

NETWORK DEPLOYMENT GUIDE

WC-COA

COALESCE V2 NETWORK DEPLOYMENT

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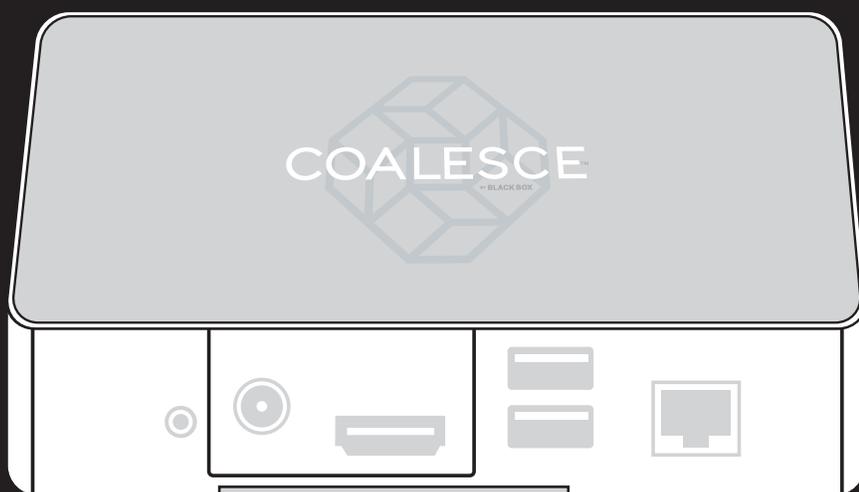


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CHAPTER 1: INTRODUCTION

1.1 COALESCE—WIRELESS COLLABORATION

Coalesce provides enterprise-class wireless collaboration and media streaming to any display. Once deployed, the Coalesce supports multiple, simultaneous user devices connected to a room display over a Wi-Fi or Ethernet network. Laptops, tablets, and phones can use a Web browser or the free Coalesce client app to connect, share media, and control the display, improving meeting engagement and fostering collaboration.

The Coalesce is enterprise-ready, providing enterprise-grade security, management, and network deployment options that comply with network policies and adjust to fit existing network setups. The Coalesce also ships with wireless access point capabilities, supporting on- and off-network deployments.

This guide provides your IT administrator with all the information needed to deploy a Coalesce successfully, either as a standalone collaboration hotspot or on one/multiple existing network(s), including corporate enterprise networks. Configuration of the Coalesce for network deployment is typically performed before use and then does not require modification after the initial setup.

1.2 COALESCE ON YOUR NETWORK

Coalesce can be flexibly deployed on your existing network and can be configured based on your own network constraints and topology. This is true for Coalesce units and instances of Coalesce Software. Some things to keep in mind about Coalesce:

- ♦ Managed as Standard Traffic. Coalesce communicates via TCP/IP and uses three ports. These ports can be configured using Coalesce Central or via the Coalesce unit's Configuration Panel.
- ♦ Enterprise Network Compatible. Coalesce supports encryption of Coalesce network data (via RSA/SHA cipher with a 2048-bit private key—optional, can be disabled) and is designed for use on complex networks, including multiple VLANs and segregated networks.
- ♦ Flexible Resource Discovery. Clients share displays in one of three ways, based on configuration:
 - IP Entry: Direct entry of the Coalesce (or the Coalesce Software host PC) IP address.
 - Broadcast: Auto-discovery via broadcast on the local network only (for click-to-connect access).
 - CDS: Non-broadcast auto-discovery using the Coalesce Directory Service (for click-to-connect access).

Coalesce Directory Service (CDS) is a non-broadcast approach that uses TCP/IP traffic and provides multiple methods for configuring a Coalesce name server to list Coalesce displays across a network for clients to discover and connect to. This approach is recommended for larger switched networks and includes an option that does not require configuration changes to the enterprise network.

1.3 INITIAL SETUP

Coalesce is configured to act as a wireless access point upon arrival. This allows administrators to connect to the Coalesce unit's network from any device and configure the unit, or the admin can connect a monitor and USB mouse to configure the unit. To access the Coalesce unit's web-based Configuration Panel, follow these steps:

1. Power on your Coalesce using the provided power adapter.
2. From a separate computer/device, connect to the Coalesce wireless network.
3. Open a Web browser and enter the Coalesce unit's IP address—192.168.43.1—in your browser address bar.

You should now see all the Coalesce unit's configuration options in your browser. Here you can assign a display name (the name that will be shown on screen), apply an administration password, customize the display appearance, designate network settings, and further configure the Coalesce based on your requirements. See Appendix D: Configuring a Coalesce for more details about Coalesce configuration.

To configure network settings, visit the Network tab on the configuration page. The image on the next page shows the Coalesce unit's network configuration page for a Coalesce that is configured to be deployed through Ethernet and standard DHCP.

