



## **Cisco ASR 5000 Series Application Detection and Control Administration Guide**

**Version 12.2**

**Last Updated October 17, 2011**

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

Text Part Number: OL-25616-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, users are encouraged to try to correct the interference by using one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Modifications to this product not authorized by Cisco could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Cisco ASR 5000 Series Application Detection and Control Administration Guide

© 2011 Cisco Systems, Inc. and/or its affiliated entities. All rights reserved.

# CONTENTS

---

<b>About this Guide .....</b>	<b>V</b>
Conventions Used.....	vi
Contacting Customer Support .....	viii
<b>Application Detection and Control Overview .....</b>	<b>9</b>
Supported Platforms and Products .....	10
Licenses .....	11
ADC Overview .....	12
P2P Voice Call Duration .....	18
Random Drop Charging Action .....	18
How ADC Works .....	19
Advantages of P2P Processing Before DPI .....	19
ADC Session Recovery .....	20
Recovery from Task Failure .....	20
Recovery from CPU or PSC/PSC2 Failure .....	20
Limitations .....	20
BitTorrent .....	20
eDonkey .....	21
FastTrack .....	21
Gadu-Gadu .....	21
Gnutella / Morpheus .....	21
Jabber .....	21
MSN .....	22
Skype .....	22
Winny .....	22
Yahoo .....	22
Other Limitations .....	22
<b>Application Detection and Control Configuration .....</b>	<b>25</b>
Configuring System for ADC .....	26
Initial Configuration .....	26
Activating PACs/PSCs .....	26
Enabling Enhanced Charging .....	27
Modifying the Local Context .....	27
ADC Configuration .....	28
Creating the Active Charging Service .....	28
Configuring ADC Rules .....	29
Configuring the Charging Action .....	47
Configuring the Rulebase .....	48
Setting EDR Formats .....	57
Enable DSCP Marking .....	58
Saving the Configuration .....	61
Verifying the Configuration .....	62
Viewing System Configuration .....	62
Viewing Service Configuration Errors .....	62
Gathering ADC Statistics .....	63
Supported Bulk Statistics .....	64

P2P Reports..... 65

**Verifying and Saving Your Configuration..... 67**

    Verifying the Configuration..... 68

        Feature Configuration..... 68

        Service Configuration..... 69

        Context Configuration..... 69

        System Configuration..... 69

        Finding Configuration Errors ..... 70

    Saving the Configuration ..... 71

    Saving the Configuration on the Chassis ..... 72

**Sample ADC Configuration..... 75**





# About this Guide

---

This document pertains to the features and functionality that run on and/or that are related to the Cisco® ASR 5000 Chassis, formerly the Starent Networks ST40.

# Conventions Used

The following tables describe the conventions used throughout this documentation.

Icon	Notice Type	Description
	Information Note	Provides information about important features or instructions.
	Caution	Alerts you of potential damage to a program, device, or system.
	Warning	Alerts you of potential personal injury or fatality. May also alert you of potential electrical hazards.
	Electro-Static Discharge (ESD)	Alerts you to take proper grounding precautions before handling a product.

Typeface Conventions	Description
Text represented as a <code>screen display</code>	This typeface represents displays that appear on your terminal screen, for example: <code>Login:</code>
Text represented as <code>commands</code>	This typeface represents commands that you enter, for example: <code>show ip access-list</code> This document always gives the full form of a command in lowercase letters. Commands are not case sensitive.
Text represented as a <code>command variable</code>	This typeface represents a variable that is part of a command, for example: <code>show card slot_number</code> <code>slot_number</code> is a variable representing the desired chassis slot number.
Text represented as menu or sub-menu names	This typeface represents menus and sub-menus that you access within a software application, for example: Click the <b>File</b> menu, then click <b>New</b>

Command Syntax Conventions	Description
{ <code>keyword</code> or <code>variable</code> }	Required keywords and variables are surrounded by grouped brackets. Required keywords and variables are those components that are required to be entered as part of the command syntax.

Command Syntax Conventions	Description
[ <b>keyword</b> or <i>variable</i> ]	Optional keywords or variables, or those that a user may or may not choose to use, are surrounded by square brackets.
	<p>With some commands there may be a group of variables from which the user chooses one. These are called alternative variables and are documented by separating each variable with a vertical bar (also known as a pipe filter).</p> <p>Pipe filters can be used in conjunction with required or optional keywords or variables. For example:</p> <p>{ <b>nonce</b>   <b>timestamp</b> }</p> <p>OR</p> <p>[ <b>count</b> <i>number_of_packets</i>   <b>size</b> <i>number_of_bytes</i> ]</p>

# Contacting Customer Support

Use the information in this section to contact customer support.

**For New Customers:** Refer to the support area of <http://www.cisco.com> for up-to-date product documentation or to submit a service request. A valid username and password is required to this site. Please contact your local sales or service representative for additional information.

**For Existing Customers with support contracts through Starent Networks:** Refer to the support area of <https://support.starentnetworks.com/> for up-to-date product documentation or to submit a service request. A valid username and password is required to this site. Please contact your local sales or service representative for additional information.



**Important:** For warranty and repair information, please be sure to include the Return Material Authorization (RMA) tracking number on the outside of the package.

---



# Chapter 1

## Application Detection and Control Overview

---

This chapter provides an overview of the Application Detection and Control (ADC) in-line service, formerly known as Peer-to-Peer Detection.

The System Administration Guide provides basic system configuration information, and the product administration guides provide procedures to configure basic functionality of core network service. It is recommended that you select the configuration example that best meets your service model, and configure the required elements for that model, as described in the respective product Administration Guide, before using the procedures in this chapter.

This chapter covers the following topics:

- [Supported Platforms and Products](#)
- [Licenses](#)
- [ADC Overview](#)
- [How ADC Works](#)

## Supported Platforms and Products

ADC is an in-line service supported on ASR 5000 running 3GPP, 3GPP2, LTE and WiMAX core network services.

## Licenses

ADC is a licensed in-line service feature, requiring the following license to be installed on the chassis:

Cisco PID [ ASR5K-00-CS01P2PD ] *Application Detection and Control, 1K Sessions*, or Starent part number [ 600-00-7606 ] *Peer-to-Peer Detection Bundle 1k Sessions*.

For information on core network licenses, license requirements for any customer-specific features, and other requirements, please contact your local sales representative.



**Important:** For information on obtaining and installing licenses, refer to the *Managing License Keys* section of the *Software Management Operations* chapter in the *System Administration Guide*.

---

## ADC Overview

P2P is a term used in two slightly different contexts. At a functional level, it means protocols that interact in a peering manner, in contrast to client-server manner. There is no clear differentiation between the function of one node or another. Any node can function as a client, a server, or both—a protocol may not clearly differentiate between the two. For example, peering exchanges may simultaneously include client and server functionality, sending and receiving information. ADC utilizes the Enhanced Charging Service (ECS) functionality. For information about ECS, refer to the *Enhanced Charging Services Administration Guide*.

Detecting P2P protocols requires recognizing, in real time, some uniquely identifying characteristic of the protocols. Typical packet classification only requires information uniquely typed in the packet header of packets of the stream(s) running the particular protocol to be identified. In fact, many P2P protocols can be detected by simple packet header inspection. However, some P2P protocols are different, preventing detection in the traditional manner. This is designed into some P2P protocols to purposely avoid detection. The creators of these protocols purposely do not publish specifications. A small class of P2P protocols is stealthier and more challenging to detect. For some protocols, no set of fixed markers can be identified with confidence as unique to the protocol.

Operators care about P2P traffic because of the behavior of some P2P applications (for example, Bittorrent, Skype, and eDonkey). Most P2P applications can hog the network bandwidth such that 20% ADC users can generate as much traffic as generated by the rest 80% non-ADC users. This can result into a situation where non-ADC users may not get enough network bandwidth for their legitimate use because of excess usage of bandwidth by the ADC users. Network operators need to have dynamic network bandwidth / traffic management functions in place to ensure fair distributions of the network bandwidth among all the users. And this would include identifying P2P traffic in the network and applying appropriate controlling functions to the same (for example, content-based premium billing, QoS modifications, and other similar treatments).

The Application Detection and Control technology makes use of innovative and highly accurate protocol behavioral detection techniques. This ADC solution can detect the following protocols and their capabilities in real time:

- ActiveSync
- Aimini
- AntsP2P
- AppleJuice
- Ares
- Armagetron
- Battlefield
- BitTorrent
  - File downloading and uploading (plain / encrypted BitTorrent)
  - Un-encrypted, plain-encrypted, and RC4-encrypted file transfer
- Blackberry
- Citrix
- Clubpenguin
- Crossfire
- Ddlink

- DirectConnect
- Dofus
- eDonkey
  - File uploading and downloading (plain / encrypted eDonkey)
- Facebook
- FaceTime
- FastTrack
- Feidian
- Fiesta
- FileTopia
- Florensia
- Freenet
- Fring
- Funshion
- Gadu-Gadu
- GameKit
- Gmail
- Gnutella
- Google Talk
  - Audio
  - Video
  - Unclassified
- Guildwars
- Half-Life 2
- HamachiVPN
- IAX
- Icecast
- iMesh
- IMO
- IPTV
- IRC
- ISAKMP
- iSkoot
- iTunes
- Jabber
- Kontiki
- Manolito

- Maplestory
- Meebo
  - Audio
  - Video
  - Unclassified
- MGCP
- MSN
  - Audio
  - Video
  - Unclassified
  - Non Audio/Video
- Mute
- MySpace
- Netmotion
- Nimbuzz
- Octoshape
- OFF
- OGG
- ooVoo
- OpenFT
- OpenVPN
- Orb
- Oscar / AoL
  - Audio
  - Video
  - Unclassified
- Paltalk
- Pando
- Pandora
- PoPo
- PPLive
- PPStream
- PS3
- QQ
- QQgame
- QQLive
- Quake

- Quicktime
- RDP
- Real Media Stream
- Scydo
- Rfactor
- SecondLife
- Shoutcast
- Skinny
- Skype
  - Audio
  - Unclassified
- Slingbox
- SopCast
- SoulSeek
- Splashfighter
- Spotify
- SSDP
- Stealthnet
- Steam
- STUN
- Tango
- TeamSpeak
- TeamViewer
- Thunder
- Tor
- Truphone
- Tunnelvoice
- TVAnts
- TVUPlayer
- Twitter
- Ultrabac
- Usenet
- UUSee
- Veoh TV
- Viber
- VPN-X
- VTun

- Warcraft3
- WhatsApp
- Wii
- Windows Media Stream
- WinMX
- Winny
- World of Kungfu
- World of Warcraft
- Xbox
- XDCC
- Yahoo
  - Audio
  - Video
  - Unclassified
- Your Freedom Tunnel
- Zattoo

The system now supports video detection for GTalk, Meebo, MSN, Oscar, and Yahoo protocols.

