SonicOS 7

Match Objects

Administration Guide

SONICWALL®

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1

Zones

A zone is a logical grouping of one or more interfaces designed to make management, such as the definition and application of Access Rules, a simpler and more intuitive process than following strict physical interface scheme. Zone-based security is a powerful and flexible method of managing both internal and external network segments, allowing the administrator to separate and protect critical internal network resources from unapproved access or attack.

A network security zone is simply a logical method of grouping one or more interfaces with friendly, user-configurable names, and applying security rules as traffic passes from one zone to another zone. Security zones provide an additional, more flexible, layer of security for the firewall. With the zone-based security, the administrator can group similar interfaces and apply the same policies to them, instead of having to write the same policy for each interface. For more information on configuring interfaces, see **Network > Interfaces**.

SonicOS zones allows you to apply security policies to the inside of the network. This allows you to do this by organizing network resources to different zones, and allowing or restricting traffic between those zones. This way, access to critical internal resources, such as payroll servers or engineering code servers, can be strictly controlled.

Zones also allow full exposure of the NAT table to allow you control over the traffic across the interfaces by controlling the source and destination addresses as traffic crosses from one zone to another. This means that NAT can be applied internally, or across VPN tunnels, which is a feature that users have long requested. Firewalls can also drive VPN traffic through the NAT policy and zone policy, because VPNs are now logically grouped into their own VPN zone.

Topics:

- How Zones Work
- Predefined Zones
- Security Types
- Allow Interface Trust
- Enabling SonicWall Security Services on Zones

How Zones Work

An easy way to visualize how security zones work is to imagine a large new building, with several rooms inside the building, and a group of new employees that do not know their way around the building. This building has one or more exits, which can be thought of as the WAN interfaces. The rooms within the building have one or more doors, which can be thought of as interfaces. These rooms can be thought of as zones inside each room are a number of people. The people are categorized and assigned to separate rooms within the building. People in each room going to another room or leaving the building, must talk to a door person on the way out of each room. This door person is the inter-zone/intra-zone security policy, and the door person's job to consult a list and make sure that the person is allowed to go to the other room, or to leave the building. If the person is allowed (for example, the security policy allows them in), they can leave the room through the door (the interface).

Upon entering the hallway, the person needs to consult with the hallway monitor to find out where the room is, or where the door out of the building is located. This hallway monitor provides the routing process because the monitor knows where all the rooms are located, and how to get in and out of the building. The monitor also knows the addresses of any of the remote offices, which can be considered the VPNs. If the building has more than one entrance/exit (WAN interfaces), the hallway monitor can direct people to use the secondary entrance/exit, depending upon how they have been told to do so (for example, only in an emergency, or to distribute the traffic in and out of the entrance/exits). This function can be thought of as WAN Load Balancing.

There are times that the rooms inside the building have more than one door, and times when there are groups of people in the room who are not familiar with one another. In this example, one group of people uses only one door, and another group uses the other door, even though groups are all in the same room. Because they also do not recognize each other, in order to speak with someone in another group, the users must ask the door person (the security policy) to point out which person in the other group is the one with whom they wish to speak. The door person has the option to not let one group of people talk to the other groups in the room. This is an example of when zones have more than one interface bound to them, and when intra-zone traffic is not allowed.

Sometimes, people want to visit remote offices, and people might arrive from remote offices to visit people in specific rooms in the building. These are the VPN tunnels. The hallway and doorway monitors check to see if this is allowed or not, and allow traffic through. The door person can also elect to force people to put on a costume before traveling to another room, or to exit, or to another remote office. This hides the true identity of the person, masquerading the person as someone else. This process can be thought of as the NAT policy.

Predefined Zones

ⓘ | **NOTE:** The predefined zones on your firewall depend on the device.

The predefined security zones on the SonicWall Security Appliance are not modifiable:

This zone	Has this function
DMZ	Normally used for publicly accessible servers and can consist of one to four interfaces, depending on your network design.
LAN	Cn consist of multiple interfaces, depending on your network design. Even though each interface has a different network subnet attached to it, when grouped together, they can be managed as a single entity.
MGMT	Used for appliance management and includes only the MGMT interface. Interfaces in other zones can also be enabled for SonicOS management, but the MGMT zone/interface provides the added security of a separate zone just for management.
MULTICAST	Provides support for IP multicasting, which is a method for sending IN packets from a single source simultaneously to multiple hosts.

SSLVPN	Used for secure remote access using the SonicWall NetExtender client.
VPN	A virtual zone used for simplifying secure, remote connectivity.
WLAN	Provides support to SonicWall SonicPoints and SonicWaves. When assigned to the Opt port, it enforces SonicPoint Enforcement, automatically dropping all packets received from non-SonicPoint devices. The WLAN zone supports: • Discovery Protocol (SDP) to automatically poll for and identify attached SonicPoints and SonicWaves • SonicWall Simple Provisioning Protocol to configure SonicPoints and SonicWaves using profiles • Wireless and guest service configurations
WAN	Can consist of multiple interfaces. If you are using the Security Appliance's WAN failover capability, you need to add the second Internet interface to the WAN zone.

NOTE: Even though you can group interfaces together into one security zone, this does not preclude you from addressing a single interface within the zone.

Security Types

NOTE: The security type of a zone depend on the device.

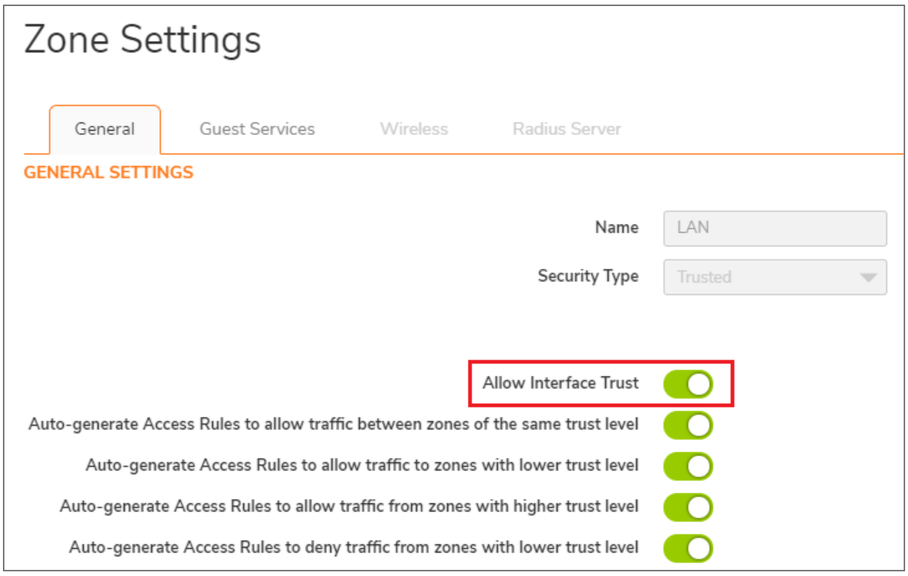
Each zone has a security type, which defines the level of trust given to that zone:

Trusted	Provides the highest level of trust—meaning that the least amount of scrutiny is applied to traffic coming from trusted zones. Trusted security can be thought of as being on the LAN (protected) side of the Security Appliance. The LAN zone is always Trusted.
Management	Unique to the MGMT zone and MGMT interface and also provides the highest level of trust.
Encrypted	Used exclusively by the VPN and SSLVPN zones. All traffic to and from an Encrypted zone is encrypted.
Wireless	Applied to the WLAN zone or any zone where the only interface to the network consists of SonicWall SonicPoint and SonicWave devices. Wireless security type is designed specifically for use with SonicPoints and SonicWaves. Placing an interface in a Wireless zone activates SDP (SonicWall Discovery Protocol) and SSPP (SonicWall Simple Provisioning Protocol) on that interface for automatic discovery and provisioning of SonicPoints and SonicWaves. Only traffic that passes through a SonicPoint or SonicWaveis allowed through a Wireless zone; all other traffic is dropped.
Public	Offers a higher level of trust than an Untrusted zone, but a lower level of trust than a Trusted zone. Public zones can be thought of as being a secure area between the LAN (protected) side of the Security Appliance and the WAN (unprotected) side. The DMZ, for example, is a Public zone because traffic flows from it to both the LAN and the WAN. By default, traffic from DMZ to LAN is denied, but traffic from LAN to ANY is allowed. This means only LAN-initiated connections have traffic between DMZ and LAN. The DMZ only has default access to the WAN, not the LAN.

Untrusted	Represents the lowest level of trust. It is used by both the WAN and the virtual Multicast zone. An Untrusted zone can be thought of as being on the WAN (unprotected) side of the Security Appliance. By default, traffic from Untrusted zones is not permitted to enter any other zone type without explicit rules, but traffic from every other zone type is permitted to Untrusted zones.

Allow Interface Trust

The **Allow Interface Trust** setting in the **Add Zone** dialog automates the creation of Access Rules to allow traffic to flow between the interface of a zone instance. For example, if the LAN zone has both the **LAN** and **X3** interfaces assigned to it, checking **Allow Interface Trust** on the LAN zone creates the necessary Access Rules to allow hosts on these interfaces to communicate with each other.



GENERAL SETTINGS

Name: LAN

Security Type: Trusted

Allow Interface Trust ●

Auto-generate Access Rules to allow traffic between zones of the same trust level ●

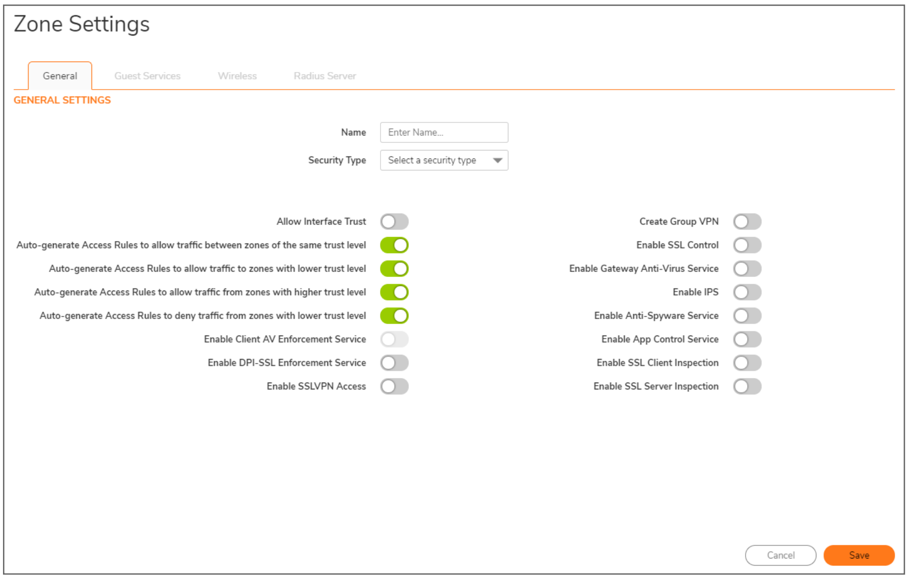
Auto-generate Access Rules to allow traffic to zones with lower trust level ●

Auto-generate Access Rules to allow traffic from zones with higher trust level ●

Auto-generate Access Rules to deny traffic from zones with lower trust level ●

Enabling SonicWall Security Services on Zones

You can enable SonicWall Security Services for traffic across zones. For example, you can enable SonicWall Intrusion Prevention Service for incoming and outgoing traffic on the WLAN zone to add more security for internal network traffic. You can enable these SonicWall Security Services on zones:



Name: Enter Name...

Security Type: Select a security type

Allow Interface Trust ○

Auto-generate Access Rules to allow traffic between zones of the same trust level ●

Auto-generate Access Rules to allow traffic to zones with lower trust level ●

Auto-generate Access Rules to allow traffic from zones with higher trust level ●

Auto-generate Access Rules to deny traffic from zones with lower trust level ●

Enable Client AV Enforcement Service ○

Enable DPI-SSL Enforcement Service ○

Enable SSLVPN Access ○

Create Group VPN ○

Enable SSL Control ○

Enable Gateway Anti-Virus Service ○

Enable IPS ○

Enable Anti-Spyware Service ○

Enable App Control Service ○

Enable SSL Client Inspection ○

Enable SSL Server Inspection ○

Enable SSLVPN Access	Enables SSLVPN secure remote access on the zone.
Enable SSL Control	Enables SSL Control on the zone. All new SSL connections initiated from that zone are now subject to inspection. SSL Control must first be enabled globally **Policy > Firewall > SSL Control**. For more information about SSL Control, see *SonicOS 7 Security Configuration*.
Create Group VPN	Creates a Group VPN policy for the zone, which is displayed in the VPN Policies table on **Network > SSL VPN > Server Settings**. You can customize the GroupVPN policy on **Network > SSL VPN > Server Settings**. If you have unselected **Create Group VPN**, the Group VPN policy is removed from **Network > SSL VPN > Server Settings**. For more information about creating VPN policies, see *SonicOS 7 Connectivity*.
Enable Gateway Anti-Virus Service	Enforces gateway anti-virus protection on multiple interfaces in the same Trusted and Public security types for WLAN zones.
Enable IPS	Enforces intrusion detection and prevention on multiple interfaces in the same Trusted and Public security types for WLAN zones.
Enable Anti-Spyware Service	Enforces anti-spyware detection and prevention on multiple interfaces in the same Trusted and Public security types for WLAN zones.
Enable App Control Service	Enforces application control policy services on multiple interfaces in the same Trusted and Public security types for WLAN zones.
Enable SSL Client Inspection	Enables granular DPI-SSL on a per-zone basis rather than globally for DPI-SSL clients.
Enable SSL Server Inspection	Enable granular DPI-SSL on a per-zone basis rather than globally for DPI-SSL servers.

Effect of Wireless and Non-Wireless Controller Modes

Topics:

- Effects of Enabling Non-Wireless Controller Mode
- Effects of Enabling Wireless Controller Mode

Effects of Enabling Non-Wireless Controller Mode

Enabling Non-Wireless Controller Mode affects the **Object > Match Objects > Zones** page. Attempts to enable or delete the affected features are denied.

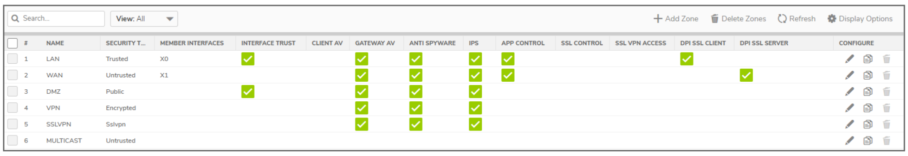
- The **Edit** and **Delete** icons for wireless zones become dimmed on the **Object > Match Objects > Zones** page.
- Internal wireless zones are disabled.

Effects of Enabling Wireless Controller Mode

Enabling Wireless Controller Mode affects the **Object > Match Objects > Zones** page. Attempts to enable or delete the affected features are denied.

- The **Edit** and **Delete** icons for VPN and SSL VPN zones become dimmed on the **Object > Match Objects > Zones** page.
- Any attempt to enable a zone with VPN and/or SSL VPN results in an error.

Match Objects > Zones



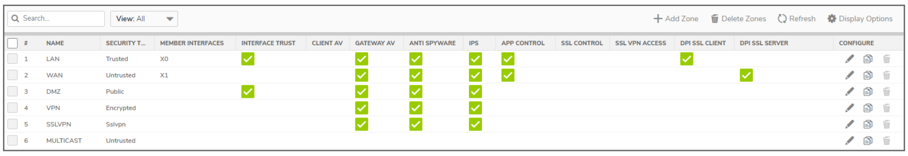
□	#	NAME	SECURITY T...	MEMBER INTERFACES	INTERFACE TRUST	CLIENT AV	GATEWAY AV	ANTI SPYWARE	IPS	APP CONTROL	SSL CONTROL	SSL VPN ACCESS	DPI SSL CLIENT	DPI SSL SERVER	CONFIGURE
□	1	LAN	Trusted	X0	✓		✓	✓	✓	✓			✓		✎ ⧉ 🗑
□	2	WAN	Untrusted	X1			✓	✓	✓	✓				✓	✎ ⧉ 🗑
□	3	DMZ	Public		✓		✓	✓	✓						✎ ⧉ 🗑
□	4	VPN	Encrypted				✓	✓	✓						✎ ⧉ 🗑
□	5	SSLVPN	Sslvpn				✓	✓	✓						✎ ⧉ 🗑
□	6	MULTICAST	Untrusted												✎ ⧉ 🗑

Topics:

- The Zone Settings Table
- Adding a New Zone
- Configuring a Zone for Guest Access
- Configuring a Zone for Open Authentication and Social Login
- Configuring a Zone for Captive Portal Authentication with RADIUS
- Configuring a Zone for Customized Policy Message
- Configuring a Zone for Customized Login Page
- Configuring the WLAN Zone
- Deleting a Zone

The Zone Settings Table

The **Zone Settings** table displays a listing of all the SonicWall Security Appliance's default predefined zones as well as any zones you create. The table displays the following status information about each zone configuration:



□	#	NAME	SECURITY T...	MEMBER INTERFACES	INTERFACE TRUST	CLIENT AV	GATEWAY AV	ANTI SPYWARE	IPS	APP CONTROL	SSL CONTROL	SSL VPN ACCESS	DPI SSL CLIENT	DPI SSL SERVER	CONFIGURE
□	1	LAN	Trusted	X0	✓		✓	✓	✓	✓			✓		
□	2	WAN	Untrusted	X1			✓	✓	✓	✓				✓	
□	3	DMZ	Public		✓		✓	✓	✓						
□	4	VPN	Encrypted				✓	✓	✓						
□	5	SSLVPN	Sslvpn				✓	✓	✓						
□	6	MULTICAST	Untrusted												

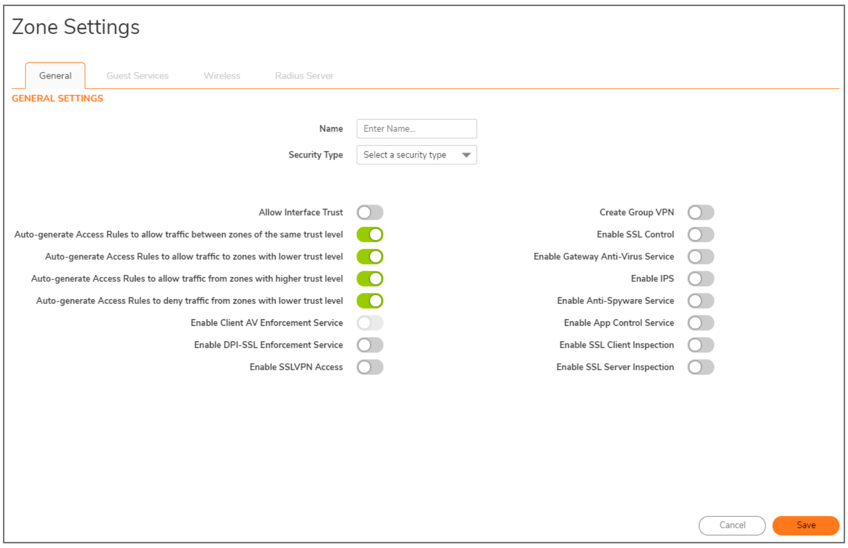
Name	Name of the zone. The predefined **LAN**, **WAN**, **WLAN**, **VPN**, **SSLVPN**, **MGMT**, **MULTICAST**, and **Encrypted** zone names cannot be changed.
Security Type	Security type: **Trusted**, **Untrusted**, **Public**, **Wireless**, or **Encrypted**.
Member Interfaces	Interfaces that are members of the zone.
Interface Trust	Check mark indicates the **Allow Interface Trust** setting is enabled for the zone.
Client AV	Check mark indicates SonicWall Client Anti-Virus is enabled for traffic coming in and going out of the zone. SonicWall Client Anti-Virus manages an anti-virus client application on all clients on the zone.
Client CF	Check mark indicates Client Content Filtering services are enabled.
Gateway AV	Check mark indicates SonicWall Gateway Anti-Virus is enabled for traffic coming in and going out of the zone. SonicWall Gateway Anti-Virus manages the anti-virus service on the firewall.
Anti-Spyware	Check mark indicates SonicWall Anti-Spyware detection and prevention is enabled for traffic through interfaces in the zone.
IPS	Check mark indicates SonicWall Intrusion Prevention Service is enabled for traffic coming in and going out of the zone.
App Control	Check mark indicates App Control Service is enabled for traffic coming in and going out the zone.
SSL Control	Check mark indicates SSL Control is enabled for traffic coming in and going out the zone. All new SSL connections initiated from that zone is now subject to inspection.
SSL VPN Access	Check mark indicates SSL VPN secure remote access is enabled for traffic

	coming in and going out the zone.
DPI-SSL Client	Check mark indicates granular DPI-SSL on a per-zone basis rather than a global basis for DPI-SSL clients.
DPI-SSL Server	Check mark indicates granular DPI-SSL on a per-zone basis rather than global basis for DPI-SSL servers.
Comments	Mousing over the **Comment** icon displays the comment entered when the Zone was configured.
Configure	Clicking the **Edit** icon displays the Edit Zone dialog. Clicking the **Delete** icon deletes the zone. The delete icon is dimmed for the predefined zones; you cannot delete these zones.

Adding a New Zone

To add a new zone:

1. Navigate to **Object > Match Objects > Zones**.
2. Click the **Add** icon.



Name: Enter Name...

Security Type: Select a security type

Allow Interface Trust	○	Create Group VPN	○
Auto-generate Access Rules to allow traffic between zones of the same trust level	●	Enable SSL Control	○
Auto-generate Access Rules to allow traffic to zones with lower trust level	●	Enable Gateway Anti-Virus Service	○
Auto-generate Access Rules to allow traffic from zones with higher trust level	●	Enable IPS	○
Auto-generate Access Rules to deny traffic from zones with lower trust level	●	Enable Anti-Spyware Service	○
Enable Client AV Enforcement Service	○	Enable App Control Service	○
Enable DPI-SSL Enforcement Service	○	Enable SSL Client Inspection	○
Enable SSLVPN Access	○	Enable SSL Server Inspection	○

3. Type a name for the new zone in the **Name** field.
4. From **Security Type**, select:

Trusted	Zones with the highest level of trust, such as internal LAN segments.
Public	Zones with a lower level of trust requirements, such as a DMZ interface.
Wireless	WLAN interface.
SSLVPN	Interfaces on which Content Filtering, Client AV enforcement, and Client CF services are enabled. ⓘ **NOTE:** Selecting this security type disables the **Enable SSLVPN Access** and **Create Group VPN** options on this dialog.

5. To allow intra-zone communications, select **Allow Interface Trust**. An Access Rule allowing traffic to flow between the interfaces of a Zone instance is created automatically. This option is selected by default.
6. To have SonicOS automatically generate access rules to allow traffic between this zone and other zones of equal trust, select **Auto-generate Access Rules to allow traffic between zones of the same trust level**. For example, *CUSTOM_LAN -> CUSTOM _LAN or CUSTOM_LAN -> LAN*. This option is selected by default.

   ⓘ | **NOTE:** For this option and the following Access Rules options, see *SonicOS Policies* for information about Access Rules.
7. To have SonicOS automatically generate access rules to allow traffic between this zone and other zones of lower trust, select **Auto-generate Access Rules to allow traffic to zones with lower trust level**. For example, *CUSTOM_LAN -> WAN or CUSTOM_LAN -> DMZ*. This option is selected by default.
8. To have SonicOS automatically generate access rules to allow traffic between this zone and other zones of higher trust, select **Auto-generate Access Rules to allow traffic from zones with higher trust level**. For example, *LAN -> CUSTOM_DMZ or CUSTOM_LAN -> CUSTOM_DMZ*. This option is selected by default.
9. To have SonicOS automatically generate access rules to deny traffic between this zone and zones of lower trust, select **Auto-generate Access Rules to deny traffic from zones with lower trust level**. For example, *WAN -> CUSTOM_LAN* or *DMZ -> CUSTOM_LAN*. This option is selected by default.
10. To enforce managed Client Anti-Virus protection on clients connected to multiple interfaces in the same Trusted, Public, or WLAN zones using the Client Anti-Virus client on your network hosts, select **Enable Client AV Enforcement Service**. This option is not selected by default.

    ⓘ | **NOTE:** This option is dimmed and unavailable until you select a security type from Security Type. For this option and the following Security Services options, see *SonicOS Security Configuration* for more information about these services.
11. To enforce enhanced NGAV (Next Generation AV) such as DPI-SSL Enforcement or SentinelOne AV enforcement, select **Enable DPI-SSL Enforcement Service**. This option is not selected by default. For more information about NGAV, see *SonicOS Security Configuration*.
12. To enable SSLVPN secure remote access on the zone, select **Enable SSLVPN Access**. This option is not selected by default.

    ⓘ | **NOTE:** This option is dimmed if **SSLVPN** is selected for **Security Type**.
13. To create a SonicWall Group VPN Policy for this zone automatically, select **Create Group VPN**. You can customize the Group VPN Policy in **Network > SSLVPN > Server Settings**. This option is not selected by default. This option is available until SSLVPN is selected for Security Type, but after the Security Type is changed to one of the other types, it remains dimmed and unavailable.

    △ | **CAUTION: Disabling Create Group VPN removes any corresponding Group VPN policy.**

    ⓘ | **NOTE:** This option is dimmed if **SSLVPN** is selected for **Security Type**. For more information about connectivity options, see *SonicOS Connectivity* for more information.

    Disabling Group VPN for WAN/WLAN VPN policies, deletes all VPN policies. Re-enabling the Create Group VPN option automatically creates a new, enabled VPN policy. Disabling VPN policies globally does not also delete auto-rules. If you do not want to VPN polices at all, globally disable VPN, and then delete all policies that correlate with VPN.

    GroupVPN policies appear in the VPN Policies table located in **Network > SSLVPN > Server Settings**. WAN/WLAN GroupVPN policies are disabled by default when the firewall is booted with the factory default.

14. To enable SSL Control on the zone, select **Enable SSL Control**. All new SSL connections initiated from that zone are now subject to inspection. This option is not selected by default.

    ⓘ | **NOTE:** SSL Control must first be enabled globally on **Policy > Firewall > SSL Control**.
15. To enforce gateway anti-virus protection on your Security Appliance for all clients connecting to this zone, select **Enable Gateway Anti-Virus Service**. SonicWall Gateway Anti-Virus manages the anti-virus service on the Security Appliance. This option is not selected by default.
16. To enforce intrusion detection and prevention on multiple interfaces in the same Trusted, Public, or WLAN zones. select **Enable IPS**. This option is not selected by default.
17. To enforce anti-spyware detection and prevention on multiple interfaces in the same Trusted or Public security type for WLAN zones, select **Enable Anti-Spyware Service**. This option is not selected by default.
18. To enforce application control policy services on multiple interfaces in the same Trusted or Public security type for WLAN zones, select **Enable App Control Service**. This option is not selected by default. For more information about App Control, see *SonicOS Policies*.
19. To enable granular DPI-SSL on a per-zone basis rather than globally for DPI-SSL clients, select **Enable SSL Client Inspection**. This option is not selected by default.
20. To enable granular DPI-SSL on a per-zone basis rather than globally for DPI-SSL servers, select **Enable SSL Server Inspection**. This option is not selected by default.
21. Click **Save**. The new zone is now added to the Security Appliance.

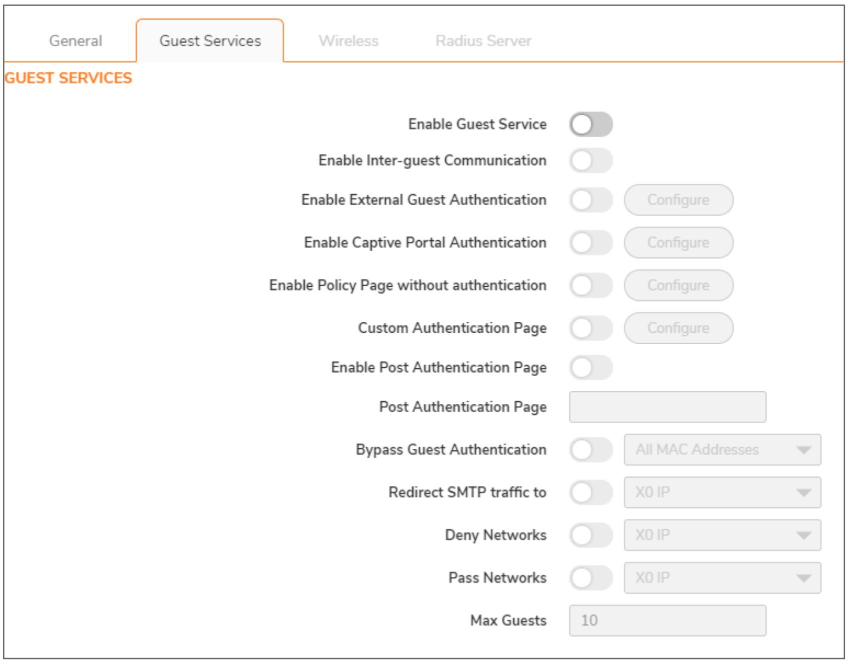
Configuring a Zone for Guest Access

ⓘ | **IMPORTANT:** You cannot configure an **Untrusted**, **Encrypted**, **SSL VPN**, or **Management** zone for guest access.

SonicWall User Guest Services provides an easy solution for creating wired and wireless guest passes and/or locked-down Internet-only network access for visitors or untrusted network nodes. This functionality can be extended to wireless or wired users on the WLAN, LAN, DMZ, or public/semi-public zone of your choice.

To configure Guest Services feature:

1. Navigate to **Object > Match Objects > Zones**.
2. Click **Edit** for the zone you wish to add Guest Services to. The **Zone Settings** dialog displays.
3. Click **Guest Services** tab.



