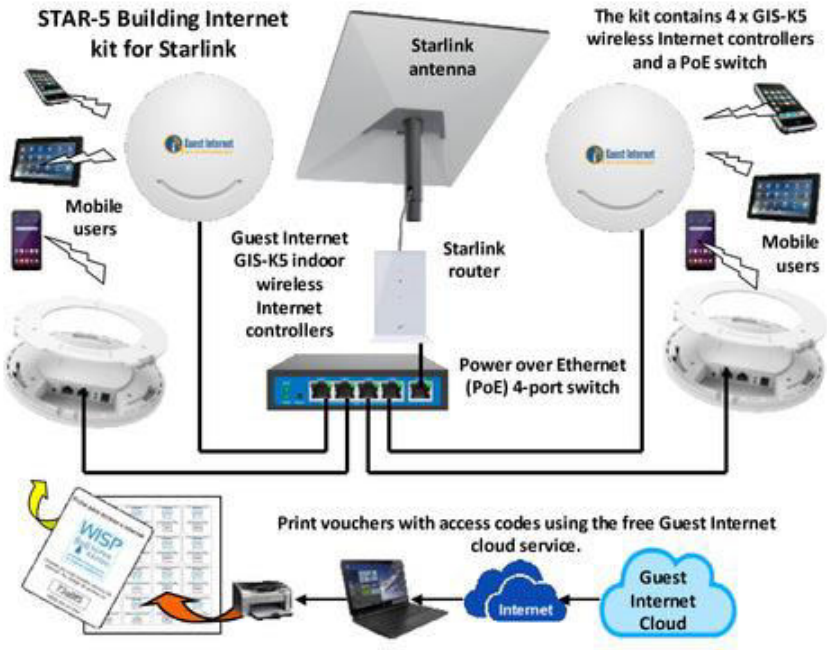
The WCW-1 client wireless has a directional antenna that must be pointed towards the central antenna. The WCW-1 antenna must have line of sight visibility to the central antenna. The WWR-1 wireless router installed in the home provides Internet access for the residents who connect to the WiFi using mobile devices and computers. The STAR-4 kit is shown in the next figure.



Guest Internet STAR-5 Kit

The Guest Internet STAR-5 kit provides WiFi Internet access for residents of an apartment building or an office building. The kit provides four Guest Internet GIS-K5 powerful indoor wireless access points that are also Internet controllers. The four GIS-K5 products connect to a power-over-Ethernet (PoE) switch to power the units. The switch uplink port connects to the Starlink router Ethernet port. The GIS-K5 products are installed inside the building, possibly one on each floor depending on the size of the building. Vouchers with access codes are generated using the free Guest Internet Cloud software. The installer has to provide the Ethernet cables that connect each GIS-K5 to the PoE switch.

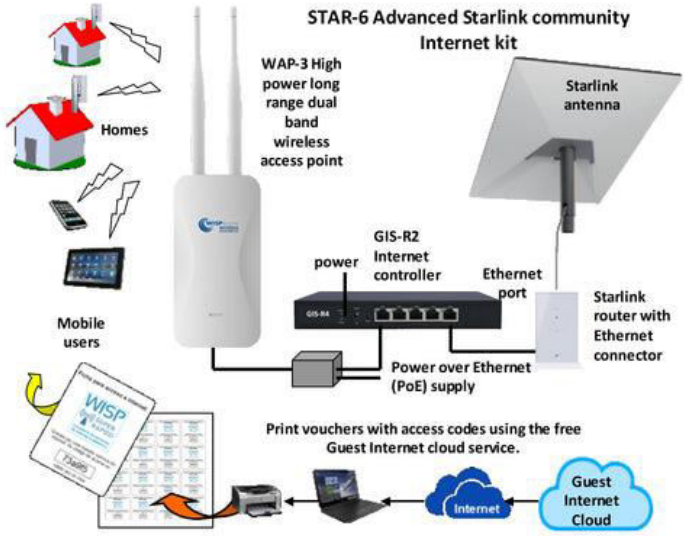
The free Guest Internet cloud can be used to monitor the community Internet service and is also used to monitor a failure of each GIS-K5 and the Starlink connection. The STAR-5 kit is shown in the figure, the Starlink antenna is not included with the kit.



