WaveLinx Wireless

General Information

Cooper Lighting Solutions views security as a cornerstone of a safe, dependable and reliable electrical system. Accordingly, the WaveLinx Wireless Connected Lighting (WCL) System employs current industry best practices to reduce, identify, contain and manage security risks. WaveLinx has been designed and engineered with wireless security as a key requirement with flexibility to accommodate improvements if new security attack surfaces are identified. The Cooper Lighting Solutions Product Cybersecurity Center of Excellence (PCCoE) provided guidance throughout the development of WaveLinx and offers Cooper Lighting Solutions customers an Internet accessible portal to identify emerging threats, find ways to secure products against them and help customers deploy and maintain Cooper Lighting Solutions product solutions in a secure environment. More information on the Cooper Lighting Solutions PCCoE can be found at www.cooperlighting.com/cybersecurity

The WaveLinx System uses a multi-tiered approach to addressing industry best practices for security risk management and utilizes guidelines promulgated by the Department of Homeland Security (DHS), National Institute of Standards and Technology (NIST) and industry standards organizations to achieve a secure and adaptable lighting control platform.

Security Features Include

1. **Physical security:**
   - An architecture that isolates the wired Ethernet network from the wireless network, which strictly limits the possibility of the WaveLinx wireless being used as an access point to the corporate network and gain confidential information.
   - Physical access also involves the customer location. This includes not allowing unauthorized personnel in areas where they do not belong, or access to devices they should not be connecting to.
2. **Customer security:**
   - Customer security process is a partnership between Cooper Lighting Solutions and the customer and involves multiple levels of password and network access protection.
   - Beyond physical access the customer provides an additional layer of security with strong authentication to access their corporate wired or wireless network and limiting the devices that can access those networks.
   - Cooper Lighting Solutions provides additional protection with unique username and password requirements for each Wireless Area Controller that are securely stored per NIST-recommended best practices.
3. **Device communication security:**
   - For secure device-to-device communications, encryption is an important factor to reduce the potential of someone reading data sent on the network. For that reason, all WaveLinx communications use AES 128-bit encryption, recommended by NIST as part of FIPS publication 197.
4. **Network communication security:**
   - WaveLinx uses secure HTTPS (TLS1.2) protocols for securing connections to the Wireless Area Controller over the wired network.
   - WaveLinx uses secure WPA2 Enterprise technology for secure connections to the Wireless Area Controller over the Wi-Fi network when acting as an access point. If the Wireless Area Controller is connected to a wired network for communications this connection method is disabled.
   - WaveLinx mobile applications uses HTTPS (TLS1.2) as part of its communications to the Wireless Area Controller regardless of connection method, which means only our mobile application can send data to the WaveLinx system.
5. **Network segmentation security:**
   - Each Wireless Area Controller employs its own unique keys, which limits any potential breach to only a small area of the system.
   - The WaveLinx Wireless Area Controller (WAC) provides segmentation between the lighting Operational Technology (OT) network and the enterprise Information Technology (IT) network.
   - The IT/OT network segmentation provides a barrier to possible IT network attack surface exposure. Even if an attack within the lighting (OT) network and its devices is successful, the WAC isolates the enterprise IT network from potential attack.

6. **OTA update security:**
   - WaveLinx provides a method to allow for digitally signed firmware update files to be sent to the devices over the air (OTA). It is imperative as part of network security to ensure OTA updates are digitally signed firmware images from their manufacturer so the devices recognize they are valid updates from that manufacturer and not sent with a malicious intent.

7. **COE assurance:**
   - Cooper Lighting Solutions's Cybersecurity Center of Excellence involvement and guidance was key as part of the WaveLinx development to ensure our product incorporates industry and governmental network security best practices.
   - The COE also provides a publically accessible site for information and feedback concerning cybersecurity threats and responses, as well as a method for you to monitor network breach risks.