General | Guest Services | Wireless | Radius Server

GUEST SERVICES

Enable Guest Service
Enable Inter-guest Communication
Enable External Guest Authentication — Configure
Enable Captive Portal Authentication — Configure
Enable Policy Page without authentication — Configure
Custom Authentication Page — Configure
Enable Post Authentication Page
Post Authentication Page
Bypass Guest Authentication — All MAC Addresses
Redirect SMTP traffic to — X0 IP
Deny Networks — X0 IP
Pass Networks — X0 IP
Max Guests — 10

4. Select **Enable Guest Services** option. All other options become available, but are not selected by default.

5. Select from the following configuration options for Guest Services:

Enable inter-guest communication	Allows guests to communicate directly with other users who are connected to this zone.
Enable External Guest Authentication	Requires guests connecting from the device or network you select to authenticate before gaining access. Selecting this option makes **Configure** available. ⓘ **NOTE:** When this option is selected, the following four options become dimmed and unavailable.
Enable Captive Portal Authentication	Allows you to create a customized login page with RADIUS authentication. Selecting this option makes **Configure** available. For information about configuring this option, see Configuring a Zone for Captive Portal Authentication with RADIUS.
Enable Policy Page without authentication	Directs users to a guest services usage policy page when they first connect to a SonicPoint or SonicWave in the WLAN zone. Guest users are authenticated by accepting the policy instead of providing a user name and password. Selecting this option makes **Configure** available. To set up an HTML customizable policy usage page, click **Configure**. For information about configuring this option, see Configuring a Zone for Customized Policy Message
Custom Authentication Page	Redirects users to a custom authentication page when they first connect to the network. Selecting this option makes **Configure** available. To set up the custom authentication page, click **Configure**. For information about configuring this option, see Configuring a Zone for Customized Login Page.

Enable Post Authentication Page	Directs users to the specified page immediately after successful authentication. Selecting this option makes **Post Authentication Page** field available.
Post Authentication Page	Enter a URL for the post-authentication page in the field.
Bypass Guest Authentication	Allows the Guest Services feature to integrate into environments already using some form of user-level authentication. This feature automates the authentication process, allowing wireless users unrestricted wireless Guest Services without requiring authentication. When selected, this option’s drop-down menu becomes available; select: • **All MAC Addresses** (default) • An Address Object • An Address Group • Create new MAC object ⓘ **NOTE:** This feature should only be used when unrestricted Guest Service access is desired, or when another device upstream is enforcing authentication.
Redirect SMTP traffic to	Redirects SMTP traffic incoming on this zone to an SMTP server you specify. When selected, this option’s drop-down menu becomes available; select: • An Address Object • Create new address object
Deny Networks	Blocks traffic to the networks you name. When selected, this option’s drop-down menu becomes available; select: • An Address Object • An Address Object group • Create new address object • Create new address object group
Pass Networks	Allows traffic through the Guest Service-enabled zone to the selected networks automatically. When selected, this option’s drop-down menu becomes available; select: • An Address Object • An Address Object group • Create new address object • Create new address object group
Max Guests	Specifies the maximum number of guest users allowed to connect to this zone. The minimum number is 1, the maximum number is 4500, and the default setting is **10**.

6. Click **Save** to apply these settings to this zone.

   ⓘ **NOTE:** For information about creating Address Objects and Address Object Groups, see SonicOS **Object > Match Objects > Addresses**.

Configuring a Zone for Open Authentication and Social Login

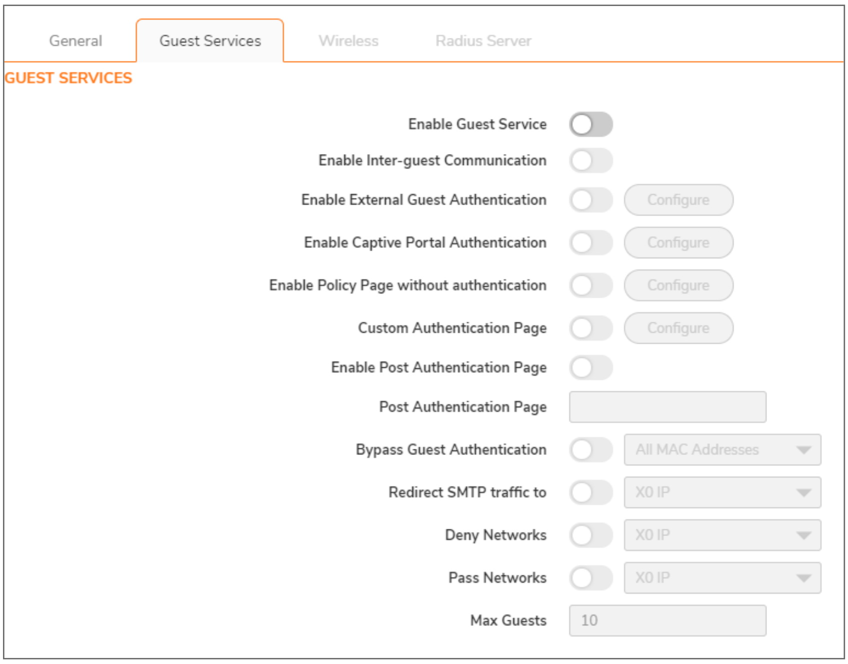
SonicOS supports Open Authentication (OAuth) and Social Login:

- Oauth assists users in sharing data between applications
- Social Login simplifies the login process for various social media

Configuring a Zone for Captive Portal Authentication with RADIUS

To configure captive portal authentication with RADIUS:

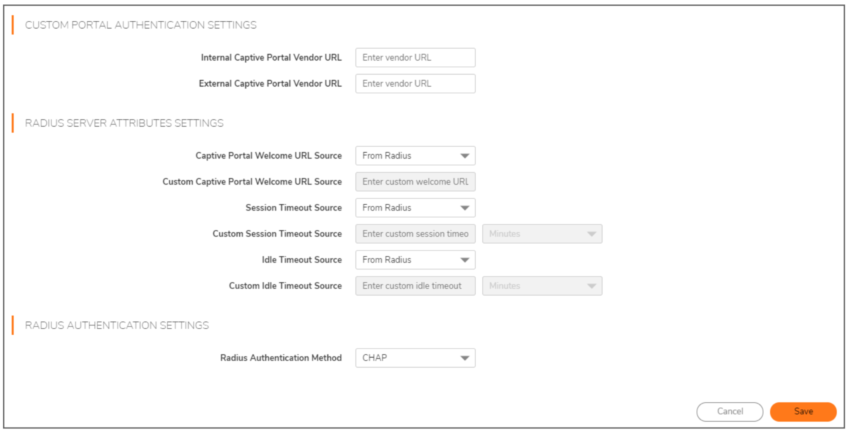
1. On the **Zone Settings** dialog, click **Guest Services** tab.



GUEST SERVICES

Enable Guest Service	○
Enable Inter-guest Communication	○
Enable External Guest Authentication	○
Enable Captive Portal Authentication	○
Enable Policy Page without authentication	○
Custom Authentication Page	○
Enable Post Authentication Page	○
Post Authentication Page	
Bypass Guest Authentication	○ All MAC Addresses
Redirect SMTP traffic to	○ X0 IP
Deny Networks	○ X0 IP
Pass Networks	○ X0 IP
Max Guests	10

2. Select **Enable Guest Services** option. The options become available.
3. Select **Enable Captive Portal Authentication**. **Configure** becomes available.
4. Click **Configure**.



CUSTOM PORTAL AUTHENTICATION SETTINGS

Internal Captive Portal Vendor URL: Enter vendor URL

External Captive Portal Vendor URL: Enter vendor URL

RADIUS SERVER ATTRIBUTES SETTINGS

Captive Portal Welcome URL Source: From Radius

Custom Captive Portal Welcome URL Source: Enter custom welcome URL

Session Timeout Source: From Radius

Custom Session Timeout Source: Enter custom session timeo | Minutes

Idle Timeout Source: From Radius

Custom Idle Timeout Source: Enter custom idle timeout | Minutes

RADIUS AUTHENTICATION SETTINGS

Radius Authentication Method: CHAP

5. In the **Custom Portal Authentication Settings** section:

   a. Enter the internal captive portal vendor's URL in the **Internal Captive Portal Vendor URl** field.

   b. Enter the external captive portal vendor's URL in the **External Captive Portal Vendor URl** field.

6. In the **Radius Server Attributes Settings** section:

   a. Select the source for the captive portal welcome URL from **Captive Portal Welcome URL Source**:

      - **From Radius** (default); go to *Step c*
      - **Custom**; the next option becomes available

   b. Enter the welcome URL in the **Custom Captive Portal Welcome URL** field.

   c. Select the source for the session timeout limit from **Session Timeout Source**:

      - **From Radius** (default); go to *Step f*
      - **Custom**; the next option becomes available

   d. Select the type of session timeout duration from **Custom Session Timeout**:

      - Minutes
      - Hours
      - Days (default)

   e. Enter the limit in the field.

   f. Select the source for the idle timeout from **Idle Timeout Source**:

      - From **Radius** (default); go to *Step 7*
      - **Custom**; the next option becomes available

   g. Select the type of idle timeout duration from **Custom Session Timeout**:

      - Minutes
      - Hours
      - Days (default)

   h. Enter the limit of the duration in the field.

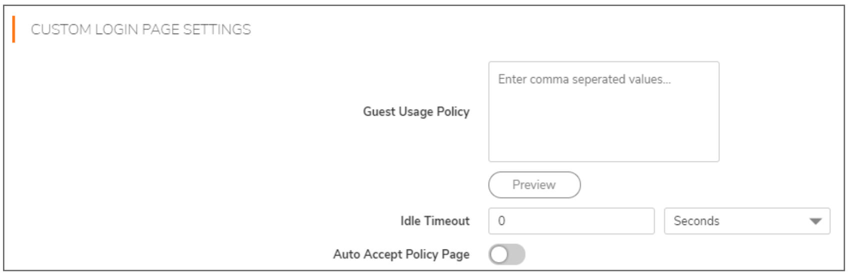
7. In the **Radius Authentication Settings** section, select the authentication method from **Radius Authentication Method**:

   - CHAP (default)
   - PAP – Encrypted
   - PAP – ClearText
8. Click **Save**.

Configuring a Zone for Customized Policy Message

To configure a customized policy message:

1. On the **Zone Settings** dialog, click **Guest Services** tab.
2. Select **Enable Guest Services** option. The options become available.
3. Select **Enable Policy Page without authentication**. **Configure** becomes available.
4. Click **Configure**.



CUSTOM LOGIN PAGE SETTINGS

Guest Usage Policy: Enter comma seperated values...

Idle Timeout: 0 Seconds

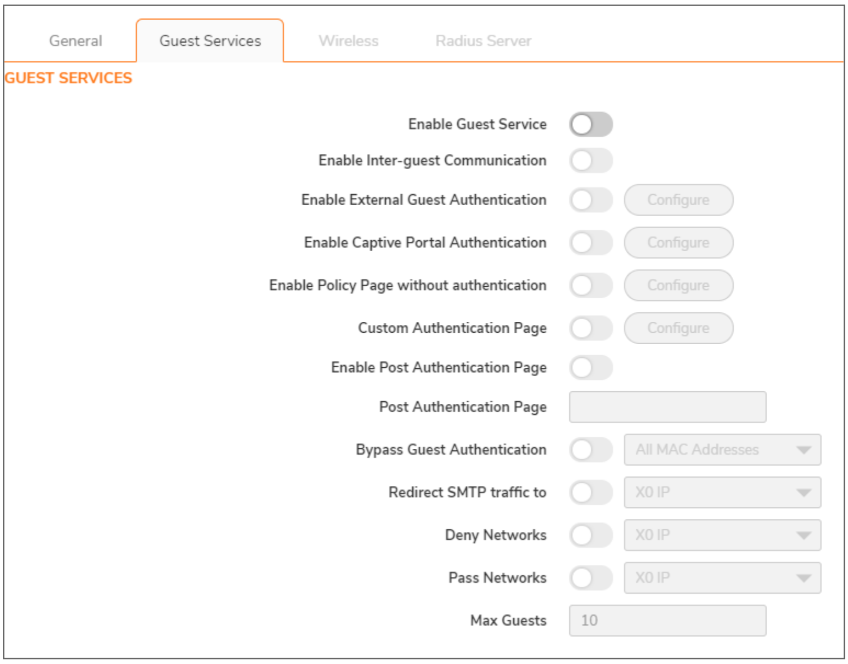
Auto Accept Policy Page: ○

5. Enter your policy for guest usage in the **Guest Usage Policy** field. The text may include HTML formatting.
6. To preview your policy message, click **Preview**.
7. To specify an idle timeout, enter the timeout value in the **Idle Timeout** field.
8. Select the type of timeout:
   - Seconds
   - Minutes (default)
   - Hours
   - Days
9. Select **Auto Accept Policy** Page. This option is not selected by default.
10. Click **Save**.

Configuring a Zone for Customized Login Page

To configure a customized login page:

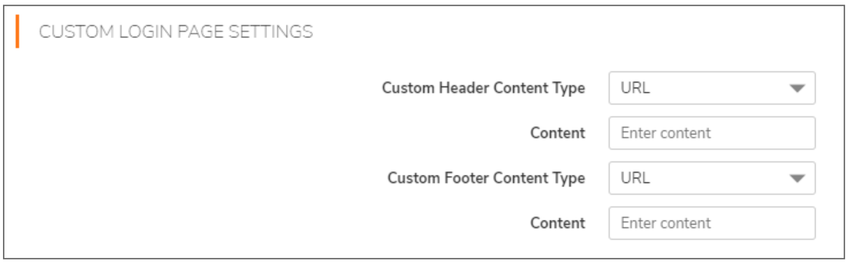
1. On the **Zone Settings** dialog, click **Guest Services** tab.



GUEST SERVICES

Enable Guest Service
Enable Inter-guest Communication
Enable External Guest Authentication
Enable Captive Portal Authentication
Enable Policy Page without authentication
Custom Authentication Page
Enable Post Authentication Page
Post Authentication Page
Bypass Guest Authentication: All MAC Addresses
Redirect SMTP traffic to: X0 IP
Deny Networks: X0 IP
Pass Networks: X0 IP
Max Guests: 10

2. Select **Enable Guest Services** option. The options become available.
3. Select **Custom Authentication Page** option.
4. Click **Configure** button.



CUSTOM LOGIN PAGE SETTINGS

Custom Header Content Type: URL
Content: Enter content
Custom Footer Content Type: URL
Content: Enter content

5. For **Custom Header Content Type**, select:
   - URL
   - Text
6. Enter the URL or Text in the **Content** field.
7. For **Custom Footer Content Type**, select:
   - URL
   - Text
8. Enter the URL or Text in the **Content** field.
9. Click **Save**.

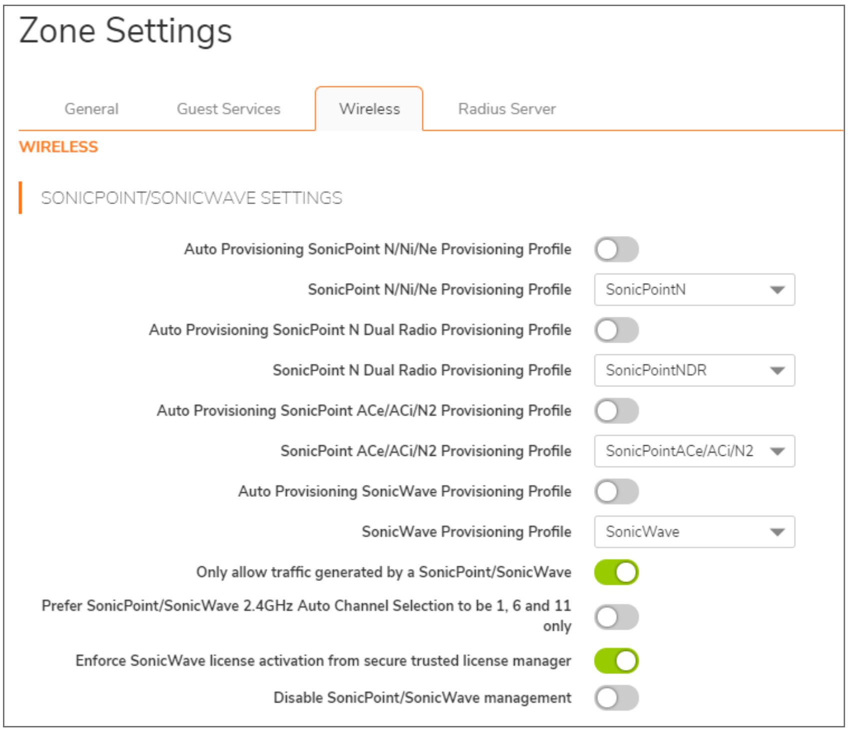
Configuring the WLAN Zone

To configure the WLAN zone:

1. Navigate to **Object > Match Objects > Zones**.
2. If you are configuring:
   - A new zone, click **Add**.
   - An existing zone, click the **Edit** icon for the WLAN zone.

   The **Zone Settings** dialog displays.

   > ⓘ **NOTE:** Depending on the zone, there also may be views available for **Guest Services**, **Wireless**, and **Radius Server**. How to configure the **General** view is described in Adding a New Zone.
3. If creating a new zone, select **Wireless** from **Security Type**. **Guest Services**, **Wireless**, and **Radius Server** appear.
4. To automate the creation of Access Rules to allow traffic to flow between the interfaces of a zone instance, select **Allow Interface Trust**. For example, if the LAN zone has both the LAN and X3 interfaces assigned to it, enabling **Allow Interface Trust** on the LAN zone creates the necessary Access Rules to allow hosts on these interfaces to communicate with each other. This option is not selected by default.
5. Click **Wireless** tab.



Zone Settings

General | Guest Services | Wireless | Radius Server

WIRELESS

SONICPOINT/SONICWAVE SETTINGS

Auto Provisioning SonicPoint N/Ni/Ne Provisioning Profile	○
SonicPoint N/Ni/Ne Provisioning Profile	SonicPointN
Auto Provisioning SonicPoint N Dual Radio Provisioning Profile	○
SonicPoint N Dual Radio Provisioning Profile	SonicPointNDR
Auto Provisioning SonicPoint ACe/ACi/N2 Provisioning Profile	○
SonicPoint ACe/ACi/N2 Provisioning Profile	SonicPointACe/ACi/N2
Auto Provisioning SonicWave Provisioning Profile	○
SonicWave Provisioning Profile	SonicWave
Only allow traffic generated by a SonicPoint/SonicWave	●
Prefer SonicPoint/SonicWave 2.4GHz Auto Channel Selection to be 1, 6 and 11 only	○
Enforce SonicWave license activation from secure trusted license manager	●
Disable SonicPoint/SonicWave management	○

6. In the **SonicPoint/SonicWave Settings** section, select the **SonicPoint/SonicWave Provisioning Profile** to apply to all SonicPoints/SonicWaves connected to this zone. Whenever a SonicPoint/SonicWave connects to this zone, it is provisioned automatically by the settings in the

SonicPoint/SonicWave Provisioning Profile, unless you have individually configured it with different settings. For information SonicPoint/SonicWave provisioning profiles, see *SonicOS Connectivity*Guide.

> ⓘ **NOTE:** For the Auto provisioning settings, optionally select **Auto provisioning** fields to allow SonicPoints/SonicWaves attached to the profile to be provisioned automatically when the profile is modified. This option is not selected by default.

7. Select the **SonicPointN/Ni/Ne Provisioning Profile** when you want to apply to all SonicPointN/Ni/Nes connected to this zone. Whenever a SonicPointN/Ni/Ne connects to this zone, it is automatically provisioned by the settings in the SonicPoint Provisioning Profile, unless you have individually configured it with different settings. The default provisioning profile is **SonicPointN**.
8. Select **SonicPoint N Dual Radio Provisioning Profile** when you want to apply to all SonicPointNDRs connected to this zone. Whenever a SonicPointNDR connects to this zone, it is automatically provisioned by the settings in the SonicPointNDR Provisioning Profile, unless you have individually configured it with different settings. The default provisioning profile is **SonicPointNDR**.
9. Select **SonicPointACe/ACi/N2 Provisioning Profile** when you want to apply to all SonicPointACe/ACi/N2s connected to this zone. Whenever a SonicPointACe/ACi/N2 connects to this zone, it is automatically provisioned by the settings in the SonicPointACe/ACi/N2 Provisioning Profile, unless you have individually configured it with different settings. The default provisioning profile is **SonicPointACe/ACi/N2**.
10. Select **SonicWave Provisioning Profile** when you want to apply to all SonicPointNDRs connected to this zone. Whenever a SonicPointNDR connects to this zone, it is automatically provisioned by the settings in the SonicPointNDR Provisioning Profile, unless you have individually configured it with different settings. The default provisioning profile is **SonicWave**.
11. Select **Only allow traffic generated by a SonicPoint/SonicWave** to allow only traffic from SonicWall SonicPoints to enter the WLAN zone interface. This allows maximum security of your WLAN. This option is selected by default. Clear this option if you want to allow any traffic on your WLAN zone regardless of whether the traffic is from a wireless connection.

    > ⓘ **TIP:** To allow any traffic on your WLAN zone regardless of whether it is from a wireless connection, clear **Only allow traffic generated by a SonicPoint / SonicPointN**.

    > ⓘ **NOTE:** For Guest Services configuration information, see Configuring a Zone for Guest Access. For RADIUS server configuration information, see Configuring the RADIUS Server.

12. Optionally, select **Prefer SonicPoint/SonicWave 2.4Hz Auto Channel Selection to be 1.6 and 11 only**. This option is not selected by default.

    > ⓘ **IMPORTANT:** Enable this option only when SonicPointN/AC 2.4Hz Auto Channel selection is preferred to be 1, 6, and 11.

13. Select **Enforce SonicWave license activation from secure trusted license manager**.

    > △ **CAUTION: This option enforces license activation from a secure trusted license manager; manual license keyset input is not allowed. Change this setting only under the direction of Technical Support.**

14. Select **Disable SonicPoint/SonicWave management** to disable all management capabilities on this WLAN.
15. To:

    - Configure the RADIUS server, go to Configuring the RADIUS Server.
    - Apply these settings to the WLAN zone, click **Save**.

Configuring the RADIUS Server

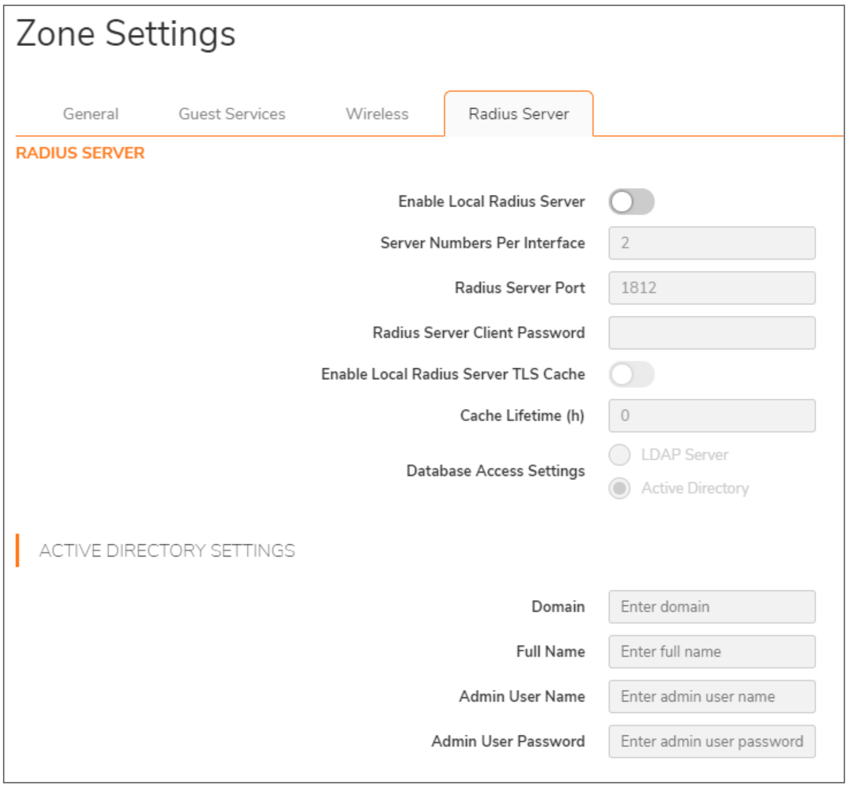
ⓘ | **NOTE:** The **Radius Server** tab is enabled or disabled based on the device.

To configure RADIUS server:

1. Navigate to **Object > Match Objects > Zones**.
2. If you are configuring:
    - A new zone, click **Add**.
    - An existing zone, click the **Edit** icon for the WLAN zone.

   The **Zone Settings** dialog displays.

   ⓘ | **NOTE:** Depending on the zone, there also may be views available for **Guest Services**, **Wireless**, and **Radius Server**. How to configure the **General** view is described in Adding a New Zone.
3. If creating a new zone, select **Wireless** from Security Type. **Guest Services**, **Wireless**, and **Radius Server** appear.
4. Click **Radius Server** tab.



Zone Settings

RADIUS SERVER

Enable Local Radius Server ○

Server Numbers Per Interface: 2

Radius Server Port: 1812

Radius Server Client Password:

Enable Local Radius Server TLS Cache ○

Cache Lifetime (h): 0

Database Access Settings: ○ LDAP Server ● Active Directory

ACTIVE DIRECTORY SETTINGS

Domain: Enter domain

Full Name: Enter full name

Admin User Name: Enter admin user name

Admin User Password: Enter admin user password

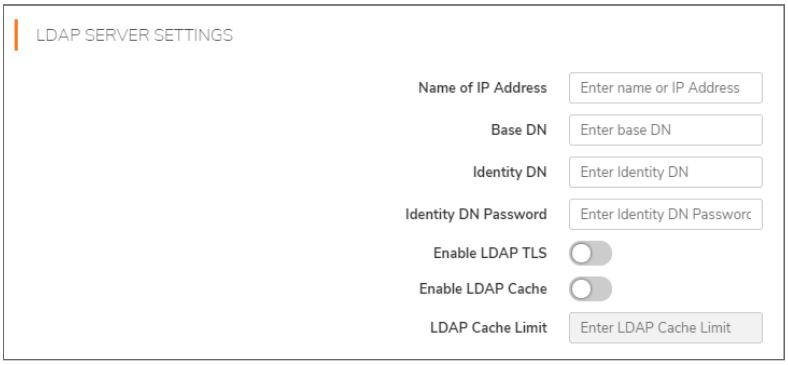
5. Select **Enable Local Radius Server**. The other options become available.
6. Enter the number of RADIUS servers numbers per interface in **Server Numbers Per Interface**. The minimum number is 1, the maximum is 512, and the default is **2**.
7. Enter the port for the RADIUS server in the **Radius Server Port** field. The default is **1812**.
8. Enter the password for the RADIUS client in the **Radius Client Password** field.

9. Optionally, select **Enable Local Radius Server TLS Cache** lifetime. This option is not selected by default. The **Cache Lifetime(h)** field becomes available.

   - Enter the lifetime, in hours, in the **Cache Lifetime(h)** field. The minimum and default is **1** hour; the maximum is 99999 hours.

10. Choose the database access method from **Database Access Settings**:

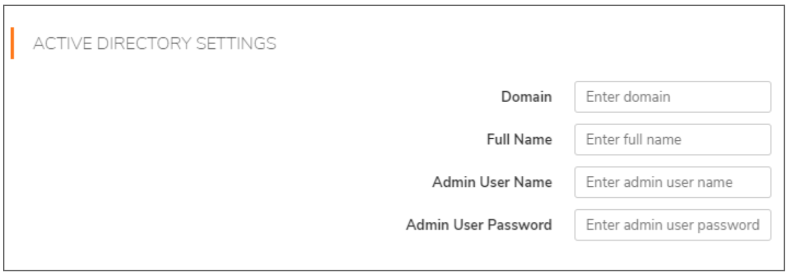
    - **LDAP Server** – More options appear; go to *Step 11*.



LDAP SERVER SETTINGS

Name of IP Address: Enter name or IP Address
Base DN: Enter base DN
Identity DN: Enter Identity DN
Identity DN Password: Enter Identity DN Passworc
Enable LDAP TLS: ○
Enable LDAP Cache: ○
LDAP Cache Limit: Enter LDAP Cache Limit

    - **Active Directory** – More options appear; go to *Step 18*.



ACTIVE DIRECTORY SETTINGS

Domain: Enter domain
Full Name: Enter full name
Admin User Name: Enter admin user name
Admin User Password: Enter admin user password

11. Enter the name or IP address of the LDAP server in the **Name or IP address** field.
12. Enter the base distinguished name in the **Base DN** field.
13. Enter the Identity distinguished name in the **Identity DN** field.
14. Enter the distinguished name password in the **Identity DN Password** field.
15. To enable LDAP Transport Layer Security (TLS), select **Enable Ldap TLS**. This option is not selected by default.
16. To enable LDAP cache, select **Enable Ldap Cache**. The Ldap Cache Lifetime(s) field becomes active.

    - Enter the lifetime, in seconds in the Ldap Cache Lifetime(s) field; the minimum is 1, the maximum is 99999, and the default is **86400**.

17. Go to *Step 22*.
18. Enter the domain name in the **Domain** field.
19. Enter the full name of the Active Directory in the **Full Name** field.
20. Enter the user name of the administrator user in the **Admin User Name** field.
21. Enter the password of the administrator user in the **Admin User Password** field.
22. Click **Save**.

Configuring DPI-SSL Granular Control per Zone

DPI-SSL granular control allows you to enable DPI-SSL on a per-zone basis rather than globally. You can enable both DPI-SSL Client and DPI-SSL Server per zone. For further information, see *SonicOS Security Configuration*Guide.

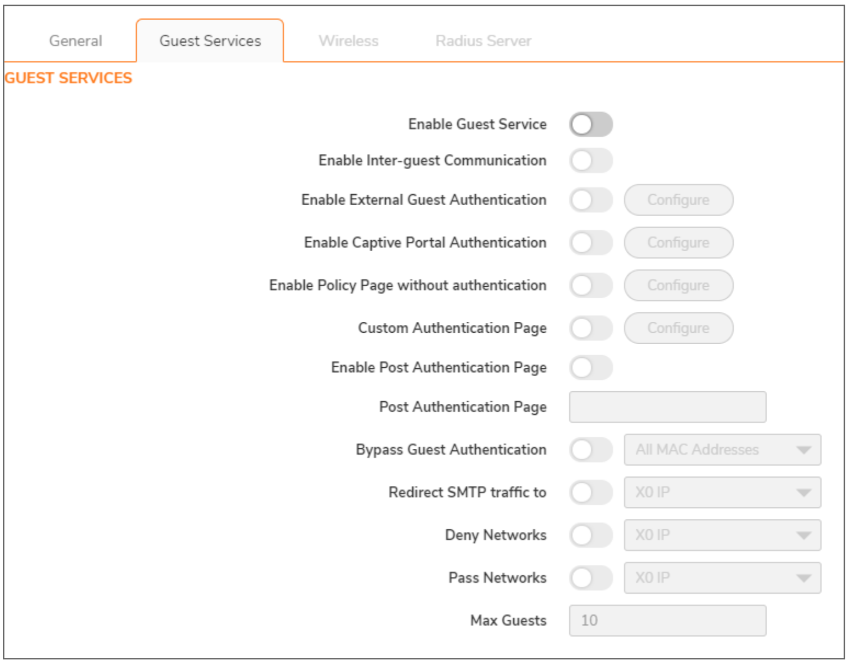
Enabling Automatic Redirection to the User-Policy Page

SonicOS allows you to redirect a guest automatically to your guest-user policy page. If you enable this feature, also known as the zero-touch policy page redirection, the guest user is redirected automatically to your guest-user policy page. If you disable the feature, the guest must click **Accept**.