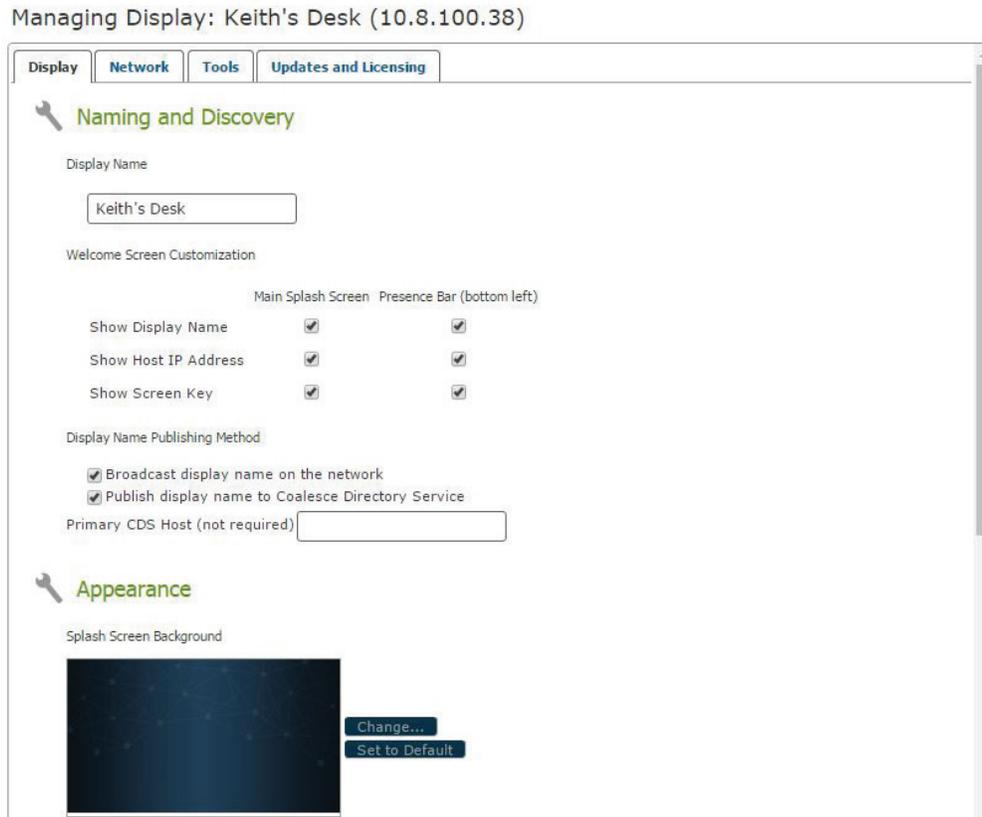


FIGURE 1-1. CONFIGURATION PAGE

The Network tab provides administrators the ability to enable/disable both the Coalesce unit's Ethernet port and the Coalesce unit's wireless capabilities, with additional settings/options available for each option when they are enabled. In addition, the Firewall between the Coalesce unit's Ethernet and wireless connections can be set to allow for Internet to pass through from the Ethernet port to the Coalesce unit's wireless network. Finally, the Coalesce unit's base ports can be modified to align Coalesce traffic with existing IT routing policies.

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1.4 COALESCE TOPOLOGY

This topology diagram illustrates how the components of a Coalesce instance relate to each other at a high level. The Coalesce client software communicates with the Coalesce via TCP/IP traffic over an Ethernet/WiFi network.

The remainder of this guide provides detailed setup instructions to accommodate specific network configurations and requirements.

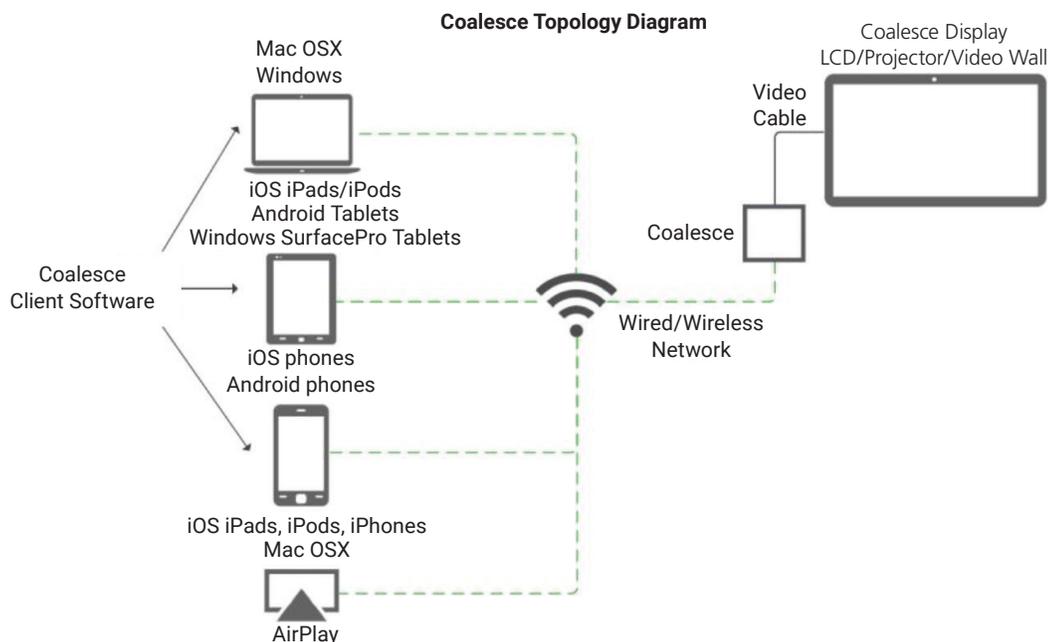


FIGURE 1-2. COALESCE TOPOLOGY DIAGRAM

1.5 NETWORK DEPLOYMENT MODES

The Coalesce features both Ethernet and wireless capabilities, which can each be enabled/disabled and configured independently. This means the Coalesce can be attached to one existing network, attached to two existing networks simultaneously, deployed off-network as a standalone wireless access point (WAP), or attached to an existing network and deployed as a WAP simultaneously. This serves a variety of network profiles and use cases, including scenarios with no network, a single network, a single network with frequent guest visitors, and environments with corporate and guest networks. How to configure the Coalesce unit's network settings depends on what network(s) users will use to access and share media from their devices to the display. Enable/configure the Ethernet and wireless network settings for your Coalesce in the Network tab of the Coalesce unit's Configuration Panel or via the Coalesce Central.

- **Wireless Access Point (WAP)—Deploy Off-Network.** Select this mode if the Coalesce will be deployed as a wireless access point (WAP) to support wireless peer-to-peer traffic only. This mode is ideal for creating an independent collaboration hotspot when there is not an existing network in place, or when users do not have equal access to the existing network. This mode can be assigned its own SSID so that devices can join that network and stream media to the in-room display.
- **Wired Ethernet Client—Attach to Existing Network.** Select this mode to connect the 10/100/1000 Ethernet controller to an existing network. This mode provides both DHCP and static IP configuration options.

NOTE: The "existing network" in this case could be the Enterprise network, a dedicated wireless network, or an isolated VLAN.

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- **Wireless WiFi Client—Attach to Existing Network.** This mode is only recommended when no Ethernet connection is available. Connect to an existing network via the Coalesce unit's wireless adapter. If your deployment space does not have wired access to the existing network, or if the Coalesce will be moved from time to time, it can be attached to a network through the built-in wireless antenna. This wireless client mode provides both DHCP and static IP address configuration options.

NOTE: The "existing network" in this case could be the Enterprise network, a dedicated wireless network, or an isolated VLAN.

- **WiFi + Wired—Multi-Network Deployments.** Select this mode to connect the 10/100/1000 Ethernet controller to an existing network AND 1) enable the Coalesce unit's WAP or 2) connect to a second existing network wirelessly—providing users two ways to connect. Both DHCP and static IP configuration options are available for both Ethernet and wireless client modes, and Internet access from the Ethernet port can be optionally provided to users connected to the Coalesce unit's WAP or wireless-client network by opening ports 80 and 443.

CONFIGURING VIA WEB BROWSER?

We recommend that you wait to apply network configuration changes until all fields are correctly set. If you change modes and press apply before finalizing your changes, your remote computer may no longer be on the same network as the Coalesce and will need to be reconnected to the network.

1.6 SELECTING A NETWORK DEPLOYMENT MODE

Using the Configuration Panel, enable and configure Ethernet and/or wireless settings. Keep in mind that if you are configuring a Coalesce using a separate computer via the Coalesce unit's browser-based Configuration Panel, changing the network the Coalesce is attached to will require you to similarly modify the network your device is attached to in order to continue configuring the Coalesce.

