

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

**WIRELESS TRANSPORT LLC,**

Plaintiff,

**v.**

**AEROHIVE NETWORKS, INC.,**

Defendant.

C.A. NO.

**JURY TRIAL DEMANDED**

**ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT**

1. This is an action for patent infringement in which Wireless Transport LLC makes the following allegations against Aerohive Networks, Inc.

**PARTIES**

2. Plaintiff Wireless Transport LLC (“Plaintiff” or “Wireless Transport”) is a Delaware limited liability company with its principal place of business at 16192 Coastal Highway, Lewes, DE 19959.

3. On information and belief, Aerohive Networks, Inc. (“Defendant” or “Aerohive”) is a corporation organized and existing under the laws of the State of Delaware, which can be served through its registered agent Corporation Trust Company, 1209 Orange St, Wilmington, DE 19801.

**JURISDICTION AND VENUE**

4. This action arises under the patent laws of the United States, Title 35 of the United States Code. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

5. Venue is proper in this district under 28 U.S.C. §§ 1391(c) and 1400(b). On information and belief, Defendant is incorporated in the State of Delaware, and, thus, resides in the State of Delaware for the purposes of 28 U.S.C. § 1400(b).

6. On information and belief, Defendant is subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Delaware Long Arm Statute, due at least to its substantial business in this forum, including: (i) at least a portion of the infringements alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services provided to individuals in Delaware and in this Judicial District.

**COUNT I**  
**INFRINGEMENT OF U.S. PATENT NO. 6,563,813**

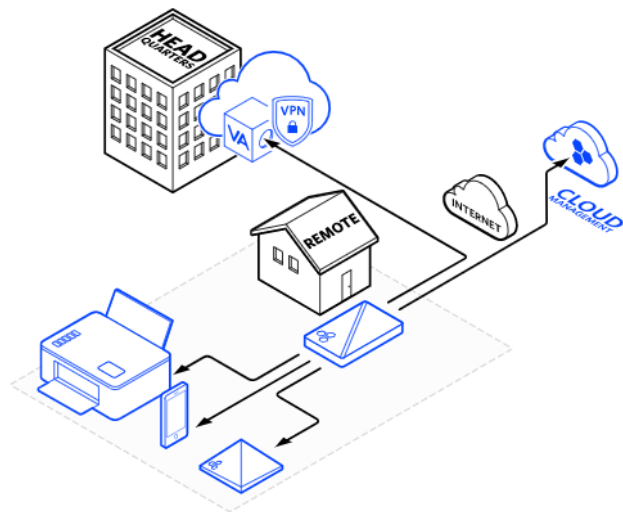
7. Plaintiff is the owner of United States Patent No. 6,563,813 ("the '813 patent") entitled "Wireless Transport Protocol." The '813 Patent issued on May 13, 2003. A true and correct copy of the '813 Patent is attached as Exhibit A.

8. Defendant owns, uses, operates, advertises, controls, sells, and otherwise provides products and/or services that infringe the '813 patent. The '813 patent provides, among other things, "A communication system comprising: a wireless client; a wireless network; a land-line client; a land-line network; and a network backbone interfacing said land-line network and said wireless network to allow data packets to be exchanged between said wireless client and said land-line client, said communication system using a wireless transport layer protocol for data frame transmission over said land-line and wireless networks, each data frame including connection handling information specifying at least one data transport connection to be used to transmit data between said wireless client and said land-line client over said wireless and land-line networks; connection addressing information; a user data field including a data packet to be transmitted from one client to another client; and at least one sequencing field identifying the last packet received by the client that is transmitting a current data packet."

9. Defendant directly and/or through intermediaries, made, has made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or services that infringed one or more claims of the '813 patent, including at least Claim 6, in this district and elsewhere in the United States. For example, but without limitation, the Aerohive SD-WAN solution forms a communication system within the meaning of the '813 Patent. By making, using, importing, offering for sale, and/or selling such products and services, and all like

products and services, Defendant has injured Plaintiff and is thus liable for infringement of the ‘813 patent pursuant to 35 U.S.C. § 271.

10. Aerohive Networks makes, uses, sells and/or offers for sale a communication system. For example, Aerohive Networks provide SD-WAN solution (“a communication system”) which comprises network products including Aerohive Access Points and SD-WAN Routers.



#### EXTEND FLEXIBLE, SIMPLIFIED, UNIFIED NETWORK ACCESS FROM HQ TO REMOTE LOCATIONS

Aerohive’s SD-WAN solution redefines small and midsize branch and remote office network economics, control, and performance, delivering a “Headquarters-like” user experience regardless of location. Powered by Aerohive Cloud Networking and a self-optimizing architecture, highly distributed organizations can benefit from secure and reliable network access that’s easier to provision, operate, and support.

Want to learn more about SD-WAN? We’ve got a vendor-neutral poster and blog series to get you up-to-speed:

[SD-WAN SOLUTION OVERVIEW](#)

[SD-WAN POSTER](#)

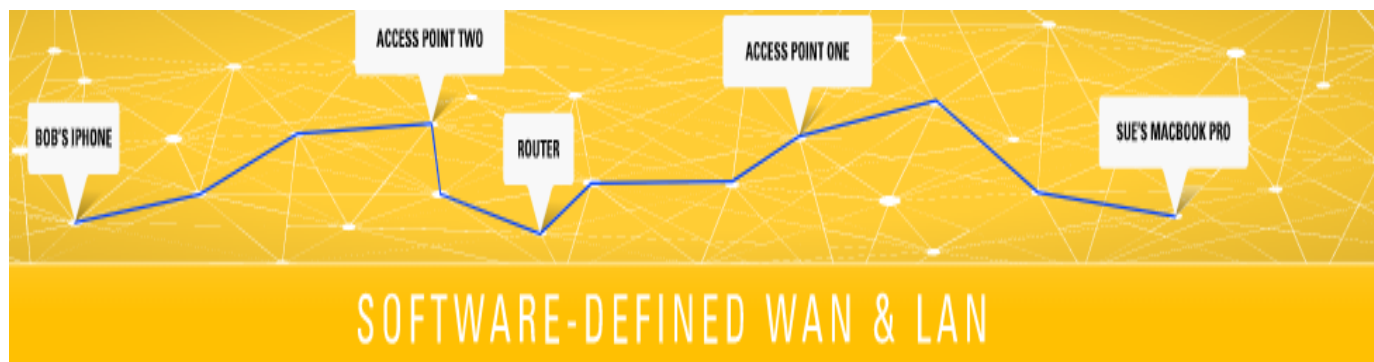
Source: <https://www.aerohive.com/technology/sd-wan/>

### AEROHIVE SD-WAN OVERVIEW

AEROHIVE’S SD-WAN SOLUTION PROVIDES FAST, RELIABLE, AND SECURE HQ-LIKE NETWORK ACCESS TO MIDSIZE REMOTE LOCATIONS AND TELESWORKERS.