To enable automatic redirection to the user-policy page:

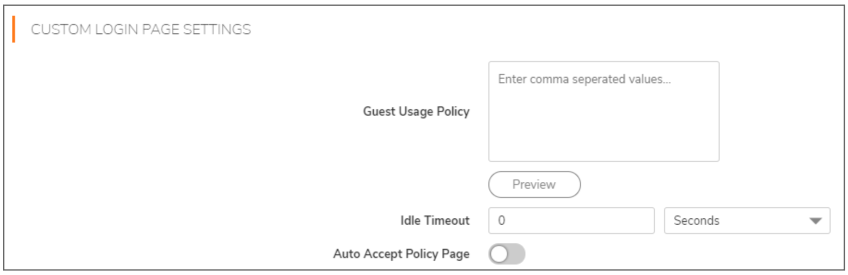
1. Navigate to **Object > Match Objects > Zones**.
2. Click either the:
   - **Add** icon to add a new zone.
   - **Edit** icon of an existing zone.

   The **Zone Settings** dialog displays.
3. Type a name for the new zone in the **Name** field.
4. Select a **Security Type** from the drop-down.
5. Click **Guest Services** tab.



6. Click **Enable Guest Services** option.

7. Click **Enable Policy Page without authentication** option.
8. Click **Configure** button. The **Custom Login Page Settings** dialog displays.



CUSTOM LOGIN PAGE SETTINGS

Guest Usage Policy: Enter comma seperated values...

Preview

Idle Timeout: 0 Seconds

Auto Accept Policy Page: ○

9. Select **Auto Accept Policy Page**option. This option is not selected by default.
10. Click **Save**.

Deleting a Zone

To delete a user-created zone:

1. Navigate to **Object > Match Objects > Zones**.

   ⓘ **NOTE:** The **Delete** icon is unavailable for predefined zones. You cannot delete these zones. Any zones that you create can be deleted.

2. Click the **Delete** icon in the zone’s Configure column which you want to delete.

To delete one or more user-created zones:

1. Navigate to **Object > Match Objects > Zones**.

   ⓘ **NOTE:** The checkboxes are unavailable for predefined zones. You cannot delete these zones. Any zones that you create can be deleted.

2. Select the checkboxes of zones to delete and click **Delete Zones**.

2

Addresses

Address objects (AOs) allow for entities to be defined one time, and to be re-used in multiple referential instances throughout the SonicOS interface. While more effort is involved in creating an address object than in simply entering an IP address, address objects were implemented to complement the management scheme of SonicOS, providing the following characteristics:

- **Zone Association** – When defined, host, MAC, and FQDN AOs require an explicit zone designation. In most areas of the interface (such as access rules) this is only used referentially. The functional application are the contextually accurate populations of address object drop-down menus and the area of VPN access definitions assigned to users and groups. When AOs are used to define VPN access, the access rule auto-creation process refers to the AO’s zone to determine the correct intersection of VPN [zone] for rule placement. In other words, if the host AO, *192.168.168.200* Host, belonging to the LAN zone was added to VPN access for the *Trusted Users* user group, the auto-created access rule would be assigned to the VPN LAN zone.
- **Management and Handling** – The versatile family of address objects types can be easily used throughout the SonicOS interface, allowing for handles (for example, when defining access rules) to be quickly defined and managed. The ability to simply add or remove members from address groups effectively enables modifications of referencing rules and policies without requiring direct manipulation.
- **Reusability** – Objects only need to be defined once, and can then be easily referenced as many times as needed.

For example, take an internal web server with an IP address of *67.115.118.80*. Rather than repeatedly typing in the IP address when constructing access rules or NAT policies, you can create a single entity called *My Web Server* as a host address object with an IP address of *67.115.118.80*. This address object, **My Web Server**, can then be easily and efficiently selected from a drop-down list in any configuration screen that employs address objects as a defining criterion.

Topics:

- Types of Address Objects
- About Address Groups
- About UUIDs for Address Objects and Groups
- Addresses Page
- Default Address Objects and Groups
- Default Pref64 Address Object
- Default Rogue Address Groups
- Adding an Address Object
- Editing Address Objects
- Deleting Custom Address Objects
- Purging MAC or FQDN Address Objects
- Creating Address Groups
- Editing Address Groups
- Deleting Address Groups
- Working with Dynamic Address Objects

Types of Address Objects

As there are multiple types of network address expressions, there are multiple address object types, as shown in the below table.

Type	Definition
Host	Defines a single host by its IP address and zone association. The netmask for a host address object is automatically set to 32-bit (*255.255.255.255*) to identify it as a single host. For example, *My Web Server* with an IP address of *67.115.118.110* and a default netmask of *255.255.255.255*.
Range	Defines a range of contiguous IP addresses. No netmask is associated with range address objects, but internal logic generally treats each member of the specified range as a 32-bit masked host object. For example, *My Public Servers* with an IP address starting value of *67.115.118.66* and an ending value of *67.115.118.90*. All 25 individual host addresses in this range are included in this address object.
Network	Similar to range objects in that they include multiple hosts, but rather than being bound by specified upper and lower range delimiters, the boundaries are defined by a valid netmask. Network address objects must be defined by the network's address and a corresponding netmask. For example, *My Public Network* with a network address of *67.115.118.64* and a netmask of *255.255.255.224* would include addresses from *67.115.118.64* through *67.115.118.95*. As a general rule, the first address in a network (the network address) and the last address in a network (the broadcast address) cannot be assigned to a host.
MAC	Allows for the identification of a host by its hardware address or IPv4/IPv6 MAC (Media Access Control) address. MAC addresses are uniquely assigned to every piece of wired or wireless networking device by their hardware manufacturers, and are intended to be immutable. MAC addresses are 48-bit values that are expressed in 6-byte hex-notation. For example, *My Access Point* with a MAC address of *00:06:01:AB:02:CD*. MAC addresses are resolved to an IP address by

	referring to the ARP cache on the security appliance. MAC address objects are used by various components of wireless configurations throughout SonicOS, such as SonicPoint or SonicWave identification, and authorizing the BSSID (Basic Service Set Identifier, or WLAN MAC) of wireless access points detected during wireless scans. MAC address objects can also be used to allow hosts to bypass Guest Services authentication.
FQDN	Allows for the identification of a host by its IPv4/IPv6 Fully Qualified Domain Name (FQDN), such as *www.sonicwall.com*. FQDNs are be resolved to their IP address (or IP addresses) using the DNS server configured on the security appliance. Wildcard entries are supported through the responses to queries sent to the DNS servers.

About Address Groups

SonicOS has the ability to group address objects and other address groups into address groups. Address groups can be defined to introduce further referential efficiencies. Address groups can contain any combination of host, range, or network address objects. For example, *My Public Group* can contain the host address object, *My Web Server*, and the range address object, *My Public Servers*, effectively representing IP addresses *67.115.118.66* to *67.115.118.90* and IP address *67.115.118.110*.

Dynamic address objects (MAC and FQDN) should be grouped separately, although they can safely be added to address groups of IP-based address objects, where they will be ignored when their reference is contextually irrelevant (for example, in a NAT policy).

Address groups are automatically created when certain features are enabled, such as a *Radius Pool*address group when the **Enable Local Radius Server** option is enabled in WLAN zone configuration, and are deleted when the feature is disabled.

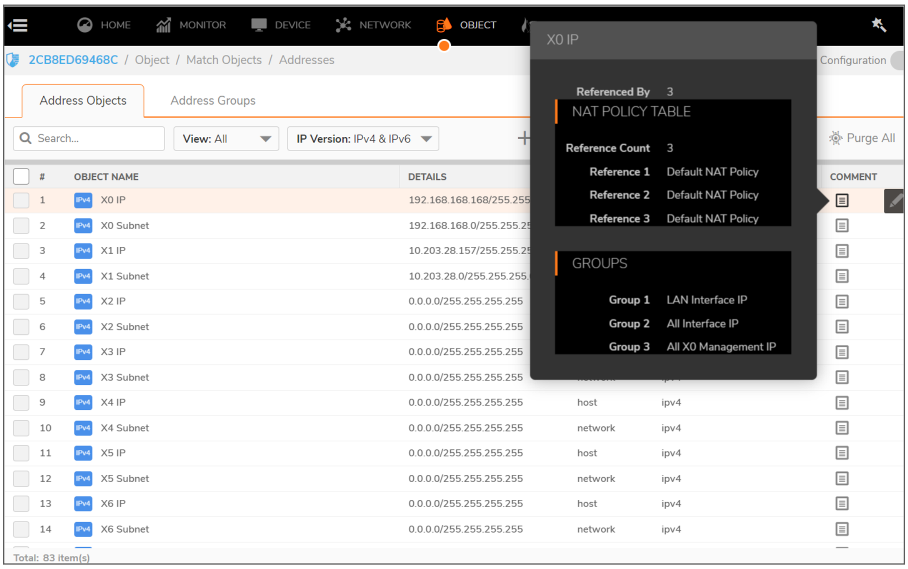
About UUIDs for Address Objects and Groups

A UUID (Universally Unique Identifier) is a 36-character string (32 alphanumeric characters and four hyphens) that is used to uniquely identify address objects and groups, among other entities, on SonicWall network security appliances. The SonicOS UUID is a system-generated, read-only internal value with these properties:

- A UUID is a unique representation of a SonicOS entity across the network.
- A UUID is generated at creation of an entity and removed at the deletion of the entity. It is not reused once it is removed.
- When an entity is modified, the UUID stays the same.
- UUIDs are regenerated after restarting the appliance with factory default settings.

By default, UUIDs are not displayed. UUID display is controlled by internal settings. For more information about internal settings, contact SonicWall Technical Support.

When displayed, UUIDs appear in the tables for each object or group type.



X0 IP

Referenced By 3

NAT POLICY TABLE

Reference Count	3
Reference 1	Default NAT Policy
Reference 2	Default NAT Policy
Reference 3	Default NAT Policy

GROUPS

Group 1	LAN Interface IP
Group 2	All Interface IP
Group 3	All X0 Management IP

#		OBJECT NAME	DETAILS		
1	IPv4	X0 IP	192.168.168.168/255.255		
2	IPv4	X0 Subnet	192.168.168.0/255.255.25		
3	IPv4	X1 IP	10.203.28.157/255.255.25		
4	IPv4	X1 Subnet	10.203.28.0/255.255.255.		
5	IPv4	X2 IP	0.0.0.0/255.255.255.255		
6	IPv4	X2 Subnet	0.0.0.0/255.255.255.255		
7	IPv4	X3 IP	0.0.0.0/255.255.255.255		
8	IPv4	X3 Subnet	0.0.0.0/255.255.255.255		
9	IPv4	X4 IP	0.0.0.0/255.255.255.255	host	ipv4
10	IPv4	X4 Subnet	0.0.0.0/255.255.255.255	network	ipv4
11	IPv4	X5 IP	0.0.0.0/255.255.255.255	host	ipv4
12	IPv4	X5 Subnet	0.0.0.0/255.255.255.255	network	ipv4
13	IPv4	X6 IP	0.0.0.0/255.255.255.255	host	ipv4
14	IPv4	X6 Subnet	0.0.0.0/255.255.255.255	network	ipv4

Total: 83 item(s)

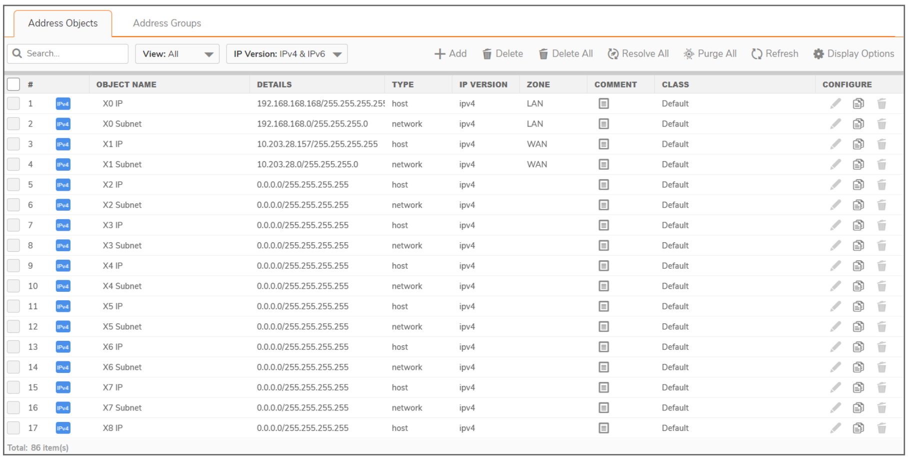
UUIDs facilitate the following functions:

- You can search for an address object or group by UUID with the global search function of the management interface.
- If an object or group object with a UUID is referenced by another entity with a UUID, you can display the reference count and referring entities by mousing over the **Comment** column on the **Addresses** page under **Object**.

Addresses Page

The Addresses page has two tabs:

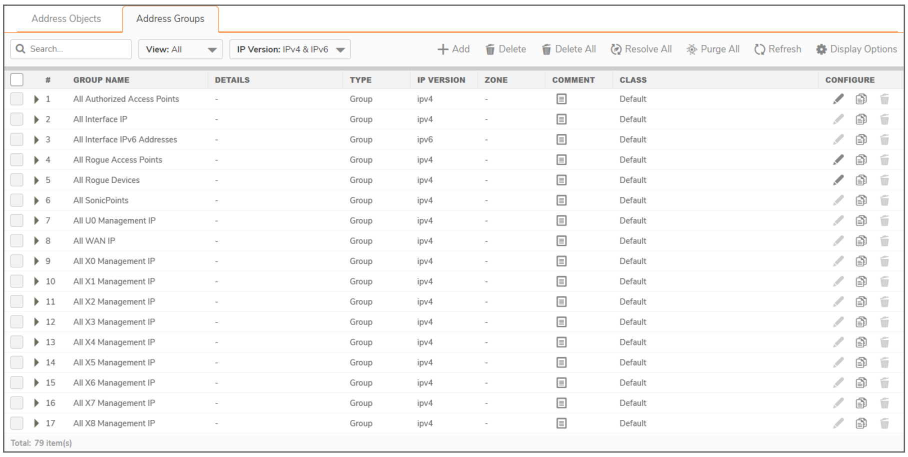
ADDRESS OBJECTS



#		OBJECT NAME	DETAILS	TYPE	IP VERSION	ZONE	COMMENT	CLASS	CONFIGURE
1	IPv4	X0 IP	192.168.168.168/255.255.255.25!	host	ipv4	LAN	▤	Default	
2	IPv4	X0 Subnet	192.168.168.0/255.255.255.0	network	ipv4	LAN	▤	Default	
3	IPv4	X1 IP	10.203.28.157/255.255.255.255	host	ipv4	WAN	▤	Default	
4	IPv4	X1 Subnet	10.203.28.0/255.255.255.0	network	ipv4	WAN	▤	Default	
5	IPv4	X2 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
6	IPv4	X2 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
7	IPv4	X3 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
8	IPv4	X3 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
9	IPv4	X4 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
10	IPv4	X4 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
11	IPv4	X5 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
12	IPv4	X5 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
13	IPv4	X6 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
14	IPv4	X6 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
15	IPv4	X7 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	
16	IPv4	X7 Subnet	0.0.0.0/255.255.255.255	network	ipv4		▤	Default	
17	IPv4	X8 IP	0.0.0.0/255.255.255.255	host	ipv4		▤	Default	

Total: 86 item(s)

ADDRESS GROUPS



View: All

IP Version: IPv4 & IPv6

□	#	GROUP NAME	DETAILS	TYPE	IP VERSION	ZONE	COMMENT	CLASS	CONFIGURE
□	1	All Authorized Access Points	-	Group	ipv4	-		Default	
□	2	All Interface IP	-	Group	ipv4	-		Default	
□	3	All Interface IPv6 Addresses	-	Group	ipv6	-		Default	
□	4	All Rogue Access Points	-	Group	ipv4	-		Default	
□	5	All Rogue Devices	-	Group	ipv4	-		Default	
□	6	All SonicPoints	-	Group	ipv4	-		Default	
□	7	All U0 Management IP	-	Group	ipv4	-		Default	
□	8	All WAN IP	-	Group	ipv4	-		Default	
□	9	All X0 Management IP	-	Group	ipv4	-		Default	
□	10	All X1 Management IP	-	Group	ipv4	-		Default	
□	11	All X2 Management IP	-	Group	ipv4	-		Default	
□	12	All X3 Management IP	-	Group	ipv4	-		Default	
□	13	All X4 Management IP	-	Group	ipv4	-		Default	
□	14	All X5 Management IP	-	Group	ipv4	-		Default	
□	15	All X6 Management IP	-	Group	ipv4	-		Default	
□	16	All X7 Management IP	-	Group	ipv4	-		Default	
□	17	All X8 Management IP	-	Group	ipv4	-		Default	

Total: 79 item(s)

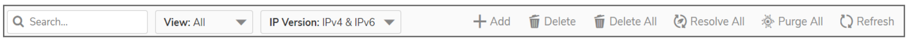
Although the two screens have similar functions, there are some differences between them.

For more about functions available on the pages, see:

- Common Features
- Sorting the Entries

Common Features

The screen **Address Objects** and **Address Groups** contains these common functions and each table contains the same column headings.



View: All

IP Version: IPv4 & IPv6

The bottom of each table displays the number of entries in the table.

□ 75 X9 IPv6 Primary Static Address

Total: 83 item(s)

Topics:

- Common Functions
- Common Column Headings

Common Functions

Function	Description
Search	Type in a search string to display only those entries containing the string. The search string is case insensitive.
View	Select **Default** to display only system-created default entries, **Custom** to display only custom entries, or **All** to display all entries. By default, the view type is selected as **All**.

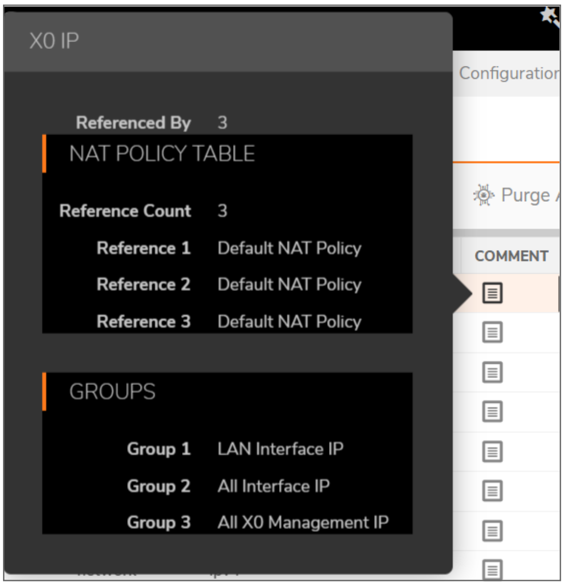
Function	Description
IP Version	Select **IPv4** to display only IPv4 entries, **IPv6** to display only IPv6 entries, or **IPv4 & IPv6** to display all entries. By default, the IP version is selected as **IPv4 & IPv6**.
Add	Click to add an address object or address group.
Delete	Select **Delete** to delete selected custom entries from the table. Default entries cannot be deleted.
Delete All	Select **Delete All** to delete all custom entries from the table. Default entries cannot be deleted.
Resolve All	Select **Resolve All** to resolve all MAC or FQDN entries in the table.
Purge All	Select **Purge All** to remove out-of-date information from all MAC or FQDN entries. For MAC address objects, this is ARP information, and for FQDN address objects it is DNS TTL values.
Refresh	Click **Refresh** to refresh the table display.

Common Column Headings

Column Heading	Description
Checkbox	Click to select a custom entry. ⓘ **NOTE:** Default address objects and default address groups cannot be deleted.
#	The number of the entry in the table. This number changes depending on whether the column is sorted by ascending or descending order. The **Address Groups** screen has a small triangle that allows you to expand or collapse the group entry.
Name	The unique name of the address object or address group entry. If an address group entry is expanded, this column shows: • The unique name of each member of the address group. • No Entries, if the address group does not contain members.
Details	Shows the details of the address object: applicable addresses or mask. For an address group entry, this column is blank; an expanded entry, however, shows the details of the members of the group.
Type	Shows the address object type, such as **Host**, **Network**, **Range**, **MAC Address**, or **FQDN**. For an address group, the type is **Group**; an expanded entry shows the type of each member.
IP Version	Shows the IP version of the address object or address group member: **IPv4**, **IPv6**, or **Mixed**.
Zone	Shows the assigned zone of the address object or address group member.
Class	Shows whether the address object or address group is **Default** (system defined) or **Custom** (user defined).
Comments	Mouse over the **Comment** icon to display pop-up information with details about the entry:

Column Heading	Description

- **Address Object** - Displays this information:



XO IP

Referenced By 3

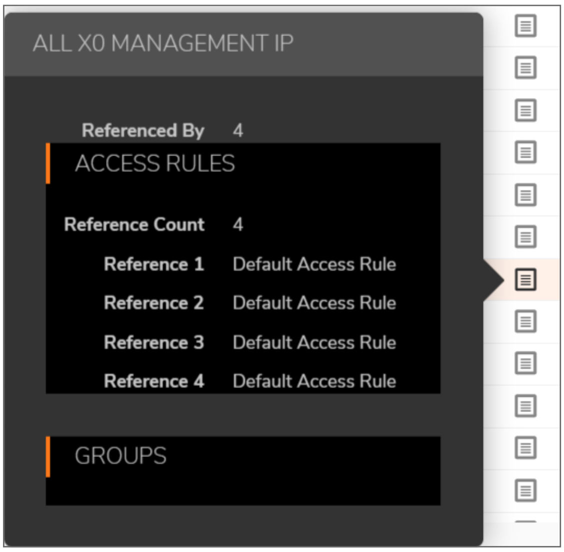
NAT POLICY TABLE

Reference Count	3
Reference 1	Default NAT Policy
Reference 2	Default NAT Policy
Reference 3	Default NAT Policy

GROUPS

Group 1	LAN Interface IP
Group 2	All Interface IP
Group 3	All X0 Management IP

  - Name of the address object
  - Referenced By: – What references the address object and the number of times it has been referenced. If the address object has not been referenced, this section will state *0*.
  - Groups : – List of groups to which the address object belongs.
  - Configure : – When you mouse over on the address object **Edit** and **Delete**icons for individual entries are displayed. Only custom address objects can be deleted; only custom entries and some default entries can be edited. If an entry cannot be edited or deleted, the icon(s) are dimmed.
- **Address Group** - Displays this information:



ALL X0 MANAGEMENT IP

Referenced By 4

ACCESS RULES

Reference Count	4
Reference 1	Default Access Rule
Reference 2	Default Access Rule
Reference 3	Default Access Rule
Reference 4	Default Access Rule

GROUPS

Column Heading	Description
	• Name of the address group • Referenced By: – What references the address group and the number of times it has been referenced. If the address group has not be referenced, this section will state *0*. • Groups : – List of groups to which the address group belongs. • Configure : – When you mouse over on the address group **Edit** and **Delete** icons for individual entries are displayed. Only custom address groups can be deleted; only custom entries and some default entries can be edited. If an entry cannot be edited or deleted, the icon(s) are dimmed.

Sorting the Entries

The **Address Objects** and **Address Groups** screens display tables for easy viewing of address objects and address groups.

You can sort the entries in the table by clicking on the column header. The entries are sorted by ascending or descending order. The arrow to the right of the column entry indicates the sorting status. A down arrow means ascending order. An up arrow indicates a descending order (alphabetical A-Z or numeric starting from zero at the top).

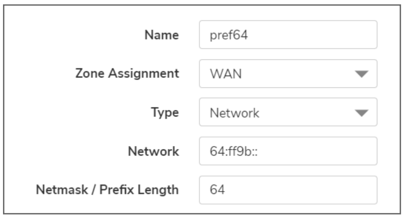
Default Address Objects and Groups

The **Default** view displays the default address objects and address groups for your firewall. Selecting the **Default** view on one screen selects it for both screens. Default address objects entries cannot be modified or deleted although some default address groups can be. Therefore, on the:

- **Address Objects** screen, the **Edit** and **Delete** icons are dimmed.
- **Address Groups** screen, the **Edit** icon for most entries and the **Delete** icon for all but a few entries are dimmed. Those entries that can be edited or deleted have the requisite icons available.

Default Pref64 Address Object

To support the NAT64 feature, SonicOS provides the default network address object, *Pref64*. It is the original destination for a NAT64 policy and is always *pref64::/n*. You can create an address object of **Network** type to represent all addresses with *pref64::/n* to represent all IPv6 clients that can do NAT64; for example:



Name	pref64
Zone Assignment	WAN
Type	Network
Network	64:ff9b::
Netmask / Prefix Length	64

A well-known prefix, *64:ff9b::/96*, is auto created by SonicOS. For further information about Pref64, see **Policy > NAT Rules** section.

Default Rogue Address Groups

SonicOS provides two default address groups for rogue wireless access points and devices.

- All Rogue Access Points
- All Rogue Devices

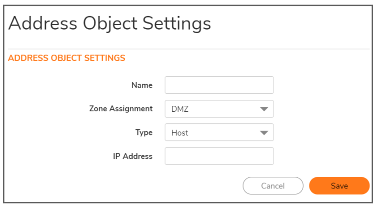
When Wireless Intrusion Detection and Prevention (WIDP) is enabled, SonicWave appliances can act as both an access point and as a sensor detecting any unauthorized access point connected to a SonicWall network. Detected rogue access points can be automatically added to the All Rogue Access Points address group, and detected rogue devices added to the All Rogue Devices address group. For information about enabling options related to rogue access points, see *Configuring Advanced IDP* in the *SonicOS Connectivity* administration documentation.

Adding an Address Object

An address object must be defined before configuring NAT policies, access rules, and services.

To add an address object:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. On the **Address Objects** screen, click **Add** at the top of the page to display the Add Address Object dialog.



Address Object Settings

ADDRESS OBJECT SETTINGS

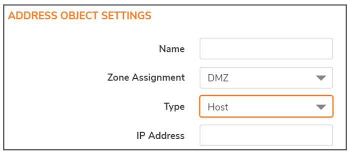
Name

Zone Assignment DMZ

Type Host

IP Address

3. In the **Name** field, enter a descriptive, unique name for the network address object.
4. Select the zone for the address object from the **Zone Assignment** drop-down list.
5. Select one of the following from the **Type** drop-down list and fill in the associated fields that display when you select the **Type**:
   - **Host**, enter the IP address in the **IP Address** field.



ADDRESS OBJECT SETTINGS

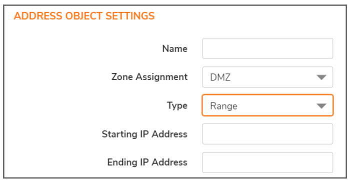
Name

Zone Assignment DMZ

Type Host

IP Address

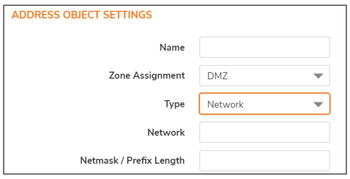
- **Range**, enter the starting and ending IP addresses in the **Starting IP Address** and **Ending IP Address** fields.



ADDRESS OBJECT SETTINGS

Name:
Zone Assignment: DMZ
Type: Range
Starting IP Address:
Ending IP Address:

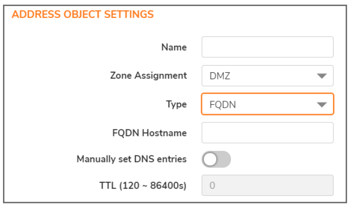
- **Network**, enter the network IP address and netmask (such as 255.255.255.0) or prefix length (such as 24) in the **Network** and **Netmask/Prefix Length** fields.



ADDRESS OBJECT SETTINGS

Name:
Zone Assignment: DMZ
Type: Network
Network:
Netmask / Prefix Length:

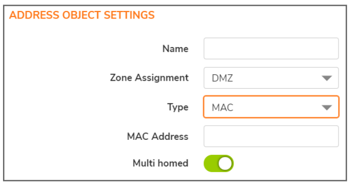
- **FQDN**, enter the domain name for the individual site or range of sites (with a wildcard '*') in the **FQDN Hostname** field. Optionally, select **Manually set DNS entries** and enter the time-to-live in seconds in the **TTL (120 ~ 86400s)** field. The minimum value is 120 and the maximum is 86400 seconds.



ADDRESS OBJECT SETTINGS

Name:
Zone Assignment: DMZ
Type: FQDN
FQDN Hostname:
Manually set DNS entries: ○
TTL (120 ~ 86400s): 0

- **MAC**, enter the MAC address (such as 00:11:f5:1b:e3:cf) in the **MAC Address** field. By default, **Multi homed** option is selected.



ADDRESS OBJECT SETTINGS

Name:
Zone Assignment: DMZ
Type: MAC
MAC Address:
Multi homed: ●

6. Click **Save**.

Editing Address Objects

ⓘ | **NOTE:** Only custom address objects and certain default address objects can be edited.

To edit an address object:

1. Navigate to **Object >Match Objects > Addresses > Address Objects** page.
2. In the **Configure** column on the Address object, click **Edit** icon. The Edit Address Object window is displayed, which has the same settings as the **Add Address Object** window (see Adding an Address Object).
3. Click **OK**.

Deleting Custom Address Objects

ⓘ | **NOTE:** Only custom address objects can be deleted.

To delete a custom address object:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. In the **Configure** column on the Address object, click **Delete** icon.
3. In the confirmation dialog box, click **OK** to delete the address object.