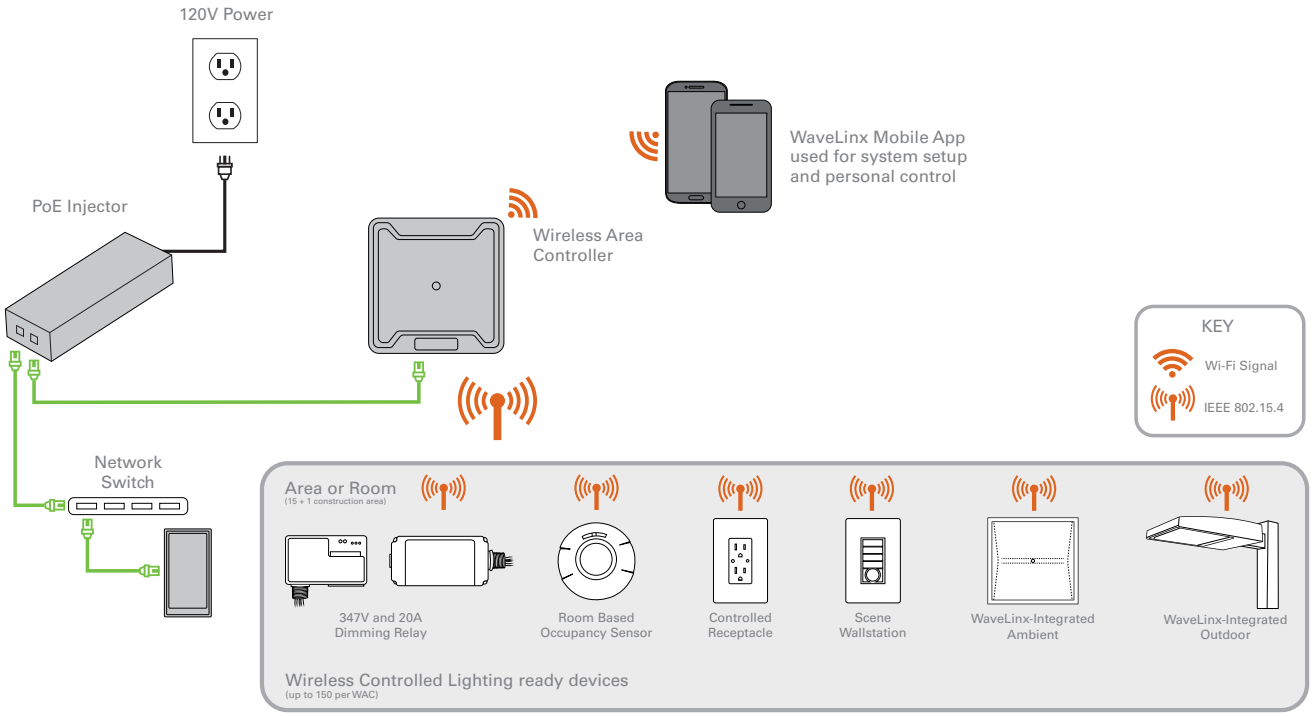
WaveLinx deployments

Connected to the corporate IT network via Ethernet:

- The Trellix Core connects to the corporate network via PoE switch and must have Ethernet access. This is required for certain features such as BACnet® integration or Trellix Locate.
- This can also accommodate setting up separate networks for your lighting control or building systems than your business information network such as a VLAN.
- Wi-Fi is used for communications from the smart phone or laptop to the Wireless Area Controllers for programming, configuration and personal control through the use of internal web pages or the WaveLinx mobile application.