First, determine what networks, if any, you want to attach your Coalesce units to. Remember, there is a firewall in place between the Coalesce unit's Ethernet and wireless ports, so when the Coalesce is attached to multiple networks, your networks remain separate and secure. When attaching to multiple networks, Black Box recommends connecting to the primary network (e.g. the enterprise network for corporate users) via the Coalesce unit's Ethernet port, and connecting to any secondary network (e.g. an existing guest network) via the Coalesce unit's wireless.

When the WAP mode is enabled, you can designate both the SSID (i.e. wireless hotspot network name) and security settings for user access to the WAP. Ethernet can be configured for DHCP, or a static IP address can be selected with settings for Gateway, Network prefix length, and DNS information.

If you are attaching the Coalesce as a wireless client to an existing network, you will need to provide the existing wireless network SSID and password (if required). You can either type in the network SSID by selecting "Add Wireless Network" or use the "Scan" feature and the associated drop-down menu to select the correct SSID. These are options in the Coalesce unit's Configuration Panel under the "Wireless Settings" section of the "Network" tab. You may need to first enable wireless settings and then press apply to see these options.

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1.7 DEPLOYING THE COALESCE

With fully configurable Ethernet and wireless capabilities, the Coalesce offers a range of deployment options. Deploying the Coalesce on an existing network is the most common setup but may require additional consideration. For small, flat network setups with a single switch (e.g. small business environments) it is usually sufficient to configure the Coalesce to receive a DHCP address and attach it to the network. In more complex network environments, IT management at the network layer should be considered/consulted. Coalesce is flexible in this regard, and the specific network configuration details should be determined based on existing network IT policies and management preferences.

This guide covers seven common deployment configurations that support different use-case needs and IT requirements. Select the configuration that most closely matches your network setting and follow the associated setup process.

TABLE 1-1. COMMON DEPLOYMENT CONFIGURATIONS

SETUP	BUSINESS SCENARIO	NETWORK CONFIGURATION	GO TO SECTION
Off-Network WAP	Visitor centers and other meeting spaces where Coalesce users do not require/have access to the existing enterprise network. The content to be shared is on users' devices, and anyone able to join the wireless hotspot can participate.	Enables the Coalesce unit's WAP mode. The wireless collaboration hotspot does not provide internet access.	2.1
Dedicated Wireless Network	Any user who can join the dedicated wireless network is able to connect and Share. Examples include areas without existing corporate/campus networks and meeting spaces with users that don't have access to an existing enterprise network.	The Coalesce is physically deployed wired (recommended) or wirelessly on a dedicated wireless network separate from an enterprise network.	2.2
Single Enterprise Network	Small businesses and other environments where all users have access to the same enterprise network. This includes any meeting space with access to the enterprise network.	The Coalesce is attached wired (recommended) or wirelessly to the enterprise network.	2.3
Isolated VLAN	Any users who can join the VLAN network are able to connect and share media to the Coalesce/display. Examples include guests and corporate users who wirelessly connect to the VLAN network in a conference room.	The Coalesce is physically deployed wired (recommended) or wirelessly on the enterprise network but is logically isolated to a VLAN. The managed VLAN is typically given internet access.	2.4
Bridged Multiple Networks	Users on different networks need to connect to the same Coalesce display. For example, both guest and enterprise networks exist and users on each need to collaborate in a meeting.	The Coalesce is attached wired (recommended) or wirelessly to a network within the enterprise and receives traffic from (an) additional network(s) via routing IP traffic (based on network requirements).	2.5
Dual Networks	Users on different networks need to connect to the same Coalesce display. For example, both guest and enterprise networks exist and users on each need to collaborate in a meeting.	The Coalesce is attached to the existing enterprise network via Ethernet and is attached to a secondary network (guest) as a wireless network client.	2.6
Enterprise Network Plus WAP	Users with access to the local network need to collaborate with users that do not have network access (e.g. guests). For example, customers or partners come in and need to collaborate with enterprise users in a meeting.	The Coalesce is attached to the existing network via Ethernet and the WAP SSID is enabled/setup. Internet access can be granted to the WAP-connected users (optional).	2.7

NOTE: Because Coalesce traffic is TCP/IP routable, you can modify these common configurations to match your specific needs and network settings.



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The following routes/ports should be open on the Coalesce network and allowed through the firewall of any computer running the Coalesce client app: 53100, 53101, 53102. If these ports conflict with other ports in use on the network, or IT policy requires a different range of ports, the Coalesce Configuration Panel and/or Coalesce Central allows an IT administrator to change the base port addresses accordingly.



CHAPTER 2: COALESCE DEPLOYMENT

2.1 COALESCE WAP MODE DEPLOYMENT (OFF-NETWORK)

This configuration is valuable for spaces that don't have an existing network, or for areas where Coalesce users do not have access to the existing network. This may include visitor centers, common areas, and ad hoc meeting spaces where users want to quickly select a display and share media from their own devices but do not necessarily need connection to an existing network—such as a corporate or campus network—while collaborating. Anyone who can connect to the Coalesce unit's wireless hotspot can share.

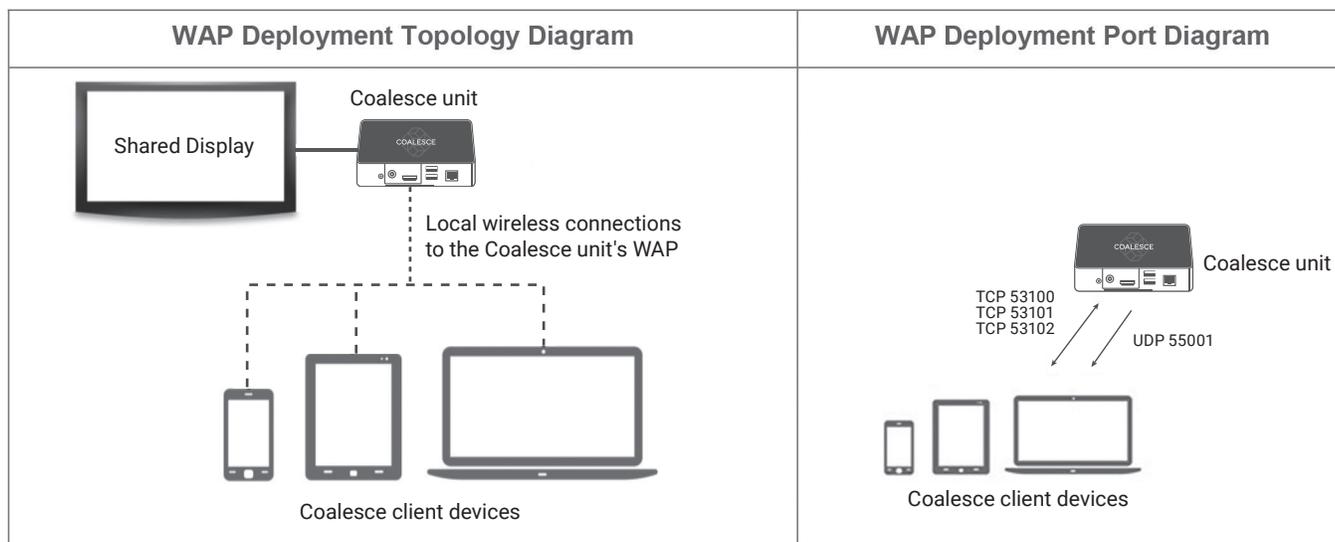


FIGURE 2-1. WAP DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce in WAP mode based on the setup instructions in the Network Deployment Modes section of this guide.
2. Repeat step 1 for each of the Coalesce units that will be deployed.
3. Deploy Coalesce units to their locations. Attach the Coalesce units to the in-room displays via the provided video cable.