- Easily deploy, monitor, and support thousands of remote sites with cloud management and automated device provisioning
- Optimize, throttle, and direct traffic based on applications and users
- Secure end-to-end LAN and WAN policy enforcement
- Single pane of glass cloud management for wired and wireless LAN and WAN

Source: <https://www.aerohive.com/technology/sd-wan/>



Source: <https://www.aerohive.com/technology/sd-lan-sd-wan/>

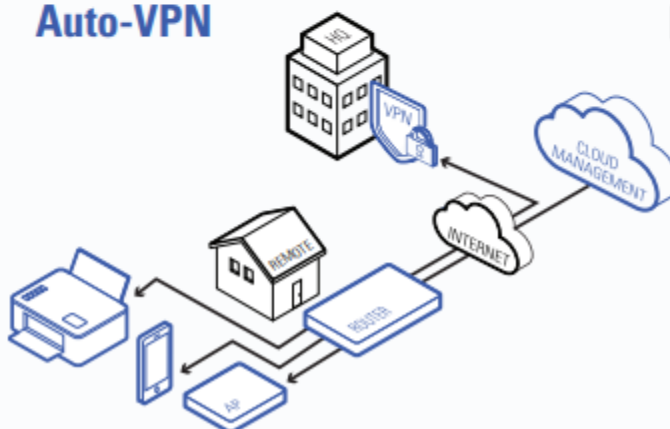
### Application & Identity-Driven Policies



SD-WAN routers understand stateful traffic flows. An administrator can selectively block, restrict, rate-limit or prioritize applications and services for individuals or groups. Additionally, these entities can be dynamically routed across multiple links based on link-state information. Some vendors provide SD-LAN-to-SD-WAN mapping for unification of security and traffic policies.

### Auto-VPN

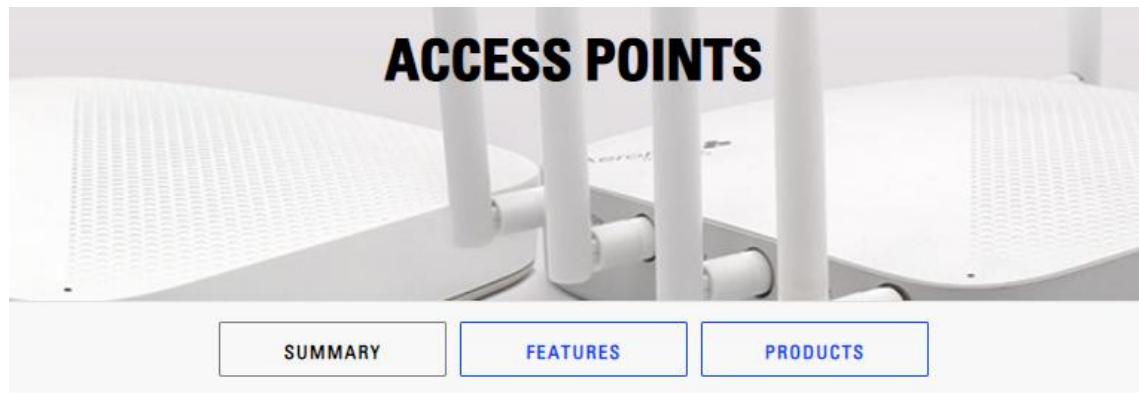
Securely connect remote sites together without the need for a dedicated and expensive private network. Auto-VPN establishes secure tunnels (typically IPsec) between remote sites and a VPN gateway without administrative or user intervention. This dynamic hub-and-spoke functionality enables flexible, effortless and cost-effective VPN deployment and management.



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11. Aerohive Networks provides a communication system comprising a wireless client. For example, the SD-WAN solution which when equipped with Aerohive Access Points (such as AP 230, 130, 1130, 122X, etc.) and SD-WAN Routers (such as XR600P and XR200P)

provide connectivity for devices (“wireless clients”) which support IEEE 802.11 a/b/g/n/ac standard.



#### UNIFIED WIRED AND WIRELESS NETWORKS POWERED BY CLOUD MANAGEMENT AND SERVICES

Our cloud networking technologies with unified wired and Wi-Fi access provide self-organizing and self-healing connectivity, reduced operational cost and complexity, and greater data insights. Supported by the industry's most flexible and adaptable architecture and licensing model, our cloud-managed access networks can be fully tailored to match your requirements both today and tomorrow.

Source: <https://www.aerohive.com/products/access-points/>

<p><b>AP630</b></p> <p>The AP630 is a high-performance, dual-band concurrent access point with one 11ax 4x4 2.4 G and one 11ax 4x4 5 G radio.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP650</b></p> <p>The AP650 is designed for indoor high-density environments that require HD video streaming and large file transfers.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP650X</b></p> <p>The AP650X has external antennas (sold separately), and an extended temperature range for industrial environments.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP250</b></p> <p>The Aerohive AP250 features two Wi-Fi radios; a fixed 5 GHz 802.11ac Wave 2 radio and a software-selectable 802.11n 2.4 GHz/ 802.11ac 5 GHz radio.</p> <p><a href="#">LEARN MORE</a></p>
<p><b>AP550</b></p> <p>The Aerohive AP550 features 802.11ac Wave 2 dual 5 GHz radio, and 4x4:4/3 MU-MIMO. Built-in BLE provides proximity, indoor location tracking, and other location-based mobile engagement services.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP150W</b></p> <p>The compact, lightweight Aerohive AP150W can be mounted directly into a wall plate, or on a stand on a desktop.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP245X</b></p> <p>The Aerohive AP245X external-antenna AP features 802.11ac Wave 2 dual radio, 3x3:3 MU-MIMO with data rates up to 1.3 Gbps per radio using existing 802.3af PoE infrastructure.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP30 (Aerohive ATOM)</b></p> <p>Atom AP30 is an 802.11ac wireless access point with plug-and-play installation.</p> <p><a href="#">LEARN MORE</a></p>
<p><b>AP122</b></p> <p>The AP122 features dual 2x2, 2-stream radios, providing dual 802.11n or 11n/ac performance with data rates up to 867 Mbps using existing 802.3af PoE infrastructure.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP122X</b></p> <p>The AP122X, with four detachable external antennas, is optimally suited for medium-capacity environments.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP130</b></p> <p>The AP130 wireless access point provides dual concurrent 2.4 GHz 802.11b/g/n and 5 GHz 802.11a/n/ac radios for 2x2 MIMO (multiple input multiple output) antennas.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>AP230</b></p> <p>The Aerohive AP230 has two radios that can operate in 802.11a/b/g/n/ac modes with optional Frame Burst support across all modes.</p> <p><a href="#">LEARN MORE</a></p>

