White Paper

Cisco Wide Area Application Services Software Legacy Common Internet File System (CIFS) Migration

What You Will Learn

Since the release of Cisco® Wide Area Application Services (WAAS) Software Version 4.1 in July 2009, a new mode for Common Internet File System (CIFS) acceleration called CIFS Application Optimizer has replaced the original Cisco WAAS CIFS optimization process commonly referred to as "Legacy CIFS" optimization. In addition to the standard transport optimization of data redundancy elimination (DRE), Lempel-Ziv (LZ) compression, and transport flow optimization (TFO), the CIFS Application Optimizer acceleration mode optimizes CIFS traffic at the application level and is based partly on the legacy Cisco Wide Area File Services Software (WAFS) implementation previously used with Cisco WAAS 4.0. For new installations, the new CIFS Application Optimizer has been enabled by default in Cisco WAAS 4.1 and later releases, and requires no additional configuration.

Cisco WAAS releases 4.1 through 4.3 support both CIFS Application Optimizer and legacy CIFS, and these two modes were mutually exclusive and incompatible. A Cisco WAAS Wide Area Application Engine (WAE) device could operate in either of these modes, but not both at the same time. With the release of Cisco WAAS 4.4, the legacy CIFS optimization will be removed and all CIFS optimizations will be performed using the CIFS Application Optimizer. The purpose of this document is to provide best practices for implementation, and document a plan for existing Cisco WAAS customers to migrate from legacy CIFS to the new CIFS Application Optimizer in preparation for upgrading to Cisco WAAS 4.4 or later.

CIFS Modes Supported in Cisco WAAS 4.1 through 4.3

Cisco WAAS releases 4.1 through 4.3 support two mutually exclusive CIFS modes:

- Legacy CIFS mode (also known as Cisco WAFS)
- Transparent CIFS Application Optimizer

Legacy CIFS mode traces its ancestry back to the original Cisco WAFS application, providing significant remote acceleration of centralized file services. However this mode, available in all Cisco WAAS prior to Cisco WAAS 4.4, requires significant configuration to set up core clusters in the data center and edge file services in remote locations and to manually define the connections between these core and edge devices. With all Cisco WAAS versions prior to Cisco WAAS 4.1, this was the recommended (and only) mode for accelerating file service and interoperating core and edge devices, or the mode to use when Disconnected mode operation at the edge was essential.

The transparent CIFS Application Optimizer mode was introduced with Cisco WAAS 4.1. This transparent mode requires no core, edge, or connectivity configuration, relying instead on automatic discovery, and transparently accelerating CIFS traffic with no additional configuration. Because of its lack of configuration requirements and ease of installation and use, this is the recommended and, as of Cisco WAAS 4.4, the only CIFS optimization mode available with Cisco WAAS. The CIFS Application Optimizer, however, does not support the legacy CIFS disconnected mode of operation.

The CIFS Application Optimizer is the default mode for all new installations. During the transition period of Cisco WAAS 4.1 through 4.3, for devices upgraded from Cisco WAAS 4.0 versions previously configured as CIFS core or edge devices, the legacy CIFS mode was the default mode. The device could then be switched between the modes using the Cisco WAAS Central Manager or the individual device command-line interface (CLI). The CIFS Application Optimizer feature cannot be enabled while the device is configured as a legacy CIFS core or edge device. The legacy file services must first be removed before the CIFS Application Optimizer feature is enabled. When the CIFS Application Optimizer feature is first enabled on a Cisco WAAS WAE device or device group, Cisco WAAS will disable the core and edge configuration pages for that device or device group and these devices can no longer be added to a defined core cluster. In the CIFS Application Optimizer mode, the Cisco WAE device then perform the function of both an edge and a core device simultaneously, depending on the direction of each request.

Table 1. Comparison of CIFS Modes

Feature	CIFS Application Optimizer Mode	CIFS Legacy Mode
Full transparency	Yes	No; uses Cisco WAFS tunnel on TCP port 4050
Cisco WAFS tunnel configuration	No	Yes (same as Cisco WAAS 4.0)
Separate edge and core configuration required	No; both CIFS edge and core devices are running after this mode is enabled	Yes
Autodiscovery	Cisco WAAS autodiscovery	Cisco WAFS CIFS autodiscovery
Remote print server acceleration	Yes, using Microsoft Windows Print Application Optimizer	No
Disconnected mode	No	Yes
File blocking	No	Yes
Default mode	Default for new installations	Default for upgrades from Cisco WAAS 4.0 if Cisco WAFS was configured before the upgrade
Read-ahead optimization	New faster streaming read-ahead; no configuration needed	Same as Cisco WAFS 4.0; uses tunnel configuration

Planning for Migration from Legacy CIFS Mode to CIFS Application Optimizer Mode

The transparent CIFS Application Optimizer is the recommended mode for all new installations and all current deployments where CIFS has not yet been configured. In cases where Cisco WAAS legacy CIFS has already been configured and deployed, customers must perform an intermediate upgrade to the transparent CIFS Application Optimizer using Cisco WAAS 4.1 prior to upgrading their systems to Cisco WAAS 4.4. Migration of all legacy CIFS to the CIFS Application Optimizer must be completed and all legacy CIFS configurations removed prior to upgrading to Cisco WAAS 4.4. Upgrading the Cisco WAAS Central Manager to Cisco WAAS 4.4 is not allowed if any device in the network is still configured as a legacy CIFS core or edge device.