NOTE: Users that connect via WAP will always discover/see the display SSID they connect to, and they will be able to click-to-connect without the use of CDS or any additional configuration required.

DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.

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2.2 DEDICATED WIRELESS NETWORK DEPLOYMENT

This configuration is valuable for visitor centers, common areas, and ad hoc meeting spaces where users want to quickly select a Display and share media from their own devices but do not necessarily need connection to an existing network—such as a corporate or campus network—while collaborating. Anyone who can join the dedicated network can share.

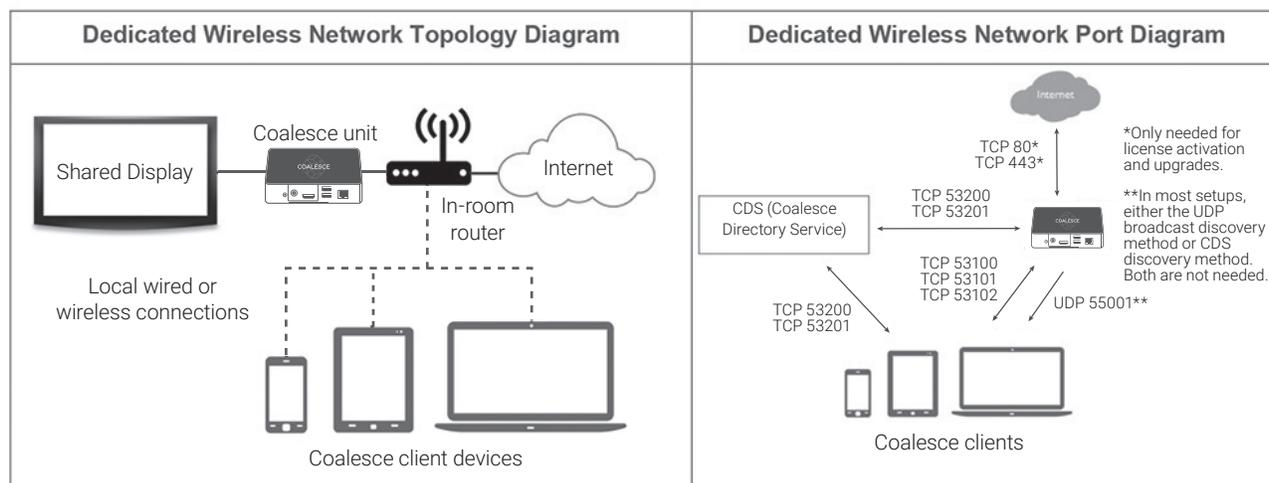


FIGURE 2-2. DEDICATED WIRELESS NETWORK DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce based on the setup instructions in the Network Deployment Modes section of this guide.
2. Repeat step 1 for each of the Coalesce units that will be deployed.
3. Deploy Coalesce units to their locations. Attach the Coalesce units to the in-room displays via provided video cables, and connect the Coalesce units to the dedicated network, wired (recommended) or wirelessly.

NOTE: This network configuration may not support broadcast display discovery. If not, you can deploy Coalesce Directory Service (CDS) to enable users to discover/see and click-to-connect to displays. Otherwise, users will need to enter the display's IP address each time they wish to connect.

See Section 2.8, Setup Displays Near You, for how to configure CDS for your Coalesce units.

DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.

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2.3 SINGLE ENTERPRISE NETWORK DEPLOYMENT

The single network configuration is typical in organizations with a single network and meeting spaces already wired for network access. In these settings, any user with access to the existing network will have access to the Coalesce display(s).

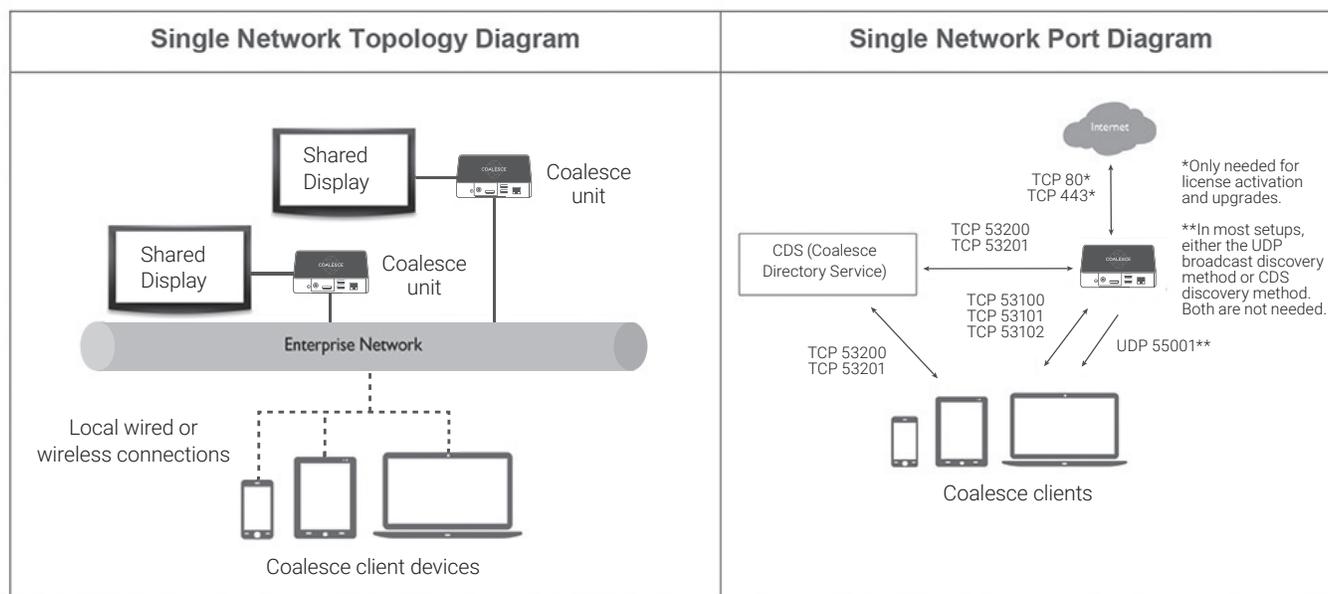


FIGURE 2-3. SINGLE ENTERPRISE NETWORK DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce units based on the setup instructions in the Network Deployment Modes section of this guide.