Guest Internet STAR-6 Kit

The STAR-6 kit is similar to the STAR-2 kit, however the WISPzone WAP-3 wireless access point is a different design with external omni-directional antennas. The Guest Internet STAR-6 kit is low cost and has double the data throughput of the STAR-1 kit. The STAR-6 kit uses the Guest Internet GIS-R2 controller connected to the Starlink router. A powerful outdoor wireless access point, WAP-3 is connected to the GIS-R2. Vouchers with access codes can be generated using the GIS-R2 software or with the free Guest Internet Cloud software.

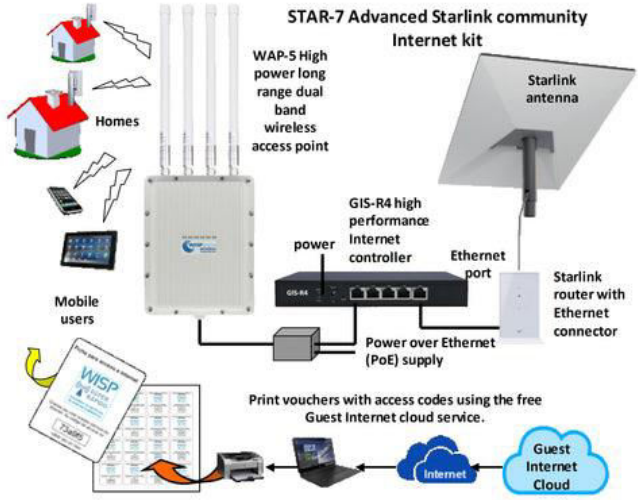
The WAP-3 wireless access point is installed outdoors at a high point, a building roof or tower, so that all users can see the antenna. Internet WiFi is available for mobile devices within a radius of 200m around the antenna. Homes can be connected to the STAR-6 kit at greater distances using the STAR-4 home installation kit. The free Guest Internet cloud can be used to monitor the community Internet service and is also used to monitor a failure of the Guest Internet GIS-R2, the WAP-3 wireless access point or the Starlink connection. The STAR-6 kit is shown in the figure, the Starlink antenna is not included with the kit.



Guest Internet STAR-7 Kit

The Guest Internet STAR-7 kit has a high performance with a data throughput four times that of the STAR-1 kit. The STAR-7 kit uses the Guest Internet GIS-R4 controller connected to the Starlink router. A powerful outdoor wireless access point, WISPzone WAP-5 is connected to the Guest Internet GIS-R4. The WAP-5 has the maximum radiated power permitted by the FCC for an extra long range of communication. The high performance means that more people and homes can connect to the wireless service. Vouchers with access codes can be generated using the Guest Internet GIS-R2 software or with the free Guest Internet Cloud software.

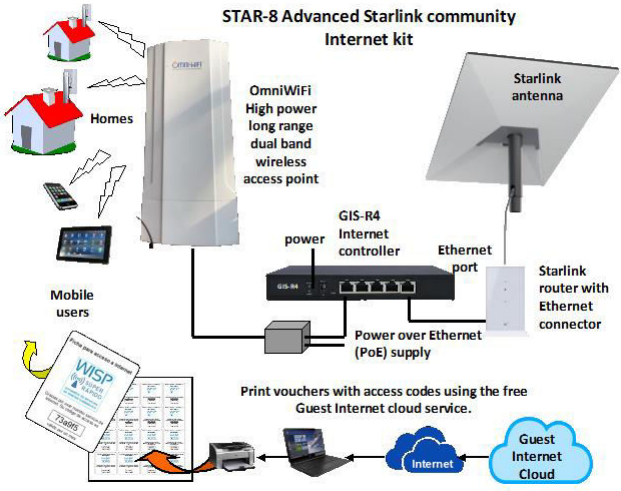
The WAP-5 wireless access point is installed outdoors at a high point, a building roof or tower so that all users can see the antenna. Internet WiFi is available for mobile devices within a radius of up to 300m around the antenna. Homes can be connected to the STAR-7 kit at much greater distances using the STAR-4 home installation kit. The free Guest Internet cloud can be used to monitor the community Internet service and is also used to monitor a failure of the Guest Internet GIS-R4, the WAP-5 wireless access point or the Starlink connection. The STAR-7 kit is shown in the figure, the Starlink antenna is not included with the kit.