Customers migrating from legacy CIFS to the CIFS Application Optimizer mode in newer Cisco WAAS releases will need to plan and follow the migration process detailed in this document after upgrading Cisco WAAS on their Cisco WAE devices. In general, after upgrading a Cisco WAAS WAE device or device group from Cisco WAAS 4.0 to a Cisco WAAS release prior to Cisco WAAS 4.4, the CIFS Application Optimizer can be manually enabled using the device CLI or the Cisco WAAS Central Manager GUI. Manually enabling the CIFS Application Optimizer after the upgrade will then disable the capability to configure legacy CIFS mode for the device or device group.

Migration Process from Legacy CIFS to CIFS Application Optimizer

When migrating from legacy CIFS to the CIFS Application Optimizer mode, the existing CIFS cache is retained. Disk allocation for CIFS in newer Cisco WAAS releases remains similar to its allocation in Cisco WAAS 4.0. Autodiscovery differs between the legacy CIFS and CIFS Application Optimizer modes. Legacy mode uses CIFS autodiscovery, whereas CIFS Application Optimizer relies on Cisco WAAS autodiscovery. CIFS autodiscovery is based on selection of the best core device from the configured core devices for each edge, while Cisco WAAS autodiscovery is based on routing and interception. It is important to verify that the network and interception are configured properly before the migration. The differences between the autodiscovery mechanisms may lead to different core Cisco WAE selections when the CIFS Application Optimizer is enabled.

In its simplest form, migration from legacy CIFS to CIFS Application Optimizer requires only enabling the CIFS Application Optimizer for each device or device group in the Cisco WAAS Central Manager GUI or at the device CLI. However, enabling the CIFS Application Optimizer at the same time disables the legacy CIFS mode on the Cisco WAE device and therefore requires that a defined process be followed in live production environments to reduce or isolate disruption of service to remote offices where legacy CIFS is operational.

This document describes two procedures for migrating from legacy CIFS mode to the new CIFS Application Optimizer mode:

- Graceful migration: This procedure is nonintrusive and allows migration without affecting traffic between the Cisco WAE devices on the branch-office and data center sides. It is, however, limited to specific described customer environments. It requires preplanning and systematic execution over a significant period of time, but has the advantage of nonstop operation of Cisco WAAS and Cisco WAAS file services.
- Disruptive migration: This procedure is operationally disruptive and affects traffic between the Cisco WAE devices on both the branch-office and data center sides. It can be applied to any existing Cisco WAAS 4.0 deployment. It requires little preplanning, but end users will experience Cisco WAAS and Cisco WAAS files service outages; however, it has the advantage of relatively quick and straightforward execution.

Note: Not all older releases of Cisco WAAS can be upgraded directly to a newer release of Cisco WAAS. Please consult the Cisco WAAS Upgrade Guide for intermediate upgrade requirements: http://www.cisco.com/en/US/partner/docs/app_ntwk_services/waas/waas/upgrade/guide/waas_upgrade43.html#wp42371.

Note: Upgrading a Cisco WAAS 4.0.x deployment that uses legacy CIFS, to a Cisco WAAS 4.4 or later release, requires an intermediate upgrade to Cisco WAAS 4.1 or later, and a subsequent graceful or disruptive migration of legacy CIFS to the CIFS Application Optimizer.

Prior to performing either migration procedure:

- Upgrade the Cisco WAAS Central Manager to Cisco WAAS 4.1 or later following the standard upgrade procedure found in the Cisco WAAS Upgrade Guide: http://www.cisco.com/en/US/partner/docs/app_ntwk_services/waas/waas/upgrade/guide/waas_upgrade43.html.
- Upgrade all the Cisco WAAS WAE devices running in Application Accelerator mode to Cisco WAAS 4.1 or later. The order in which you upgrade the devices is not important. However, you must upgrade all the devices before beginning the migration.

After completing the migration procedure:

- Migrate any preposition directives from legacy CIFS mode to CIFS Application Optimizer mode (see Appendix A).
- Migrate dynamic shares from legacy CIFS mode to CIFS Application Optimizer mode (see Appendix B).

Procedures for Disabling Legacy CIFS and Enabling CIFS Application Optimizer

Both the graceful and disruptive migration procedures defined in this document use numerous calls to disable legacy CIFS edge and core services and enable CIFS Application Optimizer. Rather than repeatedly detailing that process, the procedures are defined once here. The following procedure assumes that the Cisco WAAS Central Manager and Cisco WAAS WAE application accelerators have already been upgraded to Cisco WAAS 4.1 or later. The procedure also details configuration changes made to an individual device rather than a device group. You can also make configuration changes to disable legacy CIFS edge services and enable CIFS Application Optimizer for device groups. However, you can make configuration changes to disable older CIFS core services only for individual devices and not for device groups. Before disabling legacy CIFS core services, you must delete the core cluster to which the device belongs.