To delete one or more custom address objects:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Select the checkboxes for the entries to be deleted.
3. Click **Delete** at the top of the page.
4. In the confirmation dialog box, click **OK** to delete the address objects.

To delete all custom address objects:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Select **Delete All** at the top of the page.
3. In the confirmation dialog box, click **OK** to delete all the custom address objects.

Purging MAC or FQDN Address Objects

Purge is used to remove out-of-date ARP or DNS information from MAC or FQDN address objects.

To purge a MAC or FQDN address objects:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Click **Purge** at the top of the page.

To purge all MAC or FQDN address objects:

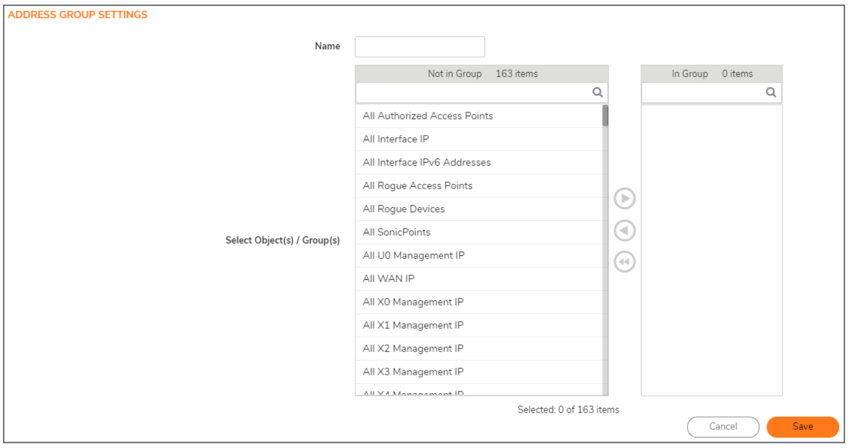
1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Click **Purge All** at the top of the page.

Creating Address Groups

As more and more address objects are added to the firewall, you can simplify managing the addresses and access policies by creating groups of addresses. Changes made to the address group are applied to each address in the group. Address groups can contain other address groups as well as address objects.

To add an address group:

1. Navigate to **Object > Match Objects > Addresses** page.
2. Click the **Address Groups** tab at the top of the page.
3. On the **Address Groups** screen, click **Add** to display the **Add Address Group** dialog.



ADDRESS GROUP SETTINGS

Name

Select Object(s) / Group(s)

Not in Group 163 items

- All Authorized Access Points
- All Interface IP
- All Interface IPv6 Addresses
- All Rogue Access Points
- All Rogue Devices
- All SonicPoints
- All U0 Management IP
- All WAN IP
- All X0 Management IP
- All X1 Management IP
- All X2 Management IP
- All X3 Management IP
- All X4 Management IP

In Group 0 items

Selected: 0 of 163 items

4. Create a descriptive, unique name for the group in the **Name** field.
5. Select the desired address objects or groups from the list and then click the right arrow. The selected items move into the list on the right. Press the **Ctrl** or **Shift** key to select multiple items.

   To remove an item from the group, select the item in the right column and click the left arrow. The selected item moves from the list on the right to the list on the left. To remove all the items from the group, click **un-select all items** icon.
6. Click **Save**.

Editing Address Groups

ⓘ **NOTE:** Only custom and some default address groups can be edited; only custom address groups can be deleted.

To edit an address group:

1. Navigate to **Object > Match Objects > Addresses** page.
2. Click the **Address Groups** tab at the top of the page.
3. In the **Configure** column on the Address Group, click **Edit** icon. The Edit Address Group window is displayed.
4. To change the name, edit the **Name** field.
5. Select the desired address objects or groups from the list and then click the right arrow. The selected items move into the list on the right. Press the **Ctrl** or **Shift** key to select multiple items.

   To remove an item from the group, select the item in the right column and click the left arrow. The selected item moves from the list on the right to the list on the left. To remove all the items from the group, click **un-select all items** icon.
6. Click **Save**.

Deleting Address Groups

ⓘ | **NOTE:** Only custom address groups can be deleted.

To delete a custom address group:

1. Navigate to **Object > Match Objects > Addresses > Address Groups** page.
2. In the **Configure** column on the Address Group, click **Delete** icon.
3. In the confirmation dialog box, click **OK** to delete the address group.

To delete one or more custom address groups:

1. Navigate to **Object > Match Objects > Addresses > Address Groups** page.
2. Select the checkboxes for the entries to be deleted.
3. Click **Delete** at the top of the page.
4. In the confirmation dialog box, click **OK** to delete the address groups.

To delete all custom address groups:

1. Navigate to **Object > Match Objects > Addresses > Address Groups** page.
2. Select **Delete All** at the top of the page.
3. In the confirmation dialog box, click **OK** to delete all the custom address groups.

Working with Dynamic Address Objects

From its inception, SonicOS has used address objects to represent IP addresses in most areas throughout the user interface. For information about address object types, see Types of Address Objects.

SonicOS supports two types of dynamic address objects:

- **MAC** – SonicOS resolves MAC AOs to an IP address by referring to the ARP cache on the firewall.
- **FQDN** – Fully Qualified Domain Names, such as 'www.reallybadWebsite.com', are resolved to their IP address (or IP addresses) using the DNS servers configured on the firewall. Wildcard entries using '*' are supported through the gleaning of responses to queries sent to the sanctioned DNS servers.

Topics:

- Key Features of Dynamic Address Objects
- Enforcing the Use of Sanctioned Servers on the Network
- Using MAC and FQDN Dynamic Address Objects

Key Features of Dynamic Address Objects

The term *Dynamic Address Object (DAO)* describes the underlying framework enabling MAC and FQDN AOs. By transforming AOs from static to dynamic structures, access rules can automatically respond to changes in the network.

The below table provides details and examples for DAOs.

DYNAMIC ADDRESS OBJECTS: FEATURES AND BENEFITS

Feature	Benefit
FQDN wildcard support	FQDN address objects support wildcard entries, such as **.somedomainname.com*, by first resolving the base domain name to all its defined host IP addresses, and then by constantly actively gleaning DNS responses as they pass through the firewall. For example, creating an FQDN AO for **.myspace.com* will first use the DNS servers configured on the firewall to resolve *myspace.com* to *63.208.226.40*, *63.208.226.41*, *63.208.226.42*, and *63.208.226.43* (as can be confirmed by nslookup myspace.com or equivalent). As most DNS servers do not allow zone transfers, it is typically not possible to automatically enumerate all the hosts in a domain. Instead, the firewall looks for DNS responses coming from sanctioned DNS servers as they traverse the firewall. So, if a host behind the firewall queries an external DNS server that is also a configured/defined DNS server on the firewall, the firewall parses the response to see if it matches the domain of any wildcard FQDN AOs. **NOTE:** Sanctioned DNS servers are those DNS servers configured for use by firewall. The reason that responses from only sanctioned DNS servers are used in the wildcard learning process is to protect against the possibility of FQDN AO poisoning through the use of unsanctioned DNS servers with deliberately incorrect host entries. Future versions of SonicOS might offer the option to support responses from all DNS server. The use of sanctioned DNS servers can be enforced with the use of access rules, as described later in Enforcing the Use of Sanctioned Servers on the Network. **NOTE:** To illustrate, assume the firewall is configured to use DNS servers *4.2.2.1* and *4.2.2.2*, and is providing these DNS servers to all firewalled client via DHCP. If firewalled client-A performs a DNS query against *4.2.2.1* or *4.2.2.2* for *vids.myspace.com*, the response is examined by the firewall and matched to the defined **.myspace.com* FQDN AO. The result (*63.208.226.224*) is then added to the resolved values of the **.myspace.com* DAO. **NOTE:** If the workstation, client-A, in the example above had resolved and cached *vids.myspace.com* before the creation of the **.myspace.com* AO, *vids.myspace.com* would not be resolved by the firewall because the client would use its resolver's cache rather than issuing a new DNS request. As a result, the firewall would not have the chance to learn about *vids.myspace.com* unless it was resolved by another host. On a Microsoft Windows workstation, the local resolver cache can be cleared using the command **ipconfig /flushdns**. This forces the client to resolve all FQDNs, thereby allowing the firewall to learn them as they are accessed.

Feature	Benefit
	ⓘ **NOTE:** Wildcard FQDN entries resolve all hostnames within the context of the domain name, up to 256 entries per AO. For example, **.sonicwall.com* resolves *www.sonicwall.com*, *software.sonicwall.com*, and *licensemanager.sonicwall.com*, to their respective IP addresses, but it does not resolve *sslvpn.demo.sonicwall.com* because it is in a different context; for *sslvpn.demo.sonicwall.com* to be resolved by a wildcard FQDN AO, the entry **.demo.sonicwall.com* would be required, which would also resolve *sonicos-enhanced.demo.sonicwall.com*, *csm.demo.sonicwall.com*, *sonicos-standard.demo.sonicwall.com*, and so on. ⓘ **NOTE:** Wildcards only support full matches, not partial matches. In other words, **.sonicwall.com* is a legitimate entry, but *w*.sonicwall.com*, **w.sonicwall.com*, and *w*w.sonicwall.com* are not. A wildcard can only be specified once per entry, so **.*.sonicwall.com*, for example, is not functional.
FQDN resolution using DNS	FQDN address objects are resolved using the DNS servers configured on the firewall in the **Network > DNS** page. Since it is common for DNS entries to resolve to multiple IP addresses, the FQDN DAO resolution process will retrieve all of the addresses to which a host name resolves, up to 256 entries per AO. In addition to resolving the FQDN to its IPs, the resolution process will also associate the entry's TTL (time to live) as configured by the DNS administrator. TTL will then be honored to ensure the FQDN information does not become stale.
MAC address resolution using live ARP cache data	When a node is detected on any of the firewall's physical segments through the ARP (Address Resolution Protocol) mechanism, the firewall's ARP cache is updated with that node's MAC and IP address. When this update occurs, if a MAC address objects referencing that node's MAC is present, it will instantly be updated with the resolved address pairing. When a node times out of the ARP cache due to disuse (for example, the host is no longer L2 connected to the firewall) the MAC AO will transition to an unresolved state.
MAC address object multi-homing support	MAC AOs can be configured to support multi-homed nodes, where multi-homed refers to nodes with more than one IP address per physical interface. Up to 256 resolved entries are allowed per AO. This way, if a single MAC address resolves to multiple IPs, all of the IP will be applicable to the access rules, etc., that refer to the MAC AO.
Automatic and manual refresh processes	MAC AO entries are automatically synchronized to the firewall's ARP cache, and FQDN AO entries abide by DNS entry TTL values, ensuring that the resolved values are always fresh. In addition to these automatic update processes, manual Refresh and Purge capabilities are provided for individual DAOs, or for all defined DAOs.

Enforcing the Use of Sanctioned Servers on the Network

Although not a requirement, it is recommended to enforce the use of authorized or sanctioned servers on the network. This practice can help to reduce illicit network activity, and will also serve to ensure the reliability of the FQDN wildcard resolution process. In general, it is good practice to define the endpoints of known protocol communications when possible. For example:

- Create address groups of sanctioned servers (for example, SMTP, DNS)
- Create access rules in the relevant zones allowing only authorized SMTP servers on your network to communicate outbound SMTP; block all other outbound SMTP traffic to prevent intentional or unintentional outbound spamming.
- Create access rules in the relevant zones allowing authorized DNS servers on your network to communicate with all destination hosts using DNS protocols (TCP/UDP 53).

  ⓘ **IMPORTANT:** Be sure to have this rule in place if you have DNS servers on your network, and you will be configuring the restrictive DNS rule that follows.
- Create access rules in the relevant zones allowing firewalled hosts to only communicate via DNS (TCP/UDP 53) with sanctioned DNS servers; block all other DNS access to prevent communications with unauthorized DNS servers.
- Unsanctioned access attempts will then be viewable in the logs.

Using MAC and FQDN Dynamic Address Objects

MAC and FQDN DAOs provide extensive access rule construction flexibility. MAC and FQDN AOs are configured in the same way as static address objects, that is from the **Object > Match Objects > Addresses > Address Objects** page. Once created, their status can be viewed by a mouse-over of their appearance, and log events will record their addition and deletion.

Dynamic address objects lend themselves to many applications. The following are just a few examples of how they may be used.

Topics:

- Blocking All Protocol Access to a Domain using FQDN DAOs
- Using an Internal DNS Server for FQDN-based Access Rules
- Controlling a Dynamic Host’s Network Access by MAC Address
- Bandwidth Managing Access to an Entire Domain

Blocking All Protocol Access to a Domain using FQDN DAOs

There might be instances where you wish to block all protocol access to a particular destination IP because of non-standard ports of operations, unknown protocol use, or intentional traffic obscuration through encryption, tunneling, or both. An example would be a user who has set up an HTTPS proxy server (or other method of port-forwarding/tunneling on trusted ports like 53, 80, 443, as well as nonstandard ports, like 5734, 23221, and 63466) on his DSL or cable modem home network for the purpose of obscuring his traffic by tunneling it through his home network. The lack of port predictability is usually further complicated by the dynamic addressing of these networks, making the IP address equally unpredictable.

Since these scenarios generally employ dynamic DNS (DDNS) registrations for the purpose of allowing users to locate the home network, FQDN AOs can be put to aggressive use to block access to all hosts within a DDNS registrar.

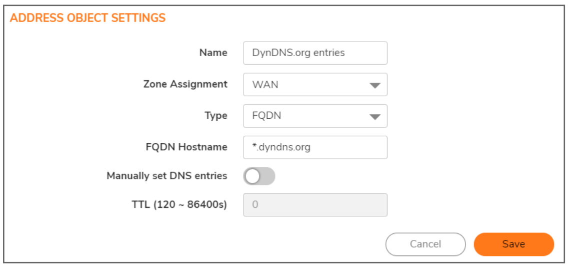
ⓘ **NOTE:** A DDNS target is used in this example for illustration. Non-DDNS target domains can be used just as well.

Assumptions

- The firewall is configured to use DNS server *10.50.165.3, 10.50.128.53*.
- The firewall is providing DHCP leases to all firewalled users. All hosts on the network use the configured DNS servers above for resolution.
    - DNS communications to unsanctioned DNS servers optionally can be blocked with access rules, as described in Enforcing the Use of Sanctioned Servers on the Network.
- The DSL home user is registering the hostname, moosifer.dyndns.org, with the DDNS provider DynDNS. For this session, the ISP assigned the DSL connection the address *71.35.249.153*.
    - A wildcard FQDN AO is used for illustration because other hostnames could easily be registered for the same IP address. Entries for other DDNS providers could also be added, as needed.

Step 1 – Create the FQDN Address Object:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Click **Add** and create the following FQDN address object:



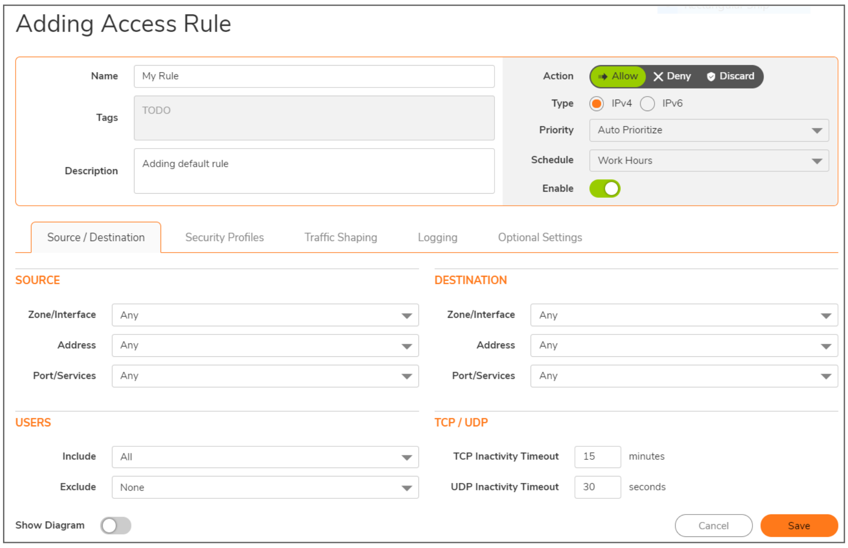
ADDRESS OBJECT SETTINGS

Name	DynDNS.org entries
Zone Assignment	WAN
Type	FQDN
FQDN Hostname	*.dyndns.org
Manually set DNS entries	○
TTL (120 ~ 86400s)	0

When first created, this entry will resolve only to the address for *dyndns.org*, for example, `63.208.196.110`. When a host behind the firewall attempts to resolve *moosifer.dyndns.org* using a sanctioned DNS server, the IP address(es) returned in the query response will be dynamically added to the FQDN AO.

Step 2 – Create the Access Rule:

1. Navigate to **Policy > Access Rules** page.
2. Click **Add** and create the access rule:



Adding Access Rule

Name: My Rule
Tags: TODO
Description: Adding default rule
Action: [✓ Allow] Deny Discard
Type: ● IPv4 ○ IPv6
Priority: Auto Prioritize
Schedule: Work Hours
Enable: On

Source / Destination | Security Profiles | Traffic Shaping | Logging | Optional Settings

SOURCE
Zone/Interface: Any
Address: Any
Port/Services: Any

DESTINATION
Zone/Interface: Any
Address: Any
Port/Services: Any

USERS
Include: All
Exclude: None

TCP / UDP
TCP Inactivity Timeout: 15 minutes
UDP Inactivity Timeout: 30 seconds

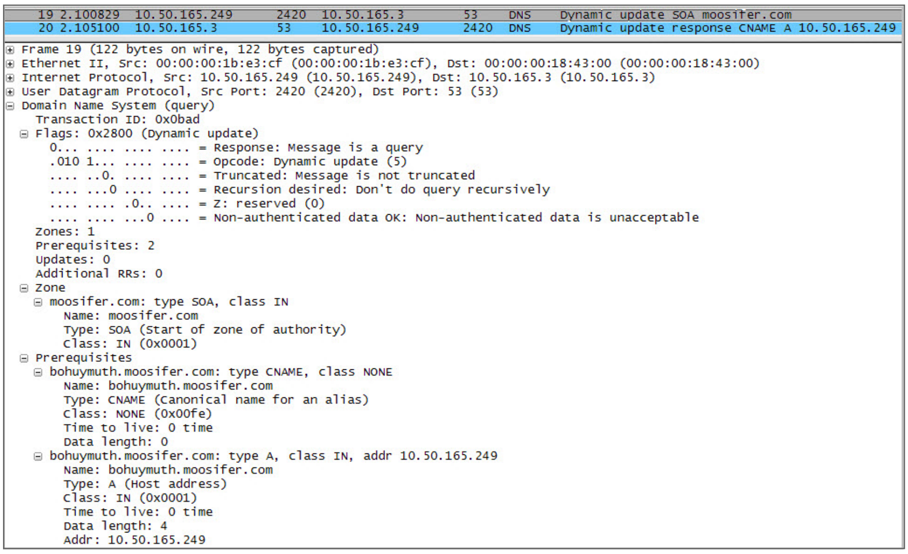
Show Diagram: Off

Any protocol access to target hosts within that FQDN will be blocked, and the access attempt will be logged.

Using an Internal DNS Server for FQDN-based Access Rules

It is common for dynamically configured (DHCP) network environments to work in combination with internal DNS servers for the purposes of dynamically registering internal hosts – a common example of this is Microsoft’s DHCP and DNS services. Hosts on such networks can easily be configured to dynamically update DNS records on an appropriately configured DNS server (for example, see the Microsoft Knowledgebase article How to configure *DNS dynamic updates in Windows Server 2003* at http://support.microsoft.com/kb/816592/en-us).

The following illustrates a packet dissection of a typical DNS dynamic update process, showing the dynamically configured host *10.50.165.249* registering its full hostname *bohuymuth.moosifer.com* with the (DHCP provided) DNS server *10.50.165.3*.



```
    19 2.100829  10.50.165.249       2420  10.50.165.3         53    DNS     Dynamic update SOA moosifer.com
    20 2.105100  10.50.165.3         53    10.50.165.249       2420  DNS     Dynamic update response CNAME A 10.50.165.249
⊞ Frame 19 (122 bytes on wire, 122 bytes captured)
⊞ Ethernet II, Src: 00:00:00:1b:e3:cf (00:00:00:1b:e3:cf), Dst: 00:00:00:18:43:00 (00:00:00:18:43:00)
⊞ Internet Protocol, Src: 10.50.165.249 (10.50.165.249), Dst: 10.50.165.3 (10.50.165.3)
⊞ User Datagram Protocol, Src Port: 2420 (2420), Dst Port: 53 (53)
⊟ Domain Name System (query)
    Transaction ID: 0x0bad
  ⊟ Flags: 0x2800 (Dynamic update)
      0... .... .... .... = Response: Message is a query
      .010 1... .... .... = Opcode: Dynamic update (5)
      .... ..0. .... .... = Truncated: Message is not truncated
      .... ...0 .... .... = Recursion desired: Don't do query recursively
      .... .... .0.. .... = Z: reserved (0)
      .... .... ...0 .... = Non-authenticated data OK: Non-authenticated data is unacceptable
    Zones: 1
    Prerequisites: 2
    Updates: 0
    Additional RRs: 0
  ⊟ Zone
    ⊟ moosifer.com: type SOA, class IN
        Name: moosifer.com
        Type: SOA (Start of zone of authority)
        Class: IN (0x0001)
  ⊟ Prerequisites
    ⊟ bohuymuth.moosifer.com: type CNAME, class NONE
        Name: bohuymuth.moosifer.com
        Type: CNAME (Canonical name for an alias)
        Class: NONE (0x00fe)
        Time to live: 0 time
        Data length: 0
    ⊟ bohuymuth.moosifer.com: type A, class IN, addr 10.50.165.249
        Name: bohuymuth.moosifer.com
        Type: A (Host address)
        Class: IN (0x0001)
        Time to live: 0 time
        Data length: 4
        Addr: 10.50.165.249
```

In such environments, it could prove useful to employ FQDN AOs to control access by hostname. This would be most applicable in networks where hostnames are known, such as where hostname lists are maintained, or where a predictable naming convention is used.

Controlling a Dynamic Host’s Network Access by MAC Address

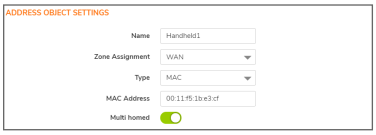
Since DHCP is far more common than static addressing in most networks, it is sometimes difficult to predict the IP address of dynamically configured hosts, particularly in the absence of dynamic DNS updates or reliable hostnames. In these situations, it is possible to use MAC address objects to control a host’s access by its relatively immutable MAC (hardware) address.

Like most other methods of access control, this can be employed either inclusively, for example, to deny access to/for a specific host or group of hosts, or exclusively, where only a specific host or group of hosts are granted access, and all other are denied. In this example, we will illustrate the latter.

Assuming you had a set of DHCP-enabled wireless clients running a proprietary operating system which precluded any type of user-level authentication, and that you wanted to only allow these clients to access an application-specific server (for example, 10.50.165.2) on your LAN. The WLAN segment is using WPA-PSK for security, and this set of clients should only have access to the 10.50.165.2 server, but to no other LAN resources. All other wireless clients should not be able to access the *10.50.165.2* server, but should have unrestricted access everywhere else.

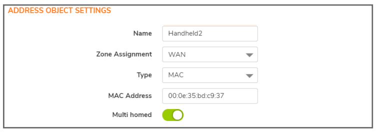
Step 1 – Create the MAC Address Objects:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Click **Add** and create the following MAC address objects (multi-homing optional, as needed).



ADDRESS OBJECT SETTINGS

Name	Handheld1
Zone Assignment	WAN
Type	MAC
MAC Address	00:11:f5:1b:e3:cf
Multi homed	●



ADDRESS OBJECT SETTINGS

Name	Handheld2
Zone Assignment	WAN
Type	MAC
MAC Address	00:0e:35:bd:c9:37
Multi homed	●

3. Once created, if the hosts are present in the firewall's ARP cache, they will be resolved immediately, otherwise they will appear in an *unresolved* state in the **Address Objects** table until they are activated and are discovered through ARP.
4. Create an address group for the handheld devices:

Step 2 – Create the Access Rules:

1. Navigate to **Policy > Access Rules** page.
2. Click **Add** and create four access rules with the settings shown in the below table.

SAMPLE ACCESS RULES

Setting	Access Rule 1	Access Rule 2	Access Rule 3	Access Rule 4
Allow / Deny	Allow	Deny	Allow	Deny
From Zone	WLAN	WLAN	WLAN	WLAN
To Zone	LAN	LAN	LAN	LAN
Service	MediaMoose Services	MediaMoose Services	Any	Any
Source	Handheld Devices	Any	Handheld Devices	Any
Destination	10.50.165.2	10.50.165.2	Any	Any
Users allowed	All	All	All	All
Schedule	Always on	Always on	Always on	Always on

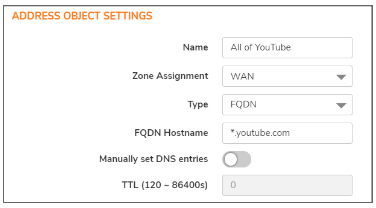
ⓘ **NOTE:** The MediaMoose Services service is used to represent the specific application used by the handheld devices. The declaration of a specific service is optional, as needed.

Bandwidth Managing Access to an Entire Domain

Streaming media is one of the most profligate consumers of network bandwidth. But trying to control access, or manage bandwidth allotted to these sites is difficult because most sites that serve streaming media tend to do so off of large server farms. Moreover, these sites frequently re-encode the media and deliver it over HTTP, making it even more difficult to classify and isolate. Manual management of lists of servers is a difficult task, but wildcard FQDN address objects can be used to simplify this effort.

Step 1 – Create the FQDN Address Objects:

1. Navigate to **Object > Match Objects > Addresses > Address Objects** page.
2. Click **Add** and create the following address object.



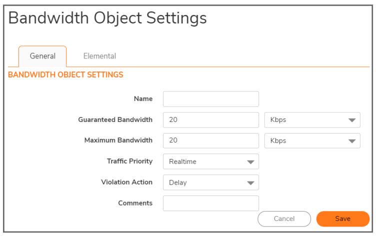
ADDRESS OBJECT SETTINGS

Name	All of YouTube
Zone Assignment	WAN
Type	FQDN
FQDN Hostname	*.youtube.com
Manually set DNS entries	○
TTL (120 ~ 86400s)	0

Upon initial creation, **.youtube.com* resolves to IP addresses *208.65.153.240*, *208.65.153.241*, *208.65.153.242*, but after an internal host begins to resolve hosts for all of the elements within the youtube.com domain, the learned host entries are added, such as the entry for the *v87.youtube.com* server (*208.65.154.84*).

Step 2 – Create the Bandwidth Object

1. Navigate to **Object > Profile Objects > Bandwidth** page.
2. Click **Add** and create the bandwidth object.



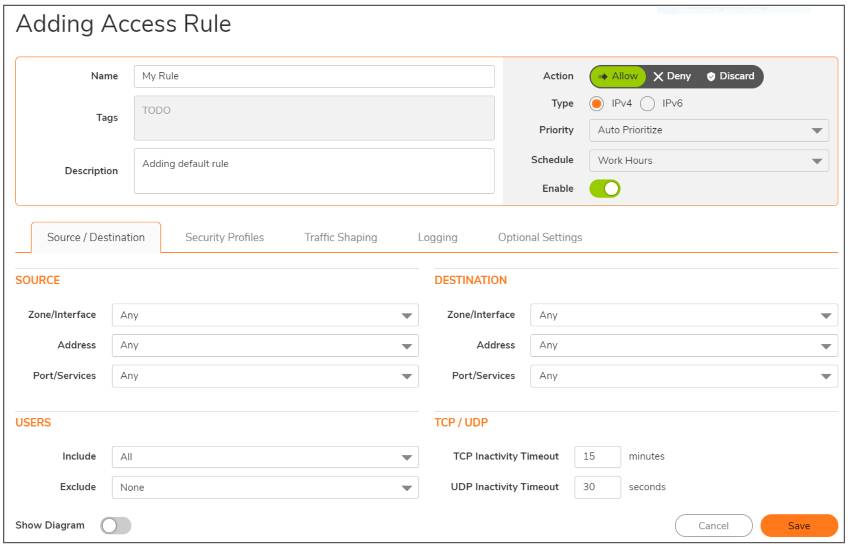
Bandwidth Object Settings

BANDWIDTH OBJECT SETTINGS

Name:
Guaranteed Bandwidth: 20 Kbps
Maximum Bandwidth: 20 Kbps
Traffic Priority: Realtime
Violation Action: Delay
Comments:

Step 3 – Create the Access Rule:

1. Navigate to **Policy > Access Rules** page.
2. Click **Add** and create the access rule:



Adding Access Rule

Name: My Rule
Tags: TODO
Description: Adding default rule
Action: Allow
Type: ● IPv4 ○ IPv6
Priority: Auto Prioritize
Schedule: Work Hours
Enable: On

SOURCE

Zone/Interface: Any
Address: Any
Port/Services: Any

DESTINATION

Zone/Interface: Any
Address: Any
Port/Services: Any

USERS

Include: All
Exclude: None

TCP / UDP

TCP Inactivity Timeout: 15 minutes
UDP Inactivity Timeout: 30 seconds

Show Diagram: Off

After the access rule is created, the Bandwidth Management icon appears within the Access Rule table, indicating that BWM is active and providing statistics. Move your mouse pointer over the icon to see the BWM settings.

Access to all *.youtube.com hosts, using any protocol, is now be cumulatively limited to speed that you have set, a low percentage of your total available bandwidth for all user sessions.

3

Services

Service Objects and Service Groups are configured under**Object > Match Objects > Services** page.

SonicOS supports an expanded IP protocol support to allow users to create service objects, service groups, and access rules based on these custom service protocols. For a list of pre-defined protocols, see Predefined IP Protocols for Custom Service Objects. To add specific IP protocols required for your network, refer to Adding Custom IP Type Services.

Services are used by the SonicWall security appliance to configure access rules for allowing or denying traffic to the network. The SonicWall security appliance includes predefined default service objects and default service groups. You can edit, but not delete, default service objects and default service groups. You can create custom service objects and custom service groups to meet your specific business requirements.

The **View** drop-down list at the top of the page allows you to control the display of default and custom service objects and groups. Select **All** type to display both custom and default entries, select **Custom** to display only custom, or select **Default** to display only default service entries.