NOTE: This network configuration option requires either a wired (recommended) or wireless connection to the existing enterprise network.

2. Repeat step 1 for each of the Coalesce units that will be deployed.

3. Deploy Coalesce units to their locations. Attach the Coalesce units to the in-room displays via provided video cables, and connect the Coalesce units to the enterprise network, wired (recommended) or wirelessly.

NOTE: This network configuration will most likely not support broadcast display discovery. Instead, you can deploy Coalesce Directory Service (CDS) to enable users to discover/see and click-to-connect to displays. Otherwise, users will need to enter the display's IP address each time they wish to connect.

See Section 2.8, Setup Displays Near You, for how to configure CDS for your Coalesce units.

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DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.



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2.4 DEDICATED VLAN DEPLOYMENT

These configurations are valuable for visitor centers, common areas, and ad hoc meeting spaces where users want to quickly select a display and share media from their own devices but do not necessarily need broad access to the existing network—such as a corporate or campus network—while sharing media to the display. Anyone who can join the dedicated VLAN network can share. This option also allows IT to segment Coalesce traffic to an independent VPN within the corporate network to allow management and monitoring of Coalesce-specific communications independently from other enterprise applications on the network.

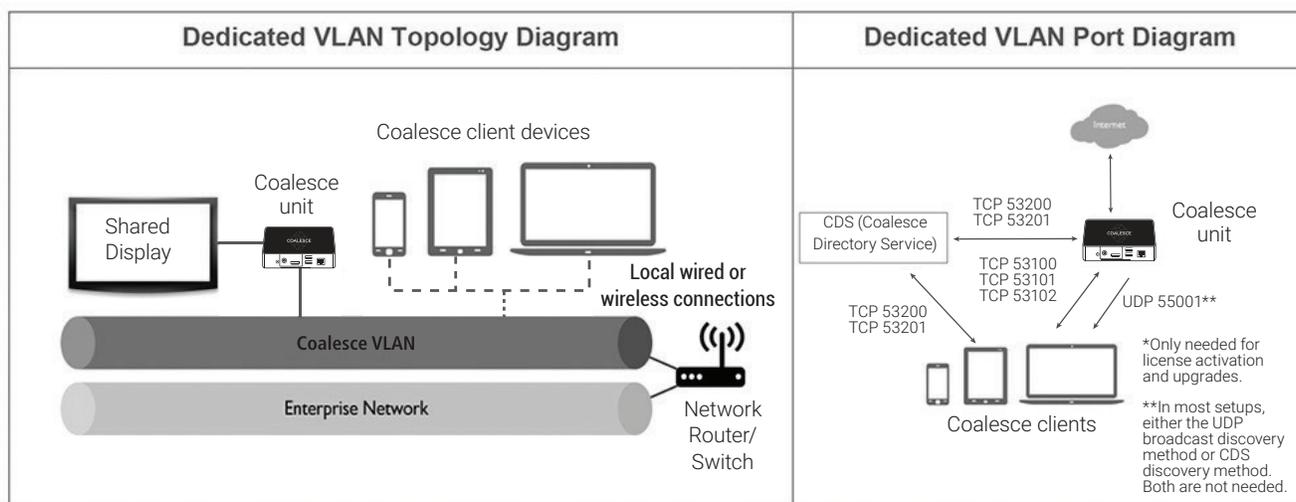


FIGURE 2-4. DEDICATED VLAN DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce based on the setup instructions in the Network Deployment Modes section of this guide.

NOTE: This network configuration option requires either a wired (recommended) or wireless connection to the existing enterprise network.

2. Repeat step 1 for each of the Coalesce units that will be deployed.
3. Deploy Coalesce units to their locations. Attach the Coalesce units to the in-room displays via provided video cables, and connect the Coalesce units to the VLAN, wired (recommended) or wirelessly.

NOTE: This network configuration may not support broadcast display discovery. If not, you can deploy Coalesce Directory Service (CDS) to enable users to discover/see and click-to-connect to displays. Otherwise, users will need to enter the display's IP address each time they wish to connect.

See Section 2.8, Setup Displays Near You, for how to configure CDS for your Coalesce units.

DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.

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2.5 BRIDGED MULTIPLE NETWORKS DEPLOYMENT

Coalesce units can be deployed across subnets and VLANs when users on different networks need to connect to the same Coalesce display. Coalesce supports multiple networks and can be configured to support access across subnets and VLANs for collaboration among parties with different network access, such as organizations with enterprise and guest networks. For example, the enterprise network may be segregated into multiple subnets or both guest and enterprise network users may need to access the same display to collaborate in a meeting.

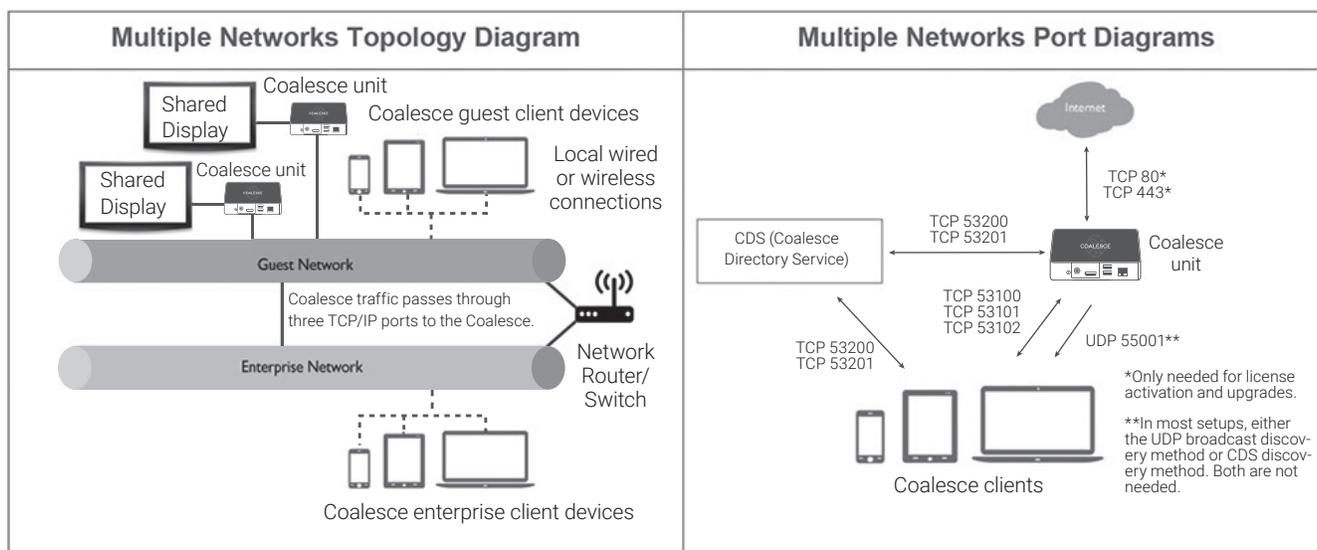


FIGURE 2-5. BRIDGED MULTIPLE NETWORKS DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce units based on the setup instructions in the Network Deployment Modes section of this guide.

