



ProConnect BYOB and Customer-provided Router and Switch Requirements

Bring Your Own Bandwidth

The Fidium ProConnect service is a managed, hosted voice solution. It is recommended to use Fidium internet connectivity and managed devices. Alternatively, customers may want to maintain their current internet connectivity and self-manage the service.

If a customer chooses to use their own internet connectivity, Fidium ProConnect requires specific network settings and configurations to work correctly as an Over-The-Top service. You should work with your IT person and/or your ISP to troubleshoot and resolve any network issues before the installation of the ProConnect service.

Requirements

ProConnect IP phones must be connected to a network via a Cat5 or Cat6 Ethernet cable. Wireless (Wi-Fi) capable IP phones must be hard-wired for the initial setup. Fidium does not install or troubleshoot inside wiring; it is the customer's responsibility.

The ProConnect IP phones will share the same data connection with all the computers and other connected devices unless the customer configures their network otherwise. Spikes in data usage could affect call quality. Each IP phone requires a minimum of 100 kbps per voice call in both upstream and downstream directions.

The minimum network requirements before noticing call quality issues are the following

- 1% or less of Packet loss
- Jitter below 30ms
- Ping of 300ms or less (Roundtrip)

The following chart provides **general** guidelines for sizing the data connection:

Number of Devices	VoIP Dedicated bandwidth
5	1 Mbps
10	1 Mbps
15	3 Mbps
20	3 Mbps
30	5 Mbps
40	5 Mbps
50	10 Mbps



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Bring Your Own Router/Firewall

Confirm your Session Initiation Protocol (**SIP**) **Application Layer Gateway (ALG)** default setting is **turned off**.

If your router has a setting for Network Address Translation (NAT) endpoint filtering, make sure it is set to: 'Endpoint Independent Transmission Control Protocol (TCP) and User Datagram Protocol (UDP)'.

Because DPI inspects the payload and can introduce latency, the primary guideline is to exclude trusted VoIP traffic from heavy DPI inspection while using SPI to ensure session integrity

Provide a suitable DHCP server for the IP phones upon bootup, and provide the following:

- IP Address (IPv4)
- Subnet Mask
- Default Gateway
- Domain Naming System (DNS) Server(s)

ProConnect IP phones must be configured by Fidium to utilize zero-touch provisioning (ZTP). They cannot be configured on the local switching LAN to use any DHCP Options, as this will conflict with ZTP. **Options 66 and 150 must not be configured** on the router.

Fidium's IP phones and ATAs do not require any TCP or UDP ports opened inbound. If your router/firewall allows all outbound traffic by default and denies all inbound except for established sessions, you do not need any of the following ports opened. However, if outbound sessions are restricted, please ensure the following are permitted:

For IP Phones:

- TCP/443 for configuration management, directory searches, and XSI commands.
- UDP/TCP Port 53 for DNS queries
- UDP/5060 for SIP Signaling
- UDP/10000 thru 41999 for RTP for physical phones
- UDP/8000-8099 for Audio RTP and 8100-8199 for Video RTP if using Webex

For the ATAs (Innomedia 8328-1N, 8328-4 and 9338-1N)

- SIP signaling — UDP/TCP port 5060
- RTP — a range of UDP ports, 10,000–20,000 and 16384–32767.
- HTTP/HTTPS - Port 80
- NTP - UDP port 123
- DNS - TCP/UDP port 53 (if needed)



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- Disabling SIP ALG and NAT-aware SIP features

If using a Poly or Cisco phone on Wi-Fi connections, it is the customer's responsibility to configure the Wi-Fi equipment. Fidium will not support Wi-Fi connections unless Fidium is also providing the Wi-Fi service.

Off-network phones are supported best-effort. Fidium cannot guarantee that phones will register or that there will be VoIP QoS on another provider's internet connection. Fidium recommends implementing QoS to prioritize voice traffic. Please refer to your router and switch configuration guide for information on setting up QoS on your network. Support for the customer-provided router and internal LAN/WLAN will remain the customer's responsibility after the installation of the ProConnect service.

When using the Webex Desktop and Mobile^[1] (iPhone and Android) applications, those applications will utilize the data network; therefore, the following configuration settings must be made within the customers data firewall. If the firewall is filtering on domain, the **voicecci.net**, **fidium.net** and **consolidated.net** domains must be whitelisted.

