acme packet

Net-Net® Diameter Director
Maintenance Release Guide

Release Versions D-CX1.0.0M1/D-CZ2.0.0M1

Notices

About this Guide

Overview

The *Net-Net® Diameter Director Maintenance Release Guide* provides information about the contents of maintenance releases related to Net-Net D-CX1.0.0 and D-CZ2.0.0. This information can be related to defect fixes, to adaptations made to the system software, and to adaptations ported to this release of the Net-Net OS from prior releases. When applicable, this guide contains explanations of defect fixes to the software and step-by-step instructions, if any, for how to enables these fixes on your system. This guide contains explanations of adaptations including conceptual information and configuration steps.

Purpose of This Document

Designed as a supplement to the main documentation set supporting Net-Net D-CX1.0.0 and D-CZ2.0.0, this document informs you of changes made to the Net-Net OS software in the maintenance releases of D-CX1.0.0 and D-CZ2.0.0. Consult this document for content specific to maintenance releases.

Organization

The *Net-Net® Diameter Director Maintenance Release Guide* is organized chronologically by maintenance release number, started with the oldest available maintenance release and ending with the most recently available maintenance release.

This document contains a [Maintenance Release Availability Matrix (3)](), showing when and if given maintenance releases have been issued and the date of issue. Each available maintenance release constitutes one chapter of this guide.

In certain cases, a maintenance release will not have been made generally available. These cases are noted in the Maintenance Release Availability Matrix. When Acme Packet has not made a maintenance release available, there will be no corresponding chapter for that release. Therefore, you might encounter breaks in the chronological number of maintenance release.

Maintenance Release Availability Matrix

The table below lists the availability for Net-Net D-CX1.0.0 and D-CZ2.0.0 maintenance releases.

Maintenance Release Number	Availability Notes
D-CX1.0.0 M1	October 15, 2012
D-CZ2.0.0 M1	December 19, 2012

Who is Acme Packet?

Acme Packet (NASDAQ: APKT), the leader in session delivery network solutions, enables the trusted, first-class delivery of next-generation voice, data and unified communications services and applications across IP networks. Our Net-Net product family fulfills demanding security, service assurance and regulatory requirements in service provider, enterprise and contact center networks. Based in Bedford, Massachusetts, Acme Packet designs and manufactures its products in the USA. For more information, visit www.acmepacket.com.

Technical Assistance

If you need technical assistance with Acme Packet products, you can obtain it online by going to support.acmepacket.com. With your customer identification number and password, you can access Acme Packet's on-line resources 24 hours a day. If you do not have the information required to access the site, send an email to tac@acmepacket.com requesting a login.

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- From the United States, Canada, and Mexico call: 1 866 226 3758
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Customer Questions, Comments, or Suggestions

Acme Packet is committed to providing our customers with reliable documentation. If you have any questions, comments, or suggestions regarding our documentation, please contact your Acme Packet customer support representative directly or email support@acmepacket.com.

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Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
October 15, 2012	Revision 1.00	• Initial Release
December 19, 2012	Revision 1.05	• Announces D-CZ2.0.0M1 Availability • Adds ToS Caveat section

Interface and Agent Status via SNMP

You can perform an SNMP query that returns the service status of a configured Diameter Director Interface and Diameter Director Agent.

The following SNMP objects are added to the ap-dd.mib file:

Statistic	SNMP Object
Diameter Director Interface Status	apDdInterfaceStatus 1.3.6.1.4.1.9148.3.12.1.2.1.1.27
Diameter Director Agent Status	apDdAgentStatus 1.3.6.1.4.1.9148.3.12.1.2.7.1.27

The `apDdInterfaceStatus` reflects the Status column, per interface, in the **show diameter-director interface** command.

The `apDdAgentStatus` reflects the Status column, per agent, in the **show diameter-director agent** command.

The returned values in their SNMP guise and definitions are:

- 0 - out-of-service
- 1 - in-service
- 2 - constrained

HDR Output

The following sections list where the Diameter Director Interface and Agent statuses appear via HDR.

Interface Statistics   This collection of statistics found in the dd-interface HDR group presents collected data by configured Diameter Director Interface. The statistics presented here are the same as those available in the show diameter-director interface ACLI command.

- Configure HDR Group name as: `dd-interface`
- SNMP MIB: apDdInterfaceStatsTable
- OID:`1.3.6.1.4.1.9148.3.12.1.2.1`

HDR Position	Statistic Recorded	Timer Value (sec)	SNMP MIB	SNMP Data Type
1	Interface		apDdInterfaceIndex: 1.3.6.1.4.1.9148.3.12.1.2.1.1.1	Integer
2	Realm		apDdInterfaceRealmName: 1.3.6.1.4.1.9148.3.12.1.2.1.1.2	Display String
3	Client Transactions - Period Active	10	apDdClientTransCPActive: 1.3.6.1.4.1.9148.3.12.1.2.1.1.3	Gauge
4	Client Transactions - Period High	10	apDdClientTransCPHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.4	Gauge
5	Client Transactions - Period Total	10	apDdClientTransCPTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.5	Gauge
6	Client Transactions - Lifetime Period Maximum		apDdClientTransLTPerMax: 1.3.6.1.4.1.9148.3.12.1.2.1.1.7	Counter