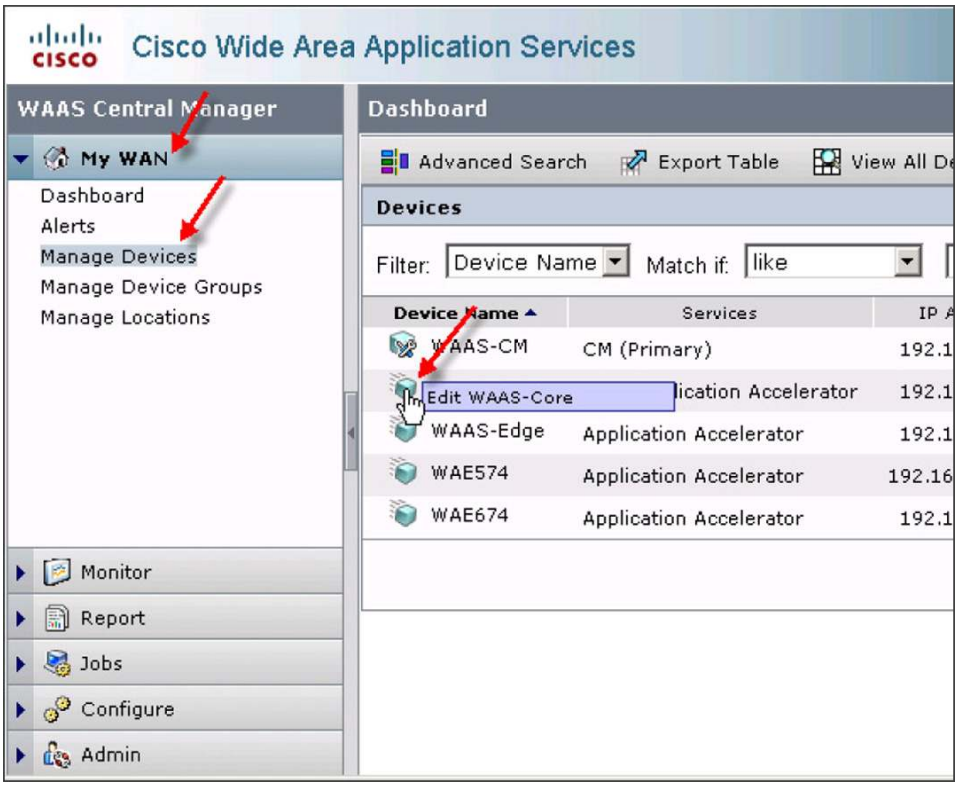
Disabling Legacy CIFS Core and Edge Services

Before a Cisco WAAS WAE device enabled as a core server can be disabled as a core server, it must be removed from any core cluster of which it is a part.

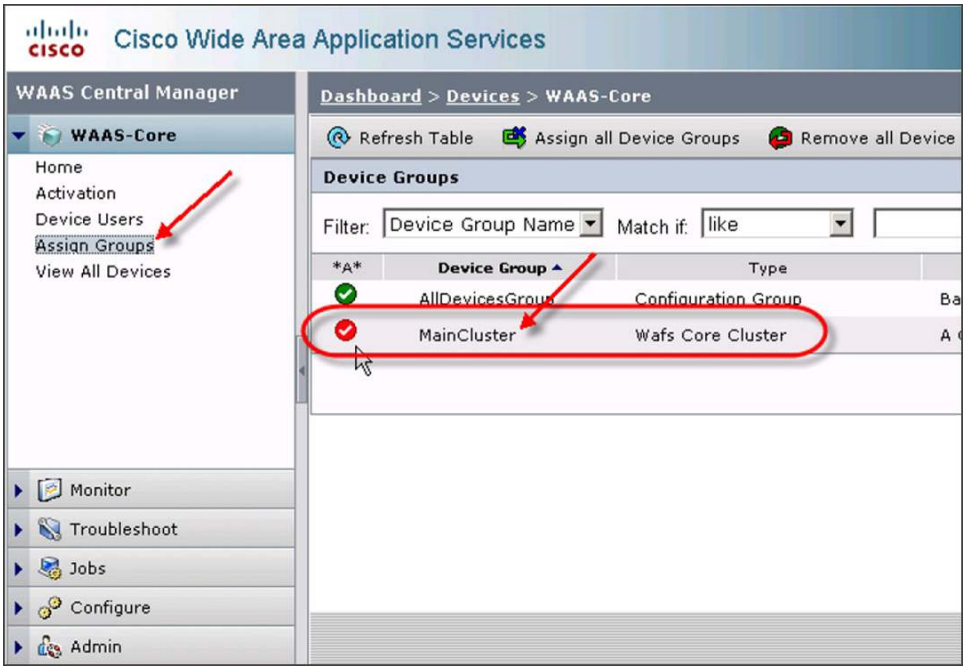
Disable Core Services

Step 1. Identify the core cluster. From the Cisco WAAS Central Manager GUI navigation pane, choose My WAN > Manage Devices.