For Device Management, XSI (Broadworks eXtended Services Interface), etc., Webex clients need to reach the following on the Fidium network:

TCP 443	xsp.consolidated.net	72.251.185.60
	apps.fidium.net	72.251.187.3
	xsp-w4b.consolidated.net	72.251.167.3

For Webex softphone services, the following IPs and ports must be opened **outbound** in the firewall:

State	SIP	RTP
CA	66.60.166.11 UDP/5060, TCP/5075	66.60.166.10 UDP/10000 to 41999
IL	208.124.104.235,UDP/5060,TCP/5075	208.124.104.234 UDP/10000 to 41999
ME	71.161.127.203,UDP/5060,TCP/5075	71.161.127.202 UDP/10000 to 41999
MN	216.70.4.24 UDP/5060, TCP/5075	216.70.4.23 UDP/10000 to 41999
PA	209.195.142.11 UDP/5060, TCP/5075	209.195.142.10 UDP/10000 to 41999
TX	207.70.173.248 UDP/5060, TCP/5075	207.70.173.247 UDP/10000 to 41999

In addition to the settings above, Cisco provides additional details on configuring the local network in order for two-way voice calls to be successful.



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<https://help.webex.com/en-us/WBX000028782/Network-Requirements-for-Webex-Services>

^[1] ***Note: The Webex soft client for tablets (Android and iPad) only supports VoIP voice calls. Cellular voice calls are not available on tablet devices.**

Bring Your Own Switch

This document outlines the requirements for providing Fidium's ProConnect service using a customer-provided switching fabric. The requirements listed below should be considered the minimum requirements to deliver ProConnect services over customer equipment.

Customer agrees to be responsible for the installation, management, and troubleshooting of the customer-provided LAN switching equipment used for the ProConnect service.

The switch or switches on which IP phones and Cloud Wi-Fi Access Points will connect should support Power over Ethernet (PoE). If they do not, please advise your Sales rep so they can order a power adapter for each device that will connect to a non-PoE switch. For convenience, use the following table to determine the required wattage to power up the Fidium PoE devices provided. Refer to your switch manufacturer's data sheets to determine what PoE standard they support.

Device Model	Power Requirements	PoE Standard
Meraki MR36 Wireless Access Point	15W	802.3af
Meraki MR46 Wireless Access Point	30W	802.3at
Meraki MR56 Wireless Access Point	30W	802.3at
Meraki MR76 Wireless Access Point	15W	802.3af
Meraki MR86 Wireless Access Point	30W	802.3at
Poly VVX 250 IP Phone	4.5W	802.3af
Poly VVX 350 IP Phone	13W	802.3af
Poly VVX 450 IP Phone	13W	802.3af

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Poly Expansion Modules	Add 5W for each	n/a
Polycom VVX 301 IP Phone	7W	802.3af class 2
Polycom VVX 311 IP Phone	7W	802.3af class 2
Polycom VVX 401 IP Phone	15.4W	
Polycom VVX 411 IP Phone	15.4W	
Polycom VVX 501 IP Phone	15.4W	802.3at class 4
Polycom VVX 601 IP Phone	15.4W	802.3at class 4
Poly VVX D230 IP Phone	7W	
Poly Edge E220 IP Phone	13W	802.3af
Poly Edge E320 IP Phone	13W	802.3af
Poly Edge E350 IP Phone	13W	802.3af
Poly Edge E400 IP Phone	13W	802.3af
Poly Edge E450 IP Phone	13W	802.3af
Poly Edge E500 IP Phone	13W	802.3af
Poly Edge E550 IP Phone	13W	802.3af
Poly CCX 400 IP Phone	13W	802.3af
Poly CCX 500 IP Phone	13W	802.3af
Poly CCX 600 IP Phone	25W	802.3at
Poly CCX 700 IP Phone	25W	802.3at
Poly Rove B2 IP Phone	7W	
Poly Rove B4 IP Phone	7W	
Poly Trio 8300 IP Phone	15.4W	802.3af class 4
Poly Trio 8800 IP Phone	15.4W	802.3at class 4

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Poly Trio C60 IP Phone	15.4W	802.3at class 4
Cisco IP Phone 6821	6.49W	802.3af class 2
Cisco IP Phone 6851	6.49W	802.3af class 2
Cisco IP Phone 6871	12.95W	802.3af class 3
Cisco IP Phone 8811	7W	802.3af class 2
Cisco IP Phone 8841	7W	802.3af class 2
Cisco IP Phone 8845	7W	802.3af class 2
Cisco IP Phone 8851	15.4W	802.3af class 3
Cisco IP Phone 8861	15.4W	802.3af class 4
Cisco IP Phone 8865	15.4W	802.3af class 4
Cisco IP Phone 8875	15.4W	802.3af class 4
Cisco IP Conference Phone 8832	15.4W	802.3af class 3

If the customer has a single data network with no separate voice VLAN, all the IP phones, ATAs and computers will be on the same data network. The customer is responsible **for configuring** their network with their own private IP space. In this simple deployment scenario, any kind of switch or switches can be used. Gigabit switches are preferred. If using business grade switches or any switch that can be configured, each port can be made a member of a single native VLAN (no VLAN tagging).