HDR Position	Statistic Recorded	Timer Value (sec)	SNMP MIB	SNMP Data Type
7	Client Transactions - Lifetime High		apDdClientTransLTHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.8	Counter
8	Client Transactions - Lifetime Total		apDdClientTransLTTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.6	Counter
9	Server Transactions - Period Active	10	apDdServerTransCPActive: 1.3.6.1.4.1.9148.3.12.1.2.1.1.9	Gauge
10	Server Transactions - Period High	10	apDdServerTransCPHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.10	Gauge
11	Server Transactions - Period Total	10	apDdServerTransCPTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.11	Gauge
12	Server Transactions - Lifetime Period Maximum		apDdServerTransLTPerMax: 1.3.6.1.4.1.9148.3.12.1.2.1.1.13	Counter
13	Server Transactions - Lifetime High		apDdServerTransLTHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.14	Counter
14	Server Transactions - Lifetime Total		apDdServerTransLTTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.12	counter
15	Sockets - Period Active	10	apDdGenSocketsCPActive: 1.3.6.1.4.1.9148.3.12.1.2.1.1.15	Gauge
16	Sockets - Period High	10	apDdGenSocketsCPHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.16	Gauge
17	Sockets - Period Total	10	apDdGenSocketsCPTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.17	Gauge
18	Sockets - Lifetime Period Maximum		apDdGenSocketsLTPerMax: 1.3.6.1.4.1.9148.3.12.1.2.1.1.19	Counter
19	Sockets - Lifetime High		apDdGenSocketsLTHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.20	Counter
20	Sockets - Lifetime Total		apDdGenSocketsLTTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.18	counter
21	Connections - Period Active	10	apDdGenConnectsCPActive: 1.3.6.1.4.1.9148.3.12.1.2.1.1.21	Gauge
22	Connections - Period High	10	apDdGenConnectsCPHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.22	Gauge
23	Connections - Period Total	10	apDdGenConnectsCPTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.23	Gauge
24	Connections - Lifetime Period Maximum		apDdGenConnectsLTTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.25	Counter
25	Connections - Lifetime High		apDdGenConnectsLTHigh: 1.3.6.1.4.1.9148.3.12.1.2.1.1.26	Counter
26	Connections - Lifetime Total		apDdGenConnectsLTTotal: 1.3.6.1.4.1.9148.3.12.1.2.1.1.24	counter
27	Interface Status		apDdInterfaceStatus 1.3.6.1.4.1.9148.3.12.1.2.1.1.27	integer

Agent Data

This collection of statistics found in the dd-agent HDR group presents Diameter Director Agent data.

- Configure HDR Group name as: `dd-agent`
- SNMP MIB: apDdAgentStatsTable
- OID: `1.3.6.1.4.1.9148.3.12.1.2.7`

HDR Position	Statistic Recorded	Description	SNMP Object	SNMP Data Type
1	Agent	The index ID of the agent for this set of statistics. This index will be persistent across reboots.	apDdAgentIndex	Integer32 (non-zero)
2	Realm	Realm on which the agent is operating	apDdAgentRealmName 1.3.6.1.4.1.9148.3.12.1.2.7.1.2	DisplayString
3	Period Active Client Trans	Number of active client transactions in the current period	apDdClientTransCPActive 1.3.6.1.4.1.9148.3.12.1.2.1.1.3	Gauge32
4	Period High Client Trans	Maximum value of "Period Active Client Trans" in the current period	apDdClientTransCPHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.4	Gauge32
5	Period Total Client Trans	Total number of client transactions in the current period	apDdClientTransCPTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.5	Gauge32
6	PerMax Client Trans	Maximum value of "Period Total Client Trans" across all periods	apDdClientTransLTPerMax 1.3.6.1.4.1.9148.3.12.1.2.1.1.7	Counter32
7	Lifetime High Client Trans	Maximum value of "Period High Client Trans" across all periods	apDdClientTransLTHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.8	Counter32
8	Lifetime Total Client Trans	Total number of client transactions across all periods	apDdClientTransLTTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.6	Counter32
9	Period Active Server Trans	Number of active server transactions in the current period	apDdServerTransCPActive 1.3.6.1.4.1.9148.3.12.1.2.1.1.9	Gauge32
10	Period High Server Trans	Maximum value of "Period Active Server Trans" in the current period	apDdServerTransCPHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.10	Gauge32
11	Period Total Server Trans	Total number of server transactions in the current period	apDdServerTransCPTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.11	Gauge32
12	PerMax Server Trans	Maximum value of "Period Total Server Trans" across all periods	apDdServerTransLTPerMax 1.3.6.1.4.1.9148.3.12.1.2.1.1.13	Counter32
13	Lifetime High Server Trans	Maximum value of "Period High Server Trans" across all periods	apDdServerTransLTHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.14	Counter32
14	Lifetime Total Server Trans	Total number of server transactions across all periods	apDdServerTransLTTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.12	Counter32
15	Period Active Sockets	Number of active sockets in the current period	apDdGenSocketsCPActive 1.3.6.1.4.1.9148.3.12.1.2.1.1.15	Gauge32
16	Period High Sockets	Maximum value of "Period Active Sockets" in the current period	apDdGenSocketsCPHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.16	Gauge32
17	Period Total Sockets	Total number of sockets created in the current period	apDdGenSocketsCPTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.17	Gauge32
18	Permax Sockets	Maximum value of "Period Total Sockets" across all periods	apDdGenSocketsLTPerMax 1.3.6.1.4.1.9148.3.12.1.2.1.1.19	Counter32