Guest Internet STAR-8 Kit

The Guest Internet STAR-8 kit has a high performance with a data throughput six times that of the STAR-1 kit. The STAR-8 kit uses the Guest Internet GIS-R4 controller that can be connected to the Starlink router. A powerful outdoor wireless access point, the OmniWiFi is connected to the Guest Internet GIS-R4. The OmniWiFi has the maximum radiated power permitted by the FCC for an extra long range of communication. The high performance means that more people and homes can connect to the wireless service. Vouchers with access codes can be generated using the Guest Internet GIS-R4 software or with the free Guest Internet Cloud software.

The OmniWiFi wireless access point is installed outdoors at a high point, a building roof or tower so that all users can see the antenna. Internet WiFi is available for mobile devices within a radius of up to 300m around the antenna. Homes can be connected to the STAR-8 kit at much greater distances using the STAR-4 home installation kit. The free Guest Internet cloud can be used to monitor the community Internet service and is also used to monitor a failure of the Guest Internet GIS-R4, the OmniWiFi wireless access point or the Starlink connection. The STAR-8 kit is shown in the figure, the Starlink antenna is not included with the kit.



The size limitation of a community network

The size of the STAR kit network installation is limited by the bandwidth of the Starlink antenna and also by the physical distances of the community. These factors mean that a single Starlink antenna can provide an Internet service for a community between 50 to 75 homes, over a radius up to about 1Km, providing that there is line of sight between all antennas.

Guest Internet controllers can expand beyond the size limitation of the Starlink network with multi-site Cloud management and roaming. More about this in the next section.

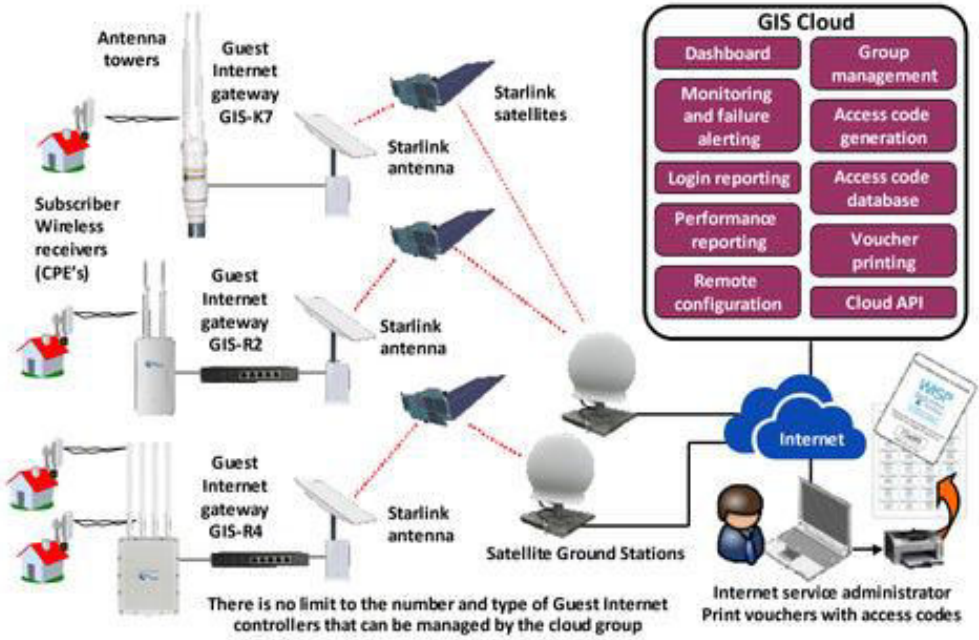
Building a larger multi-site city wide community network

Guest Internet products have unique features that are not available elsewhere, and that can be used to build very large public Internet networks. Internet service providers use Guest Internet controllers to manage the Internet service for large communities, where access to the Internet is limited and infrastructure costs have to be minimized.

The issue of managing very large public Internet networks is a frequently asked question and Guest Internet has the answers. Guest Internet developed two important technologies that make very large networks manageable.

- The Guest Internet Cloud administration has a group feature the permits an unlimited number of controllers to be added to a group. Access code vouchers are then printed for that group and can be use at the location of any Guest Internet controller. In addition, reports are available both for individual controllers and for groups of controllers. The Cloud permits many controllers to be managed as if they were one large controller.

