

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

Summary

This document presents the latest network design requirements for the AARP Foundation Tax-Aide program. The IRS requires secure environments for tax return preparation.

Tax returns may be prepared on a private sub-network defined by an AARP Foundation Tax-Aide provided router, or on a shared password-protected network. The program requires that Chromebooks NOT be connected directly to open (public) WiFi networks. Wireless printing and scanning may be done *only* on Tax-Aide private sub-networks.

How to Use This Document

This document outlines and then describes in detail six possible supported network designs and also, as a seventh, the requirements for counselors using home networks. These six site network design options are listed by order of preference, with option #1 the most secure and preferred option, and option #6 the least secure and least desirable option.

The first five options set up private sub-networks, and most sites use options #1 and #2 (private sub-network with Tax-Aide owned equipment). The sixth site design option uses a shared network, and the seventh details counselor home network use.

Network Design Option Summary

A. Network Options: Private Networks

AARP Foundation Tax-Aide managed equipment ensures we have the site sub-network properly designed for both ease of use and for desired security. A WPA2-PSK (AES) password protected router restricts access to our private sub-network and secures print traffic. Only Tax-Aide counselors can access this sub-network, and counselors can print only on AARP printers. Private networks are recommended and should be used wherever possible.

Option 1 – (recommended) Chromebooks, printers, and scanners are wirelessly connected to the AARP Foundation Tax-Aide private sub-network using our own router wired to the host network via RJ-45 cable (also called Ethernet or Cat 5/6 cable).

Option 2 – (recommended) Chromebooks, printers, and scanners are wirelessly connected to the AARP Foundation Tax-Aide private sub-network using our own router connected to the host network over WiFi via a Wireless Internet Service Provider (WISP) mode.

Option 3 – Chromebooks, printers, and scanners are wirelessly connected to a private sub-net on the host's network. In simplest terms, this option is much like the above options 1 and 2 except that the host site owns and configures a sub-network for exclusive AARP Foundation Tax-Aide use. Some host sites now implement security mechanisms which may require

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

special configuration to permit Tax-Aide's routers to connect and function properly. In many instances, it's possible to work with the host IT department to whitelist our router based on its MAC address. If this is not possible, the host site may devote one of their own routers or define a VLAN (virtual local area network) or port on a switch for our exclusive use. In that case, Chromebooks are wirelessly connected to the host's Tax-Aide password protected private sub-network using the host site's equipment.

Option 4– Chromebooks, printers, and scanners are wirelessly connected to a AARP Foundation Tax-Aide private network formed by using a Tax-Aide supplied hotspot connected to Verizon's wireless data (cellular) network. This option is to be used only when it is impossible to connect to the host site's internet, or there is no internet available at the site. Hotspots must be approved by the Regional Coordinator well in advance of the tax season.

Option 5– Chromebooks, printers, and scanners are wirelessly connected to a AARP Foundation Tax-Aide private network formed by using a Tax-Aide supplied router connected wirelessly to a Tax-Aide supplied hotspot connected to Verizon's wireless data (cellular) network. Adding a WISP router allows more connections though total throughput/capacity remains limited. This design allows wired network printers. Again, this option is to be used only when it is impossible to connect to the host site's internet, or there is no internet available at the site. Hotspots must be approved by the Regional Coordinator well in advance of the tax season.

B. Network Options: Shared Networks

Option 6 – If no other option exists, the Tax-Aide site may share the host site's network. In some locations, our only option may be to connect our Chromebooks directly to the host site's password-protected network, effectively sharing that network with the host site's normal users. In this case, wireless printer or scanner connections are not allowed, and all printing must be done on a printer connected to a single Chromebook via USB cable.

Option 7 – a counselor uses their home password-protected WiFi network to connect to tax software. Certain requirements must be met by the home router, which will be described below.

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

Network Design Options - Detailed Descriptions

A. PRIVATE NETWORKS

Network Option 1: Tax-Aide private sub-network using wired connection

At the host site, we connect our own properly configured router via RJ-45 (Ethernet) cable to the host's network, forming a private sub-network. Scanners and printers connect to our own router. The printer may be connected via Ethernet cable to a port on our router (this results in faster printing) or may be connected via WiFi. Printers and scanners are configured with static IP addresses.