- If the customer has chosen to configure a separate voice VLAN, there will be (2) VLAN IDs; one for the data VLAN and one for the voice VLAN. This requires a switch that can be configured with those 2 VLAN IDs. Customers can select any two VLAN IDs of their choice. If intending to connect computers to the back of the phones, the switch ports where IP phones connect to will be configured as trunk ports carrying both the data VLAN as well as the voice VLAN. In this scenario, FIDIUM requires each port to be configured with VLAN Trunking (802.1Q) or a phone VLAN equivalent. Additionally, the Link Layer Discovery Protocol – Media Endpoint Discovery (LLDP-MED) (802.1AB) must be configured to ensure the IP



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phones boot up into the voice VLAN. Refer to your switch vendor documentation on how to configure those ports. Note that Fidium cannot assist with configuring customer-provided switches. If unable to correctly configure the customer-provided switching equipment, please contact your Sales rep so Fidium-managed switches can be added to your order. **Note that if you are opting for a Fidium-managed switch, a Fidium-managed router MUST be installed to provide access/management of the Fidium switch. Alternatively, if necessary to keep your own router, Fidium Cloud Wi-Fi (Meraki Wireless Access Points + Meraki Switches) could be ordered. This deployment type does not require a Fidium Managed Router.**

- **The customer must identify and make the changes to their switching infrastructure to support all items above or identify an external contact who will be at the customer's expense.**
- **Fidium will not provide management of customer-owned switch equipment.** Customer will provide IT Staff or network vendor who can configure and maintain their switching equipment.
- **The IT Staff or network vendor must be available during service cutover.**
- LAN Cabling Requirements
 - o Must meet 100/1000BASE-TX standards
 - (e.g.) Cabling must be copper, and must be category 5 or better.
 - o All cables must be terminated adequately to RJ-45 connectors
 - o Cables must run directly from the receiving Ethernet jack to the switch/telephony closet without splices and without passing through another hub, switch, or repeater.
 - o Ethernet wiring must be separated from sources of EMI (electromagnetic interference).
 - (e.g.) It should not run parallel to electrical wiring, should not cross fluorescent light fixtures or air conditioning units.
 - o All cables must have both endpoints identified and labeled.
 - (e.g.) Ethernet jacks must be labeled and have a corresponding label on the cable or patch panel in the switch room/telephony closet.
 - o All cabling must be indoors or properly shielded in a conduit.
 - o No Ethernet cable should be longer than 100 meters.

After installation, if any issues arise with your voice service, Fidium will have very limited troubleshooting capabilities and may not be able to resolve all issues because it does not own all the devices along the voice traffic path.



ProConnect BYOB and Customer-provided Router and Switch Requirements

Bring your Own Phones

Customers may reuse their IP phones, provided they are on Fidium's certified phone list. Please speak to your Fidium sales representative or sales engineer to confirm if your IP phone can be used with our ProConnect service. The customer understands that any Desk Phone that is reused in conjunction with Fidium ProConnect, not initially provided by Fidium Communications, may affect the overall performance of the solution. Fidium Communications is not responsible for the performance of any hardware provided by the customer. Any issues with the customer-supplied hardware that require additional implementation hours will be billed to the customer at the standard labor rate. Interoperability must be tested at least 10 business days before the ProConnect solution turn-up.

Supported Cisco IP Phones (Must be MPP/3PCC version)

- 6821
- 6841
- 6851
- 6861
- 6871
- 8811
- 8841
- 8845
- 8851
- 8861
- 8865
- 8875
- 8832

Supported Poly IP Phones

- CCX 400 w/ handset
- CCX 500 w/ handset
- CCX 600 w/ handset
- CCX 700 w/ handset
- Edge E220
- Edge E320
- Edge E350
- Edge E400



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- Edge E450
- Edge E500
- Edge E550
- VVX 250
- VVX 350
- VVX450
- Rove 20 Handset
- Rove 30 Handset
- Rove 40 Handset
- Rove 20 handset + B1 base station kit
- Rove 30 handset + B2 base station kit
- Rove B2 Base Station
- Rove B4 Base Station
- Rove R8 Repeater
- Trio 8300
- Trio C60