- The Guest Internet group administration manages roaming between controllers in the network. This means that any user who connects to one controller using a group access code can then move to a different controller and remain connected to the internet. The cloud provides the hand-off service of the user from one controller to the next. The user can move between controllers and remain connected until the duration of the code expires, at which time the user will be disconnected. The principle of operation is similar to that of a mobile phone network.



In practical terms, this means that a city can have hundreds of Starlink antennas installed, each with a Guest Internet controller and a wireless network. The resulting installation will provide Internet access for the residents of the city, both mobile users and homes. There must be a line of sight connection within each

Starlink antenna network, but not between adjacent Starlink networks. The multi-site network is illustrated in the next figure.

The network is not limited to a Starlink connection between each local site and the Internet. Each local site connection can use DSL, fiber, LTE/5G or alternative satellite services such as HughesNet. The Guest Internet Cloud management system can be used with any type of Internet connection. The Guest Internet Cloud can monitor all links and all equipment for failure so managing the reliability of a very large network is easy.

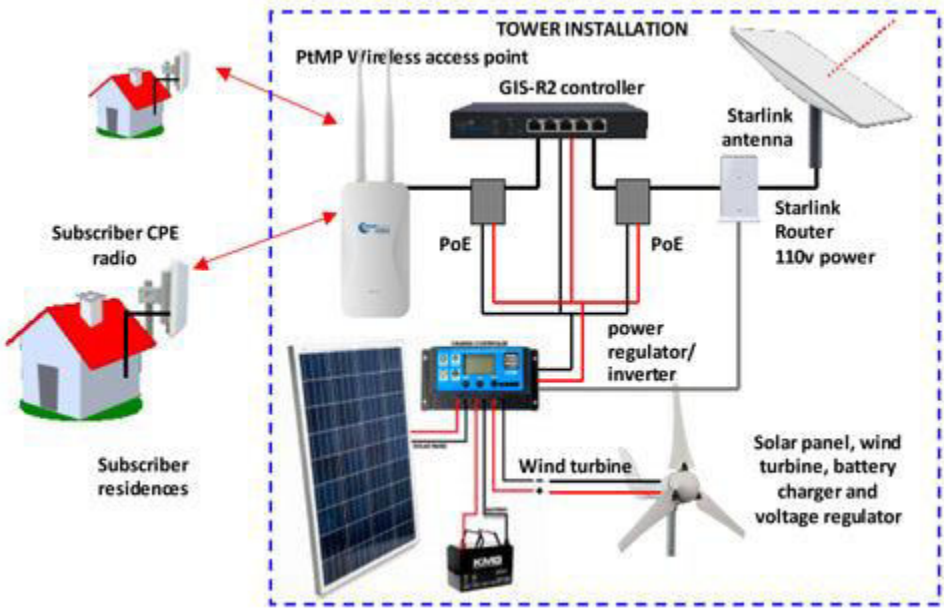
Remote communities where electrical power is not available or suffers interruptions

Many Guest Internet installations are located in remote rural communities in Latin America and the Caribbean. When electrical power is provided for the community it is often interrupted during the day. Power interruptions are not good for the Starlink antenna as it takes some time to stabilize after power is restored.

Installations can be powered using solar and possibly wind power. The Guest Internet equipment consumes less than 10 Watts of power, however the Starlink antenna can consume over 100 Watts. A solar power system should have a charging capacity of 500 Watts to ensure that power is available during the night and also during cloudy days when the sunlight produces less energy.

User mobile devices can be charged using a small solar panel. Homes can also have small solar chargers to power the Internet connection.

The cost of solar is high and a solar charger like that shown in the diagram is a significant part of the installation cost, however it is an investment that some communities are willing to make.



Ensuring that the Starlink terms and conditions are not abused

Guest Internet provides the administrator of the Internet service with powerful tools to monitor the service, this is the Guest Internet Cloud, which is free to use. The Guest Internet Cloud monitors two very important parameters that should not be exceeded.

- The total data bytes over the Starlink connection, and will show if the Starlink data limits are exceeded.
- The bandwidth utilization of the Starlink connection, and will show if network congestion is occurring.

