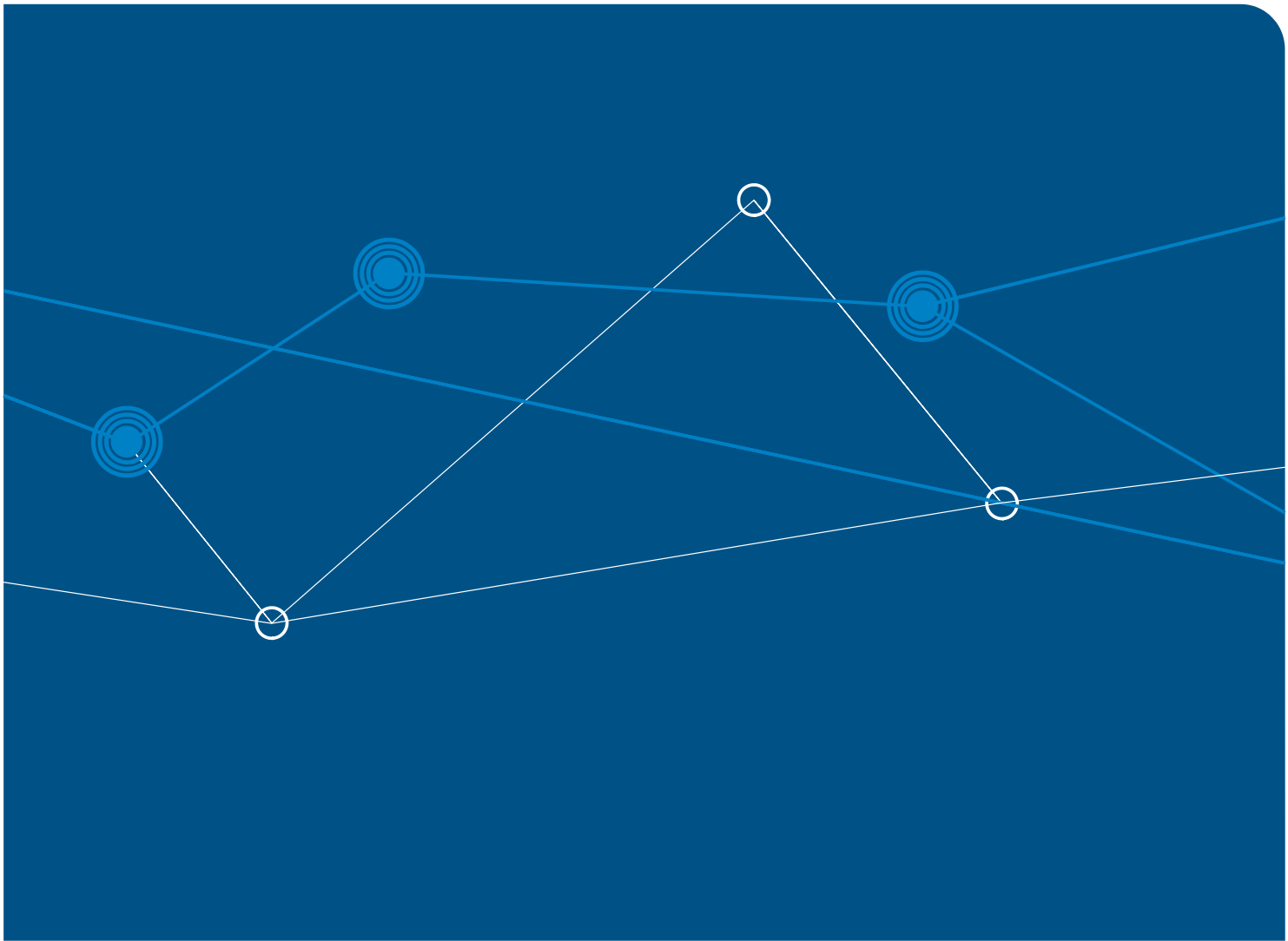
gogo CLIENT

CLIENT GUIDE WITH HOMEACCESS



gogoCLIENT™ with HomeAccess Guide

Part number GOGO-DC-0008-02.

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About This Guide

This manual describes the gogoCLIENT with Home Access (i.e., the gogoCLIENT including Home Access and Home Web). It is intended for users who have purchased the Home Access platform and wish to set up a home Web server and/or provide access to selected devices on their private home network to the public Internet. The purpose of the gogoCLIENT with Home Access Guide is to help you set up your Home Access environment quickly and safely, then derive full benefit from the product.

gogoSERVER Documents

Refer to the gogoSERVER Documentation Guide for details regarding the various manuals that comprise the gogoSERVER documentation suite.

Obtaining Documentation

The gogoSERVER documents are supplied as Portable Document Format (PDF) files on the gogoSERVER Software & Documentation CD-ROM. Printed copies of these documents are also available.

The Software & Documentation CD-ROM also contains gogoOS image files, gogoCLIENT software, the latest documentation updates, as well as gogoOS software and copyright information. You can also find these items on the gogo6 corporate Web site.

Document Revision

See the gogoCLIENT with Home Access Release Notes to learn which software version corresponds to this document. The revision number of this document is 02

Introduction

Why Do I Need the Home Access Platform?

Use *Home Access* to remotely connect to, view and otherwise interact with compliant Internet- ready devices[1] residing on the private network in your home, such as webcams and personal video recorders (PVR). With *Home Web*, you can host your own Web presence without worrying about the disk space or traffic limitations imposed by commercial Web hosting facilities. Publish your very own content for the world to see in a few easy clicks!

The Relationship Between Home Web and Home Access

You have the choice of using either Home Web, Home Access or both, depending on your requirements and environment. Not everyone will need to use both, and either feature can be disabled as appropriate via the gogoCLIENT Utility. Both utilities are installed at the same time because they are part of the gogo6 gogoCLIENT with Home Access installation package. However, you are not required to use both for the system to work properly.

Home Web can be considered a subset of Home Access. As its name suggests, Home Access offers access to the candidate devices residing on the local private network, but Home Web's access is limited to the single Web server where the gogoCLIENT with Home Access is installed. Both use IPv6 connectivity to bridge the NAT inside the user's home network. Both Home Web and Home Access offer access to HTTP services. The difference is that Home Web provides access to the HTTP services hosted on the machine on which the gogoCLIENT with Home Access is running (*i.e.*, the tunnel endpoint). Home Access, on the other hand, provides access to HTTP services on devices that reside on the private home network, and not those hosted on the machine running the gogoCLIENT with Home Access. Exactly what content these HTTP services provide depends on the type of device and type of HTTP access the manufacturer has chosen to support (ex: a video camera that publishes a new picture/frame via HTTP every 60 seconds or a PVR that provides an HTTP recording scheduling interface).

The main components of Home Web and Home Access are presented below. For more detailed information, consult the sections covering Home Web (page 21) and Home Access (page 25).

Home Access Web Server

The main component of Home Web and Home Access is an IPv6-capable HTTP server that acts as a Web server. Its access to the public Internet is not blocked by the NAT because it listens for IPv6 activity instead of IPv4 activity.

Shared by both Home Web and Home Access, the Web server has one or two main responsibilities, depending on which features have been enabled in the gogoCLIENT Utility:

Home Web	Home Access
Acting as the HTTP server (Web server). If the Home Web feature has been activated and Web-ready content has been placed in the directory defined as the *Published Document Root* in the gogoCLIENT Utility, then clients on the public Internet can connect to this server to freely access the content. The server will respond to all valid HTTP requests it receives.	For the devices located in the private network behind the client host, the Web server is in charge of completing all HTTP proxying between the incoming IPv6 connections (because it is able to listen for IPv6 activity) and the IPv4 devices in the private network that have been configured in the gogoSERVER Utility to offer content.

1. Compliant Internet-ready devices are devices that offer some sort of HTTP access and/or control

NOTE: The address of a site contained in an incoming HTTP request is only resolved if the requested domain is part of the domain configured on the gogoSERVER.