Source: <https://www.aerohive.com/starthere/start-ap/>

## Hardware Specifications

The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### ✓ Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
- One RJ45 (9600 bits per second, 8 data bits, no parity, 1 stop bit, no flow control)
- Eth0 Ethernet port: autosensing 10/100/1000Base-T/TX Mbps, with IEEE 802.3af- or 802.3at-compliant PoE
- Eth1 Ethernet Port: autosensing 10/100/1000Base-T/TX Mbps

Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

<p><b>XR600P</b></p> <p>XR600P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.</p> <p><a href="#">LEARN MORE</a></p>	<p><b>XR200P</b></p> <p>XR200P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.</p> <p><a href="#">LEARN MORE</a></p>
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Source: <https://www.aerohive.com/starthere/start-routers/>

## Hardware Specifications

The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- **Two embedded single-band omnidirectional 802.11b/g/n antennas**
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
- Four IEEE 802.3, 802.3u, and 802.3ab compliant 10/100/1000 Mbps RJ45 Ethernet LAN ports with autosensing and auto-MDI/MDI-X. IEEE 802.3x PAUSE frame flow control in full duplex. Ports 1 and 2 provide 15.4W of PoE power.
- One Type-A USB 2.0 port with backward compatibility with USB1.1.

Source: <https://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/br/xr200p.htm>

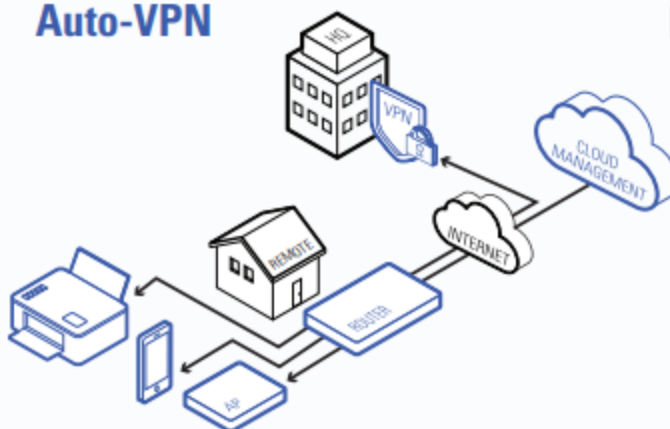
## Application & Identity-Driven Policies



SD-WAN routers understand stateful traffic flows. An administrator can selectively block, restrict, rate-limit or prioritize applications and services for individuals or groups. Additionally, these entities can be dynamically routed across multiple links based on link-state information. Some vendors provide SD-LAN-to-SD-WAN mapping for unification of security and traffic policies.

## Auto-VPN

Securely connect remote sites together without the need for a dedicated and expensive private network. Auto-VPN establishes secure tunnels (typically IPsec) between remote sites and a VPN gateway without administrative or user intervention. This dynamic hub-and-spoke functionality enables flexible, effortless and cost-effective VPN deployment and management.



Source: [https://www.aerohive.com/wp-content/uploads/Aerohive\\_SD-WAN\\_Poster.pdf](https://www.aerohive.com/wp-content/uploads/Aerohive_SD-WAN_Poster.pdf)

12. Aerohive Networks provides a communication system comprising a wireless network. For example, the Aerohive Access Points (such as AP 230, 130, 1130, 122X, etc.) and SD-WAN Routers (such as XR600P and XR200P) work on the wireless networking standards (such as IEEE 802.11 (WLAN) standard on 2.4 GHz and 5 GHz band frequencies).



## Hardware Specifications

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The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### ▼ Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
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- Eth1 Ethernet Port: autosensing 10/100/1000Base-T/TX Mbps

Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

## Hardware Specifications

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The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- Two embedded single-band omnidirectional 802.11b/g/n antennas
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
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- One Type-A USB 2.0 port with backward compatibility with USB1.1.

Source: <https://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/br/xr200p.htm>

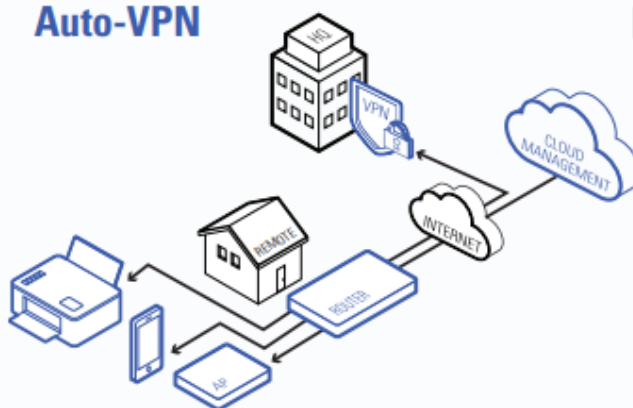
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13. Aerohive Networks provides a communication system comprising a land-line client. For example, the SD-WAN solution comprises Aerohive Access Points (such as AP 230, 130, 1130, 122X, etc.) and SD-WAN Routers (such as XR600P and XR200P) to support a land-line client.

## Hardware Specifications

---

The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### ▼ Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
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Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

## Hardware Specifications

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The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- Two embedded single-band omnidirectional 802.11b/g/n antennas
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
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- One Type-A USB 2.0 port with backward compatibility with USB1.1.