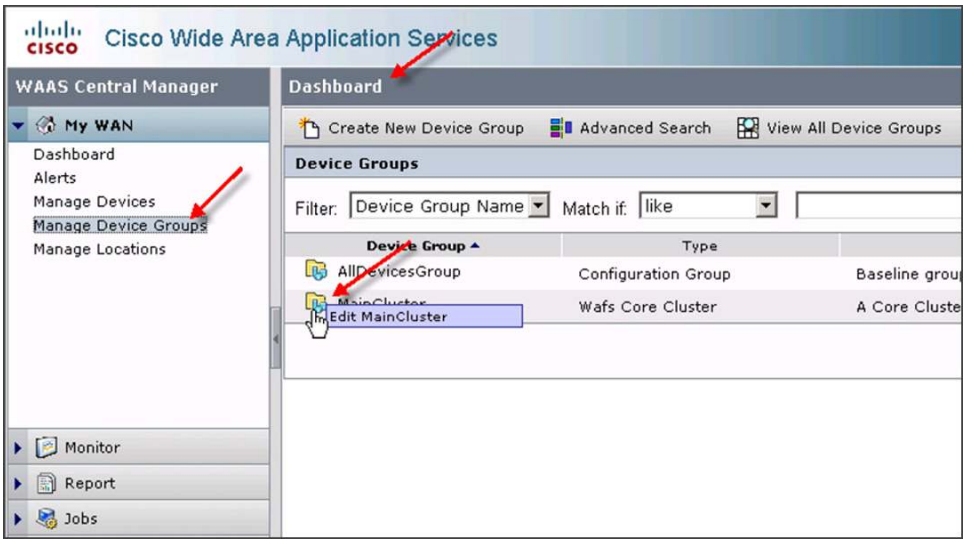
Step 2. Click the edit icon to the left of the target device.



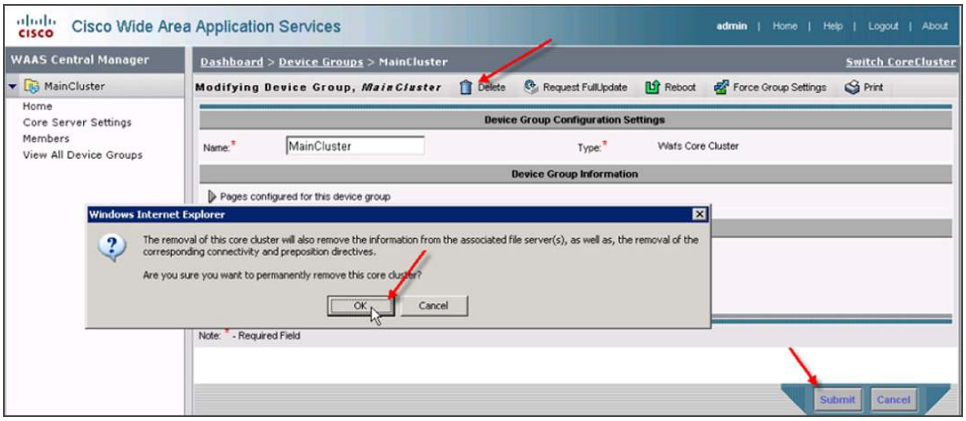
Step 3. The Devices Dashboard window appears. In the navigation pane on the left, select Assign Groups. In the Device Groups pane on the right, note the device group name with the type WAFS Core Cluster.



Step 4. Return to the Dashboard. From the Cisco WAAS Central Manager GUI navigation pane, choose My WAN > Manage Device Groups. Click the edit icon to the left of the device group name identified in the previous step.



Step 5. Click Delete in the menu bar at the top. Click OK to confirm that the core cluster will be permanently deleted. All core devices will then be released from this core cluster.