The service administrator can see these numbers at any time by looking at the cloud account using a mobile phone.

The Guest Internet Cloud also has many other important benefits. One is monitoring the network for failure. The cloud can monitor

the Starlink service, the Guest Internet controller and all the wireless products that connect to the controller.

How a community can recover the cost of the Internet service

Members of a community can share the cost of the installation and monthly operating cost, and with the code access all have equal access to the Internet service. If 75 homes in a community are sharing the Internet service then the monthly cost per home is low.

As some residents may want greater access to the Internet then they can purchase additional bandwidth with vouchers for that access.

It may be the case that an entrepreneur invests in the Starlink installation and wireless infrastructure then sells Internet access vouchers to members of the community. The entrepreneur can recover the initial investment plus ongoing fees and make a profit on the service. Internet access is always in great demand so providing that the cost of the service for the residents affordable, the service will make a profit.

Examples of how to use the STAR kits

1. Selling Internet access to mobile devices in a range of 100 meters

For this you will need:

- A Starlink or an internet connection of similar or better speed
- A STAR-1 or STAR-2 to manage the WiFi access codes and broadcast the WiFi signal

This simple setup will allow you to sell WiFi access to people using their mobile devices.

2. Selling Internet access to homes in a range of 1 kilometer

For this you will need:

- A Starlink or an internet connection of similar or better speed
- A STAR-1 or STAR-2 to manage the WiFi access codes and broadcast the WiFi signal
- STAR-4 kit(s) installed in the homes where you want to sell Internet access

This setup will allow you to sell WiFi access to homes up to 1 kilometer, providing there is no obstructions like trees, buildings which can block WiFi signal.

3. Selling Internet access to homes in a range of 1+ kilometer

For this you will need:

- A Starlink or an internet connection of similar or better speed
- A STAR-7 or STAR-8 to do the management of the WiFi access codes and broadcast the WiFi signal
- STAR-4 kit(s) installed in the homes where you want to sell Internet access

This setup will allow you to sell WiFi access to homes that are 1+ kilometer but no more than 3 kilometers, as it depends on the types of obstructions that can weaken or block the WiFi signal.

4. Selling Internet access in a building

For this you will need:

- A Starlink or an internet connection of similar or better speed
- A STAR-5 kit to do all the management of the WiFi access codes. It comes with an Internet controller and wireless access points to propagate the signal across the floors of the building. Depending on how large each floor is and how many floors the building has, you will need extra STAR-5 kits to complement the WiFi structure.

This setup will allow you to sell WiFi access to people living in an apartment building, commercial or government building, shopping mall, etc.

11. Get started with your public WiFi Internet project

Connecting many people to one Internet service provider

Before starting a public WiFi Internet project for a business or for a community first answer some basic questions about the service that will be provided

- What is the speed of the Internet connection, this is quoted in Mb/s (mega-bits per second). If Starlink provides the Internet service then the speed is in the range of 100Mb/s to 200Mb/s.
- How many people will connect to the Internet service at the same time? (Called concurrent connections).

Here comes the part where we make the first calculation. We divide the speed of the Internet service by the number of people that we expect who will connect that the same time.

Lest say that we have a 100Mb/s data connection and we want to connect 500 people.

100/500 = 0.1 Mb/s per person = 100Kbits/s

This won't work as each person will need 2Mb/s minimum to check emails and social media. Video streaming requires a minimum of 3Mb/s.

So lets do that calculation again, this time dividing the speed of the Internet circuit by the data speed per person

100/2 = 50 people

So we see that a 100Mb/s data speed can have 50 people connected, and no more.

We control the number of people that can connect at the same time by giving access codes (in this case 50) where each access code has a maximum download speed of 2Mb/s and maximum upload speed of 0.2Mb/s, or 200Kb/s.

Most Internet services, like Starlink, have a faster download speed and a slower upload speed.

So, if you want to connect 500 people to the Internet you will need a circuit speed of 1000Mb/s, or 1Gb/s.

For the example of 100Mb/s and 50 concurrent users we can issue more than 50 access codes providing that we ensure that the codes are used at different times. We do this by setting a time limit for each code. For example we can issue 50 1-day codes each day, which is 1500 codes each month.