The Home Access web server's configuration files are dynamically generated based, in part, on the domain name that is configured on the gogoSERVER and received during the TSP exchange. It is aware of the subdomains corresponding to the Home Access devices since the mapping configuration is also used to dynamically generate the HTTP server's configuration files to support HTTP proxying for those subdomains.

How the Web Server Works

An IPv6 device on the Internet connects to the HTTP server on the client host and obtains the desired content directly. IPv4 requests, on the other hand, pass through the gogoSERVER server for translation first, as described below.

The Web content accessible via the Home Web *Published Document Root* folder is only assigned an IPv6 address. On the gogoSERVER server side, the DNS name, including the subdomain name (ex: `myusername.brokername`), has both an IPv4 and an IPv6 entry. As such, IPv6 requestors receive the IPv6 address tunnel endpoint (*i.e.*, the IPv6 address that was assigned to the host running the gogoCLIENT when a tunnel was established) from the DNS server and access the site stored on the client host directly. This IPv6 address is the same one to which the HTTP proxy on the gogoSERVER will transfer the IPv4 requests it receives (when switching from IPv4 to IPv6).

Requestors with an IPv4 address are returned what they assume is the IPv4 address of the client host and must therefore traverse the NAT. The IPv4 address the requestor actually receives, however, is that of the gogoSERVER server. The IPv4 address points to the gogoSERVER because IPv4- to-IPv6 HTTP proxying needs to take place for IPv4 requestors.

When the gogoCLIENT with Home Access connects to the gogoSERVER and establishes a tunnel, the gogoSERVER will dynamically update a DNS server with an IPv4 and IPv6 address for the user's endpoint domain name (`username.brokername`). The IPv6 address sent to the DNS is the IPv6 address that it assigned to the gogoCLIENT's tunnel endpoint. The IPv4 address sent to the DNS is the HTTP proxy's IPv4 address configured on the gogoSERVER (usually one of its own IPv4 addresses). This is done so that an IPv6 host on the Internet will be able to reach the HTTP services on the tunnel endpoint directly (Home Web), and an IPv4 host will reach the HTTP services by going through an additional step: IPv4-to-IPv6 HTTP proxying via the gogoSERVER. In this way, the request is received by the Web server as an IPv6 address, even though it was originally sent in IPv4 format.

When Home Access is used, the Home Access feature of the gogoCLIENT will send dynamic DNS updates to the gogoSERVER, which will in turn relay them to the final DNS server (the gogoSERVER proxies the dynamic DNS updates to the real server while

ensuring that they originate from the correct location).

One dynamic DNS update is sent per accessible Home Access device (`device.username.brokername`). The gogoSERVER will insert its own IPv4 address for these devices as well (for the same reason as for Home Web). The IPv6 addresses specified in the dynamic DNS update for each device are chosen by the Home Access. They are either the device's own IPv6 address (in the case of a native IPv6 device) or the IPv6 address of the tunnel endpoint (in the case of an IPv4 device). This approach is taken because the Home Access knows it must perform HTTP IPv6-to-IPv4 proxying for incoming requests for IPv4 devices, and must thus be in the path.

Network Address Translator (NAT)

The NAT is located at the home of the individual who is running Home Web and/or Home Access. Physically speaking, the NAT is usually a software layer present on the home network's router, as opposed to a separate hardware device.

IPv6 devices residing on the home network do not pass by the NAT and are thus directly reachable from the public Internet. Accessibility to IPv4 devices, on the other hand, is elegantly controlled by the NAT once they have been configured in the *Home Access* tab of the gogoSERVER

Client Utility, a name in the DNS has been obtained and the HTTP proxying configuration has been updated so that the HTTP proxy knows to which IPv4 address the request should be proxied.

NOTE: The IPv4 units on the private home network only have IPv4 addresses, and are not directly accessible from the public Internet because of the NAT. The NAT is the component in charge of handling routing between public and private addresses. As such, when an incoming request is received from the public Internet, it will be dispatched to the proper address on the private network by the NAT.

HTTP Proxying

An HTTP server can receive HTTP requests addressed directly to it or to another HTTP server. *HTTP proxying* occurs when an HTTP server takes reception of a request for another entity, then forwards it on to its final destination.

How HTTP Proxying Works

The client host is assigned a DNS name that adheres to the following syntax: `myusername.brokername`. The name is registered by the gogoSERVER on the DNS server via dynamic DNS updates when the tunnel is created and the connection is established via dynamic DNS. The assigned name is mapped to the registered IP address on which the Home Web HTTP server (an application running on the client host) is listening. The implemented naming convention means that users can enter an address formulated according to the syntax `devicename.myusername.brokername` in their browser window because dynamic DNS updates for the subdomains (`devicename.myusername.brokername`) are sent by the client based on the Home Access configuration.

When the client host receives a request for a device on its home network, it first determines that there is a device name preceding the user name and broker name in the address. The client host then looks up the home network address (IPv4 only) associated with the device name in an internal configuration table, and transmits the request to the intended recipient on the home network.

HTTP Proxying as Applied to HomeAccess

To connect to an IPv4 device located on the private network behind the client host, an IPv6 device on the public Internet will contact the HTTP server with a specific request for the device (`devicename.myusername.brokername`). The HTTP server knows where to transfer the request because it has been configured with the device's IP address. The difference is that it will be determined when the connection is established that the requested content is stored on a device located behind the host server unit and not on the host server itself. The Web server will then transfer the request to the specified recipient in the private network, and at the same time transform the IPv6 request into an IPv4 request, in the case of an IPv4-only device.

About the gogoSERVER

The gogoSERVER is a specialized router designed to provide all the advantages of Internet Protocol version 6 (IPv6) to existing IPv4 networks. Including the gogoSERVER in your system paves the way to implementing seamless peer-to-peer applications such as IP telephony, videoconferencing and multi-player on-line games, in addition to online sensors and device monitoring systems. The gogoSERVER is fully equipped to meet your mobility and end-to-end security requirements; it is the instrument of choice for forward-thinking network operators who wish to offer their end users the benefits of IPv6, and thus distinguish themselves in a highly-competitive market and take advantage of new IPv6-based revenue opportunities.

The gogoSERVER provides Authorization, Authentication and Accounting (AAA) services via the Tunnel Setup Protocol (TSP) and grants connected clients access to a permanent IPv6 address, a delegated prefix and IPv6 Domain Name System (DNS) resolution.

In order to provide such services, data tunnels are negotiated then established between each client and the gogoSERVER. The tunnels are requested by the client software, which is offered free of charge and is available for a wide range of operating systems.

gogoSERVER Software Components

The gogoSERVER software, gogoOS, comprises distinct software components that interact with one other: TSP servers, HTTP servers, AAA models, tunnel brokers and tunnel servers. Each component is individually configured, then linked to or associated with other components.

- The TSP servers and HTTP servers process the requests for dynamic tunnels received from clients. gogoSERVER clients transmit requests to a TSP server through a port using the TSP protocol. HTTP clients, on the other hand, transmit requests to an HTTP server via a Web interface
- AAA models contain various sets of parameters and criteria that shape how client connections and tunnels are established. AAA models are configured and assigned to TSP and HTTP servers.
- Tunnel brokers process requests received from TSP servers or HTTP servers, then send them on to tunnel servers.
- The role of the tunnel server is to provide the resources needed to create the requested tunnels.

NOTE: The terms TSP Listener and HTTP Listener are deprecated and have since been replaced throughout the gogoSERVER and gogoOS documentation by the equivalents TSP Server and HTTP Server, respectively.

gogoCLIENT with HomeAccess Installer Utility

The gogoCLIENT with Home Access for Windows is delivered via an installer utility. This section explains the procedures that must be followed in order to properly install the gogoCLIENT with Home Access on the local node, as well as add the tunnel driver to Windows interfaces.

To install the gogoCLIENT with Home Access, your system must have the minimum hardware requirements of your installed operating system and a CD-ROM drive (unless you are installing from a network connection).

