
Outdoor Event Configuration with Listen Everywhere

Overview:

The purpose of this tech note is to outline the setup and configuration of a Listen Everywhere (LE) solution for small to medium outdoor drive-in worship, theater applications, or similar events. The LE server can be deployed into an existing network or as a separate dedicated network. The information provides details on the advantages, configuration, and setup for each option.

This is an extension of the [Network Configuration](#) tech note, and should be read first to best understand this further context.

Dedicated Networks Versus Existing Networks:

The LE server can be setup on a dedicated network or be part of an existing network. A dedicated network is used only for listening needs and consists of a network router or dedicated DHCP server, wireless access point(s) (WAP), and the LE server(s). An existing network is a network that has already been set up and configured at the venue, has other network traffic, and where the LE server can be added to the network with minimal configuration.

Advantages of Dedicated Networks:

- All-in-one solution that does not need to be combined with another network.
- No need to permanently run Ethernet cables or mount hardware.
- Create a portable solution to be used in other locations.

Advantages of Existing Networks:

- Most or all the networking equipment is already deployed.
- Can be a permanent assistive listening system (ALS) solution.
- Does not require set up for each event if access points are permanently mounted.

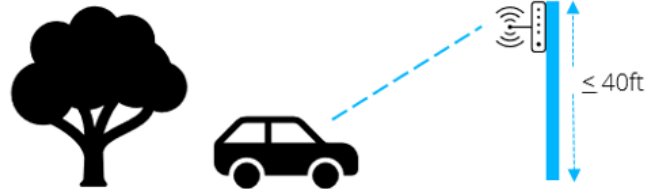
Equipment Considerations:

Listen Technologies recommends using enterprise-grade networking equipment to ensure the lowest possible latency and best overall streaming performance. For our suggested WAPs and routers, please refer to our [Wireless Access Point Optimization](#) tech note.*

**See below for a specific aspect of the [Wireless Access Point Optimization](#) tech note that indicates the best practices for WAP outdoor placement.*

Outdoor Wireless Access Points:

- **Clients should be within line-of-sight of the access point:** This will greatly increase wireless communication between the WAP and the mobile device in use.
- **Mount at a height 40ft or less:** WAPs should be placed high enough to achieve line-of-sight, but not too high where a proper connection cannot be established. This helps avoid multipath reception caused by reflective surfaces, such as cement.
- **Secure physical mounting:** Access points and masts may sway in the wind if not properly mounted.
- **Avoid physical obstructions:** This includes walls, trees, etc. Physical obstructions may cause signal attenuation.
- **Point the antenna to the correct direction:** Not all outdoor WAPs have omnidirectional (i.e. 360-degree) coverage. If you have an WAP with a directional antenna, be sure to adjust the antenna accordingly.
- **Make sure other networking equipment is outdoor rated:** If your other equipment is not outdoor rated, be sure to use weather-protected enclosures and/or weatherized seals.
- **Avoid poor weather conditions:** Harsh weather conditions, such as rainstorms, can negatively impact Wi-Fi signals.



Dedicated Network Setup:

The networking equipment will need to be configured based on needs of the venue prior to the LE server sends audio to participants.

Network Equipment Setup:

- Router Configuration:
 1. Follow the initial setup instructions that came with your router.
 2. Connect to your router and make the following changes:
 - The router needs to be set up as a DHCP server that can serve the appropriate number of users. For events with less than ~250 users, minimal configuration is typically needed for the network (e.g. 192.168.1.4 – 192.168.1.254). For events with 250 or more users, you can set up a larger DHCP range (e.g. 192.168.1.4 – 192.168.2.254).
 - Ensure that multi-cast (mDNS) is enabled. This option is enabled on many networks by default. For mDNS, and other networking considerations, please refer to the [Network Configuration](#) tech note.

- Wireless Access Point Configuration:
 1. Follow the initial setup for your WAP(s).
 2. Each WAP must also have a valid DHCP address range. In the examples below, the WAPs would be configured as follows:
 - For ~250 or less users:
 - Wireless Access Points used: 2*
 - Subnet Mask: 255.255.255.0 (/24)
 - Router/Gateway: 192.168.1.1
 - Reserved WAP addresses: 192.168.1.2 & 192.168.1.3
 - DHCP Address range: 192.168.1.4 – 192.168.1.254
 - For ~250 to 500 users:
 - Wireless Access Points used: 3-5*
 - Subnet Mask: 255.255.254.0 (/23)
 - Router/Gateway: 192.168.1.1
 - Reserved WAP addresses: 192.168.1.2 – 192.168.1.6
 - DHCP Address range: 192.168.1.7 – 192.168.2.251
 3. By default, a WAP will change wireless channels automatically. This is fine for most cases, except in areas with multiple wireless networks broadcasting. In this case, follow the AP channel Optimization section of the [Network Configuration](#) tech note.