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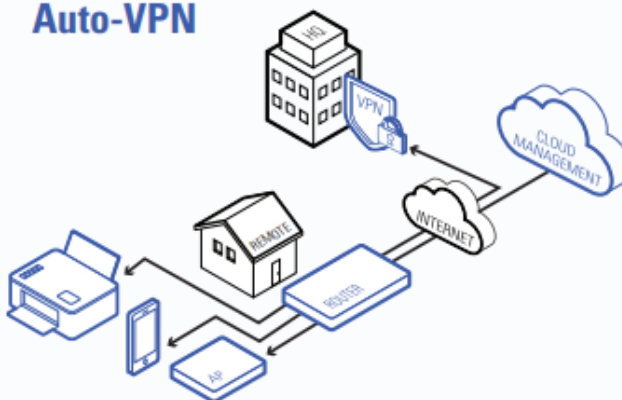
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## Auto-VPN

Securely connect remote sites together without the need for a dedicated and expensive private network. Auto-VPN establishes secure tunnels (typically IPsec) between remote sites and a VPN gateway without administrative or user intervention. This dynamic hub-and-spoke functionality enables flexible, effortless and cost-effective VPN deployment and management.



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14. Aerohive Networks provides a communication system comprising a land-line network. For example, the Aerohive Access Points (such as AP 230, 130, 1130, 122X, etc.) and SD-WAN Routers (such as XR600P and XR200P) support IEEE 802.3 (Ethernet) wired network standard.

## Hardware Specifications

---

The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### ▼ Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
- One RJ45 (9600 bits per second, 8 data bits, no parity, 1 stop bit, no flow control)
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Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

## Hardware Specifications

---

The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- Two embedded single-band omnidirectional 802.11b/g/n antennas
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
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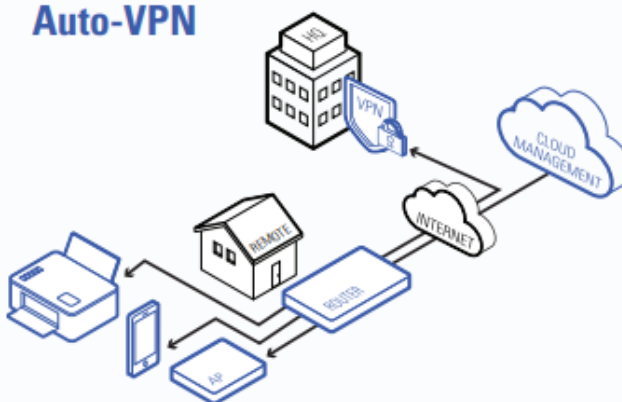
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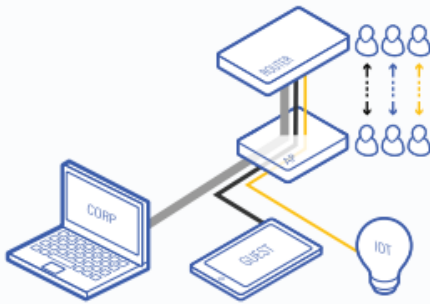


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15. Aerohive Networks provides a communication system comprising a network backbone interfacing said land-line network and said wireless network to allow data packets to be exchanged between said wireless client and said land-line client. For example, Aerohive Networks provide network products (including Aerohive Access Points such as AP 230, 130, 1130, 122X, etc. and SD-WAN Routers such as XR600P and XR200P) for interfacing a land-line network and a wireless network. The network products support TCP/IP (Transmission Control Protocol/Internet Protocol) which allow exchange of packets between wireless network and land-line/wired network.



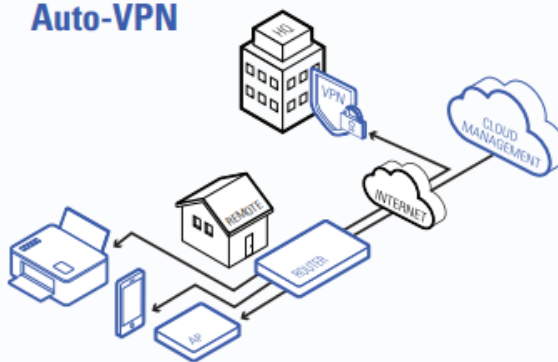
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## ACCESS POINTS



SUMMARY

FEATURES

PRODUCTS



### UNIFIED WIRED AND WIRELESS NETWORKS POWERED BY CLOUD MANAGEMENT AND SERVICES

Our cloud networking technologies with unified wired and Wi-Fi access provide self-organizing and self-healing connectivity, reduced operational cost and complexity, and greater data insights. Supported by the industry's most flexible and adaptable architecture and licensing model, our cloud-managed access networks can be fully tailored to match your requirements both today and tomorrow.

Source: <https://www.aerohive.com/products/access-points/>

XR600P	XR200P
XR600P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.	XR200P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.
<a href="#">LEARN MORE</a>	<a href="#">LEARN MORE</a>

Source: <https://www.aerohive.com/starthere/start-routers/>

## 2. TCP/IP Overview

The generic term "TCP/IP" usually means anything and everything related to the specific protocols of TCP and IP. It can include other protocols, applications, and even the network medium. A sample of these protocols are: UDP, ARP, and ICMP. A sample of these applications are: TELNET, FTP, and rcp. A more accurate term is "internet technology". A network that uses internet technology is called an "internet".

### 2.1 Basic Structure

To understand this technology you must first understand the following logical structure:

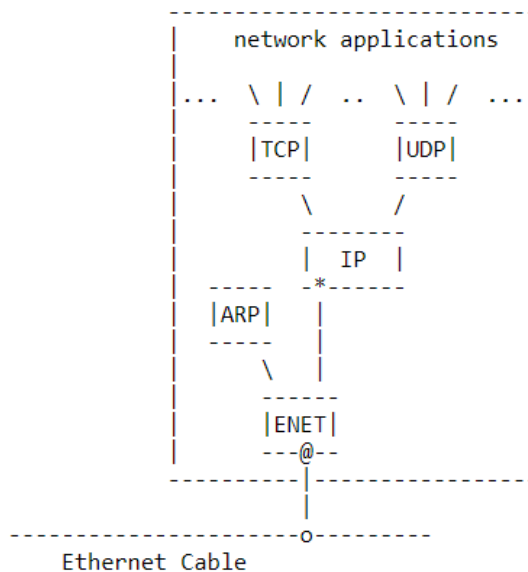


Figure 1. Basic TCP/IP Network Node

Source: <https://tools.ietf.org/html/rfc1180, page 1>



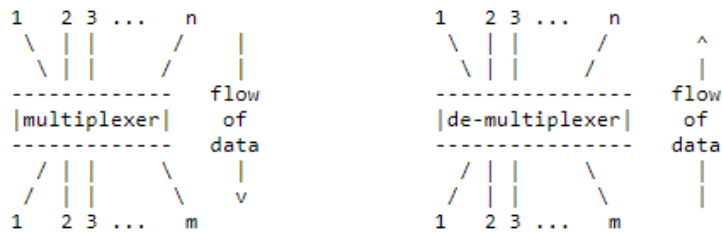


Figure 4. n-to-m multiplexer and m-to-n de-multiplexer

It performs this multiplexing in either direction to accommodate incoming and outgoing data. An IP module with more than 1 network interface is more complex than our original example in that it can forward data onto the next network. Data can arrive on any network interface and be sent out on any other.