It is strongly recommended to carefully read over the *gogoCLIENT with Home Access Release Notes* before proceeding with the installation. When ready, follow the steps listed below and let *Setup* guide you through the installation process. Remember to close all open windows before you begin.

- Launch the *Setup* installer executable by double-clicking the installer icon, as shown below. The introduction screen will appear when you first launch the installation program; click *Next* and Setup will begin.

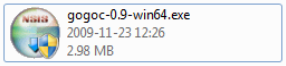

Figure 1 - gogoCLIENT with Home Access Windows Package File

- When you initially open the executable, the security warning below will be displayed by your operating system. There is no reason for concern. Click the *Run* button to proceed.

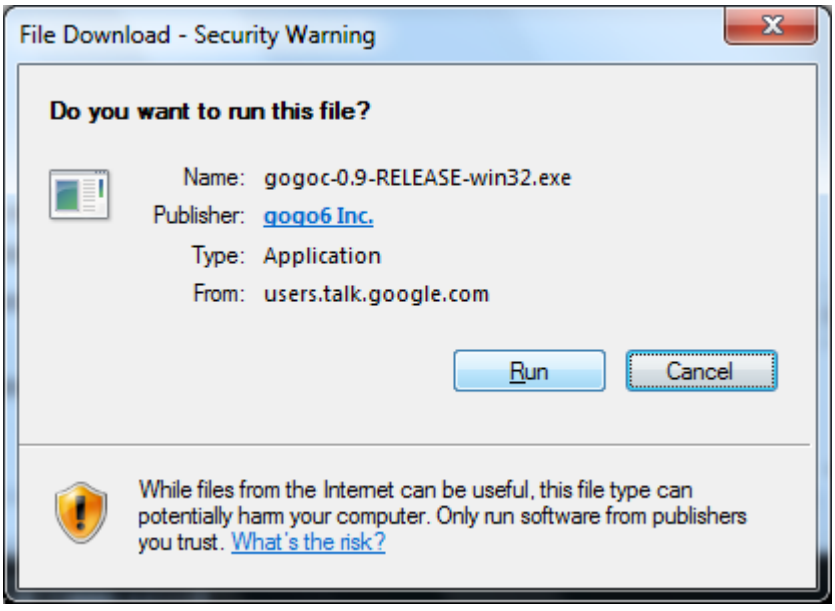

Figure 2 - Open File - Security Warning

- gogo6's License Agreement for the gogoCLIENT with HomeAccess is then displayed. Click *I Agree* to continue once you have read and understood the terms of the agreement.

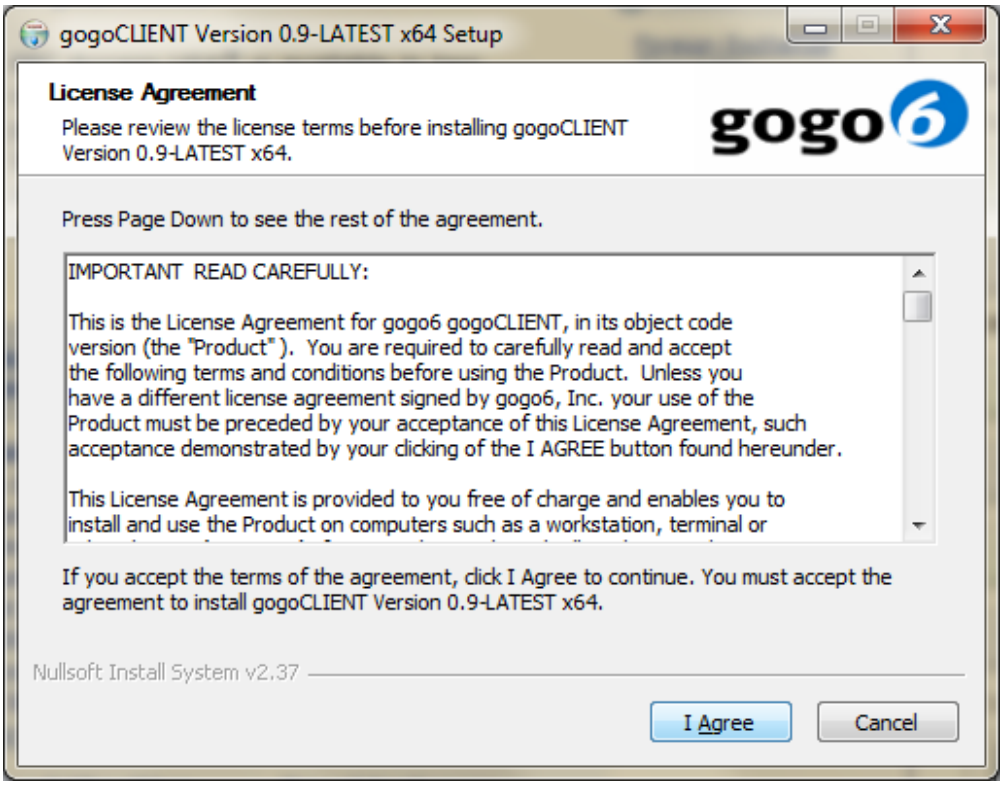

Figure 3 - gogoCLIENT with Home Access License Agreement

- Select which package component(s) you wish to install by clicking the checkbox beside each one. The total disk space required will be displayed.
  - ✓ The “gogoCLIENT binaries,” “Apache HTTP Server” and “Runtime Scripts” components are mandatory and must be checked for the software to be successfully installed.
  - ✓ Only uncheck the “Tunnel Driver” component if you are certain the gogoCLIENT will never be positioned behind a NAT or if you do not require DSTM (forIPv4-in-IPv6 connectivity).
  - ✓ It is recommended to leave the “Additional Languages” checkbox selected.
- Click the *Next* button to move to the next screen, where you select the gogoCLIENT software installation directory.

Figure 4 - Choosing gogoCLIENT with Home Access component

Define the location where the gogoCLIENT with Home Access will be installed, if needed, by clicking the *Browse* button.

- The default location is **C:\Program Files\gogo6\gogoCLIENT**.

Click *Install* when you are ready to continue.

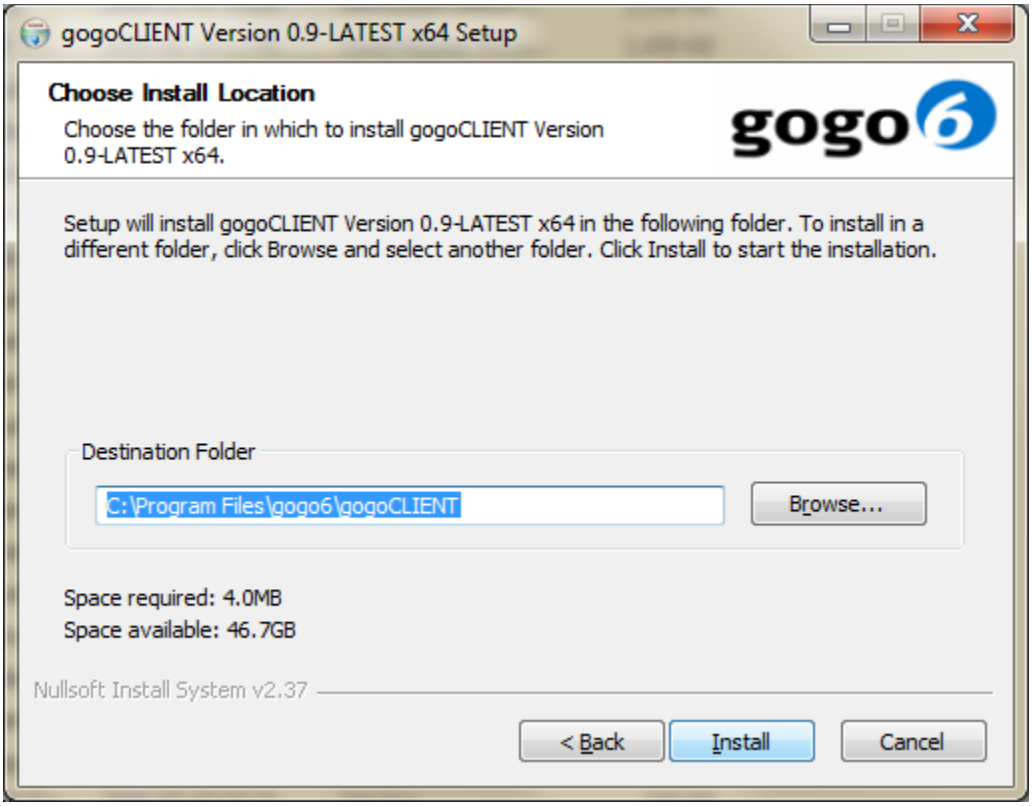

Figure 5 - Choosing installation location

- The gogoCLIENT driver is not yet officially recognized and tested for compatibility by Microsoft. This is why you will probably see this warning message. If you do, simply click *Install this driver software anyway* (Windows Vista) or *Continue Anyway* (Windows XP) to complete the installation.