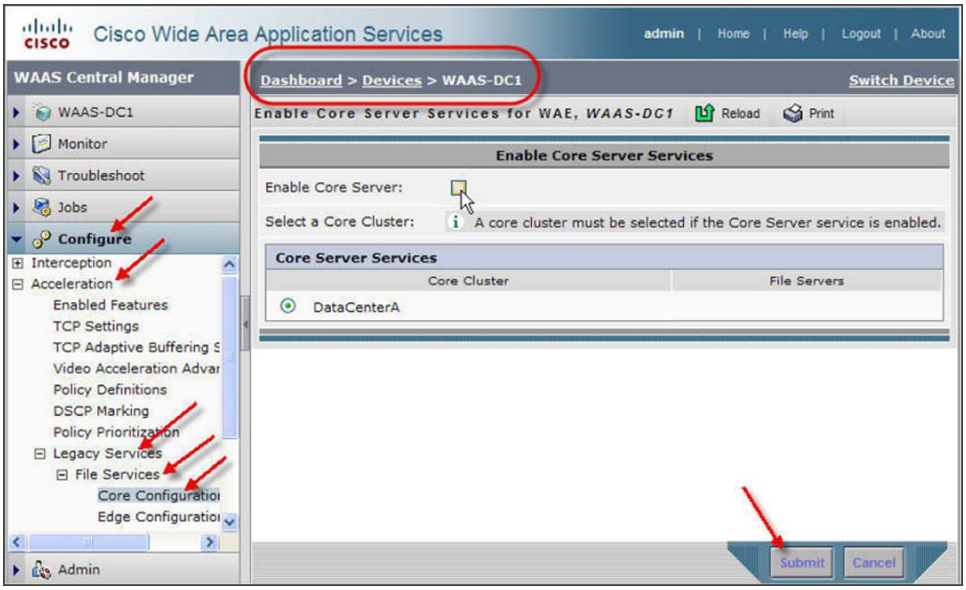


Step 6. In the Cisco WAAS Central Manager GUI navigation pane, choose My WAN > Manage Devices.

Step 7. Again, select the target device. The Devices Dashboard window appears.

Step 8. In the Configure drawer in the navigation pane, click Acceleration > Legacy Services > File Services > Core Configuration.

Step 9. In the right pane, uncheck Enable Core Server and click Submit. A dialog box will appear warning that a reload of the device will occur. Click OK.



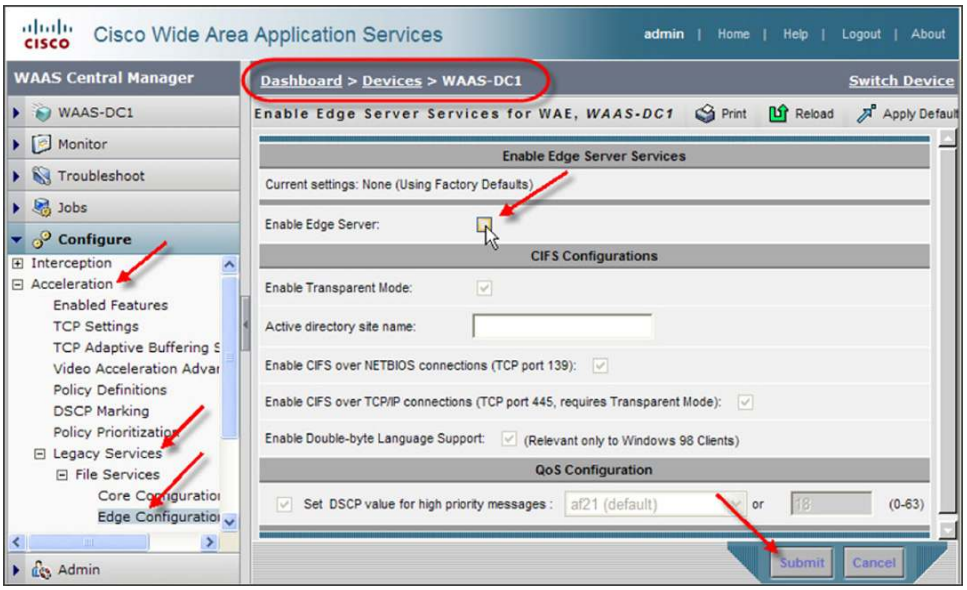
Disable Edge Services

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose My WAN > Manage Devices.

Step 2. Select the target device. The Device Dashboard window appears.

Step 3. In the Configure drawer in the navigation pane, click Acceleration > Legacy Services > File Services > Edge Configuration.

Step 4. In the right pane, uncheck Enable Edge Server and click Submit.



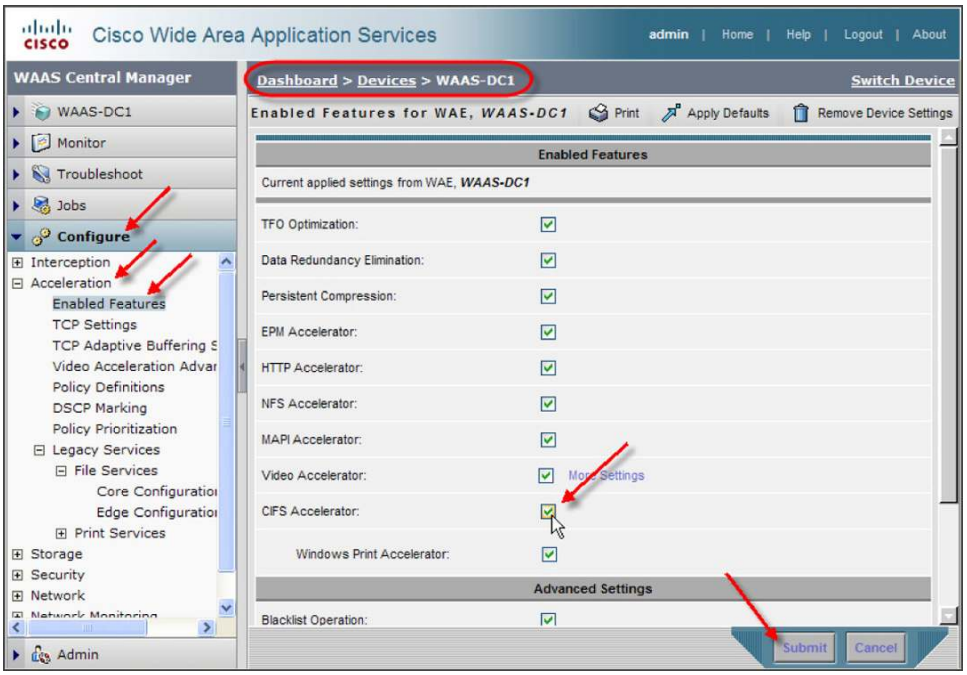
Enabling CIFS Application Optimizer

Step 1. From the Cisco WAAS Central Manager GUI navigation pane, choose My WAN > Manage Devices.