ADC supports statistics reporting and postpaid charging policies. Per-protocol statistics via bulkstats and via report records including:

- UDR types: Summarizing data usage for a given content type
- EDR types: Specific to a particular event
- e-GCDRs: Specific to 3GPP

Upon detection of a P2P protocol for a particular flow, one of the following actions can be applied:

- Blocking P2P traffic—blocking protocol(s) and discarding traffic
- Bandwidth policing—limiting the bandwidth, applied per PDP context per P2P application type
- Flow policing—limiting the number of simultaneous P2P flows
- QoS support—including policing
- TOS marking—applied per P2P protocol type
- Prepaid and postpaid charging support for the following P2P protocols:
  - ActiveSync
  - AppleJuice
  - Ares
  - Battlefield
  - BitTorrent
  - DirectConnect



- eDonkey
  - FastTrack
  - Filetopia
  - Fring
  - Gadu-Gadutest
  - Gnutella
  - Google Talk
  - iMesh
  - IRC
  - iSkoot
  - Jabber
  - Manolito
  - MSN voice/non-voice
  - Mute
  - Nimbuzz
  - ooVoo
  - Orb
  - Oscar
  - Paltalk
  - Pando
  - PoPo
  - PPLive
  - PPStream
  - QQ
  - QQLive
  - Skype audio
  - Slingbox
  - SopCast
  - SoulSeek
  - UUSEE
  - Winny
  - Yahoo voice/non-voice
  - Zattoo
- Prepaid and postpaid ADC content-based billing
  - Statistics reporting—analyzing per-protocol statistics using bulkstats

## P2P Voice Call Duration

The ADC product has the capability to detect network traffic created by P2P VoIP clients such as Skype, Yahoo, MSN, Gtalk, Oscar. The VoIP call duration is a direct indication to the revenue impact of the network operator. The ADC product is well poised to process the network traffic online to detect and control the VoIP presence, and generate records that can be used to calculate the VoIP call durations.

## Random Drop Charging Action

The random drop charging action is added as an option to degrade P2P voice calls. This is achieved by randomly dropping packets of the voice calls over the voice call period.

Voice data is encoded in multiple packets by the codec. Since there is a possibility of packets being dropped in a network, the codec replicates the same information across multiple packets. This provides resilience to random packet drops in the network. For a considerable degradable voice quality, a chunk of packets need to be dropped. By this way, the codec will be unable to decode the required voice information. The chunk size for achieving degradation of voice call varies from one protocol to another.

The Random Drop decision has to be made once for a chunk of packets. By choosing the random drop time from a configured range, the drop is achieved at random seconds within a configured range. The packets will drop within a known period of time. For example, if a voice call happens for 2 minutes and if we configure a drop interval of 12–15 seconds, then a packet will be dropped within the first 15 seconds of the voice call.



**Important:** This feature is applicable only for VOIP calls.

---

## How ADC Works

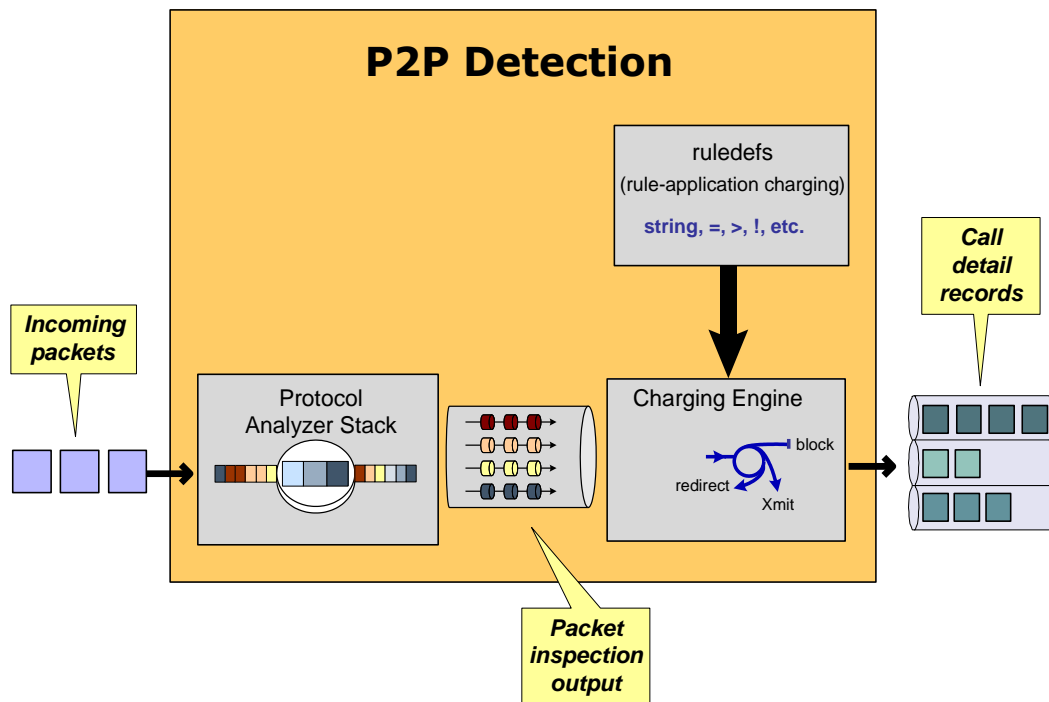
ADC interfaces to a PCRF Diameter Gx interface to accept policy ACLs and rulebases from a PDF. ADC supports real-time dynamic policy updates during a subscriber session. This includes modifying the subscriber's policy rules during an active session by means of ACL name and Rulebase name.

In Rel. 7 Gx interface, a Charging Rulebase will be treated as a group of ruledefs. A group of ruledefs enables grouping rules into categories, so that charging systems can base the charging policy on the category. When a request contains names of several Charging Rulebases, groups of ruledefs of the corresponding names are activated. For P2P rules to work in the group of ruledefs, P2P detection has to be enabled in the rulebase statically.

Static policy is supported initially. A default subscriber profile is assumed and can be overwritten on the gateway. Per-subscriber static policy is pulled by the gateway from the AAA service at subscriber authentication.

The following figure illustrates how packets travel through the system using ADC. The packets are investigated and then handled appropriately using ruledefs for charging.

**Figure 1. Overview of Packet Processing in ECSv2**



## Advantages of P2P Processing Before DPI

- Some protocols like BitTorrent and Orb use HTTP traffic for initial setup. If P2P analysis is done after HTTP, it is possible that these protocols may go undetected.

- Protocols like Skype use well known ports (like 80 & 443). In these scenarios, the HTTP engine reports these as invalid packets. For protocol detection, it is desirable to have P2P detection before Deep Packet Inspection (DPI).
- Stateless detection of protocols based on signature will be easier when the P2P analysis is done before DPI.

## ADC Session Recovery

Intra-chassis session recovery is coupled with SessMgr recovery procedures.

Intra-chassis session recovery support is achieved by mirroring the SessMgr and AAAMgr processes. The SessMgrs are paired one-to-one with the AAAMgrs. The SessMgr sends checkpointed session information to the AAAMgr. ACS recovery is accomplished using this checkpointed information.



**Important:** In order for session recovery to work there should be at least four packet processing cards (PSCs/PSC2s), one standby and three active. Per active CPU with active SessMgrs, there is one standby SessMgr, and on the standby CPU, the same number of standby SessMgrs as the active SessMgrs in the active CPU.

There are two modes of session recovery, one from task failure and another on failure of CPU or PSC/PSC2.

### Recovery from Task Failure

When a SessMgr failure occurs, recovery is performed using the mirrored “standby-mode” SessMgr task running on the active packet processing card. The “standby-mode” task is renamed, made active, and is then populated using checkpointed session information from the AAAMgr task. A new “standby-mode” SessMgr is created.

### Recovery from CPU or PSC/PSC2 Failure

When a packet processing card hardware failure occurs, or when a planned packet processing card migration fails, the standby packet processing card is made active and the “standby-mode” SessMgr and AAAMgr tasks on the newly activated packet processing card perform session recovery.

## Limitations

This section lists the limitations of ADC in this release.

### BitTorrent

- Some clients (like Azureus 3.0) provide an advanced user interface which can include an embedded web browser. These are not detected as BitTorrent. Also other features like chat or instant messaging are not detected as BitTorrent. These features are client specific and not related to the BitTorrent protocol.
- Certain clients also display advertisements. These images are downloaded through plain HTTP and are not detected as BitTorrent.

## eDonkey

- The eDonkey client eMule supports a protocol named Kademia. This protocol is an implementation of a DHT (Distributed Hash Table). Kademia is only used for searching new peers which have the file the user wants to download. The download itself uses the eDonkey protocol. However, the Kademia protocol is not detected as eDonkey.
- The eDonkey client eMule supports a text chat that is not detected as eDonkey.

## FastTrack

SSL packets and HTTP packets from the Kazaa client is not detected. Only data transfer is detected.

## Gadu-Gadu

Radio traffic passes through HTTP and is not detected.

## Gnutella / Morpheus

- Some of the clients that use Gnutella protocol for file sharing can also use other file sharing protocols. The part of traffic that follows Gnutella Protocol will only be detected as Gnutella.
- Client specific patterns which are not part of the Gnutella Protocol will not be detected as Gnutella. UDP contributes to about 20-30 % of most Gnutella clients. Detection is based on some strange patterns in the first packet of these UDP flows. Untested Gnutella clients may have more strange patterns, causing drop in the detection %.
- The Morpheus Client creates a lot of TCP flows, without any string pattern in the application header. These flows are not currently detected.

## Jabber

- Most clients that use Jabber for IM offer other services like Voice Call or File Transfer. These services are not detected as Jabber.
- Jabber with SSL encryption cannot be detected, because it uses SSL.

## MSN

MSN HTTP downloads such as MSN Games and MSN Applications are not detected. Traffic from these MSN applications use a different protocol for their traffic.

## Skype

- The Skype detection cannot detect traffic of most of the third-party plug-ins. The plug-ins use Skype only for marketing and presentation purposes such as opening a window within a Skype window or modifying the main Skype window with buttons or sounds. These plug-ins do NOT use the Skype protocol to transfer data over the network.
- Other than Skype Voice, all detected Skype traffic is marked as Skype. Distinctions between different data types within Skype (i.e. text chat, file transfer, and so on) cannot be made.
- Skype voice detection may not be accurate if it happens with other traffic (file transfer, video, etc.) on the same flow.

## Winny

The Winny client also supports bbs. This is currently not detected.

## Yahoo

Yahoo! HTTP downloads for yahoo games, images and ads that come during yahoo messenger startup are not detected as Yahoo!. If configured, these can be passed on to the HTTP analyzer for HTTP Deep Packet Inspection.

## Other Limitations

- Most of the heuristic analysis for a subscriber is stateful and depends on building an internal state based on certain patterns seen by the analyzer. Patterns occur over multiple packets in a single flow and over multiple flows for a subscriber. If the system loses the state (due to a task failure for example), then the detection can fail for the affected subscribers/flows after recovery.

Most P2P protocols emit these patterns regularly (sometimes as early as the next flow created by the application). When the system sees the pattern again, it re-learns the subscriber state and starts detecting the protocol.

- In this release, P2P rules cannot be combined with UDP and TCP rules in one ruledef.





# Chapter 2

## Application Detection and Control Configuration

---

This chapter describes how to configure the Application Detection and Control (ADC) feature.

The following topics are covered in this chapter:

- [Configuring System for ADC](#)
- [Verifying the Configuration](#)
- [Gathering ADC Statistics](#)
- [P2P Reports](#)

# Configuring System for ADC

This section lists the high-level steps to configuring the system with enhanced charging services for ADC in conjunction with ECS services.

To configure the system for ADC support with ECS:

- Step 1** Set initial configuration parameters such as activating PACs/PSCs and modifying the local context as described in the [Initial Configuration](#) section.
- Step 2** Enable the Enhanced Charging service with ADC and set basic ECS parameters such as service configuration, Ruledefs, charging actions, and EDRs as described in the [ADC Configuration](#) section.
- Step 3** Save the changes to system configuration as described in the [Save the Configuration](#) section.