NOTE: Do not be alarmed by this warning; the gogoCLIENT is already used by many of gogo6's clients and has been proven as an efficient and stable product.

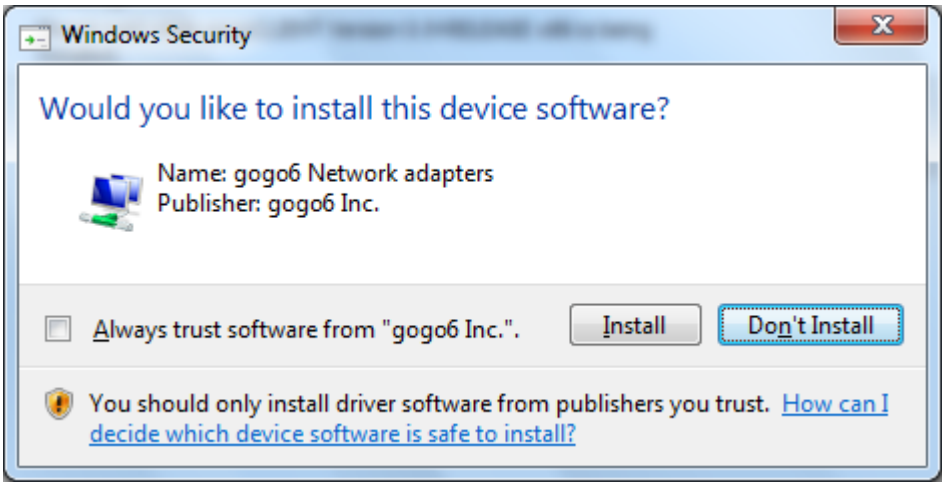

Figure 6 - gogo6 Network Adapter Warning

When the installation is complete, the summary screen is displayed with two options available.

- It is always advisable to consult the README file to be aware of the latest changes and any special instructions related to your platform. This is also where you can find important information on the product name and version number, as well as how to reach gogo6 Technical Support.
- You should also launch the gogoCLIENT Utility to customize how your gogoCLIENT with Home Access is configured. Entering a personal userid, password and server details is sufficient for most users.

Click *Finish* to exit the gogoCLIENT with Home Access installer.

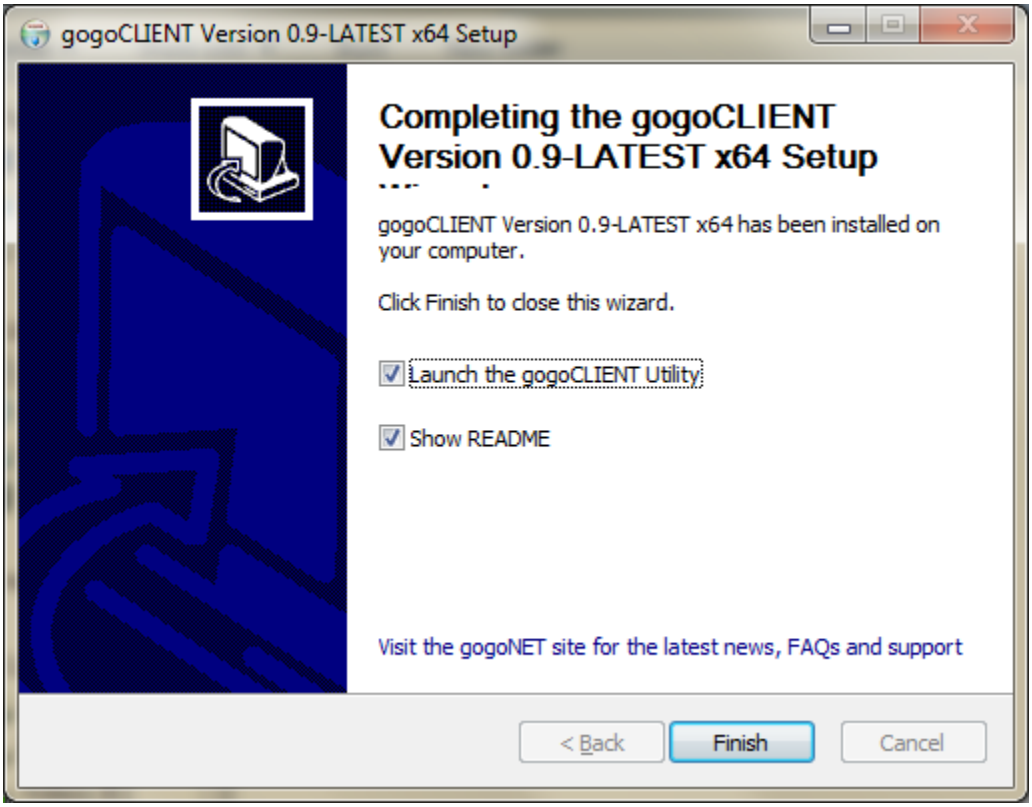

Figure 7 - Installation is complete

The installation utility creates the appropriate files in the destination folder, adds a shortcut to the Windows Start menu and creates a new network connection.

Home Web

This section explains how to get started when first setting up Home Web (see Figure 8 below). You are shown how Home Web obtains IPv6 connectivity and publishes the content you specify on the public Internet. It also covers the steps that are completed when a remote user connects to the Home Web personal Web server to issue an IPv4 HTTP request.

For the configuration sequence to make sense to the application, it is recommended to configure the gogoCLIENT Utility proceeding from left to right in the tab order. Some configuration elements (ex: Home Web) are dependent on elements in previous tabs (ex: login credentials) in order to become enabled.

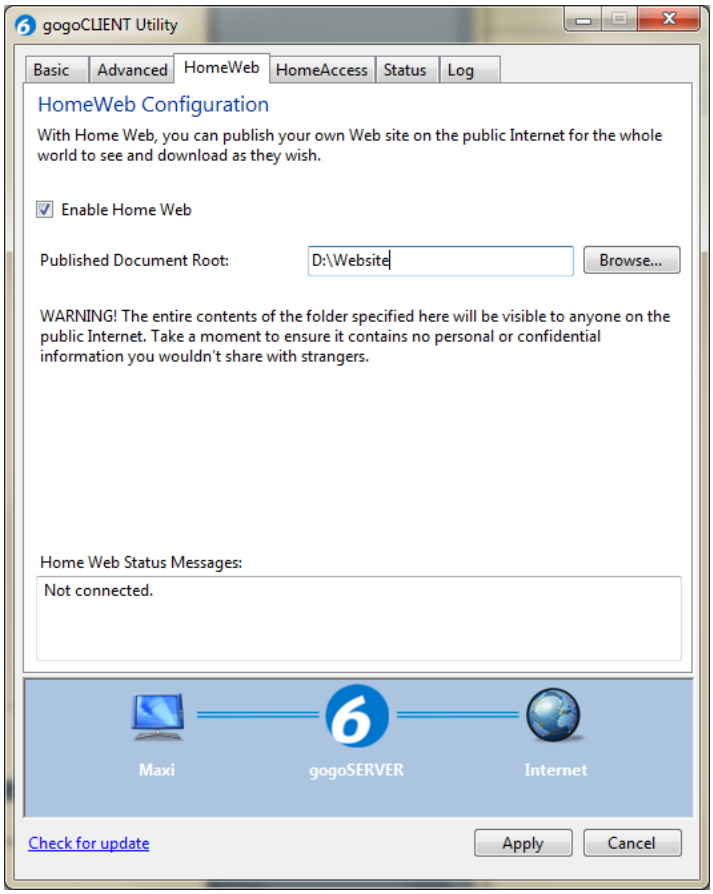

Figure 8 - gogoCLIENT with Home Access - Home Web tab

Overview

The purpose of Home Web is to provide a mechanism for accessing the various HTTP services that are offered in the designated published folder by the computing device on which the gogoCLIENT with Home Access is installed. This machine (i.e. the client host running the gogoCLIENT) need not be a dedicated server; it can even be the household's main PC used for a variety of unrelated tasks.