Step 2. Select the target device or device group. The Devices Dashboard window appears.

Step 3. In the Configure drawer in the navigation pane, click Acceleration > Enabled Features.

Step 4. Click the CIFS Accelerator check box and then click Submit.



Note: Legacy CIFS must be disabled before CIFS Accelerator is enabled.

Migration Scenarios

Site Definitions

- Branch site: A site where Cisco WAAS WAE devices are running legacy CIFS edge services and none of the devices are running legacy CIFS core services
- Data center: A site where Cisco WAAS WAE devices are running legacy CIFS core services and none of the devices are running legacy CIFS edge services
- Mixed site: A site where there are Cisco WAAS WAE devices running both the legacy CIFS core and edge services with any combination of edge and core services on the devices and at least one legacy CIFS edge and one core device

Scenario 1: Graceful Migration

The first qualification for a graceful migration includes minimal or no mixed sites as defined above. Because mixed sites cannot be isolated, they must be migrated simultaneously to reduce service disruption. A full mesh network Cisco WAAS deployment is a good example of environments that are not suitable for this migration alternative. The more mixed sites involved, the more difficult the migration process becomes. The second qualification requirement is enough Core Cisco WAE devices at each data center or each mixed site to simultaneously run both CIFS Application Optimizer and legacy CIFS mode on separate devices. This qualification requires that the group of core devices be split into two separate groups during the migration: one for the CIFS Application Optimizer mode and another for legacy CIFS mode. During the migration, each of the two core groups must be able to handle all the traffic that was previously handled by the combined core devices together.

To reiterate, the graceful migration process prerequisites include:

- No or minimal mixed sites
- Sufficient core devices so that half the devices can handle the entire traffic load

In an ideal situation, a graceful migration is the preferred migration option for customers intending to keep all CIFS optimizations available and functioning during the migration process. To accomplish this, the graceful migration procedure requires:

- All mixed sites must be migrated at once. Failure to migrate all mixed sites simultaneously will result in loss of CIFS optimization in parts of the network
- Existing connections are temporarily disconnected during the upgrade and migration. All subsequent new connections will be fully optimized using the new CIFS Application Optimizer once the upgrade completes successfully

The underlying key to the graceful migration scenario is the creation of two separate parallel networks running across the WAN: a CIFS Application Optimizer network and a legacy CIFS mode network. These two networks work in parallel during the migration period, allowing users to gain the CIFS optimization benefits. Each file server in every data center or mixed site needs to be accessible through both the CIFS Application Optimization network and the legacy CIFS network during the migration period.

The migration procedure assumes that there are enough core Cisco WAE devices in each data center to support both legacy CIFS mode and CIFS Application Optimizer networks. For example, a data center that has two core Cisco WAE devices can assign one of the devices to the CIFS Application Optimizer network and leave the second device to support the CIFS legacy network. Each one of these two core Cisco WAE devices should be able to support all the traffic that was previously divided between the two devices.

After all the Cisco WAE devices in the network have been upgraded to Cisco WAAS 4.1 or later, identify and divide the Cisco WAAS WAE devices where legacy CIFS core services are defined into two groups. The first group will be migrated immediately to the new, transparent CIFS Application Optimizer and prepared to handle the traffic of the branch-office devices as they are subsequently migrated to the new CIFS Application Optimizer. The second group will continue to work in the legacy CIFS mode, handling the traffic of the branch-office devices not yet migrated. In the following procedure:

- All those Cisco WAE devices that will use the new CIFS Application Optimizer mode are classified as group A
- The remaining Cisco WAE devices that will continue using legacy CIFS mode are classified as group B

To perform the procedure to migrate from legacy CIFS to the CIFS Application Optimizer, follow these steps:

Step 1. Split the core Cisco WAE devices in the data center into group A and group B:

1. Disable interception on all group B devices. All non-CIFS traffic as well as all new CIFS Application Optimizer traffic will now be directed only to those devices in group A. Group B devices will continue to handle legacy CIFS traffic only.
2. Migrate the data center group A devices to CIFS Application Optimizer mode:
   a. Disable legacy CIFS core services on the group A Cisco WAE devices.
   b. Enable CIFS Application Optimizer on all group A Cisco WAE devices.