**Important:** Commands used in the configuration examples in this section provide base functionality to the extent that the most common or likely commands and/or keyword options are presented. In many cases, other optional commands and/or keyword options are available. Refer to the *Command Line Interface Reference* for complete information regarding all commands.

## Initial Configuration

To perform initial system configuration for ADC support with ECS:

- Step 1** Specify the role of the PACs/PSCs in the chassis as described in the [Activating PACs/PSCs](#) section.
- Step 2** Enable ACS as described in the [Enabling Enhanced Charging](#) section.
- Step 3** Set local system management parameters as described in the [Modifying the Local Context](#) section.

## Activating PACs/PSCs

Use the following configuration example to activate two PACs/PSCs, placing one in “active” mode and labeling the other as redundant:

```
configure

card <slot_number>

    redundancy card-mode [ -noconfirm ]

    exit

card <slot_number>

    mode active pac/psc
```

```
end
```

## Enabling Enhanced Charging

Use the following configuration example to enable enhanced charging on the system:

```
configure
    require active-charging
end
```

## Modifying the Local Context

Use the following configuration example to set the default subscriber and AAA group in the local context:

```
configure
    context local
        interface <interface>
            ip address <address/mask>
            ip arp timeout <timeout>
            exit
        server ftpd
        exit
        server sshd
            subsystem sftp
            exit
        server telnetd
            exit
        subscriber default
            exit
        administrator <security_admin> encrypted password <password> ftp
        aaa group default
            exit
```

```

gtpp group default
    exit
ip route <route> SPI01
exit
port ethernet <slot/port>
    no shutdown
    bind interface <interface> local
exit
snmp engine-id local <id_number>
end

```

## ADC Configuration

To configure ADC with ACS:

- Step 1** Create the ACS service as described in the [Creating the Active Charging Service](#) section.
- Step 2** Configure ADC rules as described in the [Configuring ADC Rules](#) section.
- Step 3** Configure the charging action as described in the [Configuring the Charging Action](#) section.
- Step 4** Configure the rulebase as described in the [Configuring the Rulebase](#) section.
- Step 5** *Optional:* Set EDR formats as described in the [Setting EDR Formats](#) section.
- Step 6** Enable DSCP settings as described in the [Enable DSCP Marking](#) section.



**Important:** Commands used in the configuration examples in this section provide base functionality to the extent that the most common or likely commands and/or keyword options are presented. In many cases, other optional commands and/or keyword options are available. Refer to the *Command Line Interface Reference* for complete information regarding all commands.

## Creating the Active Charging Service

Use the following configuration example to create the ACS service:

```

configure

active-charging service <acs_service_name> [ -noconfirm ]

```

```
end
```

## Configuring ADC Rules

Use the following configuration example to set the P2P detection protocols in the ACS and the rule definitions for each P2P protocol. Note that the following example includes configuration to report voice and non-voice components for Skype, Yahoo, and MSN separately.

```
configure
```

```
active-charging service <acs_service_name>

p2p-detection protocol all

ruledef <charging_ruledef_actsync>

    p2p protocol = actsync

    exit

ruledef <charging_ruledef_aimini>

    p2p protocol = aimini

    exit

ruledef <charging_ruledef_antsp2p>

    p2p protocol = antsp2p

    exit

ruledef <charging_ruledef_applejuice>

    p2p protocol = applejuice

    exit

ruledef <charging_ruledef_ares>

    p2p protocol = ares

    exit

ruledef <charging_ruledef_armagettron>

    p2p protocol = armagettron

    exit

ruledef <charging_ruledef_battlefld>

    p2p protocol = battlefld
```

```
exit
ruledef <charging_ruledef_bittorrent>
    p2p protocol = bittorrent
exit
ruledef <charging_ruledef_blackberry>
    p2p protocol = blackberry
exit
ruledef <charging_ruledef_citrix>
    p2p protocol = citrix
exit
ruledef <charging_ruledef_clubpenguin>
    p2p protocol = clubpenguin
exit
ruledef <charging_ruledef_crossfire>
    p2p protocol = crossfire
exit
ruledef <charging_ruledef_ddlink>
    p2p protocol = ddlink
exit
ruledef <charging_ruledef_directconnect>
    p2p protocol = directconnect
exit
ruledef <charging_ruledef_dofus>
    p2p protocol = dofus
exit
ruledef <charging_ruledef_edonkey>
    p2p protocol = edonkey
exit
ruledef <charging_ruledef_facebook>
```

```
p2p protocol = facebook
exit
ruledef <charging_ruledef_facetime>
    p2p protocol = facetime
    exit
ruledef <charging_ruledef_fasttrack>
    p2p protocol = fasttrack
    exit
ruledef <charging_ruledef_feidian>
    p2p protocol = feidian
    exit
ruledef <charging_ruledef_fiesta>
    p2p protocol = fiesta
    exit
ruledef <charging_ruledef_filetopia>
    p2p protocol = filetopia
    exit
ruledef <charging_ruledef_florensia>
    p2p protocol = florensia
    exit
ruledef <charging_ruledef_freenet>
    p2p protocol = freenet
    exit
ruledef <charging_ruledef_fring>
    p2p protocol = fring
    exit
ruledef <charging_ruledef_funshion>
    p2p protocol = funshion
    exit
```

```
ruledef <charging_ruledef_gadugadu>

    p2p protocol = gadugadu

    exit

ruledef <charging_ruledef_gamekit>

    p2p protocol = gamekit

    exit

ruledef <charging_ruledef_gmail>

    p2p protocol = gmail

    exit

ruledef <charging_ruledef_gnutella>

    p2p protocol = gnutella

    exit

ruledef <charging_ruledef_gtalk>

    p2p protocol = gtalk

    exit

ruledef <charging_ruledef_guildwars>

    p2p protocol = guildwars

    exit

ruledef <charging_ruledef_half-life2>

    p2p protocol = half-life2

    exit

ruledef <charging_ruledef_hamachivpn>

    p2p protocol = hamachivpn

    exit

ruledef <charging_ruledef_iax>

    p2p protocol = iax

    exit

ruledef <charging_ruledef_icecast>

    p2p protocol = icecast
```



```
exit

ruledef <charging_ruledef_imesh>

    p2p protocol = imesh

    exit

ruledef <charging_ruledef_imo>

    p2p protocol = imo

    exit

ruledef <charging_ruledef_iptv>

    p2p protocol = iptv

    exit

ruledef <charging_ruledef_irc>

    p2p protocol = irc

    exit

ruledef <charging_ruledef_isakmp>

    p2p protocol = isakmp

    exit

ruledef <charging_ruledef_iskoot>

    p2p protocol = iskoot

    exit

ruledef <charging_ruledef_itunes>

    p2p protocol = itunes

    exit

ruledef <charging_ruledef_jabber>

    p2p protocol = jabber

    exit

ruledef <charging_ruledef_kontiki>

    p2p protocol = kontiki

    exit

ruledef <charging_ruledef_manolito>
```

```
p2p protocol = manolito
exit
ruledef <charging_ruledef_maplestory>
    p2p protocol = maplestory
    exit
ruledef <charging_ruledef_meebo>
    p2p protocol = meebo
    exit
ruledef <charging_ruledef_mgcp>
    p2p protocol = mgcp
    exit
ruledef <charging_ruledef_msn>
    p2p protocol = msn
    exit
ruledef <charging_ruledef_mute>
    p2p protocol = mute
    exit
ruledef <charging_ruledef_myspace>
    p2p protocol = myspace
    exit
ruledef <charging_ruledef_netmotion>
    p2p protocol = netmotion
    exit
ruledef <charging_ruledef_nimbuzz>
    p2p protocol = nimbuzz
    exit
ruledef <charging_ruledef_octoshape>
    p2p protocol = octoshape
    exit
```

```
ruledef <charging_ruledef_off>

    p2p protocol = off

    exit

ruledef <charging_ruledef_ogg>

    p2p protocol = ogg

    exit

ruledef <charging_ruledef_oovoo>

    p2p protocol = oovoo

    exit

ruledef <charging_ruledef_openft>

    p2p protocol = openft

    exit

ruledef <charging_ruledef_openvpn>

    p2p protocol = envpn

    exit

ruledef <charging_ruledef_orb>

    p2p protocol = orb

    exit

ruledef <charging_ruledef_oscar>

    p2p protocol = oscar

    exit

ruledef <charging_ruledef_paltalk>

    p2p protocol = paltalk

    exit

ruledef <charging_ruledef_pando>

    p2p protocol = pando

    exit

ruledef <charging_ruledef_pandora>

    p2p protocol = pandora
```

```
exit
ruledef <charging_ruledef_popo>
    p2p protocol = popo
exit
ruledef <charging_ruledef_pplive>
    p2p protocol = pplive
exit
ruledef <charging_ruledef_ppstream>
    p2p protocol = ppstream
exit
ruledef <charging_ruledef_ps3>
    p2p protocol = ps3
exit
ruledef <charging_ruledef_qq>
    p2p protocol = qq
exit
ruledef <charging_ruledef_qqgame>
    p2p protocol = qqgame
exit
ruledef <charging_ruledef_qqlive>
    p2p protocol = qqlive
exit
ruledef <charging_ruledef_quake>
    p2p protocol = quake
exit
ruledef <charging_ruledef_quicktime>
    p2p protocol = quicktime
exit
ruledef <charging_ruledef_rdp>
```

```
p2p protocol = rdp
exit
ruledef <charging_ruledef_rfactor>
    p2p protocol = rfactor
    exit
ruledef <charging_ruledef_rmstream>
    p2p protocol = rmstream
    exit
ruledef <charging_ruledef_scydo>
    p2p protocol = scydo
    exit
ruledef <charging_ruledef_secondlife>
    p2p protocol = secondlife
    exit
ruledef <charging_ruledef_shoutcast>
    p2p protocol = shoutcast
    exit
ruledef <charging_ruledef_skinny>
    p2p protocol = skinny
    exit
ruledef <charging_ruledef_skype>
    p2p protocol = skype
    exit
ruledef <charging_ruledef_slingbox>
    p2p protocol = slingbox
    exit
ruledef <charging_ruledef_sopcast>
    p2p protocol = sopcast
    exit
```

```
ruledef <charging_ruledef_soulseek>

    p2p protocol = soulseek

    exit

ruledef <charging_ruledef_splashfighter>

    p2p protocol = splashfighter

    exit

ruledef <charging_ruledef_spotify>

    p2p protocol = spotify

    exit

ruledef <charging_ruledef_ssdps>

    p2p protocol = ssdp

    exit

ruledef <charging_ruledef_stealthnet>

    p2p protocol = stealthnet

    exit

ruledef <charging_ruledef_steam>

    p2p protocol = steam

    exit

ruledef <charging_ruledef_stun>

    p2p protocol = stun

    exit

ruledef <charging_ruledef_tango>

    p2p protocol = tango

    exit

ruledef <charging_ruledef_teamspeak>

    p2p protocol = teamspeak

    exit

ruledef <charging_ruledef_teamviewer>

    p2p protocol = teamviewer
```

```
exit

ruledef <charging_ruledef_thunder>

    p2p protocol = thunder

    exit

ruledef <charging_ruledef_tor>

    p2p protocol = tor

    exit

ruledef <charging_ruledef_truphone>

    p2p protocol = truphone

    exit

ruledef <charging_ruledef_tunnelvoice>

    p2p protocol = tunnelvoice

    exit

ruledef <charging_ruledef_tvants>

    p2p protocol = tvants

    exit

ruledef <charging_ruledef_tvuplayer>

    p2p protocol = tvuplayer

    exit

ruledef <charging_ruledef_twitter>

    p2p protocol = twitter

    exit

ruledef <charging_ruledef_ultrabac>

    p2p protocol = ultrabac

    exit

ruledef <charging_ruledef_usenet>

    p2p protocol = usenet

    exit

ruledef <charging_ruledef_uusee>
```

```
p2p protocol = uusee
exit
ruledef <charging_ruledef_veohtv>
    p2p protocol = veohtv
    exit
ruledef <charging_ruledef_viber>
    p2p protocol = viber
    exit
ruledef <charging_ruledef_vpnx>
    p2p protocol = vpnx
    exit
ruledef <charging_ruledef_vtun>
    p2p protocol = vtun
    exit
ruledef <charging_ruledef_warcraft3>
    p2p protocol = warcraft3
    exit
ruledef <charging_ruledef_whatsapp>
    p2p protocol = whatsapp
    exit
ruledef <charging_ruledef_wii>
    p2p protocol = wii
    exit
ruledef <charging_ruledef_winxp>
    p2p protocol = winxp
    exit
ruledef <charging_ruledef_winnpy>
    p2p protocol = winpy
    exit
```



```
ruledef <charging_ruledef_wmstream>

    p2p protocol = wmstream

    exit

ruledef <charging_ruledef_wofkungfu>

    p2p protocol = wofkungfu

    exit

ruledef <charging_ruledef_wofwarcraft>

    p2p protocol = wofwarcraft

    exit

ruledef <charging_ruledef_xbox>

    p2p protocol = xbox

    exit

ruledef <charging_ruledef_xdcc>

    p2p protocol = xdcc

    exit

ruledef <charging_ruledef_yahoo>

    p2p protocol = yahoo

    exit

ruledef <charging_ruledef_yourfreetunnel>

    p2p protocol = yourfreetunnel

    exit

ruledef <charging_ruledef_zattoo>

    p2p protocol = zattoo

    exit

# Configuration to report audio and video components for GTalk, Meebo, MSN,
# Oscar, Skype, and Yahoo separately:

ruledef <charging_ruledef_gtalk_audio>

    p2p protocol = gtalk

    p2p traffic-type = audio
```

```
exit

ruledef <charging_ruledef_gtalk_video>

    p2p protocol = gtalk

    p2p traffic-type = video

    exit

ruledef <charging_ruledef_gtalk_nonav>

    p2p protocol = gtalk

    p2p traffic-type = unclassified

    exit

ruledef <charging_ruledef_meebo_audio>

    p2p protocol = meebo

    p2p traffic-type = audio

    exit

ruledef <charging_ruledef_meebo_video>

    p2p protocol = meebo

    p2p traffic-type = video

    exit

ruledef <charging_ruledef_meebo_nonav>

    p2p protocol = meebo

    p2p traffic-type = unclassified

    exit

ruledef <charging_ruledef_msn_audio>

    p2p protocol = msn

    p2p traffic-type = audio

    exit

ruledef <charging_ruledef_msn_video>

    p2p protocol = msn

    p2p traffic-type = video

    exit
```

```
ruledef <charging_ruledef_msn_nonav>

    p2p protocol = msn

    p2p traffic-type = unclassified

    exit

ruledef <charging_ruledef_oscar_audio>

    p2p protocol = oscar

    p2p traffic-type = audio

    exit

ruledef <charging_ruledef_oscar_video>

    p2p protocol = oscar

    p2p traffic-type = video

    exit

ruledef <charging_ruledef_oscar_nonav>

    p2p protocol = oscar

    p2p traffic-type = unclassified

    exit

ruledef <charging_ruledef_skype_audio>

    p2p protocol = skype

    p2p traffic-type = audio

    exit

ruledef <charging_ruledef_skype_nonav>

    p2p protocol = skype

    p2p traffic-type = unclassified

    exit

ruledef <charging_ruledef_yahoo_audio>

    p2p protocol = yahoo

    p2p traffic-type = audio

    exit

ruledef <charging_ruledef_yahoo_video>
```

```
p2p protocol = yahoo
p2p traffic-type = video
exit
ruledef <charging_ruledef_yahoo_nonav>
    p2p protocol = yahoo
    p2p traffic-type = unclassified
    exit
ruledef <routing_ruledef_dns-tcp>
    tcp either-port = 53
    rule-application routing
    exit
ruledef <routing_ruledef_dns-udp>
    udp either-port = 53
    rule-application routing
    exit
ruledef <routing_ruledef_ftp-control>
    tcp either-port = 21
    rule-application routing
    exit
ruledef <routing_ruledef_ftp-data>
    tcp either-port = 20
    rule-application routing
    exit
ruledef <routing_ruledef_http>
    tcp either-port = 80
    rule-application routing
    exit
ruledef <routing_ruledef_https>
    tcp either-port = 443
```

```
rule-application routing
exit
ruledef <routing_ruledef_imap>
    tcp either-port = 143
    rule-application routing
    exit
ruledef <routing_ruledef_mms-wapcl-ct>
    wsp content type = application/vnd.wap.mms-message
    rule-application routing
    exit
ruledef <routing_ruledef_mms_http_ct>
    http content type = application/vnd.wap.mms-message
    rule-application routing
    exit
ruledef <routing_ruledef_mms_http_url>
    http url ends-with .mms
    rule-application routing
    exit
ruledef <routing_ruledef_mms_wapcl-url>
    wsp url ends-with .mms
    rule-application routing
    exit
ruledef <routing_ruledef_pop3>
    tcp either-port = 110
    rule-application routing
    exit
ruledef <routing_ruledef_rtsp>
    tcp either-port = 554
    rule-application routing
```

```
exit

ruledef <routing_ruledef_rtsp-8556>

    tcp either-port = 8556

    rule-application routing

    exit

ruledef <routing_ruledef_sdp>

    sip content type = application/sdp

    rule-application routing

    exit

ruledef <routing_ruledef_sip>

    udp either-port = 5060

    rule-application routing

    exit

ruledef <routing_ruledef_smtp>

    tcp either-port = 25

    rule-application routing

    exit

ruledef <routing_ruledef_wap2.0>

    tcp either-port = 8080

    rule-application routing

    exit

ruledef <routing_ruledef_wsp-connection-less>

    udp either-port = 9200

    rule-application routing

    exit

ruledef <routing_ruledef_wsp-connection-oriented>

    udp either-port = 9201

    ip protocol = 51

    ip protocol = 50
```

```
ip protocol = 47

ip downlink = TRUE

ip uplink = TRUE

ip any-match = TRUE

tcp any-match = TRUE

udp dst-port = 5000

rule-application routing

end
```