Technically speaking, Home Web is an IPv6 Web server (Apache) running on the workstation where Home Access/Home Access is installed. The required IPv6

connectivity is supplied by the gogoCLIENT. A Web proxy is implemented in the gogoSERVER server in order to provide access to the Home Web server from the IPv4 Internet.

Home Web requires sufficient disk space because it involves publishing your personal Web content for viewing by anyone over the Internet. Such content may be HTML documents, images, scripts and more.

There is a possibility that Home Web can be embedded on a non-PC device. In such a case, the device would require a flash memory chip to store the gogoCLIENT with Home Access executable and Web content, since there is no hard disk. Contact gogo6 directly if you would like more information in this regard.

Home Web consists of the elements shown in Figure 9 below:

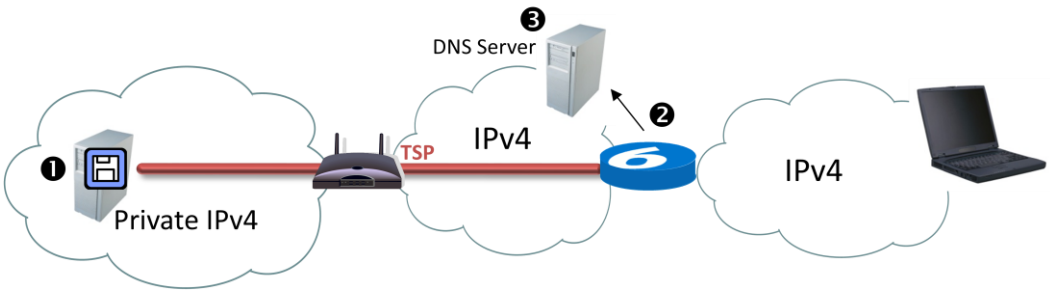

Figure 9 - Home Web components

1. An IPv6-capable Web server residing on the client host. This machine has other related components installed on it, notably the gogo6 gogoCLIENT. The NAT is a software layer that generally resides on the router to which you connect for Internet access. Conceptually, the NAT represents the separation point between the private home network and the public IPv4 Internet, as shown above.
2. An IPv6 HTTP proxy on the gogoSERVER server. This component is usually located off-site at your Internet Service Provider. You simply configure the gogoCLIENT to connect to it in order to establish IPv6 data tunnels using the TSP protocol.
3. A DNS server offering dynamic DNS updates; it may use either IPv4 or IPv6 transport when resolving domain names and updating AAAA (quad A) records. This server is always located off-site.

Environment Setup

The steps below explains how to set up the Home Web environment and provide access inside your home network. Once you have successfully completed these steps, you will have active content on the client host available for viewing by the entire Internet community.

- Connect the client host to the Internet as usual and install the gogoCLIENT with Home Access. The gogoCLIENT Utility will automatically be installed at the same time.
- Launch the gogoCLIENT Utility and configure all tabs of the interface to reflect your environment:
    - Activate Home Web for use by ticking the *Enable Home Web* checkbox located in the upper half of the *Home Web* tab.
    - Define the location of the root folder in which the published content will be stored by clicking the *Browse* button and navigating to the appropriate folder on the local host. This location is known as the *Published Document Root*.
- Establish a data tunnel with the gogoSERVER server in order to obtain IPv6 connectivity by clicking the *Connect* button in the *Basic* tab of the gogoCLIENT Utility. Internally at this point, the gogoSERVER updates the DNS server with the AAAA record of the gogoCLIENT, along with an A record pointing to the address of the proxy. Furthermore, the Web server is launched on the client host by the gogoCLIENT with Home Access.
- A status message stating, "Your Home Web server is online. You, and the Internet community can access the site via http://{<site>}" will be displayed. Any user who connects to this Web server can now view or download all content saved in the *Published* Document Root.

NOTE: Choose the location of the Published Document Root with extreme caution! Ensure that all files in all subdirectories of the Published Document Root are intended for public distribution. There is no imposed limit regarding the size or the number of files that can be stored in the Published Document Root folder used by Home Web. The only limitation is the hardware itself. See the section on Security Issues (page 33) for additional safety considerations.

Any content located in the published document root may be downloaded if directly requested by its full path name. However, for security reasons, the HTTP server will not display an index of the published document root contents. If no resource is directly requested, a file named *index.html* will be served (if it exists). For example, typing `http://myusername.brokername` in the browser will fetch *index.html*, if present. If it does not exist, a *File not Found (404)* error will be raised.

Connection to the Web Server

This is how a host on the IPv4 Internet establishes a connection with the Home Web server:

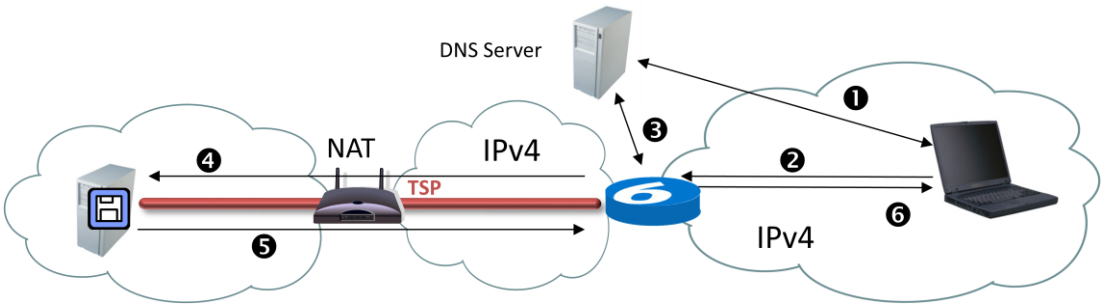

Figure 11 - An outside connection to Home Web

1. A host on the IPv4 Internet resolves the IPv4 domain name of the Home Web server and thus obtains the proxy's IPv4 address.
2. The host sends an IPv4 HTTP request to the proxy on the gogoSERVER server.
3. Upon reception of the HTTP request, the gogoSERVER resolves the host's IPv6 address therein.
4. The proxy forwards the HTTP request to the Home Web server using the IPv6 transport mechanism.
5. The Home Web server responds to the request using IPv6.
6. The proxy translates the answer back to the host on the IPv4 Internet.

If an HTTP request is made for an address in the home network that does not exist, a *File not Found (404)* error will be generated by the Web server and displayed on-screen in the requestor's browser. This error will also be returned in the Home Access context if a request is made for a subdomain that does not exist, or for an item that does not exist on a valid subdomain.

Home Access

This section explains how to set up Home Access (shown in Figure 5 below) by outlining common tasks you will carry out in order to make all or part of your home network accessible to the public Internet via Home Access. It also covers the steps that are completed when a remote visitor attempts to connect to a device on the home network in order to access its contents.