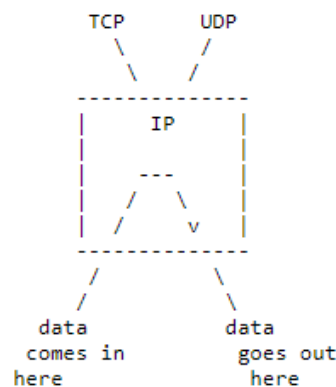


Figure 5. Example of IP Forwarding a IP Packet

The process of sending an IP packet out onto another network is called "forwarding" an IP packet. A computer that has been dedicated to the task of forwarding IP packets is called an "IP-router".

As you can see from the figure, the forwarded IP packet never touches the TCP and UDP modules on the IP-router. Some IP-router implementations do not have a TCP or UDP module.

Source: <https://tools.ietf.org/html/rfc1180>, page 5

## Hardware Specifications

The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
- One RJ45 (9600 bits per second, 8 data bits, no parity, 1 stop bit, no flow control)
- Eth0 Ethernet port: autosensing 10/100/1000Base-T/TX Mbps, with IEEE 802.3af- or 802.3at-compliant PoE
- Eth1 Ethernet Port: autosensing 10/100/1000Base-T/TX Mbps

Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

## Hardware Specifications

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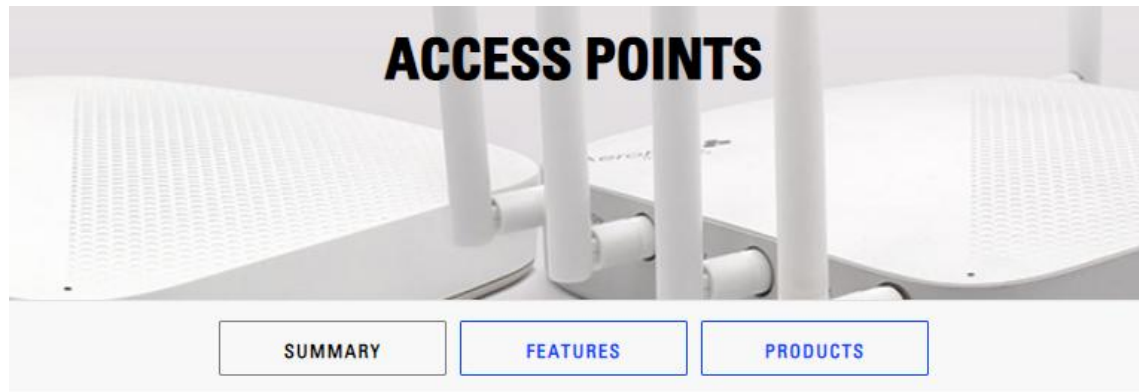
The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- Two embedded single-band omnidirectional 802.11b/g/n antennas
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
- Four IEEE 802.3, 802.3u, and 802.3ab compliant 10/100/1000 Mbps RJ45 Ethernet LAN ports with autosensing and auto-MDI/MDI-X. IEEE 802.3x PAUSE frame flow control in full duplex. Ports 1 and 2 provide 15.4W of PoE power.
- One Type-A USB 2.0 port with backward compatibility with USB1.1.

Source: <https://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/br/xr200p.htm>

16. Aerohive Networks provides a communication system which uses a wireless transport layer protocol for data frame transmission over said land-line and wireless networks, each data frame including connection handling information specifying at least one data transport connection to be used to transmit data between said wireless client and said land-line client over said wireless and land-line networks. For example, Aerohive Networks provide network products (including Aerohive Access Points such as AP 230, 130, 1130, 122X, etc. and SD-WAN Routers such as XR600P and XR200P) which support wireless protocols such as TCP/IP for transmission of data packets (such as Ethernet frame, IP packet, UDP datagram, and TCP segment and/or application message) over land-line and wireless networks. Further, TCP/IP data frames (such as Ethernet frame) contain connection handling information such as the destination address, source address ("connection addressing information"), type field and data.



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Source: <https://www.aerohive.com/products/access-points/>

XR600P	XR200P
XR600P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.	XR200P routers allow enterprises to provision branch office networks and teleworkers quickly and easily.
<a href="#">LEARN MORE</a>	<a href="#">LEARN MORE</a>

Source: <https://www.aerohive.com/starthere/start-routers/>

## Hardware Specifications

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The following specifications describe the physical features and hardware components, the power adapter and PoE electrical requirements, and the temperature and humidity ranges in which the devices can operate.

### ▼ Device Specifications

- Chassis dimensions: 7.25" W x 2.12" H x 7.25" D (184 mm W x 54 mm H x 184 mm D)
- Weight: 1.6 lb (0.73 kg)
- Three internal omnidirectional 802.11b/g/n 2.4 GHz antennas, and three internal omnidirectional 802.11a/b/g/n/ac 5 GHz antennas
- One RJ45 (9600 bits per second, 8 data bits, no parity, 1 stop bit, no flow control)
- Eth0 Ethernet port: autosensing 10/100/1000Base-T/TX Mbps, with IEEE 802.3af- or 802.3at-compliant PoE
- Eth1 Ethernet Port: autosensing 10/100/1000Base-T/TX Mbps

Source: <http://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/ap/ap230.htm>

## Hardware Specifications

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The following specifications describe the hardware components, electrical requirements, and the environmental ranges in which the XR200P can operate.