Notes:

- If in a ruledef the rule-application is not specified, by default the system configures the ruledef as a charging ruledef.

## Configuring the Charging Action

Use the following configuration example to configure the charging actions:

**configure**

```
active-charging service <acs_service_name>

    charging-action <charging_action_name1>

        flow limit-for-bandwidth direction downlink peak-data-rate 4000
peak-burst-size 1024 violate-action discard committed-data-rate 3200 committed-
burst-size 512 exceed-action discard

    exit

    charging-action <charging_action_name2>

        content-id 1

    exit

    charging-action <charging_action_name3>

        flow action terminate-flow

    end
```

## Configuring the Rulebase

Use the following configuration example to configure the rulebases for P2P. This configuration also enables the P2P analyzer to detect the P2P applications configured for the Active Charging Service. Note that the following example includes configuration to report voice and non-voice components for GTalk, MSN, Oscar, Skype, and Yahoo separately.

**configure**

```

    active-charging service <acs_service_name>

        rulebase <rulebase_name>

            action priority <priority> ruledef <charging_ruledef_actsync>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_aimini>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_antsp2p>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_applejuice>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_ares>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_armagetron>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_battlefld>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_bittorrent>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_blackberry>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_citrix>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_clubpenguin>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_crossfire>
charging-action <charging_action_name>

            action priority <priority> ruledef <charging_ruledef_ddlink>
charging-action <charging_action_name>

            action priority <priority> ruledef
<charging_ruledef_directconnect> charging-action <charging_action_name>

```



```
        action priority <priority> ruledef <charging_ruledef_dofus>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_edonkey>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_facebook>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_facetime>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_fasttrack>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_feidian>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_fiesta>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_filetopia>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_florensia>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_freenet>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_fring>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_funshion>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gadugadu>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gamekit>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gmail>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gnutella>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gtalk>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_guildwars>
charging-action <charging_action_name>
```

```

        action priority <priority> ruledef <charging_ruledef_half-life2>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_hamachivpn>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_iax>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_icecast>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_imesh>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_imo>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_ip-tv>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_irc>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_isakmp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_iskoot>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_itunes>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_jabber>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_kontiki>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_manolito>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_maplestory>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_meebo>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_mgcp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_msn>
charging-action <charging_action_name>

```

```
        action priority <priority> ruledef <charging_ruledef_mute>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_myspace>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_netmotion>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_nimbuzz>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_octoshape>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_off>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_ogg>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_oovoo>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_openft>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_openvpn>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_orb>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_oscar>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_paltalk>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_pando>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_pandora>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_popo>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_pplive>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_ppstream>
charging-action <charging_action_name>
```

```

        action priority <priority> ruledef <charging_ruledef_ps3>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_qq>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_qqgame>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_qqlive>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_quake>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_quicktime>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_rdp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_rmstream>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_rfactor>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_scydo>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_secondlife>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_shoutcast>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_skinny>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_skype>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_slingbox>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_sopcast>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_soulseek>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_splashfighter> charging-action <charging_action_name>

```

```
        action priority <priority> ruledef <charging_ruledef_spotify>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_ssdp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_stealthnet>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_steam>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_stun>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_tango>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_teamspeak>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_teamviewer>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_thunder>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_tor>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_truphone>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_tunnelvoice>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_tvants>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_tvuplayer>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_twitter>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_ultrabac>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_usenet>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_uusee>
charging-action <charging_action_name>
```

```

        action priority <priority> ruledef <charging_ruledef_veohtv>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_viber>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_vpnx>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_vtun>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_warcraft3>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_whatsapp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_wii>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_wmstream>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_winxp>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_winxpy>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_wofkungfu>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_wofwarcraft>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_xbox>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_xdcc>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_yahoo>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_yourfreetunnel> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_zattoo>
charging-action <charging_action_name>

# Configuration to report audio and video components for Oscar, GTalk, Meebo,
MSN, Skype, and Yahoo separately:

```

```

        action priority <priority> ruledef <charging_ruledef_gtalk_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_gtalk_video>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_gtalk_unclassified> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_meebo_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_meebo_video>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_meebo_unclassified> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_msn_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_msn_video>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_msn_unclassified> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_oscar_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_oscar_video>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_oscar_unclassified> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_skype_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_skype_unclassified> charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_yahoo_audio>
charging-action <charging_action_name>

        action priority <priority> ruledef <charging_ruledef_yahoo_video>
charging-action <charging_action_name>

        action priority <priority> ruledef
<charging_ruledef_yahoo_unclassified> charging-action <charging_action_name>

        route priority <priority> ruledef <routing_ruledef_http> analyzer
http