About Default Service Objects and Groups

Default service objects and groups are predefined in SonicOS and cannot be deleted, but can be edited. Only ports can be edited for default service objects. For default service groups, you can change the included or excluded services.

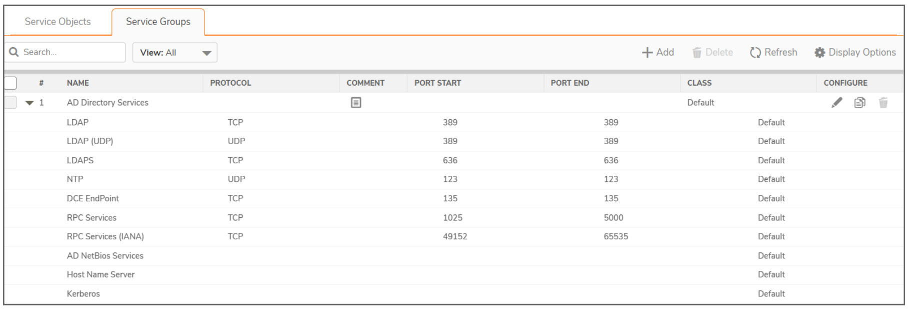
The **Service Objects** and **Service Groups** table display the following attributes of the service objects and service groups.

Name	**The name of the service**
Protocol	The protocol of the service
Port Start	The starting port number for the service.
Port End	The ending port number for the service.
Class	Indicates whether the entry is a **Default** (system) or **Custom** (user) service.
Comment	Move your mouse over the comment icon to display information about the service object or group. A pop-up displays the following: • **Referenced By** – with a list of the types of rules or policies configured on the firewall which use the service object or group, along with the number of references to it for each type. The rule or policy type is displayed as a link when available, such as for **Access Rules**, **NAT Policies**, etc. You

Name	The name of the service
	can click the link to go to the page to see the list of specific rules or policies using the service object or group. - **Groups (Member of)** – with a list of service groups or other types of groups that include the service object or group.
Configure	Displays the **Edit**, **View** and **Delete** icons for the service (default services cannot be deleted and their **Delete** icon is dimmed). The **Edit** icon displays the **Edit Service** dialog. Only ports can be edited for default service objects. For default service groups, you can change the included or excluded services.

Default service groups are groups of default service objects and/or other default service groups. Clicking on the triangle to the left of the group name displays all the individual default service objects and groups included in the group. For example, the **AD Directory Services** default group contains several service objects and service groups (see below image). By grouping these multiple entries together, they can be referenced as a single service in rules and policies throughout SonicOS.

AD DIRECTORY SERVICES GROUP DETAILS



□	#	NAME	PROTOCOL	COMMENT	PORT START	PORT END	CLASS	CONFIGURE
□	▼ 1	AD Directory Services		▤			Default	
		LDAP	TCP		389	389	Default	
		LDAP (UDP)	UDP		389	389	Default	
		LDAPS	TCP		636	636	Default	
		NTP	UDP		123	123	Default	
		DCE EndPoint	TCP		135	135	Default	
		RPC Services	TCP		1025	5000	Default	
		RPC Services (IANA)	TCP		49152	65535	Default	
		AD NetBios Services					Default	
		Host Name Server					Default	
		Kerberos					Default	

Predefined IP Protocols for Custom Service Objects

ICMP (1)	(Internet Control Message Protocol) A TCP/IP protocol used to send error and control messages.
IGMP (2)	(Internet Group Management Protocol) The protocol that governs the management of multicast groups in a TCP/IP network.
TCP (6)	(Transmission Control Protocol) The TCP part of TCP/IP. TCP is a transport protocol in TCP/IP. TCP ensures that a message is sent accurately and in its entirety.
UDP (17)	(User Datagram Protocol) A protocol within the TCP/IP protocol suite that is used in place of TCP when a reliable delivery is not required.
6over4 (41)	(Transmission of IPv6 over IPv4 domains without explicit tunnels) The 6over4 traffic is transmitted inside IPv4 packets whose IP headers have the IP protocol number set to 41.

GRE (47)	(Generic Routing Encapsulation) A tunneling protocol used to encapsulate a wide variety of protocol packet types inside IP tunnels, creating a virtual point-to-point link to firewalls or routing devices over an IP Internetwork.
ESP (50)	(Encapsulated Security Payload) A method of encapsulating an IP datagram inside of another datagram employed as a flexible method of data transportation by IPsec.
AH (51)	(Authentication Header) A security protocol that provides data authentication and optional anti-relay services. AH is embedded in the data to be protected (a full IP datagram).
ICMPv6/ND (58)	(Neighbor Discovery for Internet Message Control Protocol version 6) Neighbor Discovery defines five different ICMP packet types: A pair of Router Solicitation and Router Advertisement messages, a pair of Neighbor Solicitation and Neighbor Advertisements messages, and a Redirect message.
EIGRP (88)	(Enhanced Interior Gateway Routing Protocol) Advanced version of IGRP. Provides superior convergence properties and operating efficiency, and combines the advantages of link state protocols with those of distance vector protocols.
OSPF (89)	(Open Shortest Path First) A routing protocol that determines the best path for routing IP traffic over a TCP/IP network based on distance between nodes and several quality parameters. OSPF is an interior gateway protocol (IGP), which is designed to work within an autonomous system. It is also a link state protocol that provides less router to router update traffic than the RIP protocol (distance vector protocol) that it was designed to replace.
PIM (103)	(Protocol Independent Multicast) One of two PIM operational modes: • PIM sparse mode (PIM-SM) tries to constrain data distribution so that a minimal number of routers in the network receive it. Packets are sent only if they are explicitly requested at the RP (rendezvous point). In sparse mode, receivers are widely distributed, and the assumption is that downstream networks will not necessarily use the datagrams that are sent to them. The cost of using sparse mode is its reliance on the periodic refreshing of explicit join messages and its need for RPs. • PM dense mode (PIM-DM) assumes all downstream routers and hosts want to receive a multicast datagram from a sender and floods multicast traffic throughout the network. Routers without downstream neighbors prune unwanted traffic. To minimize repeated flooding of datagrams and subsequent pruning, PIM DM uses a state refresh message sent by routers directly connected to the source. ⓘ **NOTE:** The firewall can be configured only as a multicast proxy so multicast traffic can be passed through the up-/downstream interface. The firewall cannot act as a PIM router.
L2TP (115)	(Layer 2 Tunneling Protocol) A protocol that allows a PPP session to run over the Internet. L2TP does not include encryption, but defaults to using IPsec to provide virtual private network (VPN) connections from remote users to the corporate LAN.

Adding Service Objects using Predefined Protocols

You can add a custom service object for any of the predefined protocols, or service types:

PREDEFINED SERVICE TYPES

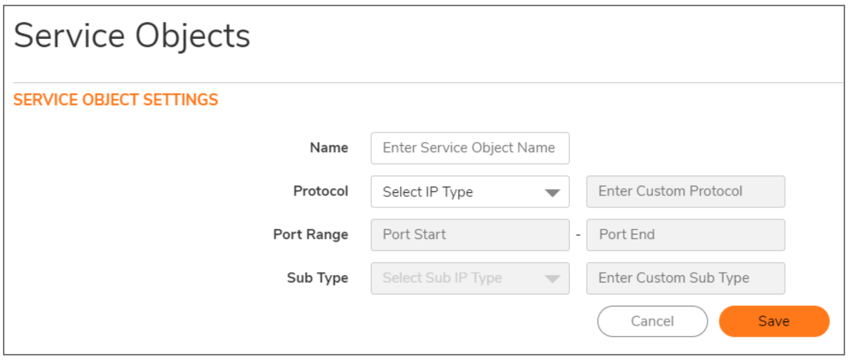
Protocol	IP Number
ICMP	1
IGMP	2
TCP	6
UDP	17
6over4	41
GRE	47
IPsec ESP	50
IPsec AH	51
ICMPv6/ND	58
EIGRP	88
OSPF	89
PIM	103
L2TP	115

For definitions of these protocols, see Predefined IP Protocols for Custom Service Objects.

All custom service objects you create are listed in the **Service Objects** table. You can group custom services by creating a custom service group for easy policy enforcement. If a protocol is not listed as a default service object, you can add a custom service object for it.

To add a custom service object using predefined protocols:

1. Navigate to **Object > Match Objects > Services > Service Objects** page.
2. Click the **Add** button. The **Service Objects** dialog displays.



3. Enter a descriptive name for the service object in the **Name** field.

4. Select the type of IP protocol from the **Protocol** drop-down menu. The fields in the dialog may change.
5. What you enter next depends on your IP protocol selection:
    - For **TCP** and **UDP** protocols, specify the **Port Range**.
    - For **ICMP**, **IGMP**, **OSPF**, and **PIM** protocols, select a Sub Type from the **Sub Type** drop-down menu.

    ⓘ **NOTE:** PIM subtypes apply to both PIM-SM and PIM-DM except the following are for PIM SM only:

    - Type1: Register
    - Type2: Register Stop
    - Type4: Bootstrap
    - Type8: Candidate RP Advertisement
    - For the remaining protocols, you do not need to specify anything further.
6. Click **Save**.

Adding Custom IP Type Services

Using only the predefined IP protocol types, if the security appliance encounters traffic of any other IP protocol type it drops it as *unrecognized*. However, there exists a large and expanding list of other registered IP types, as governed by IANA (Internet Assigned Numbers Authority): http://www.iana.org/assignments/protocol-numbers, so while the rigid practice of dropping less-common (unrecognized) IP Type traffic is secure, it is functionally restrictive.

SonicOS allows you to construct service objects representing any IP type, allowing access rules to then be written to recognize and control IP traffic of any type.

ⓘ **NOTE:** The generic service **Any** does not handle custom IP type service objects. In other words, simply defining a custom IP type service object for “IP Type 126” does not allow IP Type 126 traffic to pass through the default **LAN > WAN** Allow rule.

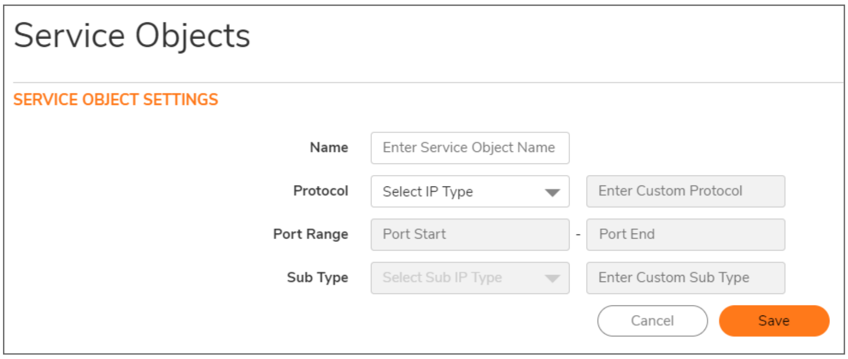
You need to create an access rule specifically containing the custom IP type service object to provide for its recognition and handling, as illustrated in Configuration Example.

Configuration Example

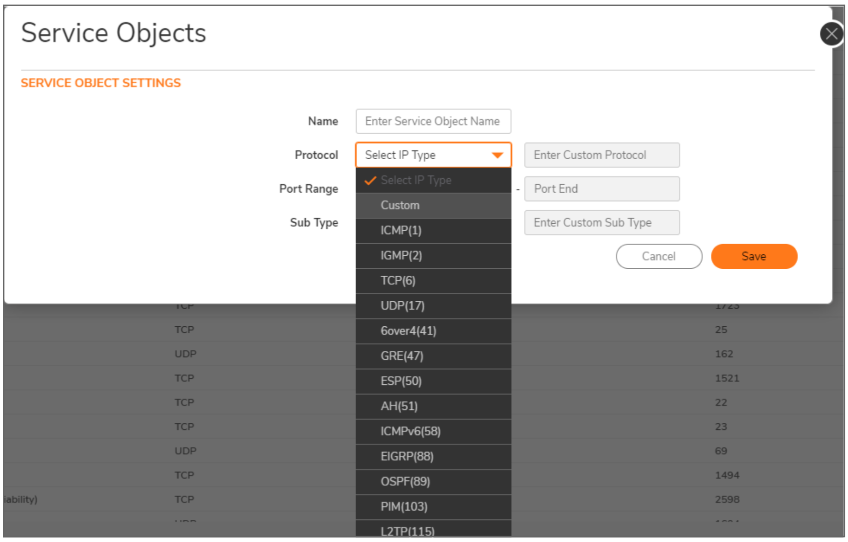
Assume an administrator needs to allow RSVP (Resource Reservation Protocol - IP Type 46) and SRP (Spectralink™ Radio Protocol – IP type 119) from all clients on the WLAN zone (WLAN Subnets) to a server on the LAN zone (for example, *10.50.165.26*). You can define custom IP type service objects to handle these two services.

To define a custom IP type service and related configuration:

1. Navigate to **Object > Match Objects > Services > Service Objects** page.
2. Click the **Add** button. The **Service Objects** dialog displays.



3. Enter a descriptive name for the service object in the **Name** field.
4. Select **Custom** IP type from the **Protocol** drop-down menu.

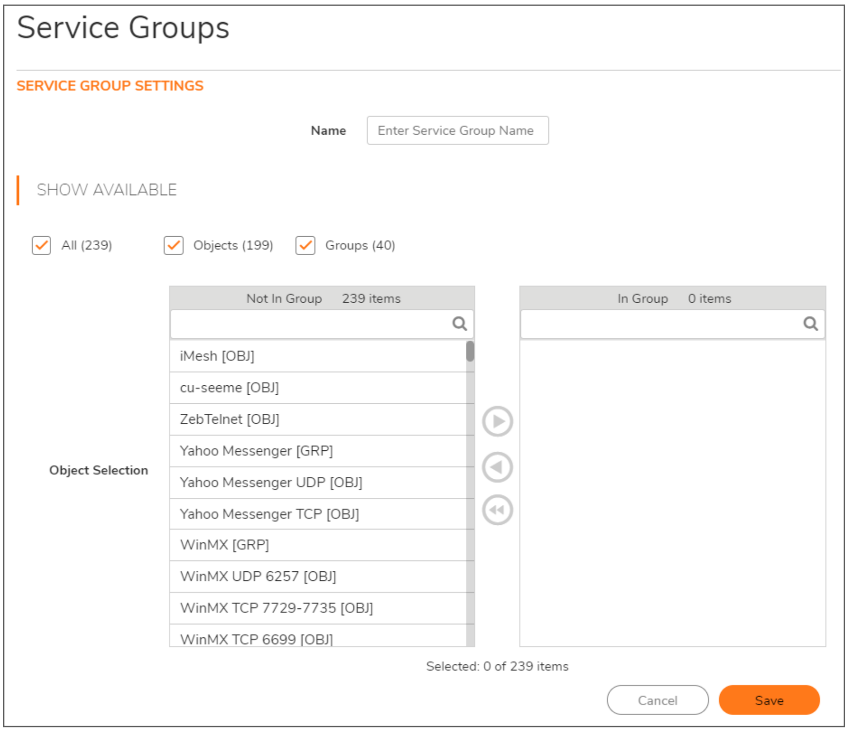


5. In the field to the right of the **Protocol** drop-down list, type in the protocol number for the **Custom** IP Type.

   ⓘ **NOTE:** The **Port Range** and **Sub Type** fields are not definable or applicable to a Custom IP Type.

   ⓘ **NOTE:** Attempts to define a custom protocol type service object for a predefined IP type is not permitted and results in an error message.

6. Click **Save**.
7. Repeat **Step 3 through Step 6** for each custom service to be defined.
8. Navigate to **Object > Match Objects > Services > Service Groups** page.
9. Click the **Add** button. The **Service Groups** dialog displays.



Service Groups

SERVICE GROUP SETTINGS

Name: Enter Service Group Name

SHOW AVAILABLE

☑ All (239) ☑ Objects (199) ☑ Groups (40)

Object Selection

Not In Group 239 items
iMesh [OBJ]
cu-seeme [OBJ]
ZebTelnet [OBJ]
Yahoo Messenger [GRP]
Yahoo Messenger UDP [OBJ]
Yahoo Messenger TCP [OBJ]
WinMX [GRP]
WinMX UDP 6257 [OBJ]
WinMX TCP 7729-7735 [OBJ]
WinMX TCP 6699 [OBJ]

In Group 0 items

Selected: 0 of 239 items

10. Enter a descriptive name for the service group in the **Name** field, such as *myServices*.
11. Select the custom service objects you just created from the list on the left, and then click the **Right Arrow** button to move them into the list on the right.

    ⓘ **NOTE:** Press **Ctrl** or **Shift** to select multiple service objects, and then click the **Right Arrow** button to move them all at one time.
12. Click **Save**.
13. Navigate to **Object > Match Objects > Services > Service Objects** page.
14. Click the **Add** button. The **Service Objects** dialog displays.
15. Create an address object for the host that the WLAN Subnets can access using *myServices*.
16. Select the custom service objects you just created from the list on the left, and then click the **Right Arrow** button to move them into the list on the right.

    ⓘ **NOTE:** Press **Ctrl** or **Shift** to select multiple service objects, and then click the **Right Arrow** button to move them all at one time.
17. Click **Save**.
18. Navigate to **Policy > Rules and Policies > Access Rules** page to create a **WLAN > LAN** rule.
19. Define an access rule allowing *myServices* from **WLAN Subnets** to the *10.50.165.26* address object.

    ⓘ **NOTE:** It may be necessary to create an access rule for bidirectional traffic; for example, an additional access rule from the **LAN > WLAN** allowing *myServices* from *10.50.165.26* to WLAN Subnets.
20. Click **Save**.

    IP protocol 46 and 119 traffic will now be recognized and allowed to pass from WLAN Subnets to the host at *10.50.165.26*.

Editing Custom Service Objects

Click the **Edit** icon under **Configure** column to edit the service object which includes the same configuration settings as the **Add Service dialog**. See Adding Service Objects using Predefined Protocols or Adding Custom IP Type Services

Deleting Custom Service Objects

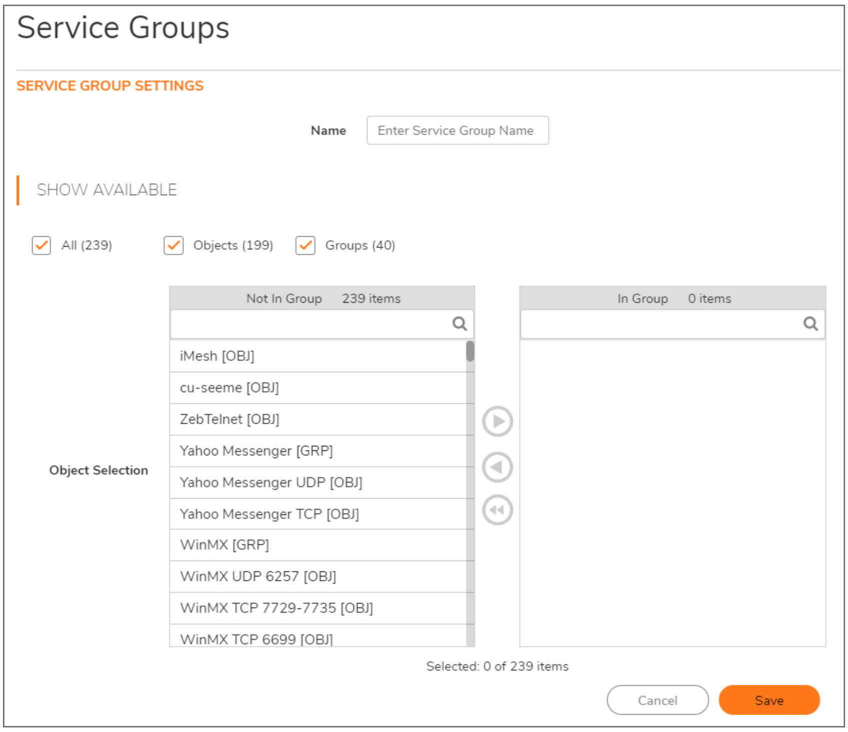
In the row for the service object you want to delete, click the **Delete** icon under **Configure** column to delete an individual custom service object. To delete one or more custom service objects, select the checkboxes for the desired entries and click **Delete** at the top of the table.

Adding Custom Service Groups

You can add custom services and then create groups of services, including default services, to apply the same policies to them. For instance, you can allow SMTP and POP3 traffic only during certain hours or days of the week by adding the two services as a custom service group.

To create a custom service group:

1. Navigate to **Object > Match Objects > Services > Service Groups** page.
2. Click the **Add** button. The**Service Groups** dialog displays.



Service Groups

SERVICE GROUP SETTINGS

Name: Enter Service Group Name

SHOW AVAILABLE

☑ All (239) ☑ Objects (199) ☑ Groups (40)

Object Selection

Not In Group 239 items

- iMesh [OBJ]
- cu-seeme [OBJ]
- ZebTelnet [OBJ]
- Yahoo Messenger [GRP]
- Yahoo Messenger UDP [OBJ]
- Yahoo Messenger TCP [OBJ]
- WinMX [GRP]
- WinMX UDP 6257 [OBJ]
- WinMX TCP 7729-7735 [OBJ]
- WinMX TCP 6699 [OBJ]

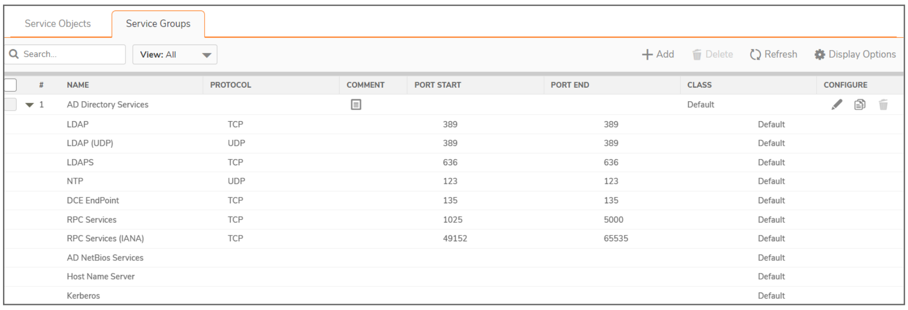
In Group 0 items

Selected: 0 of 239 items

3. Enter a name for the custom group in the **Name** field.
4. Select the custom service objects you just created from the list on the left, and then click the **Right Arrow** button to move them into the list on the right.

   ⓘ **NOTE:** Press **Ctrl** or **Shift** to select multiple service objects, and then click the **Right Arrow** button to move them all at one time.
5. Click **Save**.

Clicking the triangle to the left of a Custom service group name, expands the display to show all the individual Custom Services, Default Services, and Custom Services Groups included in the Custom service group entry.



□	#	NAME	PROTOCOL	COMMENT	PORT START	PORT END	CLASS	CONFIGURE
□	▼ 1	AD Directory Services		▤			Default	✎ ⎘ 🗑
		LDAP	TCP		389	389	Default	
		LDAP (UDP)	UDP		389	389	Default	
		LDAPS	TCP		636	636	Default	
		NTP	UDP		123	123	Default	
		DCE EndPoint	TCP		135	135	Default	
		RPC Services	TCP		1025	5000	Default	
		RPC Services (IANA)	TCP		49152	65535	Default	
		AD NetBios Services					Default	
		Host Name Server					Default	
		Kerberos					Default	

Editing Custom Service Groups

Click the **Edit** icon in the **Configure** column to edit the custom service group, which includes the same configuration settings as the **Add Service Group** dialog. For more information, see Adding Custom Service Groups.

You also can edit individual services of a custom service group by expanding the group, and clicking the **Edit** icon for the service.

Deleting Custom Service Groups

In the row for the service group you want to delete, click the **Delete** icon under **Configure** to delete an individual custom service group. To delete one or more custom service groups, select the checkboxes for the desired entries, click **Delete** at the top of the table.

4

URI Lists

A **URI List Object** defines a list of URIs (Uniform Resource Identifiers) or domains that can be marked as allowed or forbidden. You can also export a URI list to an external file or import a file into a URI list.

ⓘ | **NOTE:** When processing, URI lists have a higher priority than the category of a URI.

URI List Objects have the following requirements:

- Up to 128 URI List Objects are allowed.
- Each URI List Object supports up to 5000 URIs. The minimum number is 1.
- Up to 100 Keywords can be configured in each URI List Object. The minimum is zero.

About URIs and the URI List

Each **URI List Object** must have at least one URI in its **URI List**. You can manually add entries to the **URI List** by typing or pasting them in, or you can import a list of URIs from a text (*.txt*) file. The file can be created manually, or can be a file that was previously exported from the appliance. Each URI in the file is on its own line.

You can export the **URI List** contents into a text file that you can import later.

The URIs and URI List have the following requirements:

- Each URI can be up to 255 characters.
- The maximum combined length of all URIs in one URI List is 131,072 (1024*128) characters, including one character for each new line (carriage return) between the URIs.
- By definition, a URI is a string containing host and path. Port and other content are currently not supported, but you can use Keywords to match these.
- The host portion of a URI can be an IPv4 or IPv6 address string.
- Each URI can contain up to 16 tokens. A token in a URI is a string composed of the characters:

  0 through 9
  a through z
  A through Z
  $ - _ + ! ' ( ) , .

  - Each token can be up to 64 characters, including one character for each separator (. or /) surrounding the token.
  - An asterisk (*) can be used as a wildcard representing a sequence of one or more valid tokens, not one or more characters.

Examples of valid URIs	Examples of invalid URIs
• *news.example.com* • *news.example.com/path* • *news.example.com/path/abc.txt* • *news.*.com/*.txt* • *10.10.10.10* • *10.10.10.10/path* • *[2001:2002::2003]/path* • *[2001:2002::2003:*:2004]/path/*.txt*	Using the wildcard character (*) incorrectly can result in invalid URIs such as: • *example*.com* • *exa*ple.com* • *example.*.*.com* ⓘ **NOTE:** The wildcard character represents a sequence of one or more tokens, not one or more characters.

About URI List Groups

Starting in SonicOS 6.5.2, URI List Groups are supported for flexible and convenient management of URI List Objects, including CFS profile allowed and forbidden lists or for a Websense exclusion list. You can assign multiple URI List Objects to one group, and refer to that group directly within other modules. The URI List Group supports nested inclusion, allowing one URI List Group to contain other URI List Groups. A URI List Group can be used anywhere that a URI List Object can be used.

You can configure up to 128 URI List Groups, and the maximum length of a URI List Group name is 49 characters. You can assign up to 128 URI List Objects and/or URI List Groups to a URI List Group. The maximum number of unique URIs is 5000, and the maximum number of unique keywords is 100.

About Keywords and the Keyword List

A URI List Object uses its URI List to match URIs when scanning web traffic. It uses a token-based match algorithm, which means torrent.com does not match seedtorrent.com. The Keyword List makes URI matching more flexible, allowing the URI List Object to match traffic by matching other portions of a URI.

If a web traffic URI string (host+path+queryString) has any sub-string in the keyword list, the URI List Object gets a match. For example, if “sports” and “news” are in the keywords list, the URI List Object can match www.extremsports.com, news.google.com/news/headlines?ned=us&hl=en, or www.yahoo.com/?q=sports.

As with the URI List, you can manually add entries to the **Keyword List** by typing or pasting them in, or you can import a list of keywords from a text (*.txt*) file. The file can be created manually, or can be a file that was previously exported from the appliance. Each keyword in the file is on its own line.

You can export the **Keyword List** contents into a text file that you can import later.

Keyword and Keyword List requirements:

- Each keyword can contain up to 255 printable ASCII characters.
- The maximum combined length of keywords in one **Keyword List** is limited to 1024 * 2, including one character for each new line (carriage return) between the keywords.

Matching URI List Objects

The matching process for **URI List Objects** is based on tokens. A valid token sequence is composed of one or more tokens, joined by a specific character, like "." or "/". A URI represents a token sequence. For example, the URI *www.example.com* is a token sequence consisting of www, example, and com, joined by a ".". Generally, if a URI contains one of the URIs in a URI List Object, then the URI List Object matches that URI.

Normal matching

If a list object contains a URI such as *example.com*, then that object matches URIs defined as:

[<token sequence>(.|/)]example.com[(.|/)<token sequence>]

For example, the URI List Object matches any of the following URIs:

- *example.com*
- *www.example.com*
- *example.com.uk*
- *www.example.com.uk*
- *example.com/path*

The URI List Object does not match the URI, *specialexample.com*, because *specialexample* is identified as a different token than *example*.

Wildcard matching

Wildcard matching is supported. An asterisk (*) is used as the wildcard character, and represents a valid sequence of tokens. If a list object contains a URI such as *example.*.com*, then that list object matches URIs defined as:

[<token sequence>(.|/)]example.<token sequence>.com[(.|/)<token sequence>]

For example, the URI List Object *example.*.com* matches any of the following URIs:

- *example.exam1.com*
- *example.exam1.exam2.com*
- *www.example.exam1.com/path*

The URI List Object does not match the URI:

- *example.com*

This is because the wildcard character (*) represents a valid token sequence that isn't present in *example.com*.

IPv6 Address Matching

IPv6 address string matching is also supported. While an IPv4 address can be handled as a normal token sequence, an IPv6 address string needs to be handled specially. If a URI List Object contains a URI such as *[2001:2002::2008]*, then that URI List Object matches URIs defined as:

[2001:2002::2008][/<token sequence>]

For example, the URI List Object matches any of the following URIs:

- *[2001:2002::2008]*
- *[2001:2002::2008]/path*
- *[2001:2002::2008]/path/abc.txt*

IPv6 Wildcard Matching

Wildcard matching in the IPv6 address string is supported. If a list object contains a URI such as *[2001:2002:*:2008]/*/abc.mp3*, then that list object matches URIs defined as:

[2001:2002:<token sequence>:2008]/<token sequence>/abc.mp3

For example, the URI List Object matches any of the following URIs:

- *[2001:2002:2003::2007:2008]/path/abc.txt*
- *[2001:2002:2003:2004:2005:2006:2007:2008]/path/path2/abc.txt*

Using URI List Objects

Currently, URI List Objects can be used in these fields:

- Allowed URI List of a CFS profile
- Forbidden URI List of a CFS profile
- Web Excluded Domains of Websense

CFS URI List Objects are used in these fields differently. When used in an Allowed or URI Forbidden List of a CFS profile, the CFS URI List Object acts normally. For example, if the URI List Object contains a URI such as *example.com/path/abc.txt*, then that list object matches URIs defined as:

[<token sequence>(.|/)] example.com/path/abc.txt[(.|/)<token sequence>]

When used by the Web Excluded Domains of Websense, only the host portion of the URI takes effect. For example, if the URI List Object contains the same URI as above, *example.com/path/abc.txt*, then that list object matches all domains containing the token sequence *example.com*. The path portion in the URI is ignored.