Step 2. Split the core Cisco WAE devices in the mixed sites into group A and group B:

1. Make sure all the group B devices are running core services only and not also edge services. If any of the Cisco WAE devices are running both core and edge services, disable legacy CIFS edge services on those devices using the defined procedure.
2. Disable interception on all group B devices. All non-CIFS traffic as well as all new CIFS Application Optimizer traffic will now be directed only to those devices in group A. Group B devices will continue to handle legacy CIFS traffic only.
3. Migrate the group A devices to use CIFS Application Optimizer mode:
   a. Disable legacy CIFS core services on the Cisco WAE devices.
   b. Enable CIFS Application Optimizer on all the Cisco WAE devices.

Step 3. Migrate all Cisco WAAS WAE in each branch office:

1. Migrate all the Cisco WAE devices to use CIFS Application Optimizer mode:
   a. Disable legacy CIFS edge services on the Cisco WAE devices.
   b. Enable CIFS Application Optimizer on all the Cisco WAE devices.

Step 4. Complete the migration of group B devices in each of the data center and mixed sites:

1. Switch all group B devices to CIFS Application Optimizer mode.
   a. Disable legacy CIFS core services on the Cisco WAE devices.
   b. Enable CIFS Application Optimizer on all the Cisco WAE devices.
2. Enable interception on all group B devices.

Scenario 2: Disruptive Migration

The disruptive migration procedure is suggested for customers who cannot or are unwilling to use the graceful migration procedure, or customers who are willing to give up CIFS acceleration during the migration period. Using this disruptive procedure, until the migration is complete, new CIFS connections will be optimized by DRE/LZ compression, and TFO, but will not be CIFS accelerated. Existing legacy CIFS connections will be closed during the upgrade and migration. Additionally, several reboots are required on each Cisco WAE device, causing interruption of Cisco WAAS service. The advantage of this disruptive migration procedure is that the entire Cisco WAAS network can be migrated at the same time.

The procedure for disruptive migration is simple:

Step 1. Disable legacy core services on each Cisco WAAS WAE running legacy core services.

Step 2. Disable legacy edge services for either the AllDevicesGroup device group or on each Cisco WAAS WAE running legacy edge services.

Step 3. Enable CIFS Application Optimizer for either the AllDevicesGroup device group or on each Cisco WAAS WAE requiring CIFS acceleration.

Appendix A

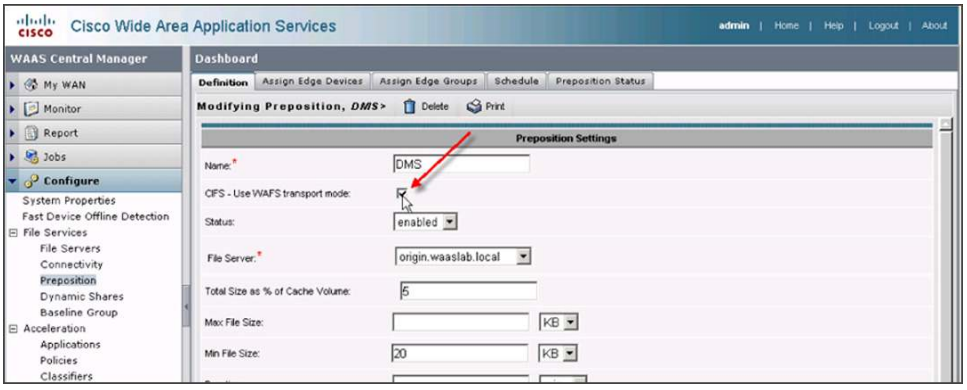
Migrating Preposition Directives

To migrate the preposition directives from legacy CIFS mode to the CIFS Application Optimizer mode, create new preposition directives:

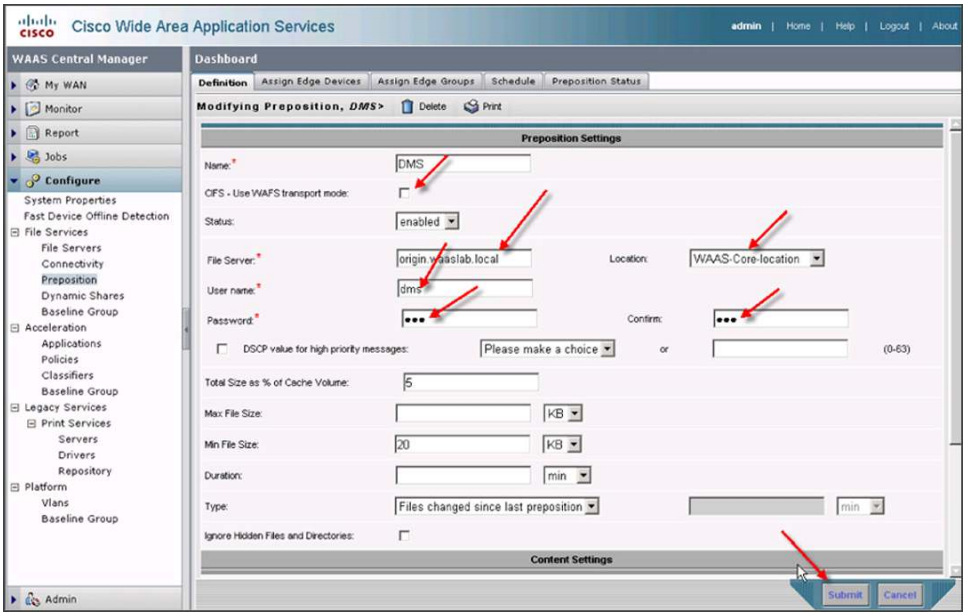
Step 1. Select the preposition directive. Under My WAN in the Configure drawer, select File > Preposition.