### ▼ Device and Enclosure Specifications

- Chassis dimensions: 7.75" W x 1.13" H x 6.1" D (19.7 cm W x 2.87 cm H x 15.57 cm D)
- Chassis weight: 14 oz (400 g)
- Two embedded single-band omnidirectional 802.11b/g/n antennas
- One IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000BASE-T) compliant 10/100/1000 Mbps RJ45 Fast Ethernet WAN port
- Four IEEE 802.3, 802.3u, and 802.3ab compliant 10/100/1000 Mbps RJ45 Ethernet LAN ports with autosensing and auto-MDI/MDI-X. IEEE 802.3x PAUSE frame flow control in full duplex. Ports 1 and 2 provide 15.4W of PoE power.
- One Type-A USB 2.0 port with backward compatibility with USB1.1.

Source: <https://docs.aerohive.com/330000/docs/help/english/ng/Content/hardware/br/xr200p.htm>

## 2.2 Terminology

The name of a unit of data that flows through an internet is dependent upon where it exists in the protocol stack. In summary: if it is on an Ethernet it is called an Ethernet frame; if it is between the Ethernet driver and the IP module it is called a IP packet; if it is between the IP module and the UDP module it is called a UDP datagram; if it is between the IP module and the TCP module it is called a TCP segment (more generally, a transport message); and if it is in a network application it is called a application message.

These definitions are imperfect. Actual definitions vary from one publication to the next. More specific definitions can be found in [RFC 1122, section 1.3.3](#).

A driver is software that communicates directly with the network interface hardware. A module is software that communicates with a driver, with network applications, or with another module.

Source: <https://tools.ietf.org/html/rfc1180, page 2>

### 3. Ethernet

This section is a short review of Ethernet technology.

An Ethernet frame contains the destination address, source address, type field, and data.

An Ethernet address is 6 bytes. Every device has its own Ethernet address and listens for Ethernet frames with that destination address. All devices also listen for Ethernet frames with a wild-card destination address of "FF-FF-FF-FF-FF-FF" (in hexadecimal), called a "broadcast" address.

Ethernet uses CSMA/CD (Carrier Sense and Multiple Access with Collision Detection). CSMA/CD means that all devices communicate on a single medium, that only one can transmit at a time, and that they can all receive simultaneously. If 2 devices try to transmit at the same instant, the transmit collision is detected, and both devices wait a random (but short) period before trying to transmit again.

Source: <https://tools.ietf.org/html/rfc1180, page 7>

RFC 1180

A TCP/IP Tutorial

January 1991

### 4. ARP

When sending out an IP packet, how is the destination Ethernet address determined?

ARP (Address Resolution Protocol) is used to translate IP addresses to Ethernet addresses. The translation is done only for outgoing IP packets, because this is when the IP header and the Ethernet header are created.

#### 4.1 ARP Table for Address Translation

The translation is performed with a table look-up. The table, called the ARP table, is stored in memory and contains a row for each computer. There is a column for IP address and a column for Ethernet address. When translating an IP address to an Ethernet address, the table is searched for a matching IP address. The following is a simplified ARP table:

IP address	Ethernet address
223.1.2.1	08-00-39-00-2F-C3
223.1.2.3	08-00-5A-21-A7-22
223.1.2.4	08-00-10-99-AC-54

TABLE 1. Example ARP Table

The human convention when writing out the 4-byte IP address is each byte in decimal and separating bytes with a period. When writing out the 6-byte Ethernet address, the conventions are each byte in hexadecimal and separating bytes with either a minus sign or a colon.

The ARP table is necessary because the IP address and Ethernet address are selected independently; you can not use an algorithm to translate IP address to Ethernet address. The IP address is selected by the network manager based on the location of the computer on the internet. When the computer is moved to a different part of an internet, its IP address must be changed. The Ethernet address is selected by the manufacturer based on the Ethernet address space licensed by the manufacturer. When the Ethernet hardware interface board changes, the Ethernet address changes.

Source: <https://tools.ietf.org/html/rfc1180#page-2>, page 8

application, the TCP module, and the IP module. At this point the IP packet has been constructed and is ready to be given to the Ethernet driver, but first the destination Ethernet address must be determined.

The ARP table is used to look-up the destination Ethernet address.

#### 4.3 ARP Request/Response Pair

But how does the ARP table get filled in the first place? The answer is that it is filled automatically by ARP on an "as-needed" basis.

Two things happen when the ARP table can not be used to translate an address:

1. An ARP request packet with a broadcast Ethernet address is sent out on the network to every computer.
2. The outgoing IP packet is queued.

Every computer's Ethernet interface receives the broadcast Ethernet frame. Each Ethernet driver examines the Type field in the Ethernet frame and passes the ARP packet to the ARP module. The ARP request packet says "If your IP address matches this target IP address, then please tell me your Ethernet address". An ARP request packet looks something like this:

```

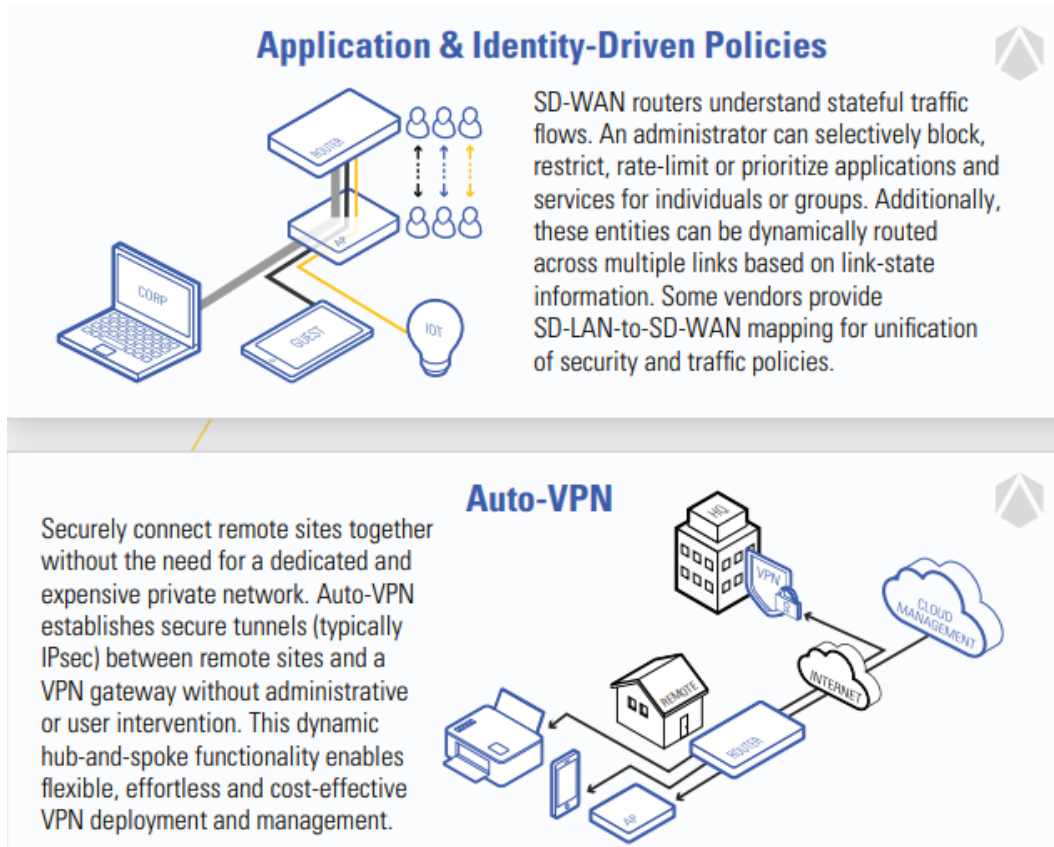
-----
|Sender IP Address  223.1.2.1      |
|Sender Enet Address 08-00-39-00-2F-C3|
-----
|Target IP Address  223.1.2.2      |
|Target Enet Address <blank>       |
-----