Managing URI List Objects

Topics:

- About the URI List Objects Table
- Configuring URI List Objects
- Editing a URI List Object
- Exporting a URI List Object
- Deleting URI List Objects

About the URI List Objects Table

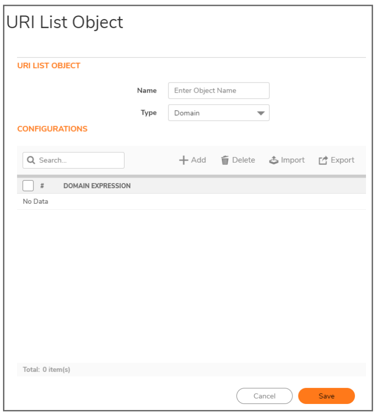
To view the URI List Objects, navigate to **Object > Match Objects > URL Lists > URL List Objects** tab.

Name	**Name of the URI List Object.**
URI List	Specifies the URIs in the URI List Object.
Keyword List	Specifies the Keywords configured in the URI List Object.
Configure	Contains the **Edit**, **Clone**, and **Delete** icons for each entry in the table.

Configuring URI List Objects

To configure URI List Objects:

1. Navigate to **Object > Match Objects > URL Lists > URI List Objects** tab.
2. At the top of the page, click **Add**.



URI List Object

URI LIST OBJECT

Name: Enter Object Name

Type: Domain

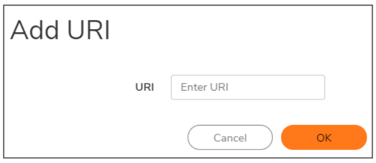
CONFIGURATIONS

☐	#	DOMAIN EXPRESSION
No Data		

Total: 0 item(s)

3. Enter a descriptive name for the URI List Object in the **Name** field.
4. You can either add the URIs or import them from a file. To:
   - Add URIs, go to *Step 6*.
   - Import URIs, go to *Step 10*.

5. Click **Add** to manually add URIs. The **Add URI** dialog displays.



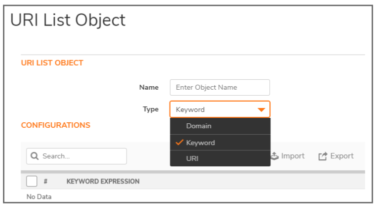
6. Enter a URI and then click **OK**. See About URIs and the URI List for information about URI requirements.
7. Repeat *Step 5* and *Step 6* until you have added all the URIs for the list.
8. To skip the Import steps, go to *Step 13*. Importing URIs from a file will overwrite any manually added URIs.
9. Click **Import** to import a list of URIs from a text file. A confirmation message displays.

   ⓘ | **IMPORTANT:** The file must confirm to the conditions stated in About URIs and the URI List.

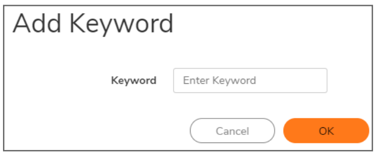
   URIs in the text file can be separated by any of these separators, which are added by pressing **Enter** or **Return** on your keyboard:

Separator	Style
\r\n	Windows style, new line separator
\r	MAC OS style, new line separator
\n	UNIX style, new line separator

   Only the first 2000 valid URIs in the file are imported. Invalid URIs are skipped and do not count toward the maximum of 2000 URIs per **URI List Object**.
10. Click **Confirm**. The **File Upload** dialog displays.
11. Select the file and click **Open**. The URI List table is populated. Any URIs that were already added via the **Add** button are replaced by the URIs in the imported file.
12. When finished adding URIs to the **URI List**, optionally select **Keyword** from the **Type** drop-down to add some keywords.



   ⓘ | **IMPORTANT:** For information about keywords and the **Keyword List**, see About Keywords and the Keyword List.
13. Click **Add** to manually add keywords. The **Add Keyword** dialog displays.



14. Type or paste a keyword into the field, then click **OK**.
15. Repeat *Step 13* and *Step 14* until you have added all the keywords for the list.
16. To import a keyword list from a text file instead of adding keywords manually, click **Import**. A confirmation message displays.

17. Click **Confirm**. The **File Upload** dialog displays.
18. Select the file and click **Open**. The Keyword List table is populated. Any keywords that were already added via the **Add** button are replaced by the keywords in the imported file.
19. When finished adding URIs and keywords, click **OK** in the **Add CFS URI List Object** dialog.
20. Click **Add**. The **URI List Objects** table is populated.

    OR

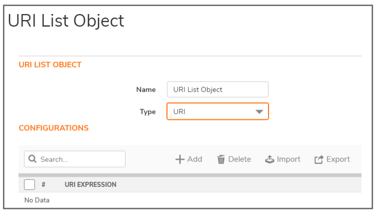
    Click **Cancel** to close the **URI List Object** dialog.

Exporting a URI List Object

To export a URI List Object:

1. Navigate to **Object > Match Objects > URL Lists > URI List Objects** tab.
2. In the **Configure** column, click the **Edit** icon for the list object to be exported.

   The **URI List Object** dialog displays.



URI List Object

URI LIST OBJECT

Name: URI List Object

Type: URI

CONFIGURATIONS

□	#	URI EXPRESSION
No Data		

3. To export the URI List, click the **URI List** button and then click **Export**.

Editing a URI List Object

To edit a URI List Object:

1. Navigate to **Object > Match Objects > URL Lists > URI List Objects** tab.
2. In the **Configure** column, click the **Edit** icon for the list object to be edited.
3. Select either URI List or Keyword List by clicking the button. You can:
   - Delete an entry in the URI List table or Keyword List table by clicking on the entry's Delete icon.
   - Select the entries in the table and click **Delete** button. Click **OK** in the confirmation message.

     When you click OK in the **URI List Object** dialog, a message indicates that there must be at least one entry left in the URI List table (this is not required for the Keyword List table). Either:
     - Add one or more entries to the table.
     - Import entries from a file.
     - Click **Cancel** and try a different approach.
   - Edit an entry by clicking the **Edit** icon. The Edit URI or Edit Keyword dialog displays, depending on which screen you selected for this step.
     - Make changes to the URI or the keyword.
     - Click **Save**. The URI List table or Keyword List table is updated.
4. Click **OK** in the **URI List Object** dialog.

Deleting URI List Objects

To delete URI List Objects:

1. Navigate to **Object > Match Objects > URL Lists > URI List Objects**tab.
2. Do one of these:
   - Click the **Delete** icon in the **Configure** column for the list object to be deleted.
   - Click the checkbox for one or more list objects to be deleted. Click the **Delete** button on top of the table.

Managing URI List Groups

Topics:

- About the URI List Groups Table
- Adding URI List Groups
- Editing a URI List Group
- Deleting URI List Groups

About the URI List Groups Table

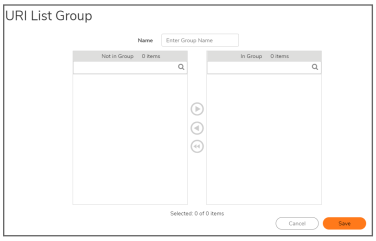
Name	Name of the URI List Group.
URI List	Specifies the URIs in the URI List Group.
Keyword List	Specifies the Keywords configured in the URI List Group.
Configure	Contains the **Edit**, **Clone** and **Delete** icons for each entry in the table.

Adding URI List Groups

To add a URI List Group:

1. Navigate to **Object > Match Objects > URL Lists > URI List Groups** tab.
2. At the top of the page, click **Add**.

   The **URI List Group** dialog displays. A list of all configured URI List Objects and URI List Groups is displayed on the left side of the dialog.



3. Enter a descriptive name for the URI List Group in the **Name** field.
4. Click on an item in the list on the left that you want to include in the URI List Group.
5. Click the right arrow button to move the selected item into the field on the right.
6. Click **Save** to create the URI List Group using the list on the right.

Editing a URI List Group

To edit a URI List Group:

1. Navigate to **Object > Match Objects > URL Lists > URI List Groups** tab.
2. In the **Configure** column, click the **Edit** icon for the group to be edited.
3. Click on an item in either side and use the left or right arrow button to move it to the other side. Items on the right are part of the URI List Group. You can click **un-select all items icon** to move all items from the right to the left side, if you want to remove all of them from the URI List Group.
4. Click **Save**.

Deleting URI List Groups

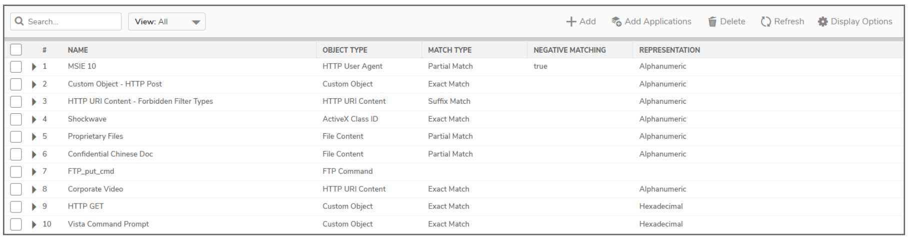
To delete URI List Groups:

1. Navigate to **Object > Match Objects > URI Lists > URI List Groups** tab.
2. Do one of these:
   - Click the **Delete** icon in the **Configure** column for the group to be deleted.
   - Click the checkbox for one or more groups to be deleted. Click the **Delete** icon on top of the table.

5

Match Objects

This section provides an overview of match objects and application list objects and describes how to create and configure them.



#	NAME	OBJECT TYPE	MATCH TYPE	NEGATIVE MATCHING	REPRESENTATION
1	MSIE 10	HTTP User Agent	Partial Match	true	Alphanumeric
2	Custom Object - HTTP Post	Custom Object	Exact Match		Alphanumeric
3	HTTP URI Content - Forbidden Filter Types	HTTP URI Content	Suffix Match		Alphanumeric
4	Shockwave	ActiveX Class ID	Exact Match		Alphanumeric
5	Proprietary Files	File Content	Partial Match		Alphanumeric
6	Confidential Chinese Doc	File Content	Partial Match		Alphanumeric
7	FTP_put_cmd	FTP Command			
8	Corporate Video	HTTP URI Content	Exact Match		Alphanumeric
9	HTTP GET	Custom Object	Exact Match		Hexadecimal
10	Vista Command Prompt	Custom Object	Exact Match		Hexadecimal

Topics:

- About Match Objects
- About Application List Objects
- Configuring a Match Object
- Configuring Application List Objects

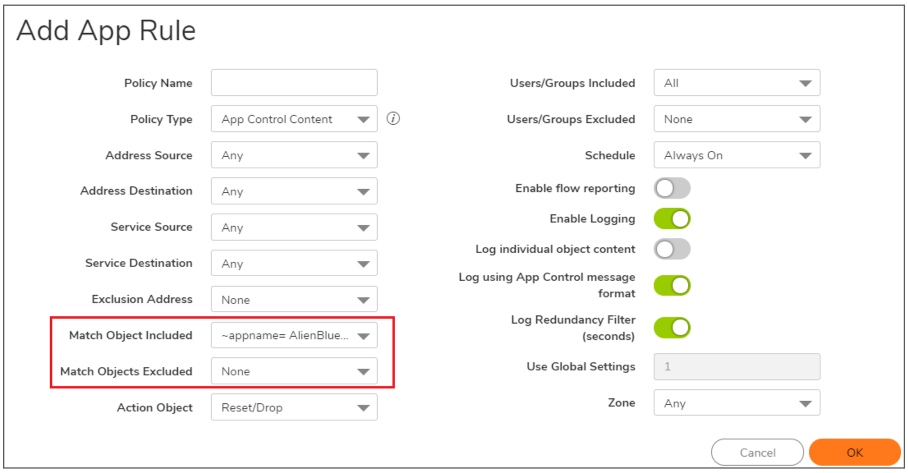
About Match Objects

Match objects represent the set of conditions which must be matched in order for actions to take place. This includes the object type, the match type (exact, partial, regex, prefix, or suffix), the input representation (text or hexadecimal), and the actual content to match. Match objects were referred to as application objects in previous releases.

Hexadecimal input representation is used to match binary content such as executable files, while alphanumeric (text) input representation is used to match things like file or email content. You can also use hexadecimal input representation for binary content found in a graphic image. Text input representation could be used to match the same graphic if it contains a certain string in one of its properties fields. Regular expressions (regex) are used to match a pattern rather than a specific string or value, and use alphanumeric input representation.

The File Content match object type provides a way to match a pattern or keyword within a file. This type of match object can only be used with FTP Data Transfer, HTTP Server, or SMTP Client policies.

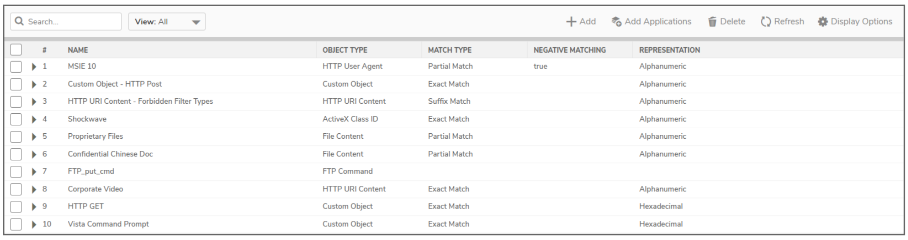
Application List and Application Category List match object types can be used with App Based Route policies, which are supported are configured on the **Policy > App Rules** page.



Add App Rule

Policy Name		Users/Groups Included	All
Policy Type	App Control Content	Users/Groups Excluded	None
Address Source	Any	Schedule	Always On
Address Destination	Any	Enable flow reporting	○
Service Source	Any	Enable Logging	●
Service Destination	Any	Log individual object content	○
Exclusion Address	None	Log using App Control message format	●
Match Object Included	~appname= AlienBlue...	Log Redundancy Filter (seconds)	●
Match Objects Excluded	None	Use Global Settings	1
Action Object	Reset/Drop	Zone	Any

These objects are created by clicking the **Add**or **Add Applications** option on the **Objects > Match Objects** page. For information about App Based Route policies, see the *SonicOS System Setup administration* documentation.



#	NAME	OBJECT TYPE	MATCH TYPE	NEGATIVE MATCHING	REPRESENTATION
1	MSIE 10	HTTP User Agent	Partial Match	true	Alphanumeric
2	Custom Object - HTTP Post	Custom Object	Exact Match		Alphanumeric
3	HTTP URI Content - Forbidden Filter Types	HTTP URI Content	Suffix Match		Alphanumeric
4	Shockwave	ActiveX Class ID	Exact Match		Alphanumeric
5	Proprietary Files	File Content	Partial Match		Alphanumeric
6	Confidential Chinese Doc	File Content	Partial Match		Alphanumeric
7	FTP_put_cmd	FTP Command			
8	Corporate Video	HTTP URI Content	Exact Match		Alphanumeric
9	HTTP GET	Custom Object	Exact Match		Hexadecimal
10	Vista Command Prompt	Custom Object	Exact Match		Hexadecimal

The below table describes the supported match object types.

SUPPORTED MATCH OBJECT TYPES

Object Type	Description	Match Types	Negative Matching	Extra Properties
ActiveX ClassID	Class ID of an Active-X component. For example, ClassID of Gator Active-X component is “c1fb8842-5281-45ce-a271-8fd5f117ba5f”	Exact	No	None
Application Category List	Allows specification of application categories, such as Multimedia., P2P, or Social Networking	N/A	No	None
Application List	Allows specification of individual	N/A	No	None

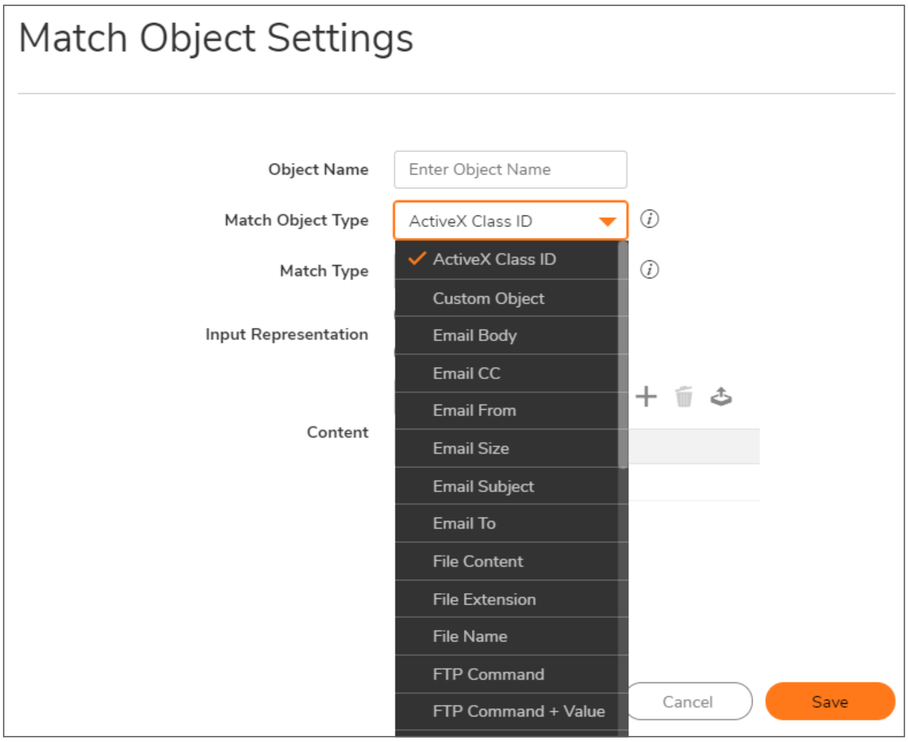
Object Type	Description	Match Types	Negative Matching	Extra Properties
	applications within the application category that you select			
Application Signature List	Allows specification of individual signatures for the application and category that you select	N/A	No	None
Custom Object	Allows specification of an IPS-style custom set of conditions.	Exact	No	There are 4 additional, optional parameters that can be set: offset (describes from what byte in packet payload we should start matching the pattern – starts with 1; helps minimize false positives in matching), depth (describes at what byte in the packet payload we should stop matching the pattern – starts with 1), minimum payload size and maximum payload size.
Email Body	Any content in the body of an email.	Partial	No	None
Email CC (MIME Header)	Any content in the CC MIME Header.	Exact, Partial, Prefix, Suffix	Yes	None
Email From (MIME Header)	Any content in the From MIME Header.	Exact, Partial, Prefix, Suffix	Yes	None
Email Size	Allows specification of the maximum email size that can be sent.	N/A	No	None
Email Subject (MIME Header)	Any content in the Subject MIME Header.	Exact, Partial, Prefix, Suffix	Yes	None
Email To (MIME Header)	Any content in the To MIME Header.	Exact, Partial, Prefix, Suffix	Yes	None
MIME Custom Header	Allows for creation of MIME custom headers.	Exact, Partial, Prefix, Suffix	Yes	A Custom header name needs to be specified.
File Content	Allows specification	Partial	No	'Disable attachment' action should never be applied to

Object Type	Description	Match Types	Negative Matching	Extra Properties
	of a pattern to match in the content of a file. The pattern will be matched even if the file is compressed.			this object.
Filename	In cases of email, this is an attachment name. In cases of HTTP, this is a filename of an uploaded attachment to the Web mail account. In cases of FTP, this is a filename of an uploaded or downloaded file.	Exact, Partial, Prefix, Suffix	Yes	None
Filename Extension	In cases of email, this is an attachment filename extension. In cases of HTTP, this is a filename extension of an uploaded attachment to the Web mail account. In cases of FTP, this is a filename extension of an uploaded or downloaded file.	Exact	Yes	None
FTP Command	Allows selection of specific FTP commands.	N/A	No	None
FTP Command + Value	Allows selection of specific FTP commands and their values.	Exact, Partial, Prefix, Suffix	Yes	None
HTTP Cookie Header	Allows specification of a Cookie sent by a browser.	Exact, Partial, Prefix, Suffix	Yes	None
HTTP Host Header	Content found	Exact, Partial, Prefix, Suffix	Yes	None

Object Type	Description	Match Types	Negative Matching	Extra Properties
	inside of the HTTP Host header. Represents hostname of the destination server in the HTTP request, such as *www.google.com*.			
HTTP Referrer Header	Allows specification of content of a Referrer header sent by a browser – this can be useful to control or keep stats of which Web sites redirected a user to customer's Web site.	Exact, Partial, Prefix, Suffix	Yes	None
HTTP Request Custom Header	Allows handling of custom HTTP Request headers.	Exact, Partial, Prefix, Suffix	Yes	A Custom header name needs to be specified.
HTTP Response Custom Header	Allows handling of custom HTTP Response headers.	Exact, Partial, Prefix, Suffix	Yes	A Custom header name needs to be specified.
HTTP Set Cookie Header	Set-Cookie headers. Provides a way to disallow certain cookies to be set in a browser.	Exact, Partial, Prefix, Suffix	Yes	None
HTTP URI Content	Any content found inside of the URI in the HTTP request.	Exact, Partial, Prefix, Suffix	No	None
HTTP User-Agent Header	Any content inside of a User-Agent header. For example: User-Agent: Skype.	Exact, Partial, Prefix, Suffix	Yes	None
Web Browser	Allows selection of specific Web browsers (MSIE, Netscape, Firefox, Safari, Chrome).	N/A	Yes	None
IPS Signature Category List	Allows selection of one or more IPS signature groups.	N/A	No	None

Object Type	Description	Match Types	Negative Matching	Extra Properties
	Each group contains multiple pre-defined IPS signatures.			
IPS Signature List	Allows selection of one or more specific IPS signatures for enhanced granularity.	N/A	No	None

You can see the available types of match objects in a drop-down menu in the **Match Object Settings** dialog.



Match Object Settings

Object Name: Enter Object Name

Match Object Type: ActiveX Class ID

Match Type

Input Representation

Content

- In the **Match Object Settings** dialog, you can add multiple entries to create a list of content elements to match. All content that you provide in a match object is case-insensitive for matching purposes. A hexadecimal representation is used to match binary content. You can use a hex editor or a network protocol analyzer like Wireshark to obtain hex format for binary files. For more information about these tools, see the Wireshark and Hex Editor sections in **Policy > App Rules**.

You can use the (Load From File) icon to import content from predefined text files that contain multiple entries for a match object to match. Each entry in the file must be on its own line. The Load From File feature allows you to easily move App Rules settings from one firewall to another.

Multiple entries, either from a text file or entered manually, are displayed in the List area. List entries are matched using the logical OR, so if any item in the list is matched, the action for the policy is executed.

A match object can include a total of no more than 8000 characters. If each element within a match object contains approximately 30 characters, then you can enter about 260 elements. The maximum element size is 8000 bytes.

Topics:

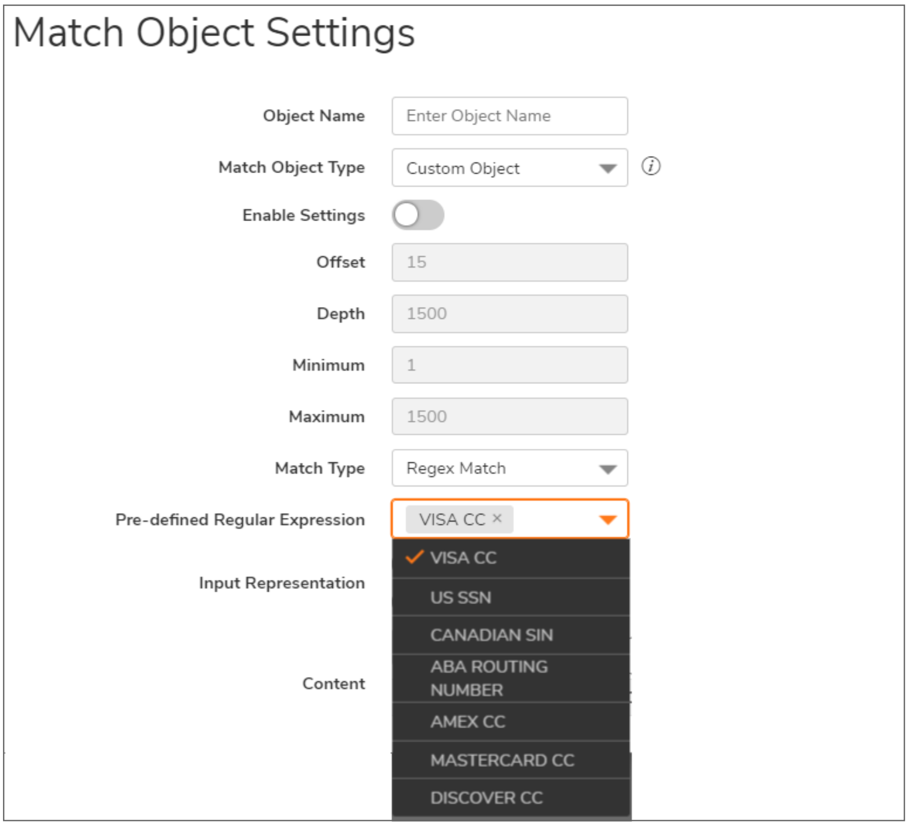
- About Regular Expressions
- About Negative Matching

About Regular Expressions

You can configure regular expressions in certain types of match objects for use in App Rules policies. The Match Object Settings options provide a way to configure custom regular expressions or to select from predefined regular expressions. The SonicWall implementation supports reassembly-free regular expression matching on network traffic. This means that no buffering of the input stream is required, and patterns are matched across packet boundaries.

SonicOS provides the following predefined regular expressions:

VISA CC	VISA Credit Card Number
US SSN	United States Social Security Number
CANADIAN SIN	Canadian Social Insurance Number
ABA ROUTING NUMBER	American Bankers Association Routing Number
AMEX CC	American Express Credit Card Number
MASTERCARD CC	Mastercard Credit Card Number
DISCOVER CC	Discover Credit Card Number



Match Object Settings

Object Name: Enter Object Name

Match Object Type: Custom Object

Enable Settings

Offset: 15

Depth: 1500

Minimum: 1

Maximum: 1500

Match Type: Regex Match

Pre-defined Regular Expression: VISA CC ×

Input Representation

Content

Policies using regular expressions match the first occurrence of the pattern in network traffic. This enables actions on matches as soon as possible. Because matching is performed on network traffic and not only on human-readable text, the matchable alphabet includes the entire ASCII character set — all 256 characters.

Popular regular expression primitives such as '.', (the any character wildcard), '*', '?', '+', repetition count, alternation, and negation are supported. Though the syntax and semantics are similar to popular regular expression implementations such as Perl, vim, and others, there are some minor differences. For example, beginning (^) and end of line ($) operators are not supported. Also, '\z' refers to the set of non-zero digits, [1-9], not to the end of the string as in PERL. For syntax information, see Regular Expression Syntax.

One notable difference with the Perl regular expression engine is the lack of back-reference and substitution support. These features are actually extraneous to regular expressions and cannot be accomplished in linear time with respect to the data being examined. Hence, to maintain peak performance, they are not supported. Substitution or translation functionality is not supported because network traffic is only inspected, not modified.

Predefined regular expressions for frequently used patterns such as U.S. social security numbers and VISA credit card numbers can be selected while creating the match object. Users can also write their own expressions in the same match object. Such user provided expressions are parsed, and any that do not parse correctly will cause a syntax error to display at the bottom of the Match Object Settings window. After successful parsing, the regular expression is passed to a compiler to create the data structures necessary for scanning network traffic in real time.

Regular expressions are matched efficiently by building a data structure called *Deterministic Finite Automaton*(DFA). The DFA's size is dictated by the regular expression provided by the user and is constrained by the memory capacities of the device. A lengthy compilation process for a complex regular expression can consume extensive amounts of memory on the appliance. It may also take up to two minutes to build the DFA, depending on the expressions involved.

To prevent abuse and denial-of-service attacks, along with excessive impact to appliance management responsiveness, the compiler can abort the process and reject regular expressions that cause this data structure to grow too big for the device. An “abuse encountered” error message is displayed at the bottom of the window.

NOTE: During a lengthy compilation, the appliance management session may become temporarily unresponsive, while network traffic continues to pass through the appliance.

Building the DFA for expressions containing large counters consumes more time and memory. Such expressions are more likely to be rejected than those that use indefinite counters such as the ‘*’ and ‘+’ operators.

Also, at risk of rejection are expressions containing a large number of characters rather than a character range or class. That is, the expression ‘(a|b|c|d|. . .|z)’ to specify the set of all lower-case letters is more likely to be rejected than the equivalent character class ‘\l’. When a range such as ‘[a-z]’ is used, it is converted internally to ‘\l’. However, a range such as

‘[d-y]’ or ‘[0-Z]’ cannot be converted to any character class, is long, and may cause the rejection of the expression containing this fragment.

Whenever an expression is rejected, the user may rewrite it in a more efficient manner to avoid rejection using some of the above tips. For syntax information, see Regular Expression Syntax. For an example discussing how to write a custom regular expression, see *Creating a Regular Expression in a Match Object* section in **Policy > App Rules**.

Regular Expression Syntax

This section provides the information about syntax that are used in building regular expressions.

REGULAR EXPRESSION SYNTAX: SINGLE CHARACTERS

Representation	Definition
.	Any character except ‘\n’. Use /s (stream mode, also known as single-line mode) modifier to match ‘\n’ too.
[xyz]	Character class. Can also give escaped characters. Special characters do not need to be escaped as they do not have special meaning within brackets [ ].
\xdd	Hex input. “dd” is the hexadecimal value for the character. Two digits are mandatory. For example, \r is \x0d and not \xd.
[a-z][0-9]	Character range.

REGULAR EXPRESSION SYNTAX: COMPOSITES

Representation	Definition
xy	x followed by y
x|y	x or y
(x)	Equivalent to x. Can be used to override precedences.