```

```

        route priority <priority> ruledef <routing_ruledef_wap2.0>
analyzer http

        route priority <priority> ruledef <routing_ruledef_https>
analyzer secure-http

        route priority <priority> ruledef <routing_ruledef_imap> analyzer
imap

        route priority <priority> ruledef <routing_ruledef_pop3> analyzer
pop3

        route priority <priority> ruledef <routing_ruledef_smtp> analyzer
smtp

        route priority <priority> ruledef <routing_ruledef_dns-udp>
analyzer dns

        route priority <priority> ruledef <routing_ruledef_dns-tcp>
analyzer dns

        route priority <priority> ruledef <routing_ruledef_ftp-control>
analyzer ftp-control

        route priority <priority> ruledef <routing_ruledef_ftp-data>
analyzer ftp-data

        route priority <priority> ruledef <routing_ruledef_rtsp> analyzer
rtsp

        route priority <priority> ruledef <routing_ruledef_rtsp-8556>
analyzer rtsp

        route priority <priority> ruledef <routing_ruledef_sip> analyzer
sip

        route priority <priority> ruledef <routing_ruledef_wsp-
connection-less> analyzer wsp-connection-less

        route priority <priority> ruledef <routing_ruledef_wsp-
connection-oriented> analyzer wsp-connection-oriented

        route priority <priority> ruledef <routing_ruledef_sdp> analyzer
sdp

        route priority <priority> ruledef <routing_ruledef_mms-wapcl-ct>
analyzer mms

        route priority <priority> ruledef <routing_ruledef_mms_wapcl-url>
analyzer mms

        route priority <priority> ruledef <routing_ruledef_mms_http-ct>
analyzer mms

```



```

route priority <priority> ruledef <routing_ruledef_mms_http_url>
analyzer mms
    rtp dynamic-flow-detection
    p2p dynamic-flow-detection
end

```

Notes:

- For information about the list of protocols that support prepaid and postpaid charging, refer to the *Application Detection and Control Overview* chapter of this guide.

## Setting EDR Formats

ECS generates postpaid charging data files which can be retrieved from the system periodically and used as input to a billing mediation system for post-processing. Event Detail Records (EDRs) are generated according to action statements in rule commands.

Up to 32 different EDR schema types may be specified, each composed of up to 32 fields or analyzer parameter names. The records are written at the time of each rule event in a comma-separated (CSV) format. This configuration aids in capturing the detected P2P protocol data in the EDR.

Use the following example to set the EDR configuration:

```

configure
    active-charging service <ecs_service>
        edr-format <edr_flow_format>
            rule-variable traffic type priority <priority>
            rule-variable voip-duration priority <priority>
            attribute sn-start-time format seconds priority <priority>
            attribute sn-end-time format seconds priority <priority>
            attribute radius-calling-station-id priority <priority>
            rule-variable ip server-ip-address priority <priority>
            attribute sn-server-port priority <priority>
            attribute sn-app-protocol priority <priority>
            attribute sn-parent-protocol priority <priority>
            rule-variable ip protocol priority <priority>
            rule-variable p2p protocol priority <priority>

```

```

    attribute sn-volume-amt ip bytes uplink priority
<priority>

    attribute sn-volume-amt ip bytes downlink priority
<priority>

    attribute sn-volume-amt ip pkts uplink priority <priority>
    attribute sn-volume-amt ip pkts downlink priority
<priority>

    rule-variable bearer 3gpp charging-id priority <priority>
    rule-variable bearer 3gpp imei priority <priority>
    rule-variable bearer 3gpp rat-type priority <priority>
    rule-variable bearer 3gpp user-location-information
priority <priority>

    end

```

Notes:

- For information on EDR format configuration and rule variables, refer to the *EDR Format Configuration Mode Commands* chapter of the *Command Line Interface Reference Guide*.

## Enable DSCP Marking

Use the following configuration example to enable DSCP marking in the configuration:

```

configure

    context ggsn

        interface <interface>

            ip address <address/mask>

            ip arp timeout <timeout>

            exit

        subscriber default

            ip context-name <context_name>

            exit

        apn <apn_name>

            selection-mode sent-by-ms

            accounting-mode none

```

```
ip access-group <access_group_name> in

ip access-group <access_group_name> out

ip source-violation ignore

ip qos-dscp conversational pt streaming pt interactive 1 pt
interactive 2 pt interactive 3 pt background pt

ip qos-dscp interactive 1 allocation-retention-priority 1 pt
interactive 1 allocation-retention-priority 2 pt interactive 1 allocation-
retention-priority 3 pt

ip qos-dscp interactive 2 allocation-retention-priority 1 pt
interactive 2 allocation-retention-priority 2 pt interactive 2 allocation-
retention-priority 3 pt

ip qos-dscp interactive 3 allocation-retention-priority 1 pt
interactive 3 allocation-retention-priority 2 pt interactive 3 allocation-
retention-priority 3 pt

ip context-name <context_name>

ip address pool name <pool_name>

active-charging rulebase <rulebase_name>

exit

aaa group default

exit

gtpv group default

exit

ggsn-service GGSN

retransmission-timeout <retransmission_timeout>

max-retransmission <max_retransmission>

plmn unlisted-sgsn home

bind address <ip_address>

exit

context <context_name>

ip access-list <access_list_name>

redirect css service <acs_service> ip any any

exit
```

```

ip pool <pool_name> <ip_address/mask> static

interface <interface>

    ip address <ip_address/mask>

    ip arp timeout <timeout>

    exit

subscriber default

    exit

radius group default

    exit

gtpv group default

    exit

ip route <ip_address/mask> <interface>

    exit

port ethernet <interface>

    no shutdown

    bind interface <interface> ggsn

    exit

port ethernet <interface>

    no shutdown

    bind interface <interface> <context_name>

    end

```

Notes:

- <acs\_service> is the name of the ACS service; no CSS service needs to be configured.

## Saving the Configuration

Refer to the *Verifying and Saving Your Configuration* chapter of this guide to save changes made to the system configuration for ADC.

## Verifying the Configuration

This section explains how to review the configurations after saving them in a *.cfg* file as described in *Verifying and Saving Your Configuration* chapter and also to retrieve errors and warnings within an active configuration for a service.

### Viewing System Configuration

The following configuration example displays the active configuration for a service:

```
configure

    context <context_name>

    end

show configuration [ card <card_num> | context <name> [ radius group [ all |
name <group> ] ] | port <slot/port> | srp ] [ showsecrets ] [ url <url> ] [
verbose ] [ | { grep <grep_options> | more } ]
```

### Viewing Service Configuration Errors

The following configuration example displays the errors in configuration for a service:

```
configure

    context <context_name>

    end

show configuration errors section active-charging [ verbose ] [ | { grep
<grep_options> | more } ]
```

# Gathering ADC Statistics

In the following table, the first column lists what statistics to gather, the second column lists an action to perform, and the third column describes what information is displayed or what information to look for in the resulting output.

**Table 1. Gathering Statistics**

Statistics Wanted	Action to Perform	Information to Look For
Analyzer statistics	At the Exec Mode prompt, enter the following command: <b>show active-charging analyzer statistics name p2p verbose</b>	The output of this command displays the analyzer statistics if a P2P analyzer is used. Since the analyzer statistics are not bound to any service, the traffic information per gateway can be obtained.
Ruledef statistics	At the Exec Mode prompt, enter the following command: <b>show active-charging ruledef statistics name &lt;name&gt;</b>	The output of this command displays the Ruledef statistics including the packet count, byte count and hits.
P2P flow statistics	At the Exec Mode prompt, enter the following command: <b>show active-charging flows type p2p traffic-type voice</b> <b>show active-charging flows type p2p traffic-type non-voice</b>	The output of this command displays the number of P2P voice and non-voice flows.
Charging Action information	At the Exec Mode prompt, enter the following command: <b>show active-charging charging-action statistics</b>	The output of this command displays the charging action information and corresponding statistics configured in the active charging service.
Transmit and Receive data	At the Exec Mode prompt, enter the following command: <b>show active-charging sessions tx-data &lt;operator&gt; &lt;bytes&gt;</b> <b>show active-charging sessions rx-data &lt;operator&gt; &lt;bytes&gt;</b>	The output of the command displays the information for sessions that have received or transmitted data which matches the criteria.
Sessions using specific protocol	At the Exec Mode prompt, enter the following command: <b>show active-charging sessions type p2p application &lt;protocol&gt;</b>	The output of this command displays information for the sessions using the specified protocol.
Total and current P2P and P2P voice flows	At the Exec Mode prompt, enter the following command: <b>show active-charging subsystem all</b>	The output of this command displays total and current P2P flow and P2P voice flow statistics, and total number of subscribers.
Voice Statistics	At the Exec Mode prompt, enter the following command: <b>show active-charging analyzer statistics name p2p application [ gtalk   msn   oscar   skype   yahoo ]</b>	The output of this command displays the voice and non-voice analyzer statistics for voice supported protocols (MSN, Yahoo, GTalk, Skype, Oscar).

## Supported Bulk Statistics


For information on ADC bulk statistics and bulk statistics configuration and collection, refer to the *Bulk Statistics Configuration Mode Commands* chapter of the *Command Line Interface Reference*, and the *Statistics and Counters Reference*.




## P2P Reports

The P2P reports provide details of the bandwidth consumption of P2P traffic over time. These reports are used to analyze network performance, identify the customer trends, network usage patterns, and network categorization.

---

 **Important:** In 9.0 and earlier releases, the P2P reporting functionality was available in the Web Element Manager software. For more information, refer to the *Web Element Manager Online Help* documentation.


 **Important:** In 10.0 and later releases, the P2P reporting functionality is supported in MUR. For more information, refer to the *Mobility Unified Reporting Online Help* documentation.

---

The following bandwidth usage reports are supported:

- Cumulative analyzer count - representing the total bandwidth consumed by the P2P traffic in bits/sec. Daily, monthly or yearly reports are supported.
- Total bandwidth consumed P2P traffic against other protocols like HTTP, RTSP, etc. Daily or monthly reports are supported.
- Per protocol type - total bandwidth consumed by the individual P2P protocol traffic in packets/sec or bytes/sec plotted against time range or date range. Daily reports are supported. The graph uses separate colors to differentiate among the multiple protocol types.
- The number of active users per application for specified date/time range. Daily reports are supported.
- Analysis of the percentage of total bandwidth consumed by P2P traffic from the total subscriber traffic. Weekly reports are supported.

---

 **Important:** For additional information about viewing reports, refer to the *Web Element Manager Online Help System*.

---



# Chapter 3

## Verifying and Saving Your Configuration

---

This chapter describes how to save your system configuration.

## Verifying the Configuration

You can use a number of commands to verify the configuration of your feature, service, or system. Many are hierarchical in their implementation and some are specific to portions of, or specific lines in, the configuration file.

### Feature Configuration

In many configurations, you have to set and verify specific features. An example includes IP address pool configuration. Using this example, enter the following commands to verify proper feature configuration:


Enter the following command to display the IP address pool configuration:

**show ip pool**

The output from this command should look similar to the sample shown below. In this example, all IP pools were configured in the *isp1* context.

```
context : isp1:
+-----Type: (P) - Public (R) - Private
|
| (S) - Static (E) - Resource
|
|+-----State: (G) - Good (D) - Pending Delete (R)-Resizing
||
||+---Priority: 0..10 (Highest (0) .. Lowest (10))
||||
||||+--Busyout: (B) - Busyout configured
|||| ||||| vvvvv Pool Name Start Address Mask/End Address Used Avail
-----
PG00 ipsec 12.12.12.0 255.255.255.0 0 254 PG00
pool1 10.10.0.0 255.255.0.0 0 65534 SG00
vpnpool 192.168.1.250 192.168.1.254 0 5 Total Pool Count: 5
```

---

 **Important:** To configure features on the system, use the *show* commands specifically for these features. Refer to the *Cisco Systems ASR 5000 Command Line Interface Reference* for more information.