NOTE: This network configuration option requires either a wired (recommended) or wireless connection to the existing network.

2. Repeat step 1 for each of the Coalesce units that will be deployed.

3. Deploy Coalesce units to their locations. Attach the Coalesce units to the in-room displays via provided video cables, and connect the Coalesce units to the existing network.

NOTE: This network configuration will most likely not support broadcast display discovery. Instead, you can deploy Coalesce Directory Service (CDS) to enable users to discover/see and click-to-connect to displays. Otherwise, users will need to enter the display's IP address each time they wish to connect.

See Section 2.8, Setup Displays Near You, for how to configure CDS for your Coalesce units.

4. Multi-network access via routing traffic: To provide access to your Coalesce display(s) from multiple networks, you can creating routes for IP traffic. To do so, open the necessary bi-directional ports* between your subnets or VLANs:

- ♦ TCP 53100, 53101, 53102
- ♦ TCP 53200 (required when CDS is installed for discovery—see See Section 2.8, Setup Display Discovery.
- ♦ TCP 53201 (required when CDS is installed for discovery—see See Section 2.8, Setup Display Discovery.

If Coalesce Directory Service (CDS) is installed, make sure the computer on which it is installed is on one of the same VLANs or subnets as the Coalesce units connected to the display(s).

These ports can be changed/configured in the Coalesce configuration panel.

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DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.



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2.6 DUAL NETWORK DEPLOYMENT

Valuable for meeting spaces with enterprise network users and guest network users, the Coalesce units can be attached simultaneously to the enterprise network via Ethernet and the guest network via the Coalesce unit's wireless capabilities, providing access for users on both networks. This is a common network configuration for large enterprises and serves to enable enterprise or campus users and guest network users the ability to collaborate using the same display(s) in their meetings.

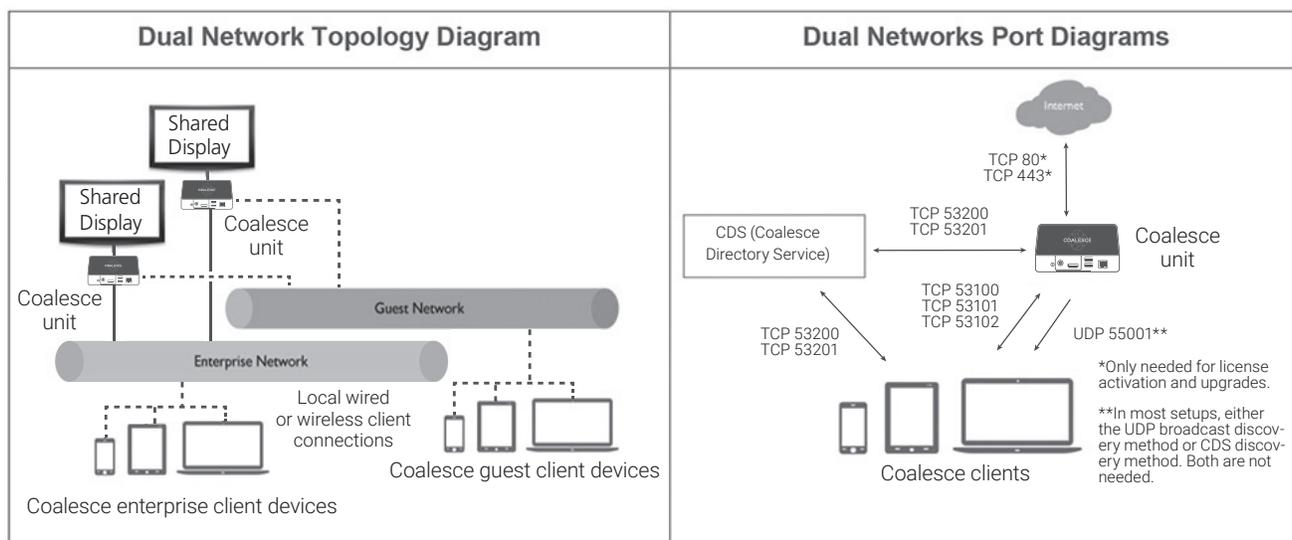


FIGURE 2-6. DUAL NETWORK DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce units based on the setup instructions in the Network Deployment Modes section of this guide.

NOTE: This network configuration option requires either a wired (recommended) or wireless connection to the existing enterprise network.

2. Repeat step 1 for each of the Coalesce units that will be deployed.

3. Deploy Coalesce units to their locations, and attach the Coalesce units to the in-room displays via provided video cables. Next, connect the Coalesce units to the primary existing network via Ethernet, and the secondary network as a wireless client.

NOTE: This network configuration will most likely not support broadcast display discovery for network users. Instead, you can deploy Coalesce Directory Service (CDS) to enable network users to discover/see and click-to-connect to displays without entering the display's IP address each time.

See Section 2.8, Setup Displays Near You, for how to configure CDS for your Coalesce units.

DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.

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2.7 ENTERPRISE NETWORK PLUS WAP DEPLOYMENT

Valuable for meeting spaces with network users and visitors/guests, the Coalesce units can be connected to an existing network and be setup as a Wireless Access Point simultaneously, providing users with two ways to connect to the Coalesce and participate in the session. Users with access to the existing network will be able to connect to the display via the existing network, and users that don't have access to the existing network can connect to the Coalesce unit's WAP/SSID. Users that connect via the WAP can also be granted internet access (optional).