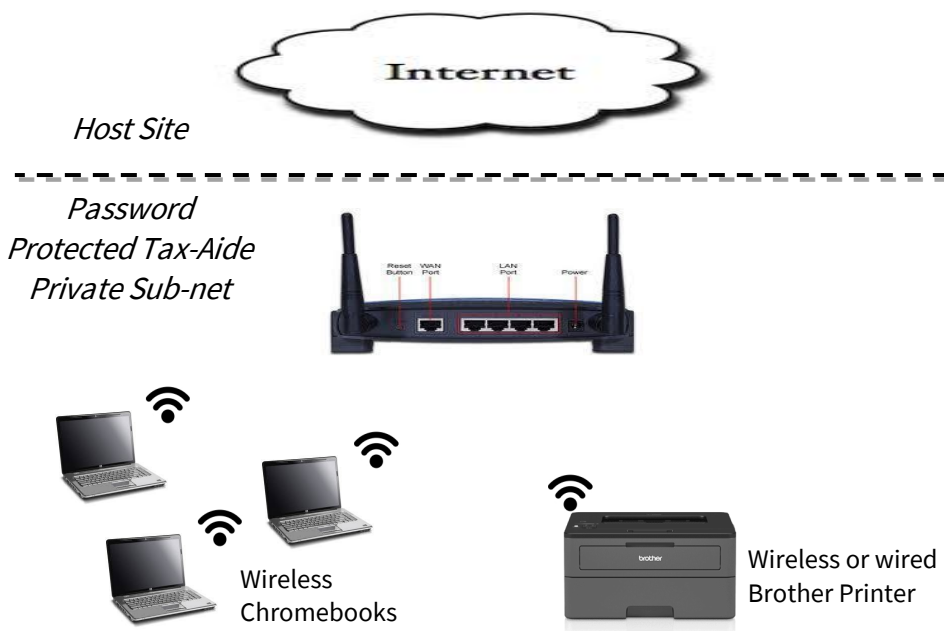


Figure 1: Option 1 and 2 - Private Sub-Network with Tax-Aide owned equipment with wired or wireless connection to the host network.

Network Option 2: Tax-Aide private sub-network using wireless connection

The single difference between Option 1 (wired) and Option 2 (wireless) is that in Option 1 the Tax-Aide router connects to the host network via an Ethernet cable, while in Option 2, the Tax-Aide router connects to the host network wirelessly. This second option requires a WISP-capable router. There is, otherwise, no change at all.

With both Option 1 (wired connection for our router) and Option 2 (wireless connection for our router) we establish a private sub-network for AARP Foundation Tax-Aide exclusive use. The router is configured to expect printer(s) and scanner(s) at predetermined IP addresses. This means that similarly configured printers and scanners are interchangeable: if a printer has problems mid-season, simply substitute the district's spare printer.

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

Network Option 3: Tax-Aide private sub-network using host-supplied equipment

In some areas, local municipalities or organizations have been willing to create a separate password protected private sub-network dedicated to Tax-Aide use, using equipment supplied by the host site. They may use a router which they configure specifically for our use or may set up a sub-network using a switch. This configuration is acceptable to the AARP Foundation Tax-Aide program with the following requirements:

- WPA2-PSK (AES) password protected sub-network is to be used only by AARP Foundation Tax-Aide counselors and other volunteers.
- Only Tax-Aide equipment will be connected to this specific sub-network.
- The Password is unique to Tax-Aide use and is changed annually at the start of tax season.
- Technical support is available from the host site's technical staff during the tax season.

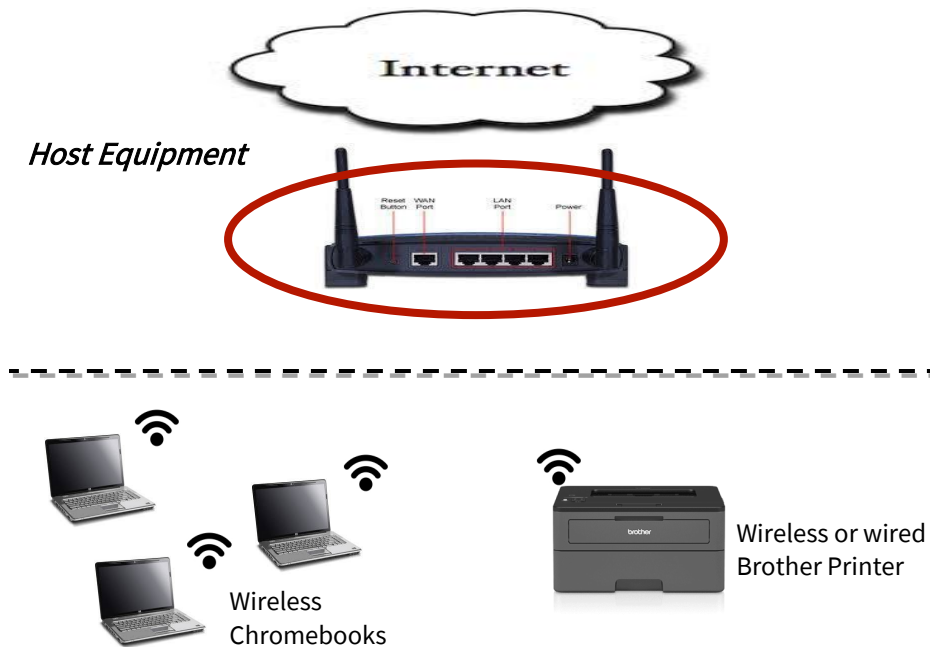


Figure 2: Network Option 3 - Tax-Aide private sub-network using host supplied router

The difference here from Options 1 and 2 is that the host site owns and configures the router or other networking equipment. We would advise that sites using this setup work with the host's IT department to make provision for static IP addresses for printers and scanners, just as we would set up our own routers. In that case we can use standard instructions for peripheral setup, and this scheme permits plug-and-play connections of printers and

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

scanners as long as the IP addresses are consistent across the relevant equipment group (in most cases, the district.)