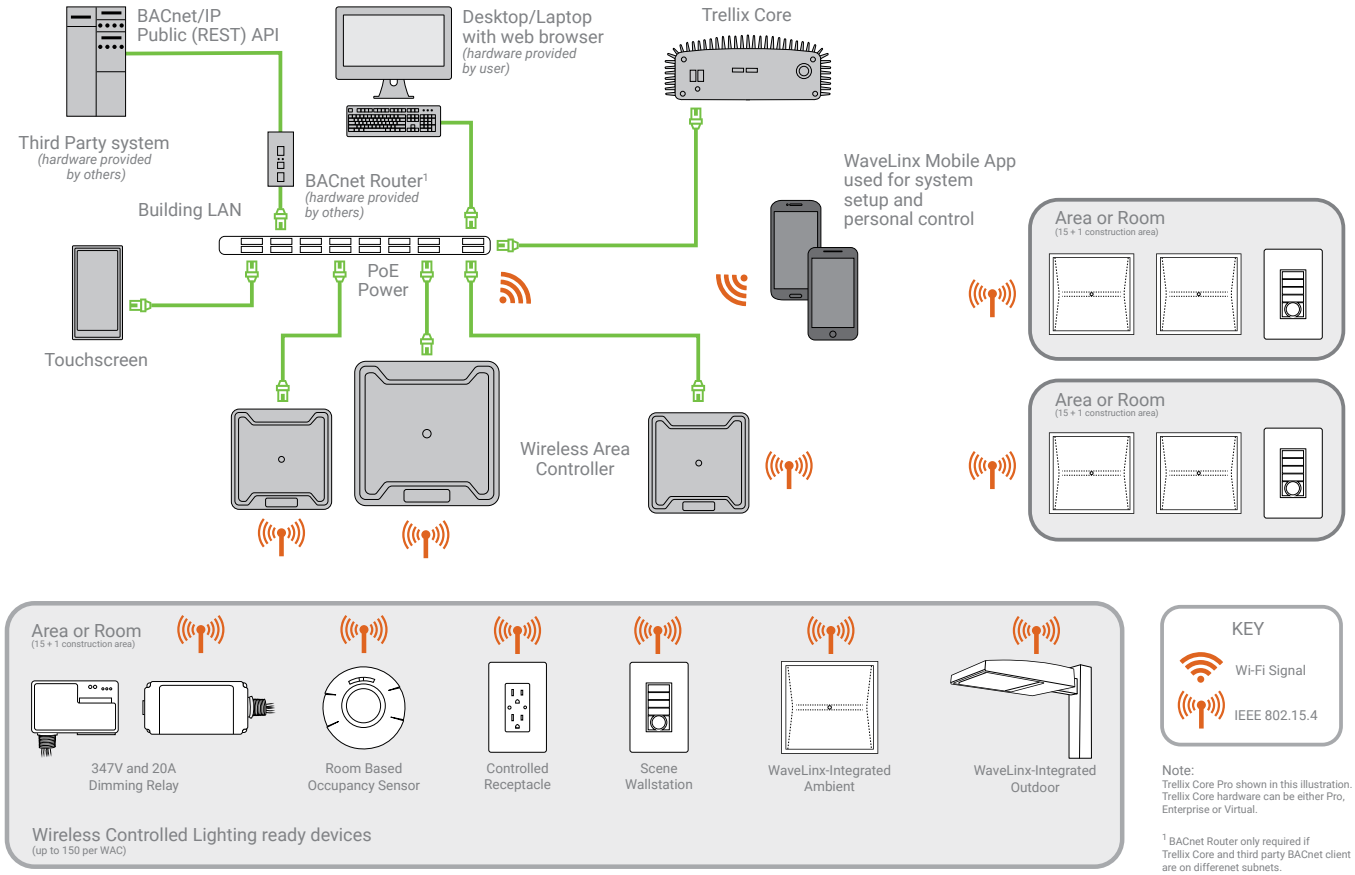
Dedicated WaveLinx Network:

- The Wireless Area Controller does not connect to the physical corporate IT network at all. This means the Wireless Area Controller is setup as a WiFi access point and the WaveLinx mobile application connects directly to the Wireless Area Controller using WPA2 wireless encryption and secure network username and password (this still requires attention to Security features 1 and 2 above.
- The Wireless Area Controller still uses AES 128-bit encryption for all device to device network communications.
- WiFi is used for communications from the phone smart device or laptop to the Wireless Area Controllers for programming, configuration and personal control through the use of internal web pages or the WaveLinx mobile application.



Connected to the corporate IT network via Ethernet:

- The Wireless Area Controller connects to the corporate network via PoE switch or power injector and must have Ethernet access. This is required for certain features such as BACnet® integration or future smart building integration features.
- This can also accommodate setting up separate networks for your lighting control or building systems than your business information network such as a VLAN.
- WiFi is used for communications from the phone smart device or laptop to the Wireless Area Controllers for programming, configuration and personal control through the use of internal web pages or the WaveLinx mobile application.



Cooper Lighting Solutions advises following your corporate best practices and selecting the installation method to meet your building and application requirements. Refer to the following Cooper Lighting Solutions white paper for additional guidelines about secure network configuration and management:

http://www.eaton.com/ecm/idcplg?IdcService=GET_FILE&allowInterrupt=1&RevisionSelectionMethod=LatestReleased&noSaveAs=0&Rendition=Primary&dDocName=WP152002EN

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