Figure 5 - gogoCLIENT with Home Access – Home Access tab

Overview

- Home Access provides IPv6 access to IPv4 devices in the home, as well as to IPv6 devices. The gogoCLIENT runs along with a reverse HTTP proxy server that translates incoming IPv6.
- Home Access handles HTTP requests for the IPv4 devices in the home network. These devices are assigned individual names and IPv4 addresses in the reverse proxy. They are not, however, assigned individual IPv6 addresses. The IPv6 devices each have their own native IPv6 address, but the IPv4 devices all share the IPv6 address of the tunnel endpoint. The mapping of IPv4 and IPv6 devices is controlled in the gogoCLIENT Utility.
- The names of the hosts in the local network are propagated via dynamic DNS updates through a proxy located on the gogoSERVER server. The DNS updates are filtered by the proxy based on their source address. Because an

authenticated tunneling mechanism is used, the gogoSERVER server now has the information it needs to match the address to the user domain name locally.

NOTE: Although the *Home Web* and *Home Access Status Messages* boxes are read-only, it is possible to select the text they contain and copy it to the Windows clipboard for troubleshooting purposes.

- Similar to Home Web, Home Access also enables accessibility to HTTP services, only this time it is for the pre-selected units in a private home network situated on the same local area network as the workstation on which the client is installed. It does not function as a Web server.
- Home Access requires fewer hardware resources than does Home Web because it is intended to simply provide access to the HTTP services offered by the devices on the network. Fewer resources are required for the client running Home Access because each device on the home network is equipped with the memory/storage resources it needs for normal operation. For example, a digital camera would have its own disk space (ex: a CompactFlash card) to store and manage its content.
- Home Access is a scalable solution, able to support as many Web-enabled devices as your private home network can contain. A more realistic limiting factor to consider is the available bandwidth obtainable from your ISP.
- The devices residing on the private network controlled by Home Access can support either IPv4, IPv6 or both. A hybrid setup is possible because the HTTP proxy server is able to translate for the IPv4 devices, and the IPv6 devices are directly accessible from the public Internet (no proxying is required).

A typical Home Access setup consists of elements similar to those shown in Figure 6 below:

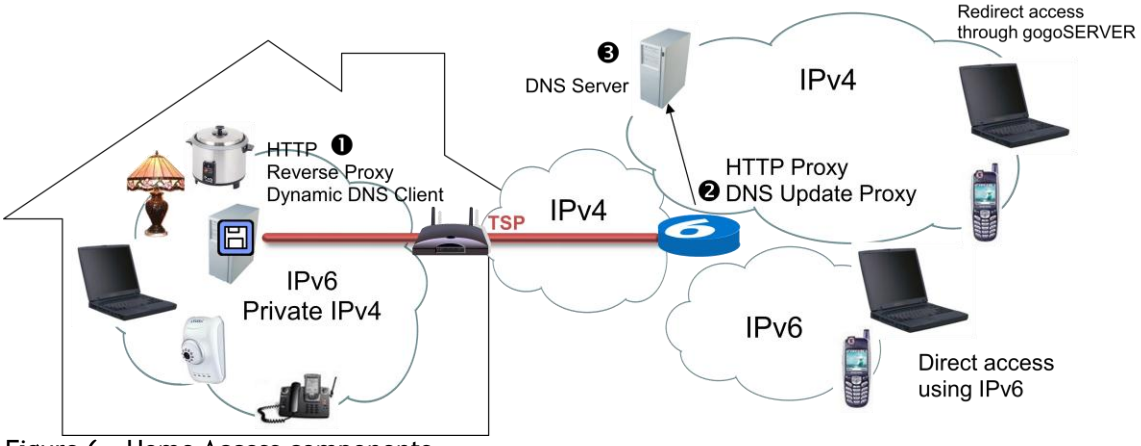

Figure 6 - Home Access components

1. The client host, upon which is installed the gogo6 gogoCLIENT, an HTTP reverse proxy and a dynamic DNS update client with IPv6 transport. The consumer devices surrounding the client host are either publicly-accessible IPv6 devices or private IPv4 devices available only via NAT traversal.
2. The gogoSERVER server, upon which is installed an HTTP proxy and a dynamic DNS update proxy with IPv6 transport.
3. A DNS server; it may use either IPv4 or IPv6 transport when resolving domain names and updating AAAA records. This server is always located off-site.

Making the Private Home Network Accessible with Home Access

This is how a private home network is made accessible to the public Internet via Home Access.

- Manually configure the IPv4/IPv6 address device name mappings in the *Home Access* tab of the gogoCLIENT Utility.
- The gogoSERVER server sets filters on the DNS update proxy to only accept updates from your personal IPv6 address or from a prefix in your domain.
- The client host connects to the gogoSERVER server and obtains IPv6 connectivity.
- The mapping names and IPv6 addresses you define are delivered to the gogoSERVER server through a DNS update over IPv6 transport.
- The gogoSERVER server updates the DNS server with both AAAA and A records for the subdomain name.

Connecting to the Private Home Network

This is how a remote visitor to the home network connects to an IPv4 device in order to access its contents via IPv4 HTTP requests.

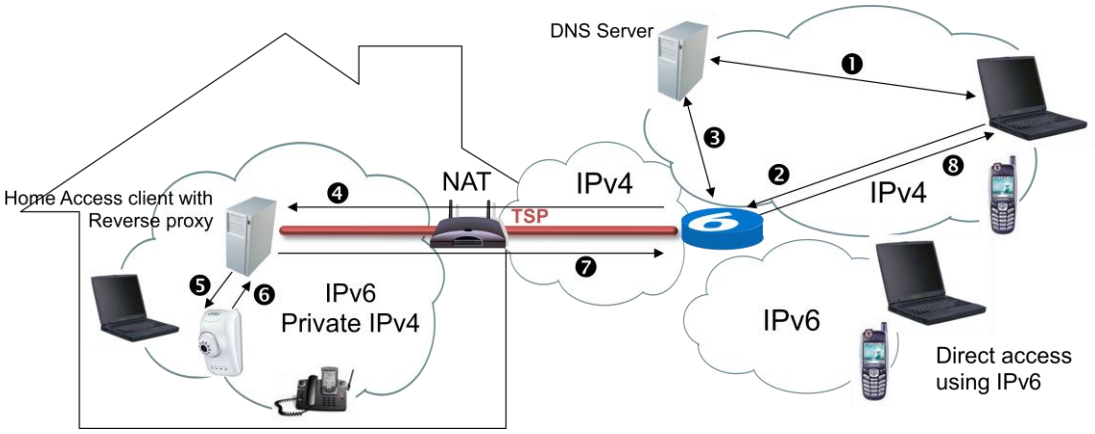

Figure 8 - Accessing the home network with Home Access

1. A remote IPv4 host resolves a subdomain name such as `camera.username.go6.net` from inside the private home network.
2. The remote host connects to the gogoSERVER server.
3. The gogoSERVER server resolves the IPv6 address assigned to `camera.username.user.freenet6.net`.
4. The gogoSERVER server sends the request to the client host located inside the home.
5. The reverse proxy on the client host sends the request to the camera over IPv4.
6. The camera responds to the request appropriately.
7. The answer is forwarded back to the gogoSERVER server by the client host.
8. The answer is translated to IPv4 again, then sent to the remote host on the public Internet

Home Access Tasks

Once Home Access has been installed, it must be configured in order to function as expected. The following are common procedures, presented here to help you get up and running quickly.

NOTE: You are not required to enter every device on your home network in the *Home Access Device Mapping* table! Only enter the devices for which you wish to provide wide-scale exposure over the public Internet. Published and unpublished devices can seamlessly cohabitate on the same private home network.

Getting started with Home Access

- Ensure you have a private IPv4 network that includes the Web-ready devices you wish to make public.
- Ensure you have access to the Internet with an ISP. Check that your access is functioning properly by opening a browser window and visiting a URL such as www.gogo6.com.
- Turn on and test all attached devices to ensure proper functioning and connectivity. At this point, the client host should be able to ping all devices of the home network that support this command.