```

TABLE 2. Example ARP Request

Each ARP module examines the IP address and if the Target IP address matches its own IP address, it sends a response directly to the source Ethernet address. The ARP response packet says "Yes, that target IP address is mine, let me give you my Ethernet address". An ARP response packet has the sender/target field contents swapped as compared to the request. It looks something like this:

Source: <https://tools.ietf.org/html/rfc1180#page-2>, page 9



Source: [https://www.aerohive.com/wp-content/uploads/Aerohive\\_SD-WAN\\_Poster.pdf](https://www.aerohive.com/wp-content/uploads/Aerohive_SD-WAN_Poster.pdf)

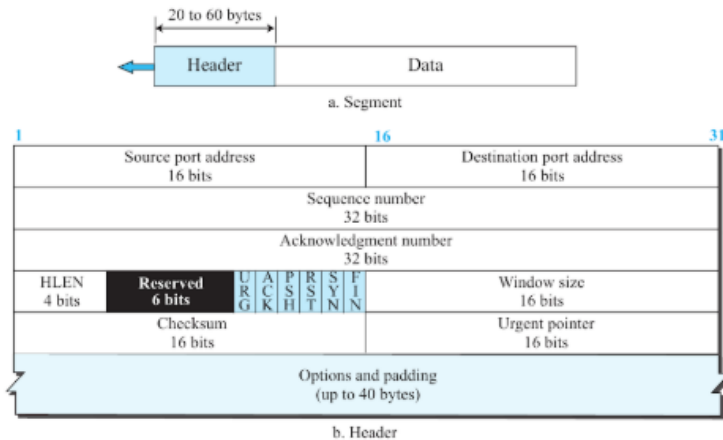
17. Aerohive Networks provides a user data field including a data packet to be transmitted from one client to another client. For example, the network products (including Aerohive Access Points such as AP 230, 130, 1130, 122X, etc. and SD-WAN Routers such as XR600P and XR200P) support wireless transport protocol such as TCP/IP. The protocol allows transmission of user data between wired and wireless devices (“client”) in the form of TCP segments/data packets.



## CHAPTER 3 TRANSPORT LAYER

there are no options and up to 60 bytes if it contains options. We will discuss some of the header fields in this section. The meaning and purpose of these will become clearer as we proceed through the section.

Figure 3.44 TCP segment format



Source:

<https://books.google.co.in/books?id=o8CjAgAAQBAJ&printsec=frontcover&dq=forouzan+computer+networks&hl=en&sa=X&ved=0ahUKEwjV95WPruPhAhVFQo8KHWsUBtsQ6AEIKDAA#v=onepage&q=forouzan%20computer%20networks&f=false>, page 186

18. Aerohive Networks provides at least one sequencing field identifying the last packet received by the client that is transmitting a current data packet. For example, the network products (including Aerohive Access Points such as AP 230, 130, 1130, 122X, etc. and SD-WAN Routers such as XR600P and XR200P) support wireless protocols such as TCP/IP for transmission. Further, TCP/IP uses sequence numbers and acknowledgement numbers for maintaining the sequence of the packets. Initial Sequence Number (ISN) is given to the first byte of the data to reassemble the bytes at the receiver end (wired and/or wireless devices). Acknowledgement number (“sequencing field”) is the next byte number that the receiver expects to receive which also provides acknowledgement for receiving the previous bytes/packets.



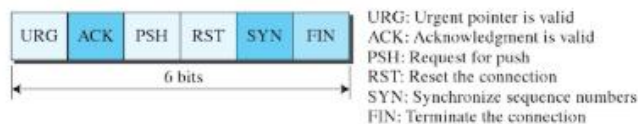
- ❑ **Source port address.** This is a 16-bit field that defines the port number of the application program in the host that is sending the segment.
- ❑ **Destination port address.** This is a 16-bit field that defines the port number of the application program in the host that is receiving the segment.
- ❑ **Sequence number.** This 32-bit field defines the number assigned to the first byte of data contained in this segment. As we said before, TCP is a stream transport protocol. To ensure connectivity, each byte to be transmitted is numbered. The sequence number tells the destination which byte in this sequence is the first byte in the segment. During connection establishment (discussed later) each party uses a random number generator to create an **initial sequence number** (ISN), which is usually different in each direction.
- ❑ **Acknowledgment number.** This 32-bit field defines the byte number that the receiver of the segment is expecting to receive from the other party. If the receiver of the segment has successfully received byte number  $x$  from the other party, it returns  $x + 1$  as the acknowledgment number. Acknowledgment and data can be piggybacked together.
- ❑ **Header length.** This 4-bit field indicates the number of 4-byte words in the TCP header. The length of the header can be between 20 and 60 bytes. Therefore, the value of this field is always between 5 ( $5 \times 4 = 20$ ) and 15 ( $15 \times 4 = 60$ ).