---

## Service Configuration

Verify that your service was created and configured properly by entering the following command:

```
show <service_type> <service_name>
```

The output is a concise listing of the service parameter settings similar to the sample displayed below. In this example, a P-GW service called *pgw* is configured.

```
Service name : pgw1
Service-Id : 1
Context : test1
Status : STARTED
Restart Counter : 8
EGTP Service : egtpl
LMA Service : Not defined
Session-Delete-Delay Timer : Enabled
Session-Delete-Delay timeout : 10000(msecs)
PLMN ID List : MCC: 100, MNC: 99
Newcall Policy : None
```

## Context Configuration

Verify that your context was created and configured properly by entering the following command:

```
show context name <name>
```

The output shows the active context. Its ID is similar to the sample displayed below. In this example, a context named *test1* is configured.

Context Name	ContextID	State
-----	-----	-----
test1	2	Active

## System Configuration

Verify that your entire configuration file was created and configured properly by entering the following command:

### **show configuration**

This command displays the entire configuration including the context and service configurations defined above.

## Finding Configuration Errors

Identify errors in your configuration file by entering the following command:

### **show configuration errors**

This command displays errors it finds within the configuration. For example, if you have created a service named “service1”, but entered it as “srv1” in another part of the configuration, the system displays this error.

You must refine this command to specify particular sections of the configuration. Add the **section** keyword and choose a section from the help menu:

### **show configuration errors section ggsn-service**

or

### **show configuration errors section aaa-config**


If the configuration contains no errors, an output similar to the following is displayed:

```
#####
Displaying Global
AAA-configuration errors
#####
Total 0 error(s) in this section !
```

# Saving the Configuration

Save system configuration information to a file locally or to a remote node on the network.

---

 **Caution:** Prior to loading 12.2, we recommend that copies of the original configuration file be made and stored (with unique release-identifying titles) both in the Flash and off the chassis. Configuration files created and saved in release 12.2 cannot be shared across multiple chassis due to a change in the encryption algorithm for passwords and secrets. These 12.2 changes modify encrypted data in the configuration file so that it cannot be recognized by previous software builds. If it is necessary to revert to a previous build, the chassis must be booted with the copy of the original configuration file. If this copy is not available, then the chassis will need to be loaded as if it is a new chassis.

---

Files saved locally can be stored in the CompactFlash or a PCMCIA memory card on the SMC. Files that are saved to a remote network node can be transmitted through FTP or TFTP.

## Saving the Configuration on the Chassis

These instructions assume that you are at the root prompt for the Exec mode:

```
[local]host_name#
```

To save your current configuration, enter the following command:

```
save configuration url [-redundant] [-noconfirm] [showsecrets] [verbose]
```

**Table 2. Command Syntax for Saving the Configuration**

Keyword/Variable	Description
<i>url</i>	<p>Specifies the path and name to which the configuration file is to be stored. <i>url</i> may refer to a local or a remote file. <i>url</i> must be entered using one of the following formats:</p> <ul style="list-style-type: none"> <li><code>{ /flash   /pcmcia1   /pcmcia2 } [ /dir ] /file_name</code></li> <li><code>file://{ /flash   /pcmcia1   /pcmcia2 } [ /dir ] /file_name</code></li> <li><code>tftp://{ ipaddress   host_name [ :port# ] } [ /directory ] /file_name</code></li> <li><code>ftp://{ username [ :pwd ] @ } { ipaddress   host_name } [ :port# ] [ /directory ] /file_name</code></li> <li><code>sftp://{ username [ :pwd ] @ } { ipaddress   host_name } [ :port# ] [ /directory ] /file_name</code></li> </ul> <p><i>/flash</i> corresponds to the CompactFlash on the SMC.  <i>/pcmcia1</i> corresponds to PCMCIA slot 1.  <i>/pcmcia2</i> corresponds to PCMCIA slot 2.  <i>ipaddress</i> is the IP address of the network server.  <i>host_name</i> is the network server's <i>hostname</i>.  <i>port#</i> is the network server's logical port number. Defaults are:</p> <ul style="list-style-type: none"> <li>tftp: 69 - data</li> <li>ftp: 20 - data, 21 - control</li> <li>sftp: 115 - data</li> </ul> <p>Note: <i>host_name</i> can only be used if the <b>networkconfig</b> parameter is configured for DHCP and the DHCP server returns a valid nameserv er.dx  <i>username</i> is the username required to gain access to the server if necessary.  <i>password</i> is the password for the specified username if required.  <i>/directory</i> specifies the directory where the file is located if one exists.  <i>/file_name</i> specifies the name of the configuration file to be saved.  Note: Configuration files should be named with a .cfg extension.</p>
-redundant	<p>Optional: This keyword directs the system to save the CLI configuration file to the local device, defined by the <i>url</i> variable, and then automatically copy that same file to the like device on the Standby SMC, if available.  Note: This keyword will only work for like local devices that are located on both the active and standby SMCs. For example, if you save the file to the <i>/pcmcia1</i> device on the active SMC, that same type of device (a PC-Card in Slot 1 of the standby SMC) must be available. Otherwise, a failure message is displayed.  Note: When saving the file to an external network (non-local) device, the system disregards this keyword.</p>



Keyword/Variable	Description
-noconfirm	Optional: Indicates that no confirmation is to be given prior to saving the configuration information to the specified filename (if one was specified) or to the currently active configuration file (if none was specified).
showsecrets	Optional: This keyword saves the CLI configuration file with all passwords in plain text, rather than their default encrypted format.
verbose	Optional: Specifies to display every parameter that is being saved to the new configuration file.



**Important:** The **-redundant** keyword is only applicable when saving a configuration file to local devices. This command does not synchronize the local file system. If you have added, modified, or deleted other files or directories to or from a local device for the active SMC, you must synchronize the local file system on both SMCs.

To save a configuration file called *system.cfg* to a directory that was previously created called *cfgfiles* on the CompactFlash in the SMC, enter the following command:

```
save configuration /flash/cfgfiles/system.cfg
```

To save a configuration file called *simple\_ip.cfg* to a directory called *host\_name\_configs*, using an FTP server with an IP address of *192.168.34.156*, on which you have an account with a username of *administrator* and a password of *secure*, use the following command:

```
save configuration
ftp://administrator:secure@192.168.34.156/host_name_configs/
simple_ip.cfg
```

To save a configuration file called *init\_config.cfg* to the root directory of a TFTP server with a hostname of *config\_server*, enter the following command:

```
save configuration tftp://config_server/init_config.cfg
```



