

Tech Note: Using Multiple Opals Behind One IP Address and Domain

Comrex Opal provides for a simple way to allow remote guests to call into a studio with high quality audio feeds. Opal consists of a box that acts as a web server, providing the functionality required to implement the WebRTC protocol for audio.

Due to certificate requirements used for WebRTC in browsers, the server inside Opal must have a domain associated with it (and a corresponding static IP address). Customers who have multiple Opals with firmware 1.2p10 and higher now have the ability to set these up behind a router, with the router's WAN port tied to the single static IP address and domain. By using customer-supplied certificates and port-forwarding options in the router, each Opal can be made to generate invites and accept connections on its own, sharing the single IP address and domain.

About Certificates

The default way for Opal to obtain certificates is to use the free online resource **Let's Encrypt**. Unfortunately, it's not possible to share this type of certificate among Opals at non-standard ports. To use multiple Opals on one domain, **the customer must supply their own certificates to all the Opals.**

Customer-supplied certs are treated in a different Comrex tech note: **Using Customer Supplied Certificates on Comrex Opal**, available on the Comrex website. Note particularly the instructions on how to duplicate the certificate among multiple Opals. Each Opal should also be programmed for the same domain (e.g. opal.comrex.com) and it must match the domain in the certificates. This setting is found in the toolbox page under **Network->SSL Certificate->Domain**.

Setting Ports

Each Opal in your system uses four distinct port ranges to operate:

- 1) TCP Port for Toolbox (fixed at port 80)
- 2) TCP port for Caller Web Page (default at port 443)
- 3) TCP Port for call setup (default at port 8082)
- 4) Four UDP ports for RTP traffic (default port 16390-16393)

Two steps are required to configure each Opal

- 1) Configure the all ports on each Opal for a range that does not overlap the others
- 2) Configure your router to forward those specific ports to that specific Opal

Note that the Toolbox port is not configurable. This means only one Opal can have the Toolbox page forwarded to the Internet. For any Opals that don't have Toolbox forwarded, Invites must be extracted from inside the LAN.

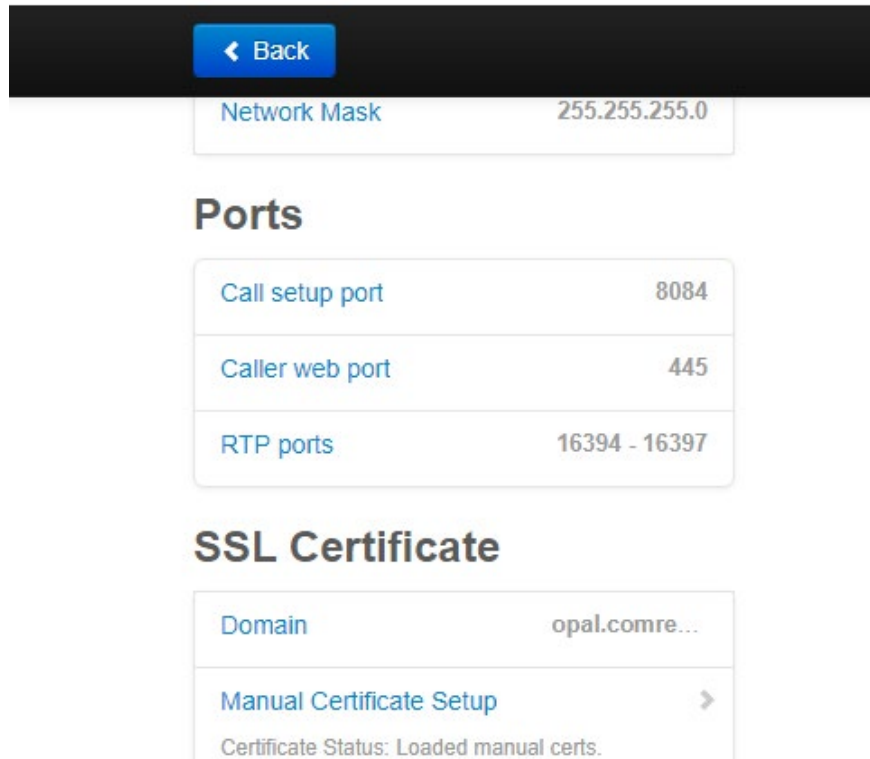


Fig. 1

Fig 1 shows the Toolbox page at **Network->Ports**. Note that the port settings have been changed to values outside the range of the default ports. Of special note is the **RTP ports** setting. The value entered will be only the first port of the four port range. The settings then will reflect the entire range, including the next three higher ports. (Default RTP range is 16390-16393, while this unit is set to 16394-16397). The entire **RTP 4-port** range must not overlap the range set on any other Opals.

Once the new port ranges are set, the system will prompt you to press “reset”. Do this and wait approximately 60 seconds to refresh the page and log in.

Setting Up Your Router for Port Forwarding

Every router has different terminology for port forwarding in its menu system. We show a sample router in fig 2, where port forwarding options are available under the “gaming” menu.

GAMING RULES								
Enable	Name	IP Address	TCP Ports	UDP Ports	Schedule	Inbound Filter	Edit	Delete
<input checked="" type="checkbox"/>	opal a	10.0.0.10	8082, 443	16390-16393	Always	Allow All		
<input checked="" type="checkbox"/>	opal b	10.0.0.20	8084, 445	16394-16397	Always	Allow All		

Fig. 2

Here, we've left Opal A at its default ports and forwarded these ports to A. We've shifted the ports on Opal B up and forwarded those ports to B.

Wrapping It Up

Fig 3 shows a scenario where three Opals are behind a router at static IP addresses, and each Opal has its ports configured and forwarded through the router. As shown, an invite that's generated from Opal C will include the domain (which now points to the router) along with the port configuration and channel number for the desired connection on Opal C. The router will detect this and open the proper channels to Opal C, and a connection can be made.

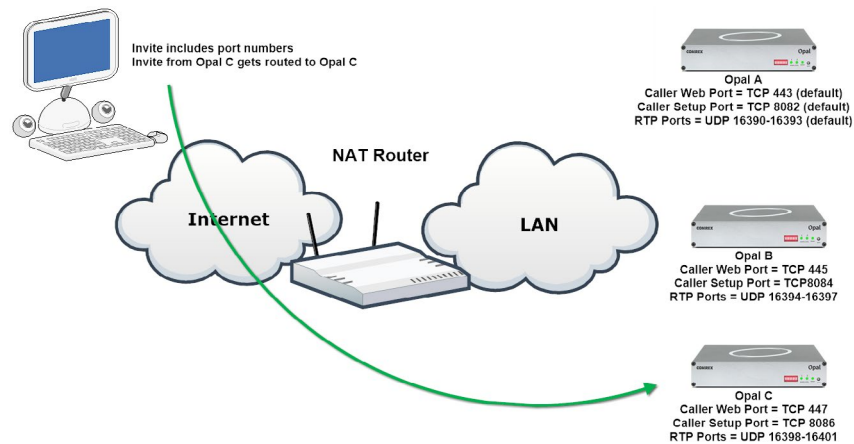


Fig. 3

Have questions or need support?

Call us at +1 978 784-1776 or email techies@comrex.com.