Source:

<https://books.google.co.in/books?id=o8CjAgAAQBAJ&printsec=frontcover&dq=forouzan+computer+networks&hl=en&sa=X&ved=0ahUKEwjV95WPruPhAhVFQo8KHWsUBtsQ6AEIKDAA#v=onepage&q=forouzan%20computer%20networks&f=false>, page 186

- ❑ **Control.** This field defines 6 different control bits or flags, as shown in Figure 3.45. One or more of these bits can be set at a time. These bits enable flow control, connection establishment and termination, connection abortion, and the mode of data transfer in TCP. A brief description of each bit is shown in the figure. We will discuss them further when we study the detailed operation of TCP later in the chapter.

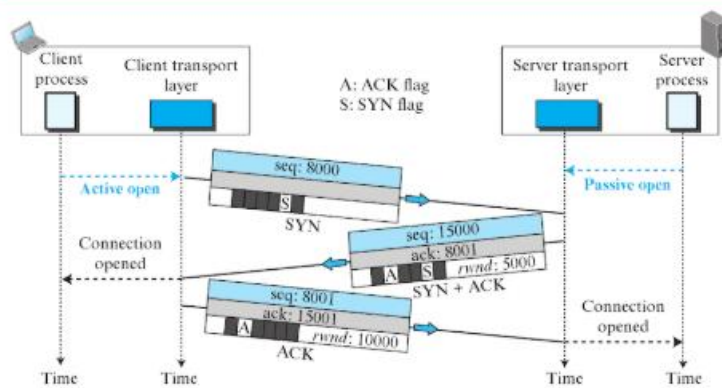
Figure 3.45 Control field



Source:

<https://books.google.co.in/books?id=o8CjAgAAQBAJ&printsec=frontcover&dq=forouzan+computer+networks&hl=en&sa=X&ved=0ahUKEwjV95WPruPhAhVFQo8KHWsUBtsQ6AEIKDAA#v=onepage&q=forouzan%20computer%20networks&f=false>, page 187

Figure 3.47 Connection establishment using three-way handshaking



number, the control flags (only those that are set), and window size if relevant. The three steps in this phase are as follows.

1. The client sends the first segment, a SYN segment, in which only the SYN flag is set. This segment is for synchronization of sequence numbers. The client in our example chooses a random number as the first sequence number and sends this number to the server. This sequence number is called the initial sequence number (ISN). Note that this segment does not contain an acknowledgment number. It does not define the window size either; a window size definition makes sense only when a segment includes an acknowledgment. The segment can also include some options that we discuss later in the chapter. Note that the SYN segment is a control segment and carries no data. However, it consumes one sequence number because it needs to be acknowledged. We can say that the SYN segment carries one imaginary byte.

A SYN segment cannot carry data, but it consumes one sequence number.

Source:

<https://books.google.co.in/books?id=o8CjAgAAQBAJ&printsec=frontcover&dq=forouzan+computer+networks&hl=en&sa=X&ved=0ahUKEwjV95WPruPhAhVFQo8KHWsUBtsQ6AEIKDAA#v=onepage&q=forouzan%20computer%20networks&f=false>, page 189

2. The server sends the second segment, a SYN + ACK segment with two flag bits set as: SYN and ACK. This segment has a dual purpose. First, it is a SYN segment for communication in the other direction. The server uses this segment to initialize a sequence number for numbering the bytes sent from the server to the client. The server also acknowledges the receipt of the SYN segment from the client by setting the ACK flag and displaying the next sequence number it expects to receive from the client. Because it contains an acknowledgment, it also needs to define the receive window size, *rwnd* (to be used by the client), as we will see in the flow control section. Since this segment is playing the role of a SYN segment, it needs to be acknowledged. It, therefore, consumes one sequence number.

**A SYN + ACK segment cannot carry data,  
but it does consume one sequence number.**

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### 3 TRANSPORT LAYER

3. The client sends the third segment. This is just an ACK segment. It acknowledges the receipt of the second segment with the ACK flag and acknowledgment number field. Note that the ACK segment does not consume any sequence numbers if it does not carry data, but some implementations allow this third segment in the connection phase to carry the first chunk of data from the client. In this case, the segment consumes as many sequence numbers as the number of data bytes.

**An ACK segment, if carrying no data, consumes no sequence number.**

Source:

<https://books.google.co.in/books?id=o8CjAgAAQBAJ&printsec=frontcover&dq=forouzan+computer+networks&hl=en&sa=X&ved=0ahUKEwjV95WPruPhAhVFQo8KHWSUBtsQ6AEIKDAA#v=onepage&q=forouzan%20computer%20networks&f=false>, page 190

19. In the alternative, because the manner of use by Defendant differs in no substantial way from language of the claims, if Defendant is not found to literally infringe, Defendant infringes under the doctrine of equivalents.

20. Defendant's aforesaid activities have been without authority and/or license from Plaintiff.

21. In addition to what is required for pleadings in patent cases, and to the extent any marking was required by 35 U.S.C. § 287, Plaintiff and all predecessors in interest to the '095 Patent complied with all marking requirements under 35 U.S.C. § 287.

22. Plaintiff is entitled to recover from Defendant the damages sustained by Plaintiff as a result of the Defendant's wrongful acts in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiff respectfully requests that this Court enter:

1. A judgment in favor of Plaintiff that Defendant has infringed the '813 Patent;
2. A judgment and order requiring Defendant to pay Plaintiff its damages, costs, expenses, and prejudgment and post-judgment interest for Defendant's infringement of the '813 Patent as provided under 35 U.S.C. § 284;
3. An award to Plaintiff for enhanced damages resulting from the knowing, deliberate, and willful nature of Defendant's prohibited conduct with notice being made at least as early as the date of the filing of this Complaint, as provided under 35 U.S.C. § 284;
4. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff its reasonable attorneys' fees; and
5. Any and all other relief to which Plaintiff may show itself to be entitled.

**DEMAND FOR JURY TRIAL**

Plaintiff, under Rule 38 of the Federal Rules of Civil Procedure, requests a trial by jury of any issues so triable by right.

Respectfully Submitted,

**WIRELESS TRANSPORT LLC**

*/s/ Jimmy Chong*

Dated: July 29, 2019

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