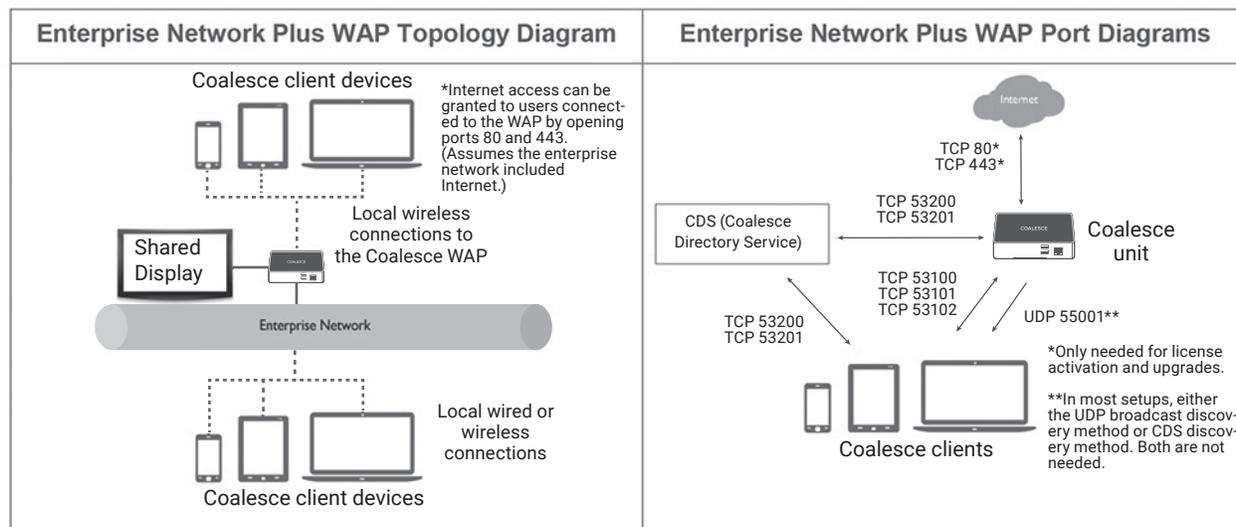


FIGURE 2-7. ENTERPRISE NETWORK PLUS WAP DEPLOYMENT DIAGRAMS

SETUP AND CONFIGURE YOUR COALESCE UNITS

1. Pre-configure your Coalesce based on the setup instructions in Section 1.3, Initial Setup.

NOTE: This network configuration option requires the Wired + WiFi network mode be selected/configured.

2. Repeat step 1 for each of the Coalesce units that will be deployed.

3. Deploy Coalesce units to their locations, and attach the Coalesce units to the in-room displays via video cables. Next, connect the Coalesce units to the existing network via Ethernet, and configure the units' SSIDs.

NOTE: This network configuration will most likely not support broadcast display discovery for network users. Instead, you can deploy Coalesce Directory Service (CDS) to enable network users to discover/see and click-to-connect to displays without entering the display's IP address each time.

Users who connect via WAP will always discover/see the display SSID they connect to, and they will be able to click-to-connect without the use of CDS or any additional configuration required.

See Section 2.8, Setup Displays Near You for how to configure CDS for your Coalesce units.

DON'T FORGET TO NAME YOUR DISPLAYS!

Display names are the easiest way for your users to identify and connect to your displays without having to type an IP address each time. Beyond your network configuration, be sure you designate display names and the other options available in the Configuration Panel. See Configuring a Coalesce Display in the Coalesce User Guide for full details about configuration options.

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2.8 SET UP DISPLAYS NEAR YOU

“Display Discovery” refers to the ability for a client device on the network to “discover” what displays are available for connection, the display security setting, and if the display is in use. Although discovery may require some initial configuration, it provides users with an intuitive and simple method of connecting to displays as they move throughout the enterprise.

2.8.1 NO DISCOVERY

Even with no discovery method configured, users can still connect to Coalesce displays on the network by entering the display’s IP address into the connect screen of the client device.

Recommended for:

Networks that do not allow UDP broadcast. Users can open clients in their web browser by typing the IP address shown on the screen. Without discovery enabled, users will be required to enter an IP address each time to connect.

How to Setup:

1. Make sure UDP broadcast is disabled by accessing the Coalesce configuration panel. To do so, browse to the Coalesce unit’s IP address when connected to the same network as the Coalesce and select “configure” in the bottom left corner of the screen. The configuration panel settings can also be accessed from the Coalesce display by using a USB mouse connected to the Coalesce and clicking the Coalesce icon in the bottom right corner of the display interface, then “System” and “Configure.”
2. On the Display tab, under the Naming and Discovery heading, uncheck the box labeled “Broadcast display name on the network.”
3. Ensure the “Host IP Address” option is selected so users will see the display’s IP address on the display in the room in order to connect (or you must provide users with the display’s IP address in some other way to enable connection).

2.8.2 THE BLACK BOX RECOMMENDED METHOD: COALESCE DIRECTORY SERVICE (CDS)

Coalesce Directory Service (CDS) is a lightweight network application for display discovery, enabling client devices on the network to “see” the Coalesce displays available for connection. CDS provides users the easiest method for display discovery and requires only a simple, one-time setup on the network side. If the CDS IP address is set on your displays, when users launch their client from a browser window, that client will also have the CDS address set. This means that once a user gets a client on your network, they will now be able to see a list of all displays on the network for connection.

Recommended for:

Networks that do not allow UDP broadcast and networks that include switches or multiple subnets. Users enter the CDS IP address one time only and subsequent use of the client will show all displays available for connection.

How to Setup:

1. Download the Coalesce Directory Service (CDS) software from the Black Box website: www.blackbox.com.
2. Install CDS on a Windows 7, Windows 8, Windows 9, or Windows 10 machine—or a VM—on the same network as your Coalesce units.

NOTE: CDS can serve Coalesce units on multiple/different subnets where necessary routes exist to all subnets for CDS traffic.

3. To point the Coalesce units to the CDS, first access the configuration panel for your Coalesce units by browsing to the Coalesce units’ IP addresses and selecting “configure.” The configuration panel settings can also be accessed from the Coalesce display interface by clicking the Coalesce icon in the bottom right corner.



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4. On the Display tab, under the Naming and Discovery heading, enter the IP address of the CDS computer in the field labeled "Primary CDS host."
5. If your network includes multiple subnets, open port 53200 and 53201 between them for discovery among the subnets.
6. USERS: Instruct users to enter the CDS IP address in the settings menu of the Coalesce app on their client devices. The CDS IP address can be found under the Network tab > Naming and Discovery in the Coalesce unit's configuration panel.

2.8.3 UNIVERSAL CDS OVERRIDE WITH A DNS ENTRY

With CDS installed, configuring DNS will enable users to view and select displays available for connection without entering the CDS IP address on their client device. Furthermore, any client, including clients downloaded from the app store for mobile devices, will see Coalesce enabled displays as soon as they join the network. This can override the CDS IP address if one has been entered previously on the client device, so guest users who may also be using Coalesce on their home network, will still see your Coalesce displays, even if they have configured CDS on their device for a different network in the past.

Recommended for:

Networks with switches and/or multiple subnets. Coalesce collaborators with different network access. Users are not required to enter an IP address to connect.

How to Setup:

Add a DNS entry to resolve the CDS IP address to its URL. Use one of the two methods below. Please refer to the CDS Reference Guide from the <http://www.blackbox.com> for more details about the DNS entry options.