Step 2. Click the edit icon to the left of the preposition directive.

Step 3. Click the check box to the right of “CIFS - Use WAFS transport mode” to disable legacy CIFS mode.



Step 4. Enter the fully qualified domain name (FQDN) of the origin server, the Cisco WAE location that is closest to the origin server, and the user credentials (username and password) for the file server that is entered in the File Server field. Click Submit.



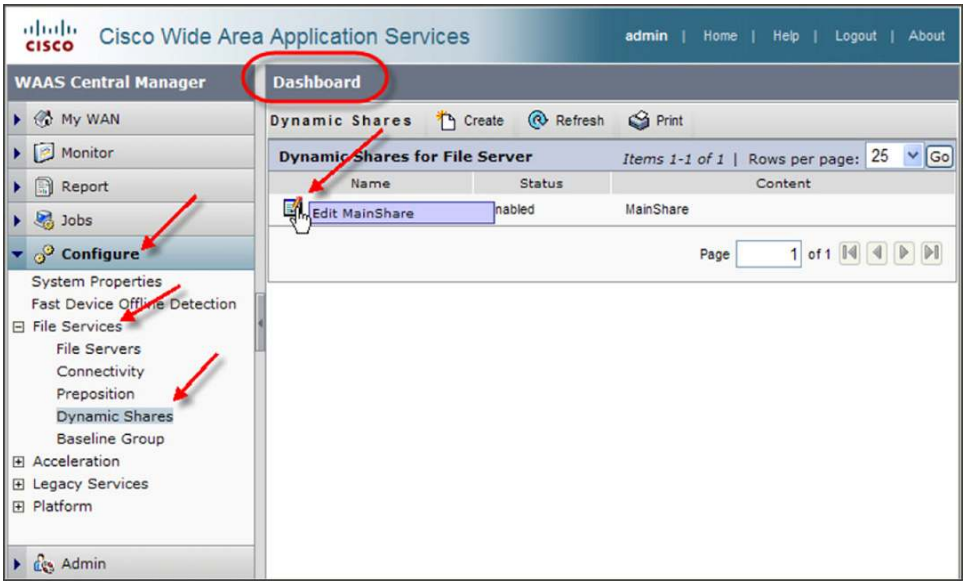
Appendix B

Migrating CIFS Dynamic Shares

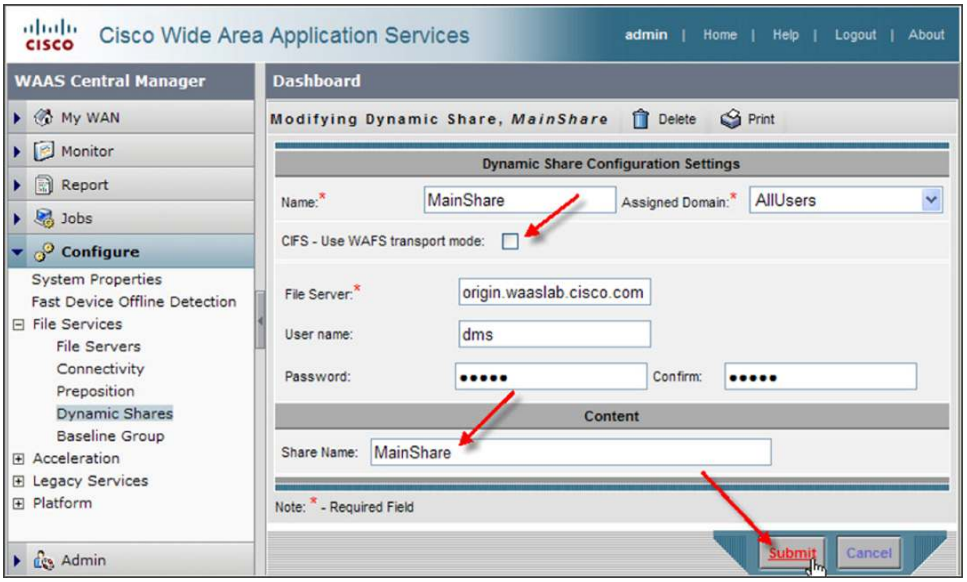
To migrate dynamic shares from Legacy CIFS mode to the CIFS Application Optimizer mode, follow these steps:

Step 1. Under My WAN in the Configure drawer, select File > Dynamic Shares.

Step 2. Click the edit icon of the dynamic share.



Step 3. Uncheck the “CIFS - Use WAFS transport mode” check box. Provide user credentials (username and password) for the file server that is entered in the File Server field. Enter a share name (optional). Click Submit.



For More Information

Go to http://www.cisco.com/go/waas.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**

Printed in USA C11-508426-01 06/11