How to add individual devices to your Home Access network

- From inside the gogoCLIENT Utility, click to open the *Home Access* tab
- Click the *Add…* button located immediately beneath the *Home Access Device Mapping* table. The *Home Access Device Mapping* dialog box will subsequently appear.
- Enter the name and IP address to assign to the device, then click *OK*. The device's status in the *Home Access Device Mapping* table will be set to **NEW**. See page 31 for more information regarding the various status values used by the gogoCLIENT with Home Access.
- When you have finished entering the specifics related to this device, Home Access will perform a syntax check of the address, but will not validate that the address is accurate. This means that entering `132100.100.100` will trigger an error because of the missing period, but entering `132.100.100.100` will not if you meant to enter `132.110.110.110` instead. If the gogoCLIENT encounters an IP address with improper syntax, the mapping will remain in the configuration file, but will be dropped from the GUI display.

NOTE: Do not pad the IP address with zeros (ex: `132.23.03.01`) because it will raise an error when you attempt to save the configuration.

The device name you choose cannot contain spaces and must be fewer than 64 alphanumeric characters in length to be accepted by the system. In addition, the device name must start with a letter, end with a letter or digit, and otherwise contain only letters, digits and hyphens. The entire FQDN you specify

(ex: `devicename.username.brokername`) cannot exceed 1024 characters.

Click the *Cancel* button at any time to return to the gogoCLIENT Utility if you are unsure about the name or address to be added.

If you make a keying error when entering the IP address of one of the devices to add to the Home Access network (ex: `132.23.83.41` instead of `132.23.41.83`) then attempt

to have the device information validated by the gogoSERVER, no error will be detected because the address syntax is correct.

Once your new device has been added to the table, you can adjust the column widths to view the entire name if necessary. A horizontal scrollbar will appear at the bottom of the table to enable you to reach the right edge of the table. If you enter more than seven devices, a vertical scrollbar will appear to allow you to access the additional entries. There is no limit on the number of devices you can enter in Home Access.

How to modify the individual devices of your Home Access network

- Select the device you previously entered in the *Home Access Device Mapping* table and click the *Edit…* button located immediately beneath the table. The *Home Access Device Mapping* dialog box will subsequently appear.
- Update the device name and/or the IP address as necessary, then click the *OK* button to close the dialog box and return to the *Home Access* tab.

Router mode must be activated on the interface if IPv6 devices are to be included in the private network. The difference with Home Access is that there is a validation layer over top of the standard gogoCLIENT validation whose purpose is to ensure that the setup is coherent with Home Access. For example, if the private network contains IPv6 devices, the gogoCLIENT with Home Access must connect to the gogoSERVER server in router mode in order to obtain an IPv6 routing prefix so the requestors on the local home network requiring IPv6 connectivity can thus calculate their individual IPv6 addresses for access to the tunnel. Refer to the *gogoCLIENT Guide* for more information regarding router mode.

How to remove a device from the Home Access network

- Select the device's entry in the *Home Access Device Mapping* table with the mouse.
- Click the *Remove* button.

You will not be prompted by the system to confirm your action; however, if you change your mind about a deletion, you can elect to simply close the gogoCLIENT Utility and not save your configuration changes when prompted to do so.

Device Status Values

When you first add a device to the *Home Access Device Mapping* table, its status will be set to **NEW**, and the message "This device mapping has not yet been published" will be displayed in the *Home Access Status Messages* area. Press the *Apply* button at the bottom of the tab when you are ready to save your changes.

Now disconnect (if necessary) from the gogoSERVER and reconnect to present the device information to the gogoSERVER for validation. If validation is successful, the status value **SUCCESS** will appear in the validated mapping column. However, an **ERROR** status will appear if an error occurred while processing the mapping. Consult the log file for more information. Furthermore, the device name in the leftmost column of the *Home Access Device Mapping* table will automatically change to its FQDN equivalent. This user-delegated domain name is the address remote visitors will enter in their browser window in order to access the device. All possible device status

values are presented in the table below:

Status Value	Description
ERROR	This device mapping failed to be published. Consult the log file for more information.
UNKNOWN	No information is available about the status of this device mapping.
MODIFIED	No information is available about the status of this device mapping (that has been changed since it was first created).
SUCCESS	This device mapping has been successfully published.
NEW	This device mapping has not yet been published.

NOTE: The devices you enter in the *Home Access Device Mapping* table are sorted by their assigned device name, not chronologically in the order they were entered in the gogoCLIENT Utility. As such, a new device might seem to disappear after you press *Apply*, when in fact it has only been moved up to a new position in the mapping table. You cannot change the sort order of devices in the *Home Access Device Mapping* table by clicking one of the column headings.

If you modify the details of a device in the *Home Access Device Mapping* table, the device status will be changed to **MODIFIED** until you either restart the gogoCLIENT Utility or you connect to the gogoSERVER and establish a tunnel. The message "This device mapping was modified but the modifications have not yet been published" will be displayed in the *Home Access Status Messages* area.

Devices are assigned the interim status **UNKNOWN** when it cannot be verified that the gogoSERVER has successfully saved the device name and address in its own mapping table (*i.e.*, that it has updated the DNS server via dynamic DNS updates). Launching the gogoCLIENT Utility without connecting to a broker will cause the status of devices to change to **UNKNOWN** and the message "No information is available about the status of this device mapping" to be displayed in the *Home Access Status Messages* area. Similarly, if the gogoSERVER is unable to validate the IP address assigned to a given device in the *Home Access Device Mapping* table, the status will remain **UNKNOWN**. In most cases, manually connecting to the gogoSERVER will update the status of all devices.

If, for any reason, the gogoSERVER is unable to save the device's name and IP address during the dynamic DNS update, the device status in Home Access will be changed to **ERROR**. If a device is powered down, it will not cause this error to occur. Note that this same error will also be triggered if you make a mistake while editing the gogoCLIENT's configuration file outside the application since the input does not undergo the software's validation procedure. Any invalid mappings detected by the gogoSERVER will not be displayed in the *Home Access Device Mapping* table, although they will still be present in the configuration file. Refer to the log file for details when an error occurs. It is recommended to set the log level to maximum for the most information possible.

Security Issues

Because Home Access offers the possibility to grant widespread access to personal devices, special care must be taken with regards to security before configuring your home network. All devices exposed on the public Internet must be properly secured! Do not hesitate to contact gogo6 Technical Support if you have any questions.

Troubleshooting

General

Q: I don't have my Internet connection ready yet. Can I still install Home Access?

A: You can install and configure Home Access without an Internet connection, but you will not be able to use it until the Internet becomes accessible.

Q: Is there a Linux version of the Home Access platform?

A: The Home Access feature is currently only available for the Windows operating system (Windows Server 2003, Windows XP Professional, Windows Vista) version of the gogoCLIENT.

Q: Can I modify the Home Access configuration by editing the configuration files manually instead of always using the gogoCLIENT Utility?

A: It is recommended to always use the application to modify its behaviour instead of manually updating the configuration files. An erroneous configuration file may prevent the gogoCLIENT from establishing a tunnel with the gogoSERVER! In addition, any changes you make to the configuration in a raw text editor will be overwritten by the gogoCLIENT Utility the next time it updates the file on its own.

Q: Does Home Access support IPv4-in-IPv6 tunnels as well?

A: Only IPv6-in-IPv4 and IPv6-in-UDP-in-IPv4 tunnels are currently supported by the Home Access platform.

Q: I am able to establish a tunnel with the gogoSERVER, but the HomeWeb and HomeAccess tabs of the interface are disabled! What should I do to configure Home Access?

A: If both the Home Web and Home Access tabs are disabled in the gogoCLIENT Utility, check to see if your system is configured to connect anonymously to the gogoSERVER by opening the Basic tab of the GUI and examining the Connect Anonymously option button. By clicking the Connect Using the Following Credentials option button, the tabs should become enabled.

Q: I changed my configuration to establish an authenticated connection, but it still doesn't work. What else can I try?

A: How have you configured your routing advertisements in the Advanced tab? Routing advertisements must be enabled to allow access to the IPv6 devices on your home network.

Q: I find the domain name myusername.brokername to be a little unwieldy. Can I set up a redirection to a personal dot-com domain name I have registered?

A: Redirection is possible, but only through an outside service; you cannot assign an alias to your IP address via the gogoCLIENT Utility.