- ♦ Method 1. Create a "Coalesce_customer_internal" domain zone and add an "A" record that maps the name 'Coalescedirectoryservice.Coalesce_customer_internal' to the IP address of the machine where the CDS is installed.
- ♦ Method 2. Coalescedirectoryservice is an unqualified host name because it does not include a domain name such as "blackbox.com" "university.edu." By leaving off the domain name, we allow the client operating system the option of appending the local domain name. This allows the IT department to add an CDS record to their name (e.g. university.edu). This method requires your internal DHCP servers to append the appropriate suffix.

2.8.4 BROADCAST DISCOVERY

Coalesce can use UDP broadcast packets to automatically populate client devices with a list of Coalesce displays on the network to connect to. Broadcast discovery is enabled by default when the Coalesce is deployed off-network in WAP mode.

Recommended for:

Dedicated network configurations and small single network configurations that do not use a switch. Users will not be required to enter an IP address to connect.

How to Setup:

1. Access the configuration panel for your Coalesce units by browsing to the Coalesce units IP address(es) and selecting "configure." The configuration panel settings can also be accessed from Coalesce display interface by clicking the Coalesce icon in the bottom right corner.
2. On the Display tab under the Naming and Discovery heading, enable the option to "Broadcast display name on the network."

APPENDIX A: COALESCE PORT DIAGRAM

The Coalesce Port Diagram shows the ports the Coalesce uses to communicate with different components over your network. Port diagrams corresponding to the unique network deployment options are provided on Sections 2.1 through 2.7 of this document. Below is the Master Coalesce Port Diagram, denoting all the ports the Coalesce uses.

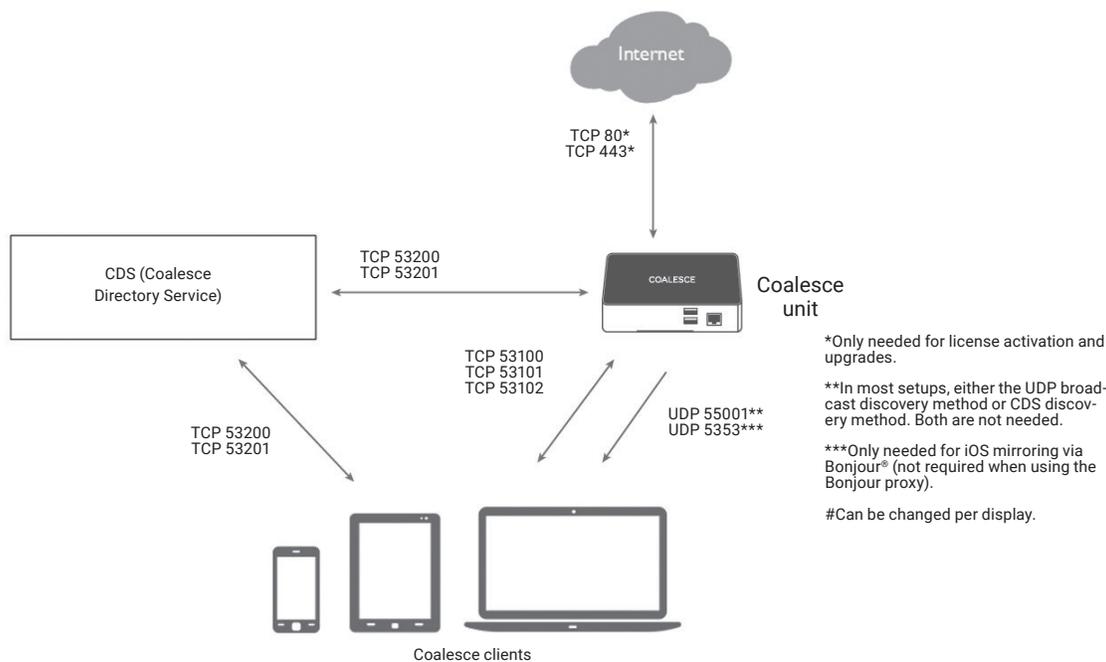


FIGURE A-1. MASTER COALESCE PORT DIAGRAM

***Inbound AirPlay® traffic to the Coalesce unit should be allowed on TCP 6000–7000, 7100, 47000, and 47010, as well as UDP 6000–7000 and 7011. AirPlay traffic inbound to the Coalesce client devices on TCP 7001 should also be allowed.

APPENDIX B: ENABLE IOS SHARING ON YOUR NETWORK

The Coalesce supports sharing for iOS devices with AirPlay® functionality (iOS 6 and higher). Mirroring is achieved through the device's native AirPlay feature. You can allow iOS users to mirror their devices to the Coalesce display with some network configuration.

There are two network setup options that will enable mirroring with AirPlay® on the network. For networks that allow UDP multicast traffic and Apple's Bonjour protocol, mirroring should be accomplished using Setup 1 below. For networks that do not allow UDP multicast traffic and/or Apple's Bonjour protocol, follow the steps for Setup 2 below.

Setup 1: Enable iOS mirroring with Bonjour®

The Bonjour protocol is required. Bonjour is a multi-cast protocol developed by Apple for device discovery.* Bonjour is packaged with the Coalesce, so no separate Bonjour install is required.

Create network firewall/antivirus exceptions for Bonjour traffic as needed. Network firewall and antivirus system exceptions must be created to allow Bonjour traffic through to the Coalesce.**

* Bonjour, as a multicast technology, uses broadcast packets across the network. Bonjour packets typically will not cross subnets or VLANs.

** The multicast port Bonjour uses is UDP 5353. There are several wireless technologies designed to minimize network impact of traffic from multicast technologies like Bonjour, including Aruba Airgroup, Cisco Bonjour Gateway...etc. Refer to the specific manufacturers for more information.

Setup 2: Enable iOS mirroring when Bonjour and/or multicast traffic is not allowed

Enable AirPlay® Proxy Discovery. The "Enable AirPlay Proxy Discovery" feature should be enabled in the Coalesce Configuration Panel or Coalesce Central.

Create network firewall/antivirus exceptions and open network ports to allow AirPlay traffic. To enable iOS mirroring, AirPlay® traffic must be allowed on the network –by opening the network ports required for AirPlay protocols—as well as through any network firewalls and/or antivirus systems—by creating exceptions.***

***Inbound AirPlay traffic to the Coalesce should be allowed on TCP 7000, 7100, 47000, 1678, 1682, 1686, and 1690, as well as UDP 1679-1693 (unicast). AirPlay traffic inbound to the Coalesce client devices on TCP 7001 should also be allowed. Not all deployments and configurations will require all of these ports/routes to be open. If you need assistance or have questions about setting up iOS mirroring, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com.

APPENDIX C: DISCLAIMER/TRADEMARKS

C.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

C.2 TRADEMARKS USED IN THIS MANUAL

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