REGULAR EXPRESSION SYNTAX: REPETITIONS

Representation	Definition
x*	Zero or more x
x?	Zero or one x
x+	One or more x
x{n, m}	Minimum of n and a maximum of m sequential x's. All numbered repetitions are expanded. So, making m unreasonably large is ill-advised.
x{n}	Exactly n x's
x{n,}	Minimum of n x's
x{,n}	Maximum of n x's

REGULAR EXPRESSION SYNTAX: ESCAPE SEQUENCES

Representation	Definition
\0, \a, \b, \f, \t, \n, \r, \v	'C' programming language escape sequences (\0 is the NULL character (ASCII character zero)).
\x	Hex-input. \x followed by two hexa-decimal digits denotes the hexa-decimal value for the intended character.
***, \?, \+, \(, \), \[, \], \{, \}, \\, \/, \<space>, \#**	Escape any special character. ⓘ **NOTE:** Comments that are not processed are preceded by any number of spaces and a pound sign (#). So, to match a space or a pound sign (#), you must use the escape sequences \ and \#.

REGULAR EXPRESSION SYNTAX: PERL-LIKE CHARACTER CLASSES

Representation	Definition
\d, \D	Digits, Non-digits.
\z, \Z	Non-zero digits ([1-9]), All other characters.
\s, \S	White space, Non-white space. Equivalent to [\t\n\f\r]. \v is not included in Perl white spaces.
\w, \W	Word characters, Non-word characters Equivalent to [0-9A-Za-z_].

REGULAR EXPRESSION SYNTAX: OTHER ASCII CHARACTER CLASS PRIMITIVES

If you want...	...then use	
[:cntrl:]	\c, \C	Control character. [\x00 - \x1F\x7F].
[:digit:]	\d, \D	Digits, Non-Digits. Same as Perl character class.
[:graph:]	\g, \G	Any printable character except space.
[:xdigit:]	\h, \H	Any hexadecimal digit. [a-fA-F0-9]. Note this is different from the Perl \h, which means a horizontal space.
[:lower:]	\l, \L	Any lower case character.
[:ascii:]	\p, \P	Positive, Negative ASCII characters. [0x00 – 0x7F], [0x80 – 0xFF].
[:upper:]	\u, \U	Any upper case character.

Some of the other popular character classes can be built from the above primitives. The following classes do not have their own short-hand due of the lack of a nice mnemonic for any of the remaining characters used for them.

REGULAR EXPRESSION SYNTAX: COMPOUND CHARACTER CLASSES

If you want...	... then use	
[:alnum:]	= [\l\u\d]	The set of all characters and digits.
[:alpha:]	= [\l\u]	The set of all characters.
[:blank:]	= [\t<space>]	The class of blank characters: tab and space.
[:print:]	= [\g<space>]	The class of all printable characters: all graphical characters including space.
[:punct:]	= [^\P\c<space>\d\u\l]	The class of all punctuation characters: no negative ASCII characters, no control characters, no space, no digits, no upper or lower characters.
[:space:]	= [\s\v]	All white space characters. Includes Perl white space and the vertical tab character.

REGULAR EXPRESSION SYNTAX: MODIFIERS

Representation	Definition
/i	Case-insensitive
/s	Treat input as single-line. Can also be thought of as stream-mode. That is, '.' matches '\n' too.

REGULAR EXPRESSION SYNTAX: OPERATORS IN DECREASING ORDER OF PRECEDENCE

Operators	Associativity
[ ], [^]	Left to right
()	Left to right
***, +, ?**	Left to right
. (Concatenation)	Left to right
|	Left to right

Comments in Regular Expressions

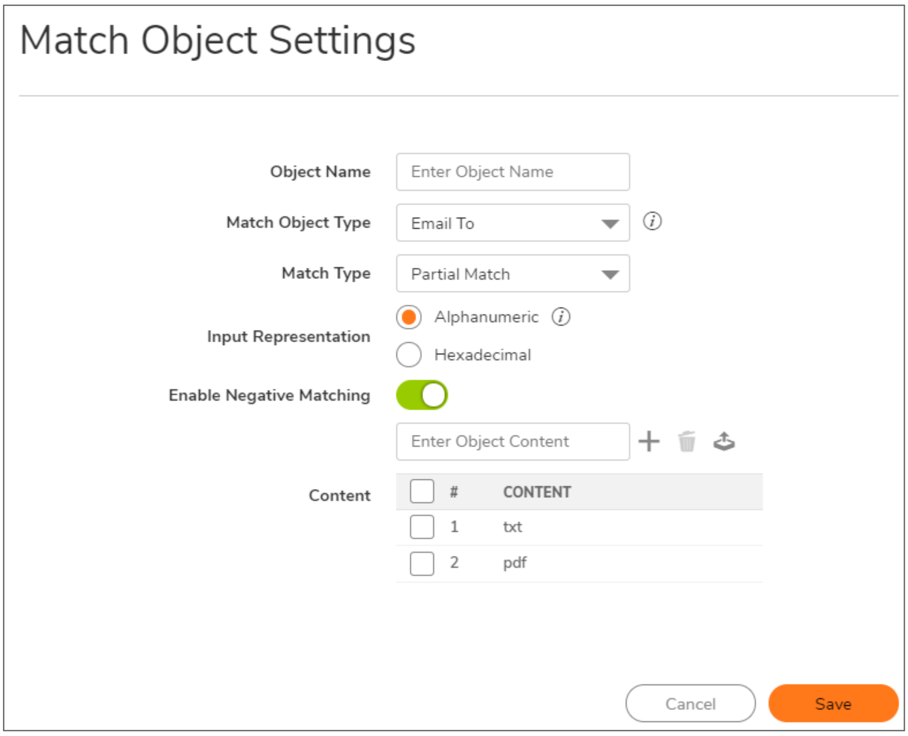
SonicOS supports comments in regular expressions. Comments are preceded by any number of spaces and a pound sign (#). All text after a space and pound sign is discarded until the end of the expression.

About Negative Matching

Negative matching provides an alternate way to specify which content to block. You can enable negative matching in a match object when you want to block everything except a particular type of content. When you use the object in a policy, the policy will execute actions based on absence of the content specified in the match object. Multiple list entries in a negative matching object are matched using the logical AND, meaning that the policy action is executed only when all specified negative matching entries are matched.

Although all App Rules policies are DENY policies, you can simulate an ALLOW policy by using negative matching. For instance, you can allow email *.txt* attachments and block attachments of all other file types. Or you can allow a few types, and block all others.

Not all match object types can utilize negative matching. For those that can, you will see the **Enable Negative Matching** checkbox on the **Match Object Settings** dialog.



Match Object Settings

Object Name: Enter Object Name

Match Object Type: Email To

Match Type: Partial Match

Input Representation: ● Alphanumeric ○ Hexadecimal

Enable Negative Matching: on

Content: Enter Object Content

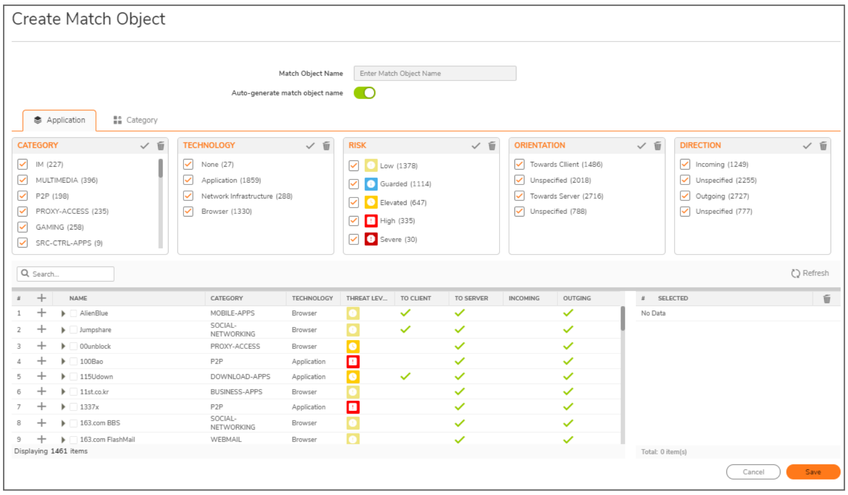
□	#	CONTENT
□	1	txt
□	2	pdf

About Application List Objects

To create Application List Objects, click **Add Applications** at the top of the **Object > Match Objects** page. The dialog provides two choices:

- **Application** – You can create an application filter object on this screen. This screen allows selection of the application category, threat level, type of technology, and attributes. After selections are made, the list of applications matching those criteria is displayed. The **Application** screen provides one way to create a match object of the **Application List** type.

- **Category** – You can create a category filter object on this screen. A list of application categories is displayed, with descriptions that appear when you move your mouse over a category. The **Category** screen allows you to create a match object of the **Application Category List** type.



Create Match Object

Match Object Name: Enter Match Object Name

Auto-generate match object name: On

CATEGORY
☑ IM (227)
☑ MULTIMEDIA (396)
☑ P2P (198)
☑ PROXY-ACCESS (235)
☑ GAMING (258)
☑ SRC-CTRL-APPS (9)

TECHNOLOGY
☑ None (27)
☑ Application (1859)
☑ Network Infrastructure (288)
☑ Browser (1330)

RISK
☑ Low (1378)
☑ Guarded (1114)
☑ Elevated (647)
☑ High (335)
☑ Severe (30)

ORIENTATION
☑ Towards Client (1486)
☑ Unspecified (2018)
☑ Towards Server (2716)
☑ Unspecified (788)

DIRECTION
☑ Incoming (1249)
☑ Unspecified (2255)
☑ Outgoing (2727)
☑ Unspecified (777)

#	+	NAME	CATEGORY	TECHNOLOGY	THREAT LEV...	TO CLIENT	TO SERVER	INCOMING	OUTGING
1	+	AlienBlue	MOBILE-APPS	Browser	🟨	✓	✓		✓
2	+	Jumpshare	SOCIAL-NETWORKING	Browser	🟨	✓	✓		✓
3	+	00unblock	PROXY-ACCESS	Browser	🟧		✓		✓
4	+	100Bao	P2P	Application	🟥		✓		✓
5	+	115Udown	DOWNLOAD-APPS	Application	🟧	✓	✓		✓
6	+	11st.co.kr	BUSINESS-APPS	Browser	🟨		✓		✓
7	+	1337x	P2P	Application	🟥		✓		✓
8	+	163.com BBS	SOCIAL-NETWORKING	Browser	🟨		✓		✓
9	+	163.com FlashMail	WEBMAIL	Browser	🟨		✓		✓

Displaying 1461 items

#	SELECTED
No Data	

Total: 0 item(s)

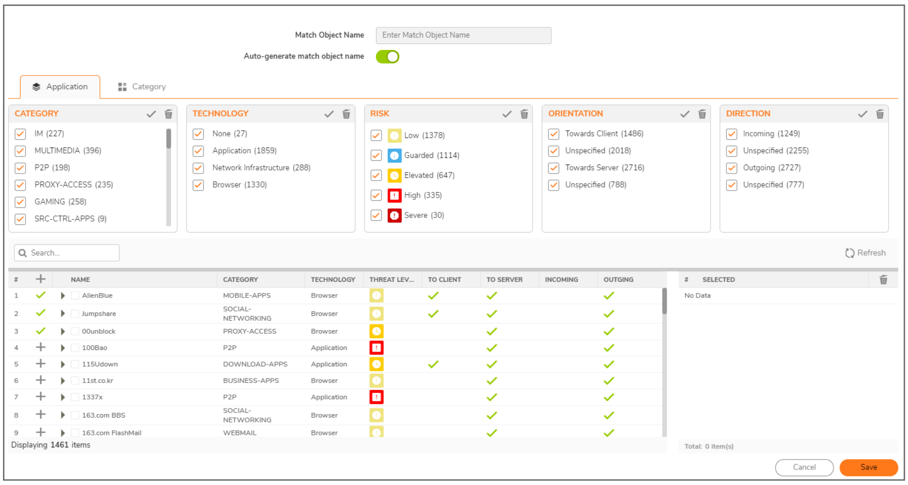
Topics:

- About Application Filters
- About Category Filters

About Application Filters

The **Application** screen provides a list of applications for selection. You can control which applications are displayed by selecting one or more application categories, technologies, risks, orientation, and direction. You can also search for a keyword in all application names by typing it into the **Search** field. For example, type in “bittorrent” into the **Search** field to find multiple applications with “bittorrent” (not case-sensitive) in the name.

When the application list is reduced to a list that is focused on your preferences, you can select the individual applications for your filter by clicking the **Plus** icon next to them, and then save your selections as an application filter object with a custom name or an automatically generated name. The image below shows the dialog with all categories, technologies, risks, orientation, and directions selected, but before any individual applications have been chosen.



Match Object Name: Enter Match Object Name

Auto-generate match object name: ●

CATEGORY	TECHNOLOGY	RISK	ORIENTATION	DIRECTION
☑ IM (227)	☑ None (27)	☑ Low (1378)	☑ Towards Cllient (1486)	☑ Incoming (1249)
☑ MULTIMEDIA (396)	☑ Application (1859)	☑ Guarded (1114)	☑ Unspecified (2018)	☑ Unspecified (2255)
☑ P2P (198)	☑ Network Infrastructure (288)	☑ Elevated (647)	☑ Towards Server (2716)	☑ Outgoing (2727)
☑ PROXY-ACCESS (235)	☑ Browser (1330)	☑ High (335)	☑ Unspecified (788)	☑ Unspecified (777)
☑ GAMING (258)		☑ Severe (30)		
☑ SRC-CTRL-APPS (9)				

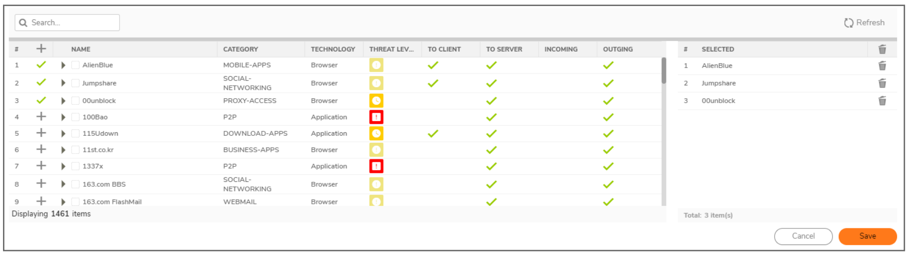
#	+	NAME	CATEGORY	TECHNOLOGY	THREAT LEV...	TO CLIENT	TO SERVER	INCOMING	OUTGING
1	✓	□ AlienBlue	MOBILE-APPS	Browser	●	✓	✓		✓
2	✓	□ Jumpshare	SOCIAL-NETWORKING	Browser	●	✓	✓		✓
3	✓	□ 00unblock	PROXY-ACCESS	Browser	●		✓		✓
4	+	□ 100Bao	P2P	Application	!		✓		✓
5	+	□ 115Udown	DOWNLOAD-APPS	Application	●	✓	✓		✓
6	+	□ 11st.co.kr	BUSINESS-APPS	Browser	●		✓		✓
7	+	□ 1337x	P2P	Application	!		✓		✓
8	+	□ 163.com BBS	SOCIAL-NETWORKING	Browser	●		✓		✓
9	+	□ 163.com FlashMail	WEBMAIL	Browser	●		✓		✓

Displaying 1461 items

#	SELECTED
No Data	

Total: 0 item(s)

As you select the applications for your filter, they appear in the **Selected** pane on the right. You can edit the list in this field by deleting the applications by clicking the **Delete** icon. The image below shows several applications in the **Selected** pane. The selected applications are also marked with a green checkmark icon in the application list on the left side.



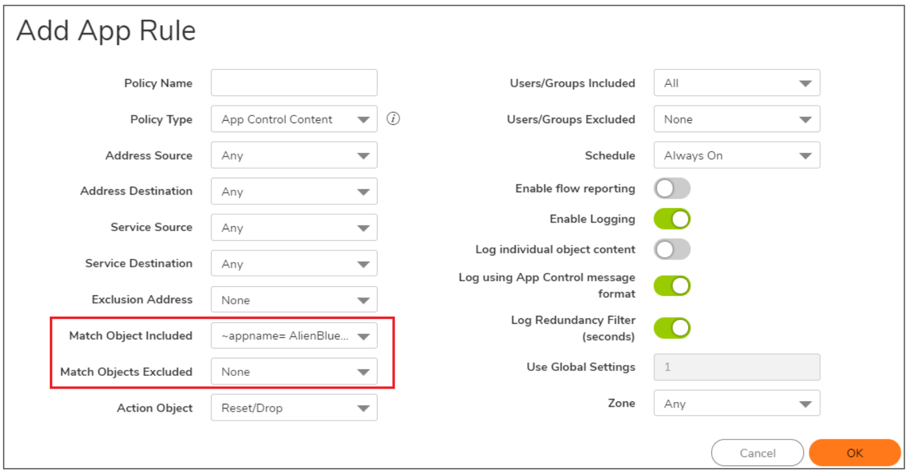
#	+	NAME	CATEGORY	TECHNOLOGY	THREAT LEV...	TO CLIENT	TO SERVER	INCOMING	OUTGING
1	✓	□ AlienBlue	MOBILE-APPS	Browser	●	✓	✓		✓
2	✓	□ Jumpshare	SOCIAL-NETWORKING	Browser	●	✓	✓		✓
3	✓	□ 00unblock	PROXY-ACCESS	Browser	●		✓		✓
4	+	□ 100Bao	P2P	Application	!		✓		✓
5	+	□ 115Udown	DOWNLOAD-APPS	Application	●	✓	✓		✓
6	+	□ 11st.co.kr	BUSINESS-APPS	Browser	●		✓		✓
7	+	□ 1337x	P2P	Application	!		✓		✓
8	+	□ 163.com BBS	SOCIAL-NETWORKING	Browser	●		✓		✓
9	+	□ 163.com FlashMail	WEBMAIL	Browser	●		✓		✓

Displaying 1461 items

#	SELECTED
1	AlienBlue
2	Jumpshare
3	00unblock

Total: 3 item(s)

When finished selecting the applications to include, you can type in a name for the object in the **Match Object Name** field (first, clear the **Auto-generate match object name** checkbox) and click the **Save** option. You will see the object name listed on the **Object > Match Objects** page with an object type of Application List. This object can then be selected when creating an App Rules policy or an App Based Route policy.



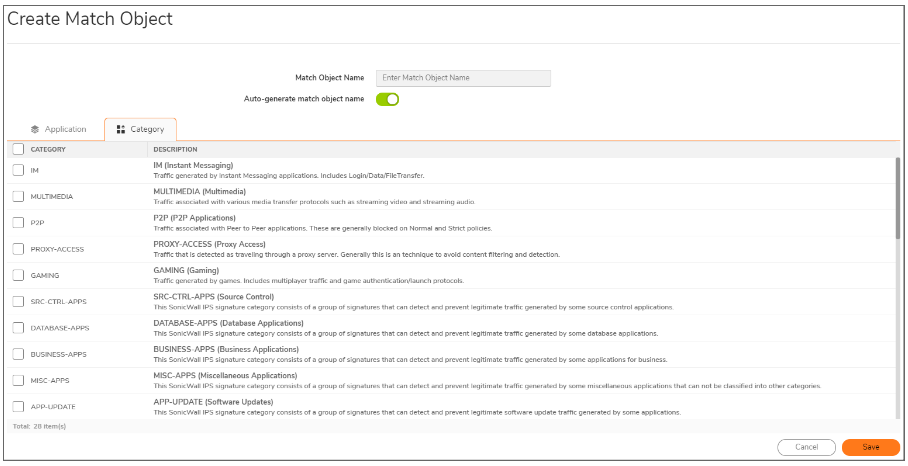
Add App Rule

Policy Name		Users/Groups Included	All
Policy Type	App Control Content	Users/Groups Excluded	None
Address Source	Any	Schedule	Always On
Address Destination	Any	Enable flow reporting	○
Service Source	Any	Enable Logging	●
Service Destination	Any	Log individual object content	○
Exclusion Address	None	Log using App Control message format	●
Match Object Included	~appname= AlienBlue...	Log Redundancy Filter (seconds)	●
Match Objects Excluded	None	Use Global Settings	1
Action Object	Reset/Drop	Zone	Any

Application list objects created using the **Auto-generate match object name** option display a tilde (~) as the first character of the object name.

About Category Filters

The **Category** screen provides a list of application categories for selection. You can select any combination of categories and then save your selections as a category filter object with a custom name. The image below shows the dialog with the description of the application categories.



Create Match Object

Match Object Name: Enter Match Object Name

Auto-generate match object name: ●

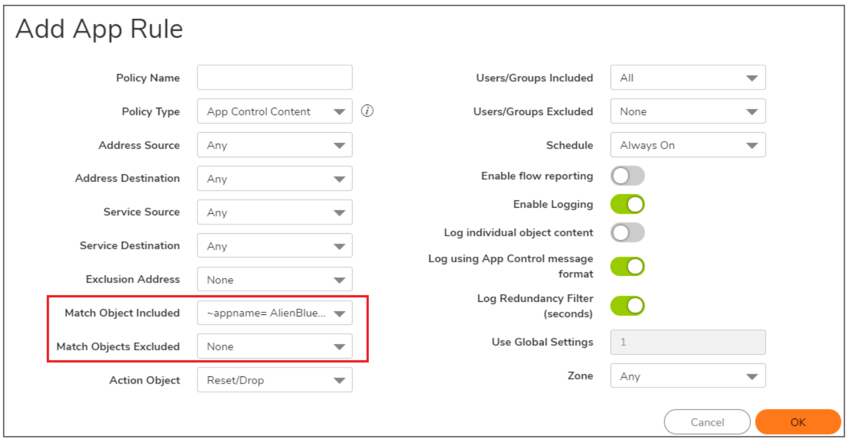
□	CATEGORY	DESCRIPTION
□	IM	IM (Instant Messaging) Traffic generated by Instant Messaging applications. Includes Login/Data/FileTransfer.
□	MULTIMEDIA	MULTIMEDIA (Multimedia) Traffic associated with various media transfer protocols such as streaming video and streaming audio.
□	P2P	P2P (P2P Applications) Traffic associated with Peer to Peer applications. These are generally blocked on Normal and Strict policies.
□	PROXY-ACCESS	PROXY-ACCESS (Proxy Access) Traffic that is detected as traveling through a proxy server. Generally this is an technique to avoid content filtering and detection.
□	GAMING	GAMING (Gaming) Traffic generated by games. Includes multiplayer traffic and game authentication/launch protocols.
□	SRC-CTRL-APPS	SRC-CTRL-APPS (Source Control) This SonicWall IPS signature category consists of a group of signatures that can detect and prevent legitimate traffic generated by some source control applications.
□	DATABASE-APPS	DATABASE-APPS (Database Applications) This SonicWall IPS signature category consists of a group of signatures that can detect and prevent legitimate traffic generated by some database applications.
□	BUSINESS-APPS	BUSINESS-APPS (Business Applications) This SonicWall IPS signature category consists of a group of signatures that can detect and prevent legitimate traffic generated by some applications for business.
□	MISC-APPS	MISC-APPS (Miscellaneous Applications) This SonicWall IPS signature category consists of a group of signatures that can detect and prevent legitimate traffic generated by some miscellaneous applications that can not be classified into other categories.
□	APP-UPDATE	APP-UPDATE (Software Updates) This SonicWall IPS signature category consists of a group of signatures that can detect and prevent legitimate software update traffic generated by some applications.

Total: 28 item(s)

To create a custom category filter object:

1. Clear the **Auto-generate match object name** checkbox and type in a name for the object in the **Match Object Name** field.
2. Select the checkboxes for one or more categories.
3. Click **Save**.

   The object name is listed on the **Object > Match Objects** page with an object type of Application Category List. This object can be selected when creating an App Rules policy or an App Based Route policy.



Add App Rule

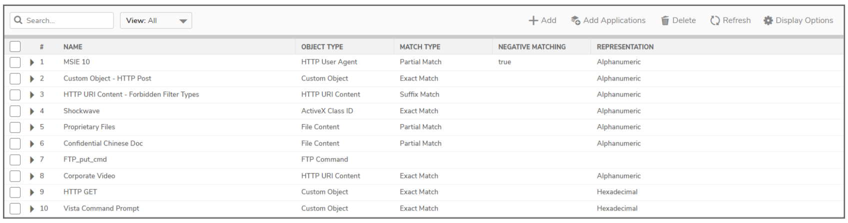
Policy Name		Users/Groups Included	All
Policy Type	App Control Content	Users/Groups Excluded	None
Address Source	Any	Schedule	Always On
Address Destination	Any	Enable flow reporting	○
Service Source	Any	Enable Logging	●
Service Destination	Any	Log individual object content	○
Exclusion Address	None	Log using App Control message format	●
Match Object Included	~appname= AlienBlue...	Log Redundancy Filter (seconds)	●
Match Objects Excluded	None	Use Global Settings	1
Action Object	Reset/Drop	Zone	Any

Application list objects created using the **Auto-generate match object name** option display a tilde (~) as the first character of the object name.

Configuring a Match Object

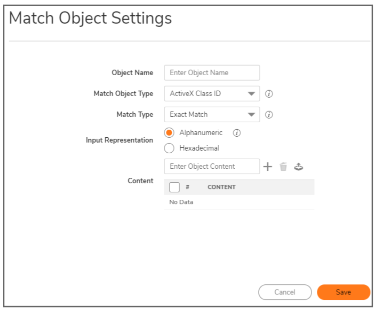
To configure a match object:

1. Navigate to the **Object > Match Objects** page.



#	NAME	OBJECT TYPE	MATCH TYPE	NEGATIVE MATCHING	REPRESENTATION
1	MSIE 10	HTTP User Agent	Partial Match	true	Alphanumeric
2	Custom Object - HTTP Post	Custom Object	Exact Match		Alphanumeric
3	HTTP URI Content - Forbidden Filter Types	HTTP URI Content	Suffix Match		Alphanumeric
4	Shockwave	ActiveX Class ID	Exact Match		Alphanumeric
5	Proprietary Files	File Content	Partial Match		Alphanumeric
6	Confidential Chinese Doc	File Content	Partial Match		Alphanumeric
7	FTP_put_cmd	FTP Command			
8	Corporate Video	HTTP URI Content	Exact Match		Alphanumeric
9	HTTP GET	Custom Object	Exact Match		Hexadecimal
10	Vista Command Prompt	Custom Object	Exact Match		Hexadecimal

2. Click **Add**. The **Match Object Settings** dialog displays.



Match Object Settings

Object Name: Enter Object Name

Match Object Type: ActiveX Class ID

Match Type: Exact Match

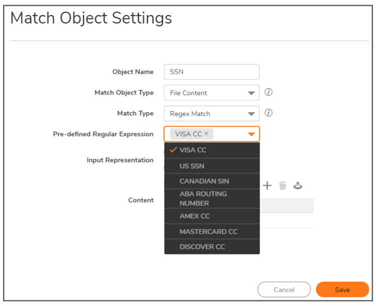
Input Representation: ● Alphanumeric ○ Hexadecimal

Content: Enter Object Content

#	CONTENT
No Data	

3. In the **Object Name** field, type a descriptive name for the object.
4. Select an **Match Object Type** from the drop-down menu. Your selection here will affect available options in this screen. See About Match Objects for a description of match object types.
5. Select a **Match Type** from the drop-down menu. The available selections depend on the match object type.
6. For the **Input Representation**, click **Alphanumeric** to match a text pattern, or click **Hexadecimal** if you want to match binary content.
7. In the **Content** text box, type the pattern to match.
8. Click **Add** icon. The content appears in the List field. Repeat to add another element to match.

   If the **Match Type** is **Regex Match**, you can select one of the predefined regular expressions and then click on the type to add it to the List. You can also type a custom regular expression into the **Content** field, and then click **Add** icon to add it to the List.



Match Object Settings

Object Name: SSN

Match Object Type: File Content

Match Type: Regex Match

Pre-defined Regular Expression: VISA CC ×

Input Representation

Content

Alternatively, you can click **Load From File** icon to import a list of elements from a text file. Each element in the file must be on a line by itself.

9. Click **Save**.You will see the object name listed on the **Object > Match Objects** page with an object type of Application List. This object can then be selected when creating an App Rules policy or an App Based Route policy.

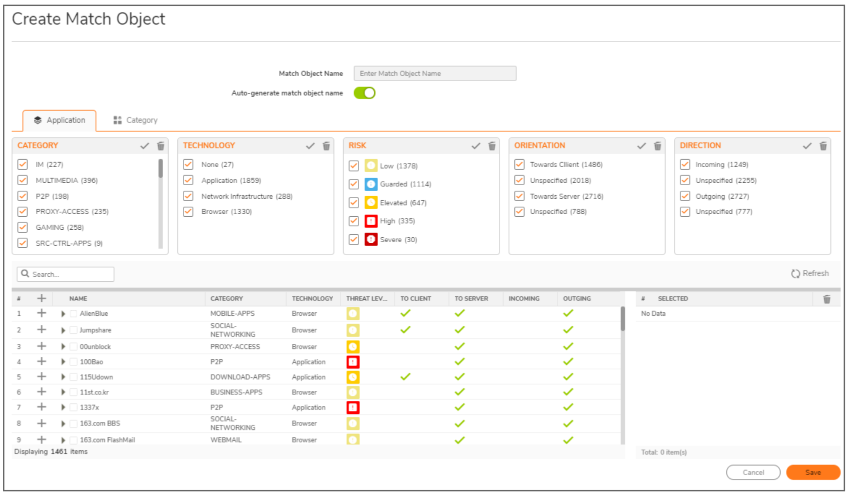
Configuring Application List Objects

This section describes how to create an Application List Object, which can be used by App Rules policies or App Based Route policies in the same way as an Application List Object created in the **Create Match Object** dialog.

For detailed information about application list object types including information about the Category screen, see About Application List Objects.

To configure an application list object:

1. Navigate to **Object > Match Objects**.
2. At the top of the page, click **Add Applications** option. The **Create Match Object** dialog opens with the Application screen displayed.