Two other important issues to administer

Each ISP might set a data limit or data cap on the number of bytes of data that can be downloaded each month. Mobile phones have data caps and ISP's have data caps. Starlink states that there is no data cap for the residential service. However if the antenna used consistently exceeds 1TB of data per month then Starlink will advise that customer to upgrade to a plan where the data is paid for (priority plan), or have the service terminated.

If any of your users are sharing copyrighted files the copyright owners will find out as they monitor the Internet constantly. They will get the IP address of the illegal copy and complain to the ISP, this might be Starlink. The DMCA law states that the ISP must warn the customer to stop sharing the copyright file and if the customer does not stop then the ISP, in this case Starlink will terminate the Internet service. Many Starlink customers have been terminated due to illegally sharing copyrighted files.

Building a wireless distribution network

We have an Internet service at a location, this might be the location of a Starlink antenna, or it might be a fiber cable termination in a building. We have people who want to access the Internet and the way that they will access is using WiFi on a mobile device. A wireless distribution network has to be built to connect remote users to the Internet service.

The first step is to install a wireless access point (WAP) at the location where we have our Internet connection. This wireless access point has what is called a point to multi-point antenna (PtMP), which means that a number of mobile devices can connect to the antenna at the same time.

The WiFi technology has a low power output. This means that the distance from the PtMP antenna to mobile devices is short, less than 100m with no obstructions. The limitation of this distance is due to the poor quality of the WiFi antenna in the mobile device.

A home with a directional wireless antenna on the roof can communicate further, maybe more than 1Km with no obstructions. The wireless antenna is called a client premise equipment, or CPE.

When the Internet connection is several Km's from the Internet connection then a point to point (PtP) wireless link can be installed, however this requires expensive equipment and specialist expertise. The PtP antennas must be installd at the top of towers to ensure line of sight between the two antennas.

The reader can download a free e-book that explains how to design and build a wireless distribution network. Type this link into your browser to download the book.

How to start a WISP business:(ENGLISH)

https://drive.google.com/file/d/1M2RObwQzOW-2HVW8vRgfMYOLC6ahht1/view?usp=sharing

The Guest Internet controller

The Guest Internet controller provides the resources that are required to deliver and sell a WiFi Internet service to a group of people, business customers, or to a community. The Guest Internet controller design can meet the requirements of ISP's like Starlink; limit the number of people connecting and the data speed of each to prevent network congestion, limit the data used by each person to ensure that the total monthly data use remains within the ISP limits, and prevent the sharing of copyrighted files without authorization.

A summary of the fifteen essential Guest Internet controller characteristics is listed below.

1. Limit the access to the Internet service by giving guests an access code, when the WiFi has open access then many more people will connect and slow the service for everyone.
2. The available bandwidth is shared by setting data speed limits for each guest, if this is not done then one user can slow the Internet for everyone, or many people will cause network congestion.
3. Optionally set data limits for guests, this is essential when the ISP charges for data use, or else charge guests for additional data use.
4. Prevent abuse of the Internet service as the business will be responsible for copyrighted file sharing or access to illegal websites, the controller blocks protocols like Torrent, and can block websites and website categories that are a risk for the business.
5. Increase the Internet speed by adding more ISP connections, dual WAN with load balance and fail-over .
6. Block guest computers that have viruses, such as DDoS, that will slow the network data speed for all guests.

7. Protect the business computers and point of sale (PoS) with a PCI DSS compliant firewall, prevent access to the business computers from the public WiFi.
8. Brand the customer WiFi login experience and advertise additional services that the motel or hotel provides for guests.
9. Monitor the WiFi service for failure, get an immediate alert if any problem occurs so that a repair can be made quickly.
10. Guest Internet provides a free cloud management service with information and reports about the service use, the cloud can be accessed from any location.
11. Optionally charge for the WiFi service, there are alternative methods with Guest Internet controllers.
    - Charge for all Internet services with the options of on-line credit card payment or the Guest Internet point of sale at the reception desk.
    - Differential charge, for example guest staying at the hotel have free internet and visitors to the conference center can purchase on-line or else purchase a vouchers from the front desk.
    - Two-tier charge, provide a slower speed free service and charge for a high-speed data service with a purchase on-line.
    - Time limited access, where the guest has a limited time free access within a 24-hour period, and after the free period expires purchase access at hourly rates, this method is very popular with airports.
12. Have a dual use WiFi network that is accessed by both customers and staff, the customers and staff are isolated with a VLAN; this will reduce the cost of the network installation.