# Chapter 4

## Sample ADC Configuration

---

This appendix contains a sample Application Detection and Control (ADC) configuration within an ECS service that includes the examples from the procedures in *Application Detection and Control Configuration* chapter.

```
configure

  license key "\

VER=1|ClM=SanDiskSDCFJ-4096|ClS=116919K2106K0235|DOI=1217844147|DOE=12\
33741747|ISS=1|NUM=26914|CMT=bngnc18,_chassis1,_|LSP=100000|LS0|LSF=10000
0|SIG=MCwCFFABNedEgGb8fAw8u0lvwxkWbJEBAhQvpG9YREYRFdDElznUBuZv3kbHQw"

  system hostname host_name

  autoconfirm

  crash enable encrypted url 057285fc2112177777b5e7a716356c3e332f12f89

  card 1

    mode active psc

    exit

  card 4

    mode active psc

    exit

  card 16

    mode active psc

    exit

  require active-charging

  context local

    interface spiol

      ip address 1.2.3.4 255.255.255.0

    exit
```

```
server ftpd

exit

ssh key
0d94d7812a224fd97a58d9c6dab47bd7b318e705d1ee91d45254ef1286be8ef5cc271cf3d
05656652014d69a568d099664ed2354369ce6481772a2dbf0f37ad20dc1e2b765d8c9f041
759c0e1e8a9e53e3975b1724329d1a2012bf0221cc132014a1224cdfc45ca7 len 461

ssh key
75f41778bab0a173ee6e4e79c102638966c38eb5490fe46be064007e6951792a6abaf2733
c4f4972318eb3b77f85d8925d4aae335dedfa0619f03cdfb3f35fef82cfa97eb1b2517654
aad83afc2c7c5c08d76e2e4e9d8edadd280f7963c227ff8f122ecef9b9d8e0 len 457
type v2-dsa

server sshd

subsystem sftp

exit

server telnetd

exit

subscriber default

exit

administrator admin encrypted password abc123def456ghi ftp

aaa group default

exit

gtp group default

exit

ip route 0.0.0.0 0.0.0.0 1.2.3.4 spio1

exit

exit

port ethernet 24/1

no shutdown

bind interface spio1 local

exit

ntp

enable
```

```
server 10.6.1.1

exit

snmp engine-id local 87e55bf69c4c479d

active-charging service service_1

p2p-detection protocol all

p2p-dynamic-rules file /net/user/xmls/p2p-all-0.2.xml

ruledef ch_actsync

    p2p protocol = actsync

    exit

ruledef ch_aimini

    p2p protocol = aimini

    exit

ruledef ch_antsp2p

    p2p protocol = antsp2p

    exit

ruledef ch_applejuice

    p2p protocol = applejuice

    exit

ruledef ch_ares

    p2p protocol = ares

    exit

ruledef ch_armagettron

    p2p protocol = armagettron

    exit

ruledef ch_battlefld

    p2p protocol = battlefld

    exit

ruledef ch_bittorrent

    p2p protocol = bittorrent
```

```
exit

ruledef ch_blackberry

    p2p protocol = blackberry

    exit

ruledef ch_citrix

    p2p protocol = citrix

    exit

ruledef ch_clubpenguin

    p2p protocol = clubpenguin

    exit

ruledef ch_crossfire

    p2p protocol = crossfire

    exit

ruledef ch_ddlink

    p2p protocol = ddlink

    exit

ruledef ch_directconnect

    p2p protocol = directconnect

    exit

ruledef ch_dofus

    p2p protocol = dofus

    exit

ruledef ch_edonkey

    p2p protocol = edonkey

    exit

ruledef ch_facebook

    p2p protocol = facebook

    exit

ruledef ch_fasttrack
```

```
p2p protocol = fasttrack
exit
ruledef ch_feidian
    p2p protocol = feidian
    exit
ruledef ch_fiesta
    p2p protocol = fiesta
    exit
ruledef ch_filetopia
    p2p protocol = filetopia
    exit
ruledef ch_florensia
    p2p protocol = florensia
    exit
ruledef ch_freenet
    p2p protocol = freenet
    exit
ruledef ch_fring
    p2p protocol = fring
    exit
ruledef ch_funshion
    p2p protocol = funshion
    exit
ruledef ch_gadugadu
    p2p protocol = gadugadu
    exit
ruledef ch_gmail
    p2p protocol = gmail
    exit
```

```
ruledef ch_gnutella
    p2p protocol = gnutella
    exit
ruledef ch_gtalk
    p2p protocol = gtalk
    exit
ruledef ch_guildwars
    p2p protocol = guildwars
    exit
ruledef ch_halfllife2
    p2p protocol = halfllife2
    exit
ruledef ch_hamachivpn
    p2p protocol = hamachivpn
    exit
ruledef ch_iax
    p2p protocol = iax
    exit
ruledef ch_icecast
    p2p protocol = icecast
    exit
ruledef ch_imesh
    p2p protocol = imesh
    exit
ruledef ch_imo
    p2p protocol = imo
    exit
ruledef ch_iptv
    p2p protocol = iptv
```



```
        exit
    ruledef ch_irc
        p2p protocol = irc
        exit
    ruledef ch_isakmp
        p2p protocol = isakmp
        exit
    ruledef ch_iskoot
        p2p protocol = iskoot
        exit
    ruledef ch_itunes
        p2p protocol = itunes
        exit
    ruledef ch_jabber
        p2p protocol = jabber
        exit
    ruledef ch_kontiki
        p2p protocol = kontiki
        exit
    ruledef ch_manolito
        p2p protocol = manolito
        exit
    ruledef ch_maplestory
        p2p protocol = maplestory
        exit
    ruledef ch_meebo
        p2p protocol = meebo
        exit
    ruledef ch_mgcp
```

```
p2p protocol = mgcp
exit

ruledef ch_msn
    p2p protocol = msn
    exit

ruledef ch_mute
    p2p protocol = mute
    exit

ruledef ch_myspace
    p2p protocol = myspace
    exit

ruledef ch_netmotion
    p2p protocol = netmotion
    exit

ruledef ch_nimbuzz
    p2p protocol = nimbuzz
    exit

ruledef ch_octoshape
    p2p protocol = octoshape
    exit

ruledef ch_off
    p2p protocol = off
    exit

ruledef ch_ogg
    p2p protocol = ogg
    exit

ruledef ch_oovoo
    p2p protocol = oovoo
    exit
```

```
ruledef ch_openft
    p2p protocol = openft
    exit
ruledef ch_openvpn
    p2p protocol = openvpn
    exit
ruledef ch_orb
    p2p protocol = orb
    exit
ruledef ch_oscar
    p2p protocol = oscar
    exit
ruledef ch_paltalk
    p2p protocol = paltalk
    exit
ruledef ch_pando
    p2p protocol = pando
    exit
ruledef ch_pandora
    p2p protocol = pandora
    exit
ruledef ch_popo
    p2p protocol = popo
    exit
ruledef ch_pplive
    p2p protocol = pplive
    exit
ruledef ch_ppstream
    p2p protocol = ppstream
```

```
exit

ruledef ch_ps3

    p2p protocol = ps3

    exit

ruledef ch_qq

    p2p protocol = qq

    exit

ruledef ch_qqgame

    p2p protocol = qqgame

    exit

ruledef ch_qqlive

    p2p protocol = qlive

    exit

ruledef ch_quake

    p2p protocol = quake

    exit

ruledef ch_quicktime

    p2p protocol = quicktime

    exit

ruledef ch_rdp

    p2p protocol = rdp

    exit

ruledef ch_rfactor

    p2p protocol = rfactor

    exit

ruledef ch_rmstream

    p2p protocol = rmstream

    exit

ruledef ch_scydo
```

```
p2p protocol = scydo
exit

ruledef ch_secondlife
    p2p protocol = secondlife
    exit

ruledef ch_shoutcast
    p2p protocol = shoutcast
    exit

ruledef ch_skinny
    p2p protocol = skinny
    exit

ruledef ch_skype
    p2p protocol = skype
    exit

ruledef ch_slingbox
    p2p protocol = slingbox
    exit

ruledef ch_sopcast
    p2p protocol = sopcast
    exit

ruledef ch_soulseek
    p2p protocol = soulseek
    exit

ruledef ch_splashfighter
    p2p protocol = splashfighter
    exit

ruledef ch_spotify
    p2p protocol = spotify
    exit
```

```
ruledef ch_ssdp
    p2p protocol = ssdp
    exit
ruledef ch_stealthnet
    p2p protocol = stealthnet
    exit
ruledef ch_steam
    p2p protocol = steam
    exit
ruledef ch_stun
    p2p protocol = stun
    exit
ruledef ch_tango
    p2p protocol = tango
    exit
ruledef ch_teamspeak
    p2p protocol = teamspeak
    exit
ruledef ch_teamviewer
    p2p protocol = teamviewer
    exit
ruledef ch_thunder
    p2p protocol = thunder
    exit
ruledef ch_tor
    p2p protocol = tor
    exit
ruledef ch_truphone
    p2p protocol = truphone
```

```
exit

ruledef ch_tunnelvoice

    p2p protocol = tunnelvoice

    exit

ruledef ch_tvants

    p2p protocol = tvants

    exit

ruledef ch_tvuplayer

    p2p protocol = tvuplayer

    exit

ruledef ch_twitter

    p2p protocol = twitter

    exit

ruledef ch_ultrabac

    p2p protocol = ultrabac

    exit

ruledef ch_usenet

    p2p protocol = usenet

    exit

ruledef ch_uusee

    p2p protocol = uusee

    exit

ruledef ch_veohtv

    p2p protocol = veohtv

    exit

ruledef ch_viber

    p2p protocol = viber

    exit

ruledef ch_vpnx
```

```
p2p protocol = vpnx
exit
ruledef ch_vtun
    p2p protocol = vtun
    exit
ruledef ch_warcraft3
    p2p protocol = warcraft3
    exit
ruledef ch_whatsapp
    p2p protocol = whatsapp
    exit
ruledef ch_wii
    p2p protocol = wii
    exit
ruledef ch_winmx
    p2p protocol = winmx
    exit
ruledef ch_winny
    p2p protocol = winny
    exit
ruledef ch_wmstream
    p2p protocol = wmstream
    exit
ruledef ch_wofkungfu
    p2p protocol = wofkungfu
    exit
ruledef ch_wofwarcraft
    p2p protocol = wofwarcraft
    exit
```



```
ruledef ch_xbox
    p2p protocol = xbox
    exit
ruledef ch_xdcc
    p2p protocol = xdcc
    exit
ruledef ch_yahoo
    p2p protocol = yahoo
    exit
ruledef ch_yourfreetunnel
    p2p protocol = yourfreetunnel
    exit
ruledef ch_zattoo
    p2p protocol = zattoo
    exit
ruledef ch_audio_gtalk
    p2p protocol = gtalk
    p2p traffic-type = audio
    rule-application charging
    exit
ruledef ch_audio_meebo
    p2p protocol = meebo
    p2p traffic-type = audio
    rule-application charging
    exit
ruledef ch_audio_msn
    p2p protocol = msn
    p2p traffic-type = audio
    rule-application charging
```

```
exit

ruledef ch_audio_oscar

    p2p protocol = oscar

    p2p traffic-type = audio

    rule-application charging

    exit

ruledef ch_audio_skype

    p2p protocol = skype

    p2p traffic-type = audio

    rule-application charging

    exit

ruledef ch_audio_yahoo

    p2p protocol = yahoo

    p2p traffic-type = audio

    rule-application charging

    exit

ruledef ch_audio

    p2p traffic-type = audio

    rule-application charging

    exit

ruledef ch_video_gtalk

    p2p protocol = gtalk

    p2p traffic-type = video

    rule-application charging

    exit

ruledef ch_video_meebo

    p2p protocol = meebo

    p2p traffic-type = video

    rule-application charging
```

```
exit

ruledef ch_video_msn

    p2p protocol = msn

    p2p traffic-type = video

    rule-application charging

    exit

ruledef ch_video_oscar

    p2p protocol = oscar

    p2p traffic-type = video

    rule-application charging

    exit

ruledef ch_video_yahoo

    p2p protocol = yahoo

    p2p traffic-type = video

    rule-application charging

    exit

ruledef ch_unclassified_gtalk

    p2p protocol = gtalk

    p2p traffic-type = unclassified

    rule-application charging

    exit

ruledef ch_unclassified_meebo

    p2p protocol = meebo

    p2p traffic-type = unclassified

    rule-application charging

    exit

ruledef ch_unclassified_msn

    p2p protocol = msn

    p2p traffic-type = unclassified
```

```
rule-application charging
exit

ruledef ch_unclassified_oscar
    p2p protocol = oscar
    p2p traffic-type = unclassified
    rule-application charging
    exit

ruledef ch_unclassified_skype
    p2p protocol = skype
    p2p traffic-type = unclassified
    rule-application charging
    exit

ruledef ch_unclassified_yahoo
    p2p protocol = yahoo
    p2p traffic-type = unclassified
    rule-application charging
    exit

ruledef rt_dns-tcp
    tcp either-port = 53
    rule-application routing
    exit

ruledef rt_dns-udp
    udp either-port = 53
    rule-application routing
    exit

ruledef rt_ftp-control
    tcp either-port = 21
    rule-application routing
    exit
```

```
ruledef rt_ftp-data
    tcp either-port = 20
    rule-application routing
    exit

ruledef rt_http
    tcp either-port = 80
    rule-application routing
    exit

ruledef rt_https
    tcp either-port = 443
    rule-application routing
    exit

ruledef rt_imap
    tcp either-port = 143
    rule-application routing
    exit

ruledef rt_mms-wapcl-ct
    wsp content type = application/vnd.wap.mms-message
    rule-application routing
    exit

ruledef rt_mms_http_ct
    http content type = application/vnd.wap.mms-message
    rule-application routing
    exit

ruledef rt_mms_http_url
    http url ends-with .mms
    rule-application routing
    exit

ruledef rt_mms_wapcl-url
```

```
wsp url ends-with .mms
rule-application routing
exit

ruledef rt_pop3
    tcp either-port = 110
    rule-application routing
    exit

ruledef rt_rtsp
    tcp either-port = 554
    rule-application routing
    exit

ruledef rt_rtsp-8556
    tcp either-port = 8556
    rule-application routing
    exit

ruledef rt_sdp
    sip content type = application/sdp
    rule-application routing
    exit

ruledef rt_sip
    udp either-port = 5060
    rule-application routing
    exit

ruledef rt_smtp
    tcp either-port = 25
    rule-application routing
    exit

ruledef rt_wap2.0
    tcp either-port = 8080
```

```
rule-application routing
exit

ruledef rt_wsp-connection-less
    udp either-port = 9200
    rule-application routing
    exit

ruledef rt_wsp-connection-oriented
    udp either-port = 9201
    ip protocol = 51