Create Match Object

Match Object Name: Enter Match Object Name

Auto-generate match object name: on

CATEGORY
- ☑ IM (227)
- ☑ MULTIMEDIA (396)
- ☑ P2P (198)
- ☑ PROXY-ACCESS (235)
- ☑ GAMING (258)
- ☑ SRC-CTRL-APPS (9)

TECHNOLOGY
- ☑ None (27)
- ☑ Application (1859)
- ☑ Network Infrastructure (288)
- ☑ Browser (1330)

RISK
- ☑ Low (1378)
- ☑ Guarded (1114)
- ☑ Elevated (647)
- ☑ High (335)
- ☑ Severe (30)

ORIENTATION
- ☑ Towards Client (1486)
- ☑ Unspecified (2018)
- ☑ Towards Server (2716)
- ☑ Unspecified (788)

DIRECTION
- ☑ Incoming (1249)
- ☑ Unspecified (2255)
- ☑ Outgoing (2727)
- ☑ Unspecified (777)

#	+	NAME	CATEGORY	TECHNOLOGY	THREAT LEV...	TO CLIENT	TO SERVER	INCOMING	OUTGING
1	+	AlienBlue	MOBILE-APPS	Browser	🟨	✓	✓		✓
2	+	Jumpshare	SOCIAL-NETWORKING	Browser	🟨	✓	✓		✓
3	+	00unblock	PROXY-ACCESS	Browser	🟧		✓		✓
4	+	100Bao	P2P	Application	🟥		✓		✓
5	+	115Udown	DOWNLOAD-APPS	Application	🟧	✓	✓		✓
6	+	11st.co.kr	BUSINESS-APPS	Browser	🟨		✓		✓
7	+	1337x	P2P	Application	🟥		✓		✓
8	+	163.com BBS	SOCIAL-NETWORKING	Browser	🟨		✓		✓
9	+	163.com FlashMail	WEBMAIL	Browser	🟨		✓		✓

Displaying 1461 items

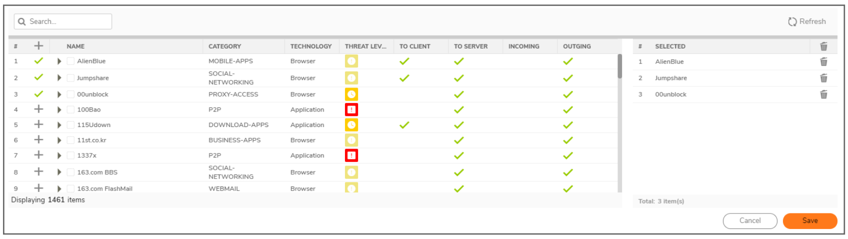
#	SELECTED
No Data	

Total: 0 item(s)

You can control which applications are displayed by selecting one or more application categories, threat levels, and technologies. When the application list is reduced to a list that is focused on your preferences, you can select the individual applications for your filter.

3. In the **Search** field, optionally type in part of an application name to search for applications with that key word in their names.
4. In the **Category** pane, select the checkboxes for one or more application categories.
5. In the **Technology** pane, select the checkboxes for one or more technologies.
6. In the **Risk** pane, select the checkboxes for one or more risk levels.
7. In the **Orientation** pane, select the checkboxes for one or more orientation type.
8. In the **Direction** pane, select the checkboxes for one or more type of direction.

9. Click the **plus sign** next to each application you want to add to your filter object. To display a description of the application, click the triangle in the **Name** column. As you select the applications for your filter, the **plus sign** icon becomes a **green checkmark** icon and the selected applications appear in the **Selected** pane on the right. You can edit the list in this field by deleting individual items or by clicking the **Delete** icon to delete all items.



#	+	NAME	CATEGORY	TECHNOLOGY	THREAT LEV...	TO CLIENT	TO SERVER	INCOMING	OUTGING
1	✓	AlienBlue	MOBILE-APPS	Browser	🟨	✓	✓		✓
2	✓	Jumpshare	SOCIAL-NETWORKING	Browser	🟨	✓	✓		✓
3	✓	00unblock	PROXY-ACCESS	Browser	🟧		✓		✓
4	+	100Bao	P2P	Application	🟥		✓		✓
5	+	115Udown	DOWNLOAD-APPS	Application	🟧	✓	✓		✓
6	+	11st.co.kr	BUSINESS-APPS	Browser	🟨		✓		✓
7	+	1337x	P2P	Application	🟥		✓		✓
8	+	163.com BBS	SOCIAL-NETWORKING	Browser	🟨		✓		✓
9	+	163.com FlashMail	WEBMAIL	Browser	🟨		✓		✓

Displaying 1461 items

#	SELECTED
1	AlienBlue
2	Jumpshare
3	00unblock

Total: 3 item(s)

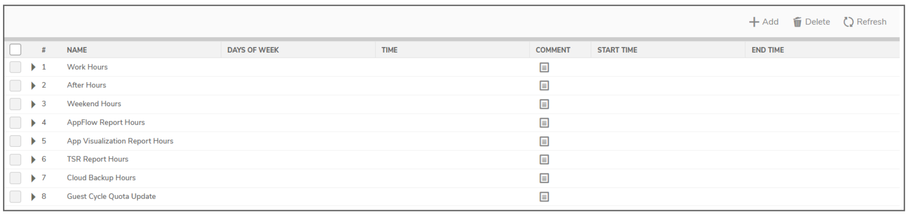
10. When finished selecting the applications to include, clear the **Auto-generate match object** name checkbox and then type in a name for the object in the Match Object Name field. Alternatively, you can simply use the auto-generated name.

11. Click **Save**. You will see the object name listed on the **Object > Match Objects** page with an object type of Application List. This object can then be selected when creating an App Rules policy or an App Based Route policy.

Schedules

SonicOS uses schedule objects in conjunction with its security features and policies. To create schedule objects, navigate to **Object > Match Objects > Schedules**. You can apply schedule objects for a specific security feature or policy (rule). For example, if you add an access rule **Policy > Rules and Policies > Access Rules** page, the **Add Rule** dialog lists all the available predefined schedule objects as well as the schedule objects that you have created in the **Schedules** page. A schedule can include multiple day and time increments for rule enforcement with a single schedule.

The **Schedules** page allows you to create and manage default and custom schedule objects for enforcing schedule times for a variety of SonicWall Security Appliance features.



□	#	NAME	DAYS OF WEEK	TIME	COMMENT	START TIME	END TIME
□	1	Work Hours			▤		
□	2	After Hours			▤		
□	3	Weekend Hours			▤		
□	4	AppFlow Report Hours			▤		
□	5	App Visualization Report Hours			▤		
□	6	TSR Report Hours			▤		
□	7	Cloud Backup Hours			▤		
□	8	Guest Cycle Quota Update			▤		

ⓘ | **NOTE:** You can modify default schedules, but you cannot delete them.

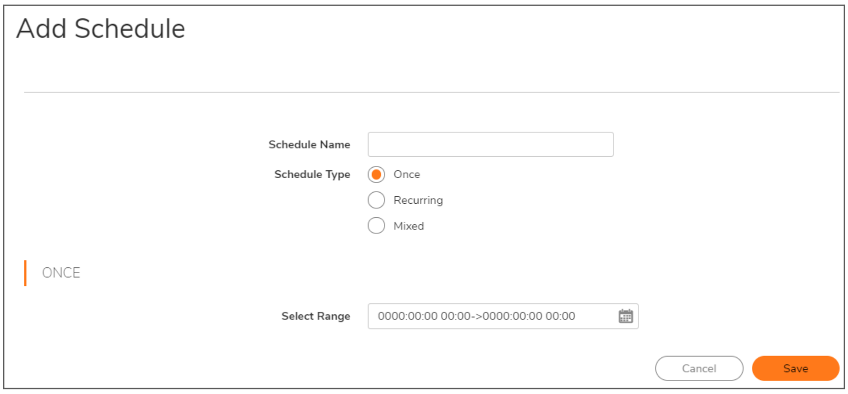
The **Schedules** table displays all predefined and custom schedules. The default schedules consist of:

Work Hours	After Hours
Weekend Hours	AppFlow Report Hours
App Visualization Report Hours	TSR Report Hours
Cloud Backup Hours	Guest Cycle Quota Update

Adding a Custom Schedule

To create custom schedules:

1. Navigate to **Object > Match Objects > Schedules**.
2. Click **Add**. The **Add Schedule** dialog displays.



Add Schedule

Schedule Name

Schedule Type ● Once ○ Recurring ○ Mixed

ONCE

Select Range 0000:00:00 00:00->0000:00:00 00:00

3. Enter a descriptive name for the schedule in the **Schedule Name** field.
4. Choose one of the following radio buttons for **Schedule Type**:

Once	For a one-time schedule between the configured **Start** and **End** times and dates. When selected, the fields under **Once** become available, and the fields under **Recurring** become dimmed.
Recurring	For a schedule that occurs repeatedly during the same configured hours and days of the week, with no start or end date. When selected, the fields under **Recurring** become available, and the fields under **Once** become dimmed.
Mixed	For a schedule that occurs repeatedly during the same configured hours and days of the week, between the configured start and end dates. When selected, all fields on the page become active.

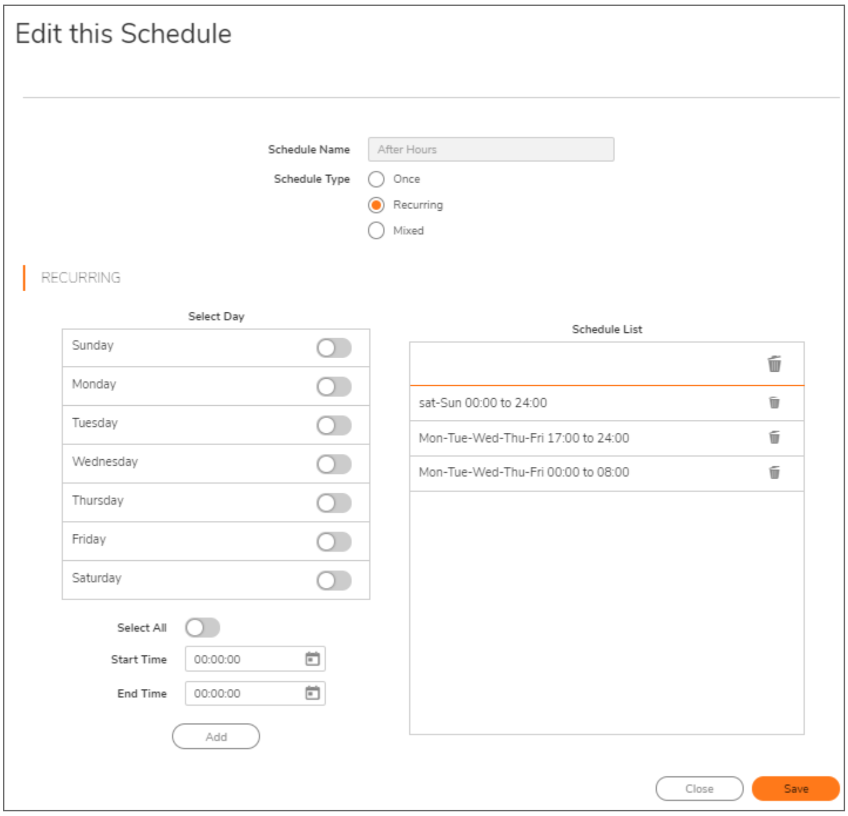
ⓘ | **NOTE:** Time must be in 24-hour format, for example, 17:00 for 5 p.m.

5. If the fields under **Once** are available, configure the:
   - Starting date and time by selecting the **Year**, **Month**, **Date**, **Hour**, and **Minute** from the drop-down menu in the **Start** row. The hour is represented in 24-hour format.
   - Ending date and time by selecting the **Year**, **Month**, **Date**, **Hour**, and **Minute** from the drop-down menu in the **End** row. The hour is represented in 24-hour format.
6. If the fields under **Recurring** are available:
   - Select the checkboxes for the days of the week to apply to the schedule or select **All**.
   - Enter the time of day for the schedule to begin in the **Start Time** field.
   - Enter the time of day for the schedule to stop in the **Stop Time** field.
7. Click **Add** to add the schedule to the **Schedule List**.
8. Click **Save**. The **Schedule** is created.

Modifying Schedules

To modify both default and custom schedules:

1. Navigate to **Object > Match Objects > Schedules**.
2. Mouse over on the Schedule which you want to edit and click **Edit** icon. The **Edit Schedule** dialog displays.



Edit this Schedule

Schedule Name: After Hours

Schedule Type: ○ Once ● Recurring ○ Mixed

RECURRING

Select Day
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Select All

Start Time: 00:00:00

End Time: 00:00:00

Schedule List
sat-Sun 00:00 to 24:00
Mon-Tue-Wed-Thu-Fri 17:00 to 24:00
Mon-Tue-Wed-Thu-Fri 00:00 to 08:00

3. You can change any component of the schedule, such as time(s), type, and/or days, except the name of default schedules cannot be changed and the field is dimmed. To make changes, follow the procedure in Adding a Custom Schedule.
4. Click **Save**.

Deleting Custom Schedules

You can delete custom schedules, but you cannot delete default schedules.

To delete a schedule object:

1. Navigate to **Object > Match Objects > Schedules**.
2. Mouse over on the Schedule which you want to delete and click **Delete** icon.

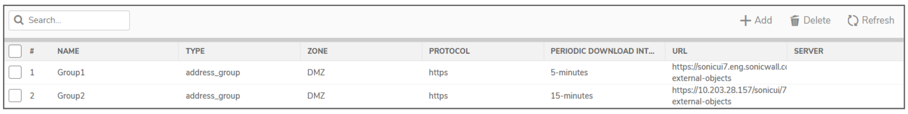
To delete multiple schedule objects:

1. Navigate to **Object > Match Objects > Schedules**.
2. In the Schedules table, select multiple custom schedules and click **Delete** at top of the page.

Dynamic Group

Dynamic Groups are comprised of Dynamic External Address Groups (DEAG) and Dynamic External Address Objects (DEAO). A Dynamic External Address Group is an Address Group whose members are dynamic. Dynamic External Address Objects are intermediate, internal objects that are dynamically created and placed under a Dynamic External Address Group when a Dynamic External Address Group file is downloaded. The Dynamic External Objects feature eliminates the need for manually modifying an Address Group to add or remove members.

DYNAMIC GROUP PAGE



□	#	NAME	TYPE	ZONE	PROTOCOL	PERIODIC DOWNLOAD INT...	URL	SERVER
□	1	Group1	address_group	DMZ	https	5-minutes	https://sonicui7.eng.sonicwall.c external-objects	
□	2	Group2	address_group	DMZ	https	15-minutes	https://10.203.28.157/sonicui/7 external-objects	

Popup tooltips appear when you move your mouse over many of the fields in a DEAG entry. Multiple Dynamic External Address Groups can be configured and you can use these DEAGs in access rules or policies. For example, if you want to maintain a group for all partner IP addresses on which certain access rules are enforced, you can create a Dynamic External Address Group / Dynamic External Object.

The creation of a Dynamic External Object consists of two parts:

- Creation of the Dynamic External Address Group file on an FTP server or on a web page at a specific URL
- Configuration of the Dynamic External Address Group on the **Object > Dynamic Group** page in SonicOS including downloading and using the information in the DEAG file.

About the Dynamic External Address Group File

The Dynamic External Address Group file (DEAG file) contains a list of IP addresses or Fully Qualified Domain Names (FQDNs) that define the DEAOs which are members of the DEAG. The DEAG file resides externally, on a server for FTP access or on a web page at a specific URL for HTTPS access. The list of IP addresses or FQDNs can be modified at the external location and the associated DEAOs and DEAG in SonicOS are dynamically updated with those changes, if configured to periodically download the file.

The DEAG file can contain a text list of either IP addresses or FQDNs formatted as follows:

- A list of IP addresses, one per line. It can include subnets specified in CIDR format.
- A list of FQDNs, one per line. An FQDN is a character string such as **www.example.com**. It cannot contain any wildcard (*) characters.
- A mixed list of FQDNs and IP addresses/subnets, one per line. This is only supported for FQDN type DEAGs. A non-FQDN type DEAG will not accept FQDNs in the DEAG file.

  However, it is not recommended to mix and match IP addresses and FQDNs in the DEAG file, because the IP addresses in this list will also be treated as FQDNs and SonicOS will attempt to resolve them. A better way to mix these input types is to create individual DEAGs of FQDN type and non-FQDN type and then add both DEAGs to a separate address group for use in access rules.

For every DEAG, a DEAO with the IP address *0.0.0.0* is automatically created. For example, if there is only one DEAG, the maximum number of IP addresses in the DEAG file is one less than the maximum number of DEAOs allowed, as defined in DEAG and DEAO Maximums.

DEAG and DEAO Maximums

Maximum DEAGs:

- The maximum number of DEAGs, including both IP address and FQDN types, is 25% of the total number of address groups supported by the device.
- The maximum number of DEAGs that can be created cannot exceed the number of address groups remaining before exceeding the total number supported on the firewall.

  For example, if a device supports 1024 Address Groups and you are using only 20 Address Groups, then 256 DEAGs (25% of 1024) can be created. However, if you have already manually created 1000 Address Groups, then only 24 DEAGs can be created.

Maximum DEAOs:

- The maximum number of *IP address type* DEAOs is 25% of the total number of address objects supported by the device.
- The maximum number of *FQDN* type DEAOs is 50% of the total number of address objects supported by the device.
- The maximum number of DEAOs that can be created cannot exceed the number of address objects remaining before exceeding the total number supported on the firewall.

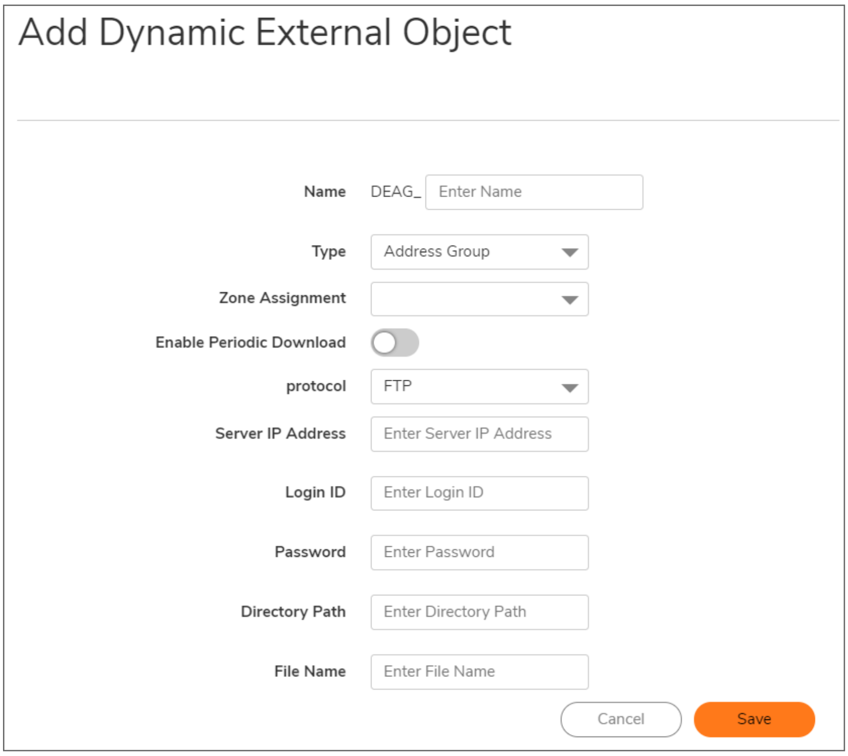
High Availability Requirements

When deployed as a High Availability pair, both the active and standby firewalls must have a connection to the server or URL to download the file that contains the list of IP addresses or FQDNs. This requires configuring the monitoring IP address on the standby unit.

Adding a Dynamic External Object

To add a Dynamic External Object:

1. Navigate to **Object > Match Objects > Dynamic Group** page.
2. Click the **Add** button. The **Add Dynamic External Object** dialog displays.



Add Dynamic External Object

Name	DEAG_ Enter Name
Type	Address Group
Zone Assignment	
Enable Periodic Download	○
protocol	FTP
Server IP Address	Enter Server IP Address
Login ID	Enter Login ID
Password	Enter Password
Directory Path	Enter Directory Path
File Name	Enter File Name

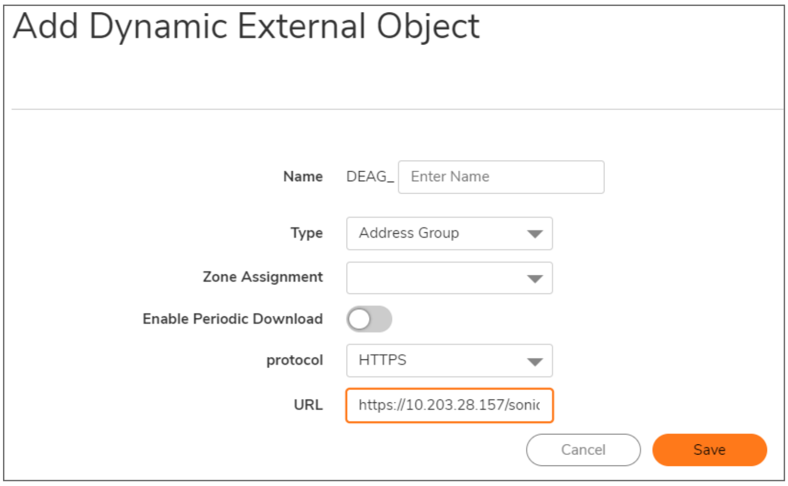
3. Enter a unique, descriptive name for the dynamic external address group in the **Name** field. “DEAG_” is automatically prepended to the name when saved.
4. The **Type** field is set to *Address Group*, with no other options.
5. In the **Zone Assignment** drop-down list, select the zone for the Dynamic External Address Group.
6. Select the **Enable Periodic Download** option for ongoing, periodic downloads of the Dynamic Address Group File.
7. If **Enable Periodic Download** is enabled, select the number of minutes or hours between downloads in the Download interval field. You can select one of:
   - 5 minutes
   - 15 minutes
   - 1 hour
   - 24 hours
8. Select the type of protocol to use for downloading the DEAG file from the **protocol** drop-down list. The choices are FTP or HTTPS. The remaining fields in the dialog are different for FTP and HTTPS.

9. If you selected **FTP** as the **protocol**, specify the following:

    - **Server IP Address** – the IP address of the FTP server where the DEAG file resides
      See About the Dynamic External Address Group File for information about the DEAG file.
    - **Login ID** – the user name for logging into the FTP server
    - **Password** – the password for logging into the FTP server
    - **Directory Path** – the folder in which the DEAG file resides on the FTP server
    - **File Name** – the name of the DEAG file on the FTP server

10. If you selected **HTTPS** as the **protocol**, specify the following:

    - **URL Name** – the URL which has the list of IP addresses or FQDNs

    Add Dynamic External Object

    Name: DEAG_ Enter Name
    Type: Address Group
    Zone Assignment:
    Enable Periodic Download: ○
    protocol: HTTPS
    URL: https://10.203.28.157/sonic

    The URL Name should start with *https://* and follow with the page name. This page contains the list of IP addresses or FQDNs.

11. Click **Save**.

Based on the configuration, the firewall reads the list of IP addresses or FQDNs from the file or URL. Then SonicOS automatically creates the following:

- Address group with the name provided in the **Add Dynamic External Object** dialog. This address group is read-only, meaning that you cannot edit or delete it.
- Address objects for every valid unique IP address or FQDN in the file. These address objects are also read-only.

The individual address objects are then added to the Dynamic External Address Group / Dynamic External Object. You can use this in access rules and policies.

Editing Dynamic External Objects

Click the **Edit**icon in the **Configure** column of the Dynamic External Object which you want to edit. The Configuration settings are same as the **Add Dynamic External Object** dialog.

You cannot change the **Name** of the DEAG or the Zone Assignment when editing the Dynamic External Object.

Deleting Dynamic External Objects

To delete Dynamic External Objects:

1. Navigate to **Object > Match Objects > Dynamic Group** page.
2. Do one of the following:
   - Click the **Delete** icon in the Configure column for the object to be deleted.
   - Click the checkbox for one or more objects to be deleted and click **Delete** at top of the page.

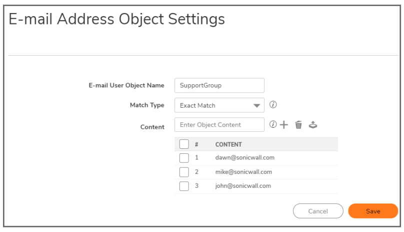
ⓘ **NOTE:** If a Dynamic External Address Group is in use, such as when an access rule is using it, the deletion attempt will fail.

8

Email Addresses

Application control allows the creation of custom email address lists as email address objects. You can only use email address objects with App Rules policies when the **Policy Type** is **SMTP Client**. Email address objects can represent individual users or the entire domain. You can also create an email address object that represents a group by adding a list of individual addresses to the object. This provides a way to easily include or exclude a group of users when creating an App Rules policy of type SMTP client. For more information, refer to **Policy > App Rules**.

For example, you can create an email address object to represent the support group:



E-mail Address Object Settings

E-mail User Object Name: SupportGroup

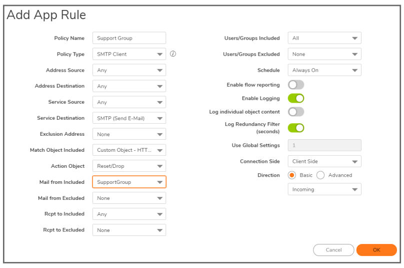
Match Type: Exact Match

Content: Enter Object Content

□	#	CONTENT
□	1	dawn@sonicwall.com
□	2	mike@sonicwall.com
□	3	john@sonicwall.com

After you define the group in an email address object, you can create an SMTP client policy that includes or excludes the group.

Navigate to **Policy > App Rules > Add**, the settings exclude the support group from a policy that prevents executable files from being attached to outgoing email. You can use the email address object in either the **Mail from Included**, **Mail from Excluded**, **RCPT to Included**, or **RCPT to Excluded** fields of the SMTP client policy. The **Mail from** fields refer to the sender of the email. The **RCPT to** fields refer to the intended recipient.

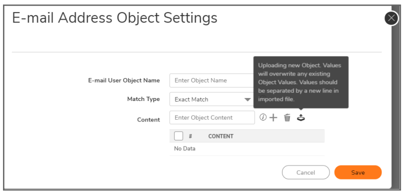


Add App Rule

Policy Name: Support Group
Policy Type: SMTP Client
Address Source: Any
Address Destination: Any
Service Source: Any
Service Destination: SMTP (Send E-Mail)
Exclusion Address: None
Match Object Included: Custom Object - HTT...
Action Object: Reset/Drop
Mail from Included: SupportGroup
Mail from Excluded: None
Rcpt to Included: Any
Rcpt to Excluded: None

Users/Groups Included: All
Users/Groups Excluded: None
Schedule: Always On
Enable flow reporting: ○
Enable Logging: ●
Log individual object content: ○
Log Redundancy Filter (seconds): ●
Use Global Settings: 1
Connection Side: Client Side
Direction: ● Basic ○ Advanced
Incoming

Although App Rules cannot extract group members directly from Outlook Exchange or similar applications, you can use the member lists in Outlook to create a text file that lists the group members. Then, when you create an email address object for this group, click **Upload** icon to import the list from your text file. Ensure that each email address is on a line by itself in the text file.



E-mail Address Object Settings

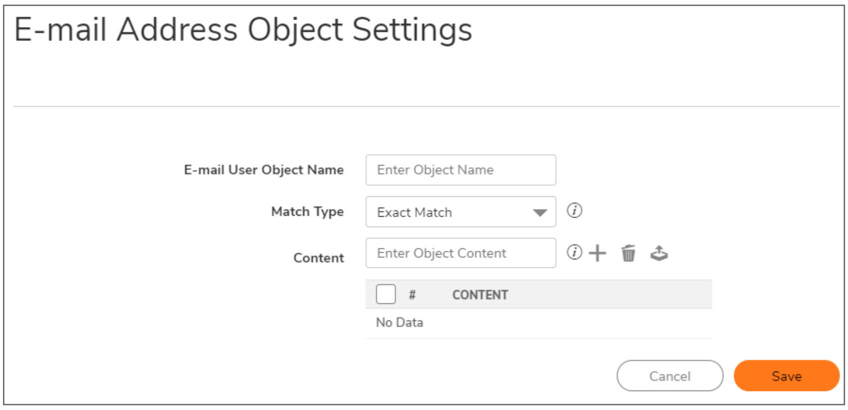
Match Type: Exact Match

Uploading new Object. Values will overwrite any existing Object Values. Values should be separated by a new line in imported file.

Configuring Email Address Objects

To configure email address object settings:

1. Navigate to **Object > Match Objects > Email Addresses**.
2. Click **Add**at the top of the page. The **E-mail Address Object Settings** dialog displays.



E-mail Address Object Settings

Match Type: Exact Match

3. Enter a descriptive name for the email address object in the **Email User Object Name** field.
4. For **Match Type**, select one of:
   - **Exact Match** – To exactly match the email address that you provide.
   - **Partial Match** – To match any part of the email address.
   - **Regex Match** – To use a regular expression to match the email address.
5. In the **Content** field, enter the email id and click **Add** icon.
   - For example, to match on a domain, select **Partial Match** in the previous step and then type **@** followed by the domain name in the **Content** field, for example, type: **@sonicwall.com**. To match on an individual user, select **Exact Match** in the previous step and then type the full email address in the **Content** field, for example: **jsmith@sonicwall.com**.
   - Importing a list of elements from a text file by clicking **Upload** icon. Each element in the file must be on a line by itself.

     By defining an email address object with a list of users, you can use App Rules to simulate groups.
6. Click **Save**.

   The Email Address Object is created and displayed in the table.

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SonicWall Support

Technical support is available to customers who have purchased SonicWall products with a valid maintenance contract.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. To access the Support Portal, go to https://www.sonicwall.com/support.

The Support Portal enables you to:

- View knowledge base articles and technical documentation
- View and participate in the Community forum discussions at https://community.sonicwall.com/technology-and-support.
- View video tutorials
- Access https://mysonicwall.com
- Learn about SonicWall professional services
- Review SonicWall Support services and warranty information
- Register for training and certification
- Request technical support or customer service

To contact SonicWall Support, visit https://www.sonicwall.com/support/contact-support.

About This Document

NOTE: A NOTE icon indicates supporting information.

IMPORTANT: An IMPORTANT icon indicates supporting information.

TIP: A TIP icon indicates helpful information.

CAUTION: A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.

WARNING: A WARNING icon indicates a potential for property damage, personal injury, or death.

SonicOS Match Objects Administration Guide
Updated - January 2021
Software Version - 7
232-005340-10 Rev B

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For more information, visit https://www.sonicwall.com/legal.

End User Product Agreement

To view the SonicWall End User Product Agreement, go to: https://www.sonicwall.com/legal/end-user-product-agreements/.

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