13. Allow selected website access before login, for example the marina can allow free access for anyone to open a weather information website without login.
14. Auto login of a device using the device MAC address, this is required when the marina has devices that will be connected to the WiFi service, for example TV's.
15. Where possible integrate the customer WiFi with the business management systems for ease of use. Guest Internet provides Application Program Interfaces (API's) for integration with billing and reservation systems.

The Guest Internet controllers can be installd in any business or community environment as the controllers can be personalized for the exact requirements of the application.

12. Glossary of acronyms

0-9

3G, 4G, 5G, mobile phone data connection types.

A

AAA; Authentication, Authorization and Accounting.

ADSL; Asynchronous Digital Subscriber Line.

API; Application Programming Interface.

APN; Access Point Name.

ARPU; Average Revenue per User.

AS; Application Server.

B

BNG; Broadband Network Gateway.

BSS; Business Support Systems.

C

CAGR; Compound Annual Growth Rate.

CAPEX; Capital Expenses.

CAT-n; Category n.

CATV; Cable TV.

CDMA; Code Division Multiplexing Access.

CDR; Charging Data Records.

CPE; Customer Premises Equipment.

CRM; Customer Relationship Management.

D

DDoS; Distributed Denial of Service.

DHCP; Dynamic Host Configuration Protocol.

DSL; Digital Subscriber Line.

E

EIRP; Effective Isotropic Radiated Power.

F

FTTH; Fiber to the Home.

FTTP; Fiber to the Premises.

FWA; Fixed Wireless Access.

G

GB; Gigabyte.

GE; Gigabit Ethernet.

GHz; Giga Hertz.

GSM; Global System for Mobile Communications.

H

HDTV; High Definition TV.

HSPA; High Speed Packet Access.

HSS; Home Subscriber Server.

HTTP; Hypertext Transport Protocol.

HW; Hardware.

I

IAB; Integrated Access and Backhaul.

IEEE; Institute of Electrical and Electronics Engineers.

IGW; Internet Gateway.

IP; Internet Protocol.

IPTV; IP Television.

IPvn; Internet Protocol version n.

ISDN; Integrated Services Digital Network.

ISP; Internet Service Provider.

ITU; International Telecommunication Network.

K

KPI; Key Performance Indicator.

L

LAN; Local Area Network.

LTE; Long Term Evolution.

M

MB; Mega-byte.

MBB; Mobile Broadband.

MHz; Mega Hertz.

MIMO; Multiple Input Multiple Output.

N

NAT; Network Address Translation.

NPV; Net Present Value.

O

OPEX; Operational Expenses.

OSS; Operations Support System.

P

PDN; Packet Data Network.

PoP; Wholesale telecom provider Point of Presence

POTS; Plain Old Telephony Service.

PtMP; Point to Multi-Point wireless connection.

PtP; Point-to-Point wireless connection.

Q

QoS; Quality of Service.

R

RADIUS; Remote Authentication Dial-In User Service.

RAN; Radio Access Network.

RF; Radio Frequency.

RJ11; Registered Jack 11.

RTP; Real Time Protocol.

RTT; Round Trip Time.

S

SDTV; Standard Definition TV.

SIP; Session Initiation Protocol.

SLA; Service-Level Agreement.

SME; Small and Medium-sized Enterprise.

SNR; Signal to Noise Ratio.

SPID; Service Profile Identifier.

STB; Set Top Box.

SW; Software.

T

TCP/IP; Transport Control Protocol /Internet Protocol.

TDD; Time Division Duplex.

TV; Television.

UL; Uplink.

USD; US dollars.

W

WAN; Wide Area Network.

WISP; Wireless Internet Service Provider.

About the Author

John D. Barker is a member of the Institute of Electrical and Electronic Engineers (MIEEE) and is an engineer with over 50 years of experience developing and manufacturing software and hardware products for computer network communications and cybersecurity applications.

The author had worked with computer and consulting companies, and has also been a founder of several technology businesses. Many of the products that the author has developed were designed for business IT applications and for the Internet service provider industry. Product technologies included cybersecurity, network access control and network management and supervision.

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