    ip protocol = 50
    ip protocol = 47
    ip downlink = TRUE
    ip uplink = TRUE
    ip any-match = TRUE
    tcp any-match = TRUE
    udp dst-port = 5000
    rule-application routing
    exit

charging-action ca_BWC
    flow limit-for-bandwidth direction downlink peak-data-rate 4000
    peak-burst-size 1024 violate-action discard committed-data-rate 3200
    committed-burst-size 512 exceed-action discard
    exit

charging-action ca_nothing
    content-id 1
    exit

charging-action ca_terminate
    flow action terminate-flow
    exit

rulebase base_1
```

```
        action priority 500 ruledef ch_actsync charging-action
ca_nothing

        action priority 501 ruledef ch_aimini charging-action ca_nothing

        action priority 502 ruledef ch_antsp2p charging-action
ca_nothing

        action priority 503 ruledef ch_applejuice charging-action
ca_nothing

        action priority 504 ruledef ch_ares charging-action ca_nothing

        action priority 505 ruledef ch_armagettrion charging-action
ca_nothing

        action priority 506 ruledef ch_battlefld charging-action
ca_nothing

        action priority 507 ruledef ch_bittorrent charging-action
ca_nothing

        action priority 508 ruledef ch_blackberry charging-action
ca_nothing

        action priority 509 ruledef ch_citrix charging-action ca_nothing

        action priority 510 ruledef ch_clubpenguin charging-action
ca_nothing

        action priority 511 ruledef ch_crossfire charging-action
ca_nothing

        action priority 512 ruledef ch_ddlink charging-action ca_nothing

        action priority 513 ruledef ch_directconnect charging-action
ca_nothing

        action priority 514 ruledef ch_dofus charging-action ca_nothing

        action priority 515 ruledef ch_edonkey charging-action
ca_nothing

        action priority 516 ruledef ch_facebook charging-action
ca_nothing

        action priority 517 ruledef ch_fasttrack charging-action
ca_nothing

        action priority 518 ruledef ch_feidian charging-action
ca_nothing

        action priority 519 ruledef ch_fiesta charging-action ca_nothing
```



```
        action priority 520 ruledef ch_filetopia charging-action
ca_nothing

        action priority 521 ruledef ch_florensia charging-action
ca_nothing

        action priority 522 ruledef ch_freenet charging-action
ca_nothing

        action priority 523 ruledef ch_fring charging-action ca_nothing

        action priority 524 ruledef ch_funshion charging-action
ca_nothing

        action priority 525 ruledef ch_gadugadu charging-action
ca_nothing

        action priority 526 ruledef ch_gmail charging-action ca_nothing

        action priority 527 ruledef ch_gnutella charging-action
ca_nothing

        action priority 528 ruledef ch_gtalk charging-action ca_nothing

        action priority 529 ruledef ch_guildwars charging-action
ca_nothing

        action priority 530 ruledef ch_halfllife2 charging-action
ca_nothing

        action priority 531 ruledef ch_hamachivpn charging-action
ca_nothing

        action priority 532 ruledef ch_iax charging-action ca_nothing

        action priority 533 ruledef ch_icecast charging-action
ca_nothing

        action priority 534 ruledef ch_imesh charging-action ca_nothing
        action priority 535 ruledef ch_imo charging-action ca_nothing
        action priority 536 ruledef ch_ipstv charging-action ca_nothing
        action priority 537 ruledef ch_irc charging-action ca_nothing
        action priority 538 ruledef ch_isamkp charging-action ca_nothing
        action priority 539 ruledef ch_iskoot charging-action ca_nothing
        action priority 540 ruledef ch_itunes charging-action ca_nothing
        action priority 541 ruledef ch_jabber charging-action ca_nothing
        action priority 542 ruledef ch_kontiki charging-action
ca_nothing
```

```
        action priority 543 ruledef ch_manolito charging-action
ca_nothing

        action priority 544 ruledef ch_maplestory charging-action
ca_nothing

        action priority 545 ruledef ch_meebo charging-action ca_nothing
        action priority 546 ruledef ch_mgcp charging-action ca_nothing
        action priority 547 ruledef ch_msn charging-action ca_nothing
        action priority 548 ruledef ch_mute charging-action ca_nothing
        action priority 549 ruledef ch_myspace charging-action
ca_nothing

        action priority 550 ruledef ch_netmotion charging-action
ca_nothing

        action priority 551 ruledef ch_nimbuzz charging-action
ca_nothing

        action priority 552 ruledef ch_octoshape charging-action
ca_nothing

        action priority 553 ruledef ch_off charging-action ca_nothing
        action priority 554 ruledef ch_ogg charging-action ca_nothing
        action priority 555 ruledef ch_oovoo charging-action ca_nothing
        action priority 556 ruledef ch_openft charging-action ca_nothing
        action priority 557 ruledef ch_openvpn charging-action
ca_nothing

        action priority 558 ruledef ch_orb charging-action ca_nothing
        action priority 559 ruledef ch_oscar charging-action ca_nothing
        action priority 560 ruledef ch_paltalk charging-action
ca_nothing

        action priority 561 ruledef ch_pando charging-action ca_nothing
        action priority 562 ruledef ch_pandora charging-action
ca_nothing

        action priority 563 ruledef ch_popo charging-action ca_nothing
        action priority 564 ruledef ch_pplive charging-action ca_nothing
        action priority 565 ruledef ch_ppstream charging-action
ca_nothing
```

```
action priority 566 ruledef ch_ps3 charging-action ca_nothing
action priority 567 ruledef ch_qq charging-action ca_nothing
action priority 568 ruledef ch_qqgame charging-action ca_nothing
action priority 569 ruledef ch_qqlive charging-action ca_nothing
action priority 570 ruledef ch_quake charging-action ca_nothing
action priority 571 ruledef ch_quicktime charging-action
ca_nothing
action priority 572 ruledef ch_rdp charging-action ca_nothing
action priority 573 ruledef ch_rfactor charging-action
ca_nothing
action priority 574 ruledef ch_rmstream charging-action
ca_nothing
action priority 629 ruledef ch_scydo charging-action ca_nothing
action priority 575 ruledef ch_secondlife charging-action
ca_nothing
action priority 576 ruledef ch_shoutcast charging-action
ca_nothing
action priority 577 ruledef ch_skinny charging-action ca_nothing
action priority 578 ruledef ch_skype charging-action ca_nothing
action priority 579 ruledef ch_slingbox charging-action
ca_nothing
action priority 580 ruledef ch_sopcast charging-action
ca_nothing
action priority 581 ruledef ch_soulseek charging-action
ca_nothing
action priority 582 ruledef ch_splashfighter charging-action
ca_nothing
action priority 583 ruledef ch_spotify charging-action
ca_nothing
action priority 584 ruledef ch_ssdp charging-action ca_nothing
action priority 585 ruledef ch_stealthnet charging-action
ca_nothing
action priority 586 ruledef ch_steam charging-action ca_nothing
action priority 587 ruledef ch_stun charging-action ca_nothing
```

```
        action priority 588 ruledef ch_tango charging-action ca_nothing
        action priority 589 ruledef ch_teamspeak charging-action
ca_nothing

        action priority 590 ruledef ch_teamviewer charging-action
ca_nothing

        action priority 591 ruledef ch_thunder charging-action
ca_nothing

        action priority 592 ruledef ch_tor charging-action ca_nothing

        action priority 593 ruledef ch_truphone charging-action
ca_nothing

        action priority 594 ruledef ch_tunnelvoice charging-action
ca_nothing

        action priority 595 ruledef ch_tvants charging-action ca_nothing

        action priority 596 ruledef ch_tvuplayer charging-action
ca_nothing

        action priority 597 ruledef ch_twitter charging-action
ca_nothing

        action priority 598 ruledef ch_ultrabac charging-action
ca_nothing

        action priority 599 ruledef ch_usenet charging-action ca_nothing
        action priority 600 ruledef ch_uusee charging-action ca_nothing
        action priority 601 ruledef ch_veohstv charging-action ca_nothing
        action priority 602 ruledef ch_viber charging-action ca_nothing
        action priority 603 ruledef ch_vpnx charging-action ca_nothing
        action priority 604 ruledef ch_vtun charging-action ca_nothing
        action priority 605 ruledef ch_warcft3 charging-action
ca_nothing

        action priority 630 ruledef ch_whatsapp charging-action
ca_nothing

        action priority 606 ruledef ch_wii charging-action ca_nothing
        action priority 607 ruledef ch_winmx charging-action ca_nothing
        action priority 608 ruledef ch_winny charging-action ca_nothing
        action priority 609 ruledef ch_wmstream charging-action
ca_nothing
```

```
        action priority 610 ruledef ch_wofkungfu charging-action
ca_nothing

        action priority 611 ruledef ch_wofwarcraft charging-action
ca_nothing

        action priority 612 ruledef ch_xbox charging-action ca_nothing
        action priority 613 ruledef ch_xdcc charging-action ca_nothing
        action priority 614 ruledef ch_yahoo charging-action ca_nothing
        action priority 615 ruledef ch_yourfreetunnel charging-action
ca_nothing

        action priority 616 ruledef ch_zattoo charging-action ca_nothing
        action priority 617 ruledef ch_audio_oscar charging-action
ca_nothing

        action priority 618 ruledef ch_audio_gtalk charging-action
ca_nothing

        action priority 619 ruledef ch_audio_msn charging-action
ca_nothing

        action priority 620 ruledef ch_audio_skype charging-action
ca_nothing

        action priority 621 ruledef ch_audio_yahoo charging-action
ca_nothing

        action priority 622 ruledef ch_video_oscar charging-action
ca_nothing

        action priority 623 ruledef ch_video_gtalk charging-action
ca_nothing

        action priority 624 ruledef ch_video_msn charging-action
ca_nothing

        action priority 626 ruledef ch_video_yahoo charging-action
ca_nothing

        action priority 627 ruledef ch_audio charging-action ca_nothing
        action priority 628 ruledef ch_video charging-action ca_nothing
route priority 10 ruledef rt_http analyzer http
route priority 12 ruledef rt_wap2.0 analyzer http
route priority 15 ruledef rt_https analyzer secure-http
route priority 20 ruledef rt_imap analyzer imap
```

```
route priority 25 ruledef rt_pop3 analyzer pop3
route priority 30 ruledef rt_smtp analyzer smtp
route priority 35 ruledef rt_dns-udp analyzer dns
route priority 36 ruledef rt_dns-tcp analyzer dns
route priority 40 ruledef rt_ftp-control analyzer ftp-control
route priority 41 ruledef rt_ftp-data analyzer ftp-data
route priority 45 ruledef rt_rtsp analyzer rtsp
route priority 46 ruledef rt_rtsp-8556 analyzer rtsp
route priority 50 ruledef rt_sip analyzer sip
route priority 55 ruledef rt_wsp-connection-less analyzer wsp-
connection-less
route priority 56 ruledef rt_wsp-connection-oriented analyzer
wsp-connection-oriented
route priority 60 ruledef rt_sdp analyzer sdp
route priority 65 ruledef rt_mms-wapcl-ct analyzer mms
route priority 66 ruledef rt_mms_wapcl-url analyzer mms
route priority 67 ruledef rt_mms_http_ct analyzer mms
route priority 68 ruledef rt_mms_http_url analyzer mms
rtp dynamic-flow-detection
p2p dynamic-flow-detection
exit
rulebase default
exit
exit
context isp
ip access-list list_1
redirect css service service_1 ip any any
exit
ip pool pool1 9.8.7.6 255.255.255.0 static
interface inet
```

```
        ip address 8.7.6.5 255.255.255.0
    exit
subscriber default
    exit
aaa group default
    exit
gtpv group default
    exit
ip route 0.0.0.0 0.0.0.0 7.6.5.4 inet
    exit
exit
context ggsn
    interface ggsn-ingress
        ip address 6.5.4.3 255.255.255.0
        exit
    subscriber default
        exit
    apn radius.com
        selection-mode sent-by-ms
        accounting-mode none
        ip access-group list_1 in
        ip access-group list_1 out
        ip source-violation ignore
        ip context-name isp
        active-charging rulebase base_1
        exit
    aaa group default
        exit
    gtpv group default
```

```
        exit
    ggsn-service ggsn
        retransmission-timeout 1
        max-retransmission 1
        gtpu udp-checksum insert
        plmn unlisted-sgsn home
        bind address 5.4.3.2
        exit
    exit
port ethernet 17/1
    medium speed 1000 duplex full
    no shutdown
    bind interface ggsn-ingress ggsn
    exit
port ethernet 20/1
    medium speed 1000 duplex full
    no shutdown
    bind interface inet isp
    exit
task facility sessmgr start aggressive
task facility acsmgr start aggressive
end
```