Home Web

Q: Why does Home Web reject the location I specified for my Published Document Root in the gogoCLIENT Utility?

A: The folder you specify could be rejected for several reasons:

- Does your data path include special characters such as accents (ex: À, É, Ö) or formatting characters (ex: ~, %, &, ^)?
- Did you include the drive letter in the path (ex: C:\Home Web\)?
- Did you check your spelling and capitalization? (ex: *C:\My Doucments*\)?
- Is the location you selected on the client host, and not on another computer on the home network or on an external drive?

It is always preferable to navigate to the desired location for the Published Document Root using the *Browse* button as opposed to entering it by hand.

Q: Can I enable/disable Home Web remotely (ex: from my laptop while at the office) if the IPv6-in-IPv4 tunnel is already successfully up and running?

A: No, this feature is not currently possible.

Home Access

Q: I cannot see my webcam on my home network! What do I do?

A: No devices are present when you first install the Home Access; they must be individually added to the *Home Access* tab of the gogoCLIENT Utility. If you have added the device to the gogoCLIENT Utility and you still cannot see it, ensure that the device is powered on, that the IP address you entered is correct and that the device in question supports this type of connection. You should also issue a ping request to the device to see if it responds.

Q: Why is it when I try to connect to my webcam, I reach my PVR instead?

A: Did you invert the two IP addresses when entering the home network devices in Home Access? Did you enter the PVR's address for both devices? Turn off the PVR, then try again to reach the webcam.

Q: Do I have to install the gogoCLIENT with Home Access on all the IPv4 and IPv6 devices present on my home network?

A: The Web server running Home Web must have the gogoCLIENT with Home Access installed. The other devices do not need the gogoCLIENT with Home Access installed because they are managed by the client host.

Q: Why can't I add two identical devices (ex: two webcams from the same manufacturer) to my home network?

A: Did you assign each one a unique name and IP address in the *Home Access* tab of the gogoCLIENT Utility?

Q: Is it preferable to create one type of network topology (ex: daisy chain, star, tree) over another for my home network?

A: Any topology method supported by your devices can be used with Home Access. The only limitation is that the client host running Home Access must have access to the Internet (so it can connect to the gogoSERVER server) and must be able to access the devices managed by Home Access. The devices on the private network are not required to be physically connected directly to the client host. See the section "Home Access Tasks" on page 29 for details on setting up your network effectively.

Q: Why can't I use Home Access to power on/off my webcam from a remote location such as my office? I can see it from the Internet!

A: Your interaction with the devices residing on your home network is limited to the HTTP services offered by the device in question. This means that, unless the device specifically offers a switch-on/off feature accessible via HTTP, you will not be able to perform this type of operation on it using Home Access.

Q: Why can't I successfully ping my device on the home network? It appears to be working normally.

A: Not all devices support the ping command. Consult the documentation that came with the device for more information.

Q: I configured my home network for use with the Home Access platform, and I am able to create a tunnel. I am even able to ping my devices from the client host. However, I cannot access my devices from the public Internet. What have I missed?

A: Contact your ISP to ensure that the gogoSERVER server to which you are connecting has been properly configured to support Home Web and Home Access. Also remember that anonymous connections to the gogoSERVER server will cause the Home Access platform to fail.

Q: Can I enable/disable Home Access remotely (ex: from my laptop while at the office) if the IPv6-in-IPv4 tunnel is already successfully up and running?

A: No, this feature is not currently possible.

Q: I entered a valid device name (`myWebcam`) and IP address (`132.23.03.01`) in the *Home Access* tab, but when I try to save I get the error stating that my device mapping contains non-standard characters. What went wrong?

A: Do not pad the IP address you enter with zeros (ex: remove the zeros from `132.23.03.01`) because it will trigger an error when you attempt to save the configuration.

Q: I just added a new device to Home Access and have an authenticated tunnel with the gogoSERVER up and running. Why can't I see the device I just added from the public Internet?

A: For a new device to be recognized by the gogoSERVER, you must disconnect and establish a new tunnel. This is how device-related information is published to the gogoSERVER.

Q: Can I add my device mappings to Home Access even if they aren't physically connected to the network?

A: Devices do not need to be connected in order to be entered in the gogoCLIENT Utility.

Q: I entered a considerable number of personal devices on my private network in Home Access, and now I have to reformat my client host. Can I take a backup copy of the gogoCLIENT Utility configuration files and avoid reentering all the devices by hand?

A: Yes, but it is nonetheless recommended to always edit these files using the application, as opposed to a text editor.

Q: In the *Home Access* tab, it says that my delegated prefix is unknown. What does this mean and what should I do, if anything, about it?

A: Without a delegated prefix, you cannot use Home Access to publish the IPv4 devices on your home network. The reason why your delegated prefix is unknown is because the gogoSERVER server did not assign you one. The most common reason for this is that either you do not currently have a tunnel established with the gogoSERVER or you established a tunnel with a broker that does support delegated prefixes (*i.e.*, it only supports anonymous connections). To obtain a delegated prefix, simply log in to the gogoSERVER server with a valid user name and password.

Security

Q: I use a firewall on my home PC. How does this affect setting up Home Access?

A: Besides applying the same principles of sensible protection regardless of your setup, the most important issue regarding the firewall is that it must not block HTTP traffic.

Q: I understand that Home Web supports HTTP requests. What about HTTPS services?

A: HTTPS is not supported, due in part to the implemented HTTP proxying mechanism.

Q: Can I use a CA root certificate in conjunction with Home Web for a secure part of my site?

A: As with HTTPS, the use of CA root certificates is not supported.

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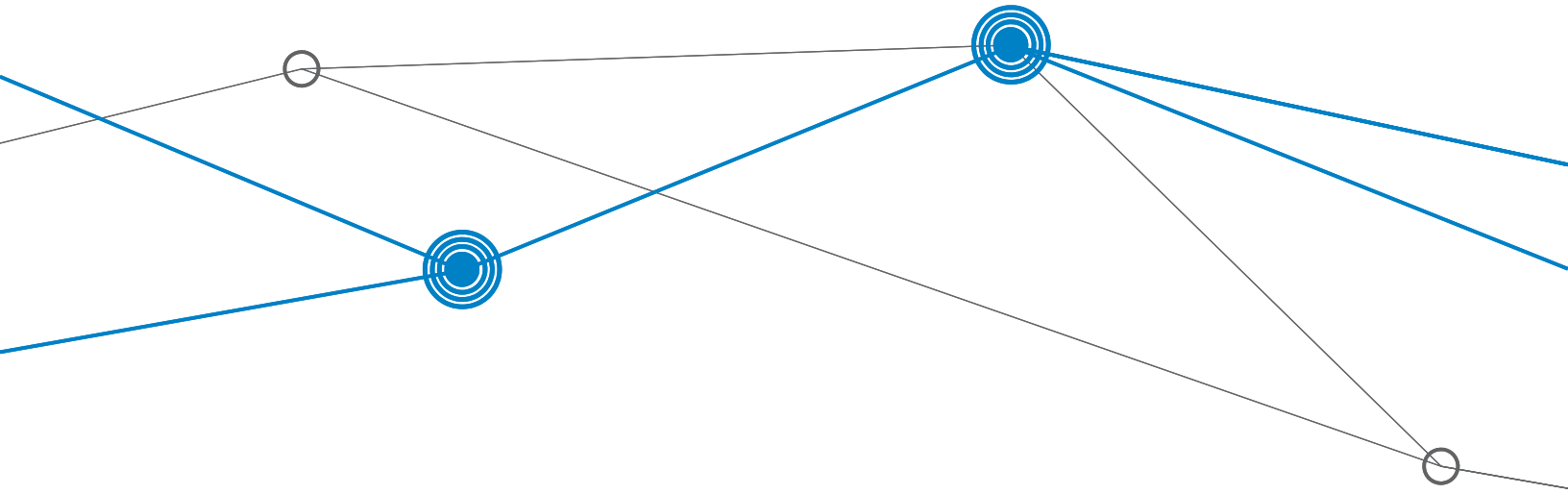

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