Network Option 4: Tax-Aide private sub-network using Hotspot

Some AARP Foundation Tax-Aide host sites can provide no Internet service. This method should be used ONLY if there is no internet available at the host site, or the host's internet connection is unusable. See the NTSC document *H54 Orbic Speed Cellular Hotspot Setup Guide* for setup instructions.



Figure 3: Network Options 4 and 5: Tax-Aide private sub-network using Hotspot with or without router.

Network Option 5: Tax-Aide private sub-network using Hotspot and router

A hotspot with a WISP-capable router provides for a certain uniformity of the site. The router, printer, and scanner should be configured in the district's standard setup. Although you can connect all equipment directly to the cellular hotspot, there are limits to the number of allowed connections, which vary by the particular hotspot model. The **Orbic Speed RC400L Hotspot** from Verizon supports a maximum of 10 connected devices. While it is possible to connect a WISP router to the hotspot's signal, the available bandwidth will not increase, and performance with more than 8 users (plus a printer and/or scanner) may be unsatisfactory. See the NTSC document *H54 Orbic Speed Cellular Hotspot Setup Guide* for setup instructions.

B. SHARED NETWORKS

Network Option 6: connect to the host site's shared network

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

In rare cases, our only option at a site is to connect directly to the host's password-protected network, sharing the network with some of the site's other users. In such cases of shared networks wireless printer connections are not allowed and all printing must be done on a printer connected to the printing Chromebook via USB cable. We do not allow printing and scanning wirelessly on shared networks for security and administrative reasons.

For small sites, a printer may be shared among Chromebook users using a USB cable connected to the printer. Each counselor plugs the cable into their Chromebook to print. Larger sites may dedicate a Chromebook with a USB connection to a printer and allow counselors to select the return to print from the list of available returns shown by the tax software on that dedicated Chromebook.

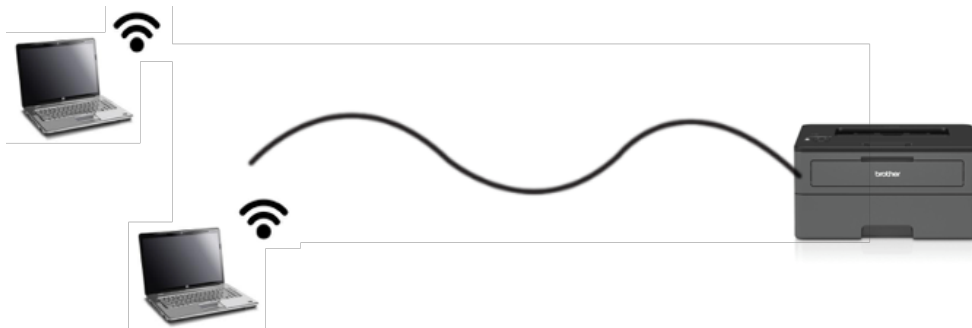


Figure 4: Network Option 6 - site shared network with printer connected to Chromebooks via USB cable.

Network Option 7: counselor uses home network

The simplest way for volunteers to connect their Chromebook to their home network is via an Ethernet adapter and cable. It is also now possible to connect wirelessly to a password-protected home network in order to work with tax software. The following requirements must be met for both wired and wireless connection to a home network:

- The home router's admin credentials must NOT be the default username and password combination (usually *admin/admin* or *password/password*.)
- The router's network name/SSID (service set identifier) must be changed from the default and must NOT contain "Tax" or "Tax-Aide".
- The home router must be password protected using WPA2-PSK (AES) security or better.
- The home network password must have been changed within the past 12 months.

Printing of tax returns, or any information showing taxpayer information, may not be done at home. Administration or training material may be printed at home on a home printer.

N02 Network Design Guide

AARP Foundation Tax-Aide National Technology & Security Committee

7/13/2022

SUMMARY AND RECOMMENDATIONS

Private networking via a Tax-Aide furnished router is our preferred network design. The NTSC strongly recommends Option 1 or Option 2 (where we own and configure the router) to provide the simplest and most stable environment for tax sites. Detailed information on router selection, configuration, and printer static IP setting on both printers and Chromebooks is supplied in the Portal's Blue Folder.

A private Tax-Aide sub-network has a security benefit in that it is impossible for an uninformed counselor to send the printout of a tax return to a non-Tax-Aide printer. It keeps our print traffic on our private network, and shields us from other site network traffic. Standardization (of network design, SSID, router password, static IP for printers etc.) makes it easy for counselors who volunteer at multiple sites.

It is our recommendation that sites use a Tax-Aide router unless prohibited by the host.

Revision History

| Version # | Date | Initials | Comments |
|-----------|----------|----------|-------------------------------------|
| 1 | 8/1/2022 | JB | NTSC Reorganization/Standardization |
| | | | |