**The amount of WAPs is an example and will vary depending on the venue's requirements.*

System Setup:

1. Install the LE server.
2. Run desired audio cabling from your audio source(s) to the LE server and connect it to the appropriate audio input(s) on the LE server.
3. Position/mount the WAP(s) at a height where there is line-of-sight to as many users in the listening area(s) as possible.*
4. Connect an Ethernet cable from the LE server's Ethernet port to the router/switch.**
5. Depending on if the router/switch distributes Power over Ethernet (PoE):
 - If the router/switch distributes PoE: Run an Ethernet cable from one of the PoE ports on the router/switch to a WAP. Do this for each WAP.
 - If the router/switch does not distribute PoE: Run an Ethernet cable from one of the ports on the router/switch to the PoE injector and link another Ethernet cable from the PoE injector to the WAP. Check with the instructions that comes with the power injector if unsure. Do this for each WAP.
6. Power up the network and allow it to fully initialize.
7. Turn on the LE server and wait for the power light to become solid. Once solid, it is attached to the network and ready for use.

8. The system should be fully functional for use with the Listen Everywhere application for iOS and Android. It is advised to test wireless network coverage to check for potential weak points and interference.***

*Refer to the [Wireless Access Point Optimization](#) tech note for more considerations.

**The maximum length of an Ethernet cable run is 328 ft.

***While audio is playing through the LE server. Connect to the LE app to the LE server and navigate around the venue listening for locations the audio becomes choppy.

Existing Network Setup:

For existing networks, most if not all the networking equipment is already in place and configured except for the LE server and WAPs added for this solution.

Network Equipment Setup:

- Router Configuration:
 1. The router of your existing network should have the following:
 - A DHCP server with an address range large enough for number of anticipated users.
 - Ensure that multi-cast (mDNS)* is enabled on the router. If the WAPs are on a different VLAN than the LE server, additional considerations (e.g. enabling an mDNS repeater) will need to be taken. If mDNS is not an option, please refer to the [Mobile App Connection Methods](#) tech note.
 - If the network is used for other functions (e-mail, web browsing, video streaming, etc.), it is recommended to enable QoS* on the router.

*For mDNS, QoS, connection to Cloud Services, port forwarding, and other networking considerations, please refer to our [Network Configuration](#) tech note.

- Wireless Access Point Configuration:
 1. Follow the initial setup guide for your new WAP(s).
 2. For each wireless network (2.4 and 5 GHz), you may want to set the WAP(s) to static channels that are not currently in use in the area (or to the least saturated channel if all channels are in use). Follow the Wireless Access Point Channel Optimization section of the [Network Configuration](#) tech note.

System Setup:

1. Install the LE server.
2. Run desired audio cabling from your audio source(s) to the LE server and connect it to the appropriate audio input(s) on the LE server.
3. Position/mount the WAP(s) at a height where there is line-of-sight to as many users in the listening area(s) as possible.*
4. Connect an Ethernet cable from the LE server to the router/switch.
5. Depending on if the router/switch distributes PoE:
 - a. If the router/switch distributes PoE: Run an Ethernet cable from one of the PoE ports on the router/switch to an WAP. Do this for each WAP.**
 - b. If the router/switch does not distribute PoE: Run an Ethernet cable from one of the ports on the router/switch to the PoE injector and link another Ethernet cable from the PoE injector to the WAP. Check with the instructions that comes with the injector if unsure. Do this for each WAP.**
6. Turn on the LE server and wait for the power light to become solid. Once solid, it is attached to the network and ready for use.
7. The system should be fully functional for use with the Listen Everywhere application for iOS and Android. It is advised to test wireless network coverage to check for potential weak points and interference.***

*Refer to the [Wireless Access Point Optimization](#) tech note for more considerations.

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Should you have any further questions or concerns, please contact Listen Technologies' Technical Services team at 1-800-330-0891 or support@listentech.com for assistance.