HDR Position	Statistic Recorded	Description	SNMP Object	SNMP Data Type
19	Lifetime High Sockets	Maximum value of "Period High Sockets" across all periods	apDdGenSocketsLTHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.20	Counter32
20	Lifetime Total Sockets	Total number of sockets created across all periods	apDdGenSocketsLTTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.18	Counter32
21	Period Active Connections	Number of active connections in the current period	apDdGenConnectsCPActive 1.3.6.1.4.1.9148.3.12.1.2.1.1.21	Gauge32
22	Period High Connections	Maximum value of "Period Active Connections" in the current period	apDdGenConnectsCPHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.22	Gauge32
23	Period Total Connections	Total number of connections created in the current period	apDdGenConnectsCPTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.23	Gauge32
24	PerMax Connections	Maximum value of "Period Total Connections" across all periods	apDdGenConnectsLTPerMax 1.3.6.1.4.1.9148.3.12.1.2.1.1.25	Counter32
25	Lifetime High Connections	Maximum value of "Period High Connections" across all periods	apDdGenConnectsLTHigh 1.3.6.1.4.1.9148.3.12.1.2.1.1.26	Counter32
26	Lifetime Total Connections	Total number of connections created across all periods	apDdGenConnectsLTTotal 1.3.6.1.4.1.9148.3.12.1.2.1.1.24	Counter32
27	Diameter Director Agent Status	HDR output/SNMP output • O/0 - out-of-service • I/1 - in-service • C/2 - constrained	apDdAgentStatus 1.3.6.1.4.1.9148.3.12.1.2.7.1.27	integer

ToS Field Marking

You can configure the byte-sized ToS field in an IP header in an ad-hoc fashion to support any and all differentiated services in your network. Upstream devices use these markings to classify traffic in order to determine the priority level of treatment it will receive. This feature manipulates the IP field on egress as traffic is sent via a Diameter Director Interface, Diameter Director Group, or Diameter Director Agent object with higher priority objects overwriting lower prioritied configurations.

Configuration is set with two hexadecimal numerals with the first numeral representing the first nibble of the ToS field and the second numeral representing the second nibble of the ToS field. For example, when the tos-value parameter is configured as 0x7B, the 7 and the B are hexadecimal numerals that correspond to the first and second nibbles in the 8-bit field. Since:

*   hexadecimal 7 = binary 0111

*   hexadecimal B = binary 1011

Then configuring 0x7B in the tos-value parameter would write the ToS field in an IP packet as: 01111011

ACLI Instructions

To configure a ToS marking on a Diameter Director Interface:

1. In Superuser mode, type **configure terminal** and press <Enter>.

    ACMEPACKET# **configure terminal**

2. Type **session-router** and press <Enter> to access the session-router path.

    ACMEPACKET(configure)# **session-router**

3. Type **diameter-director-interface** and **select** an existing configuration element.

    ```
    ACMESYSTEM(session-router)# diameter-director-interface
    ACMESYSTEM(diameter-director-interface)# select
    <realm-id>:
    1: realm01

    selection: 1
    ```

4. **tos-value** — Enter the value to mark the 8-byte ToS field with. This parameter is configured as 2 hexadecimal numerals prepended with `0x`. Valid values are 0x00 - 0xFF

5. Type **done** when finished.

    A similar process is used for applying ToS marking at the Diameter Director Agent or Diameter Director Group level.

ToS Configuration Known Issue D-CX1.0.0M1

Changing the ToS marking parameter (**tos-value**) on a diameter director interface is not RTC enabled. Use the following procedure to circumvent this limitation.

Cannot Reset ToS Marking to 0x00 for Inbound Connections

When the Net-Net DD acts as the server and accepts inbound connections from peers, you cannot reset the ToS marking parameter (**tos-value**) to its default without disconnecting and reconnecting all peers first. The work-around follows:

1. Disconnect all peers from the Net-Net DD
2. Set **tos-value** to 0x00
3. Save and activate the configuration
4. Reconnect all peers

Cannot Reset ToS Marking to 0x00 for Outbound Connections

When the Net-Net DD acts as a client and connects to a network-based server, you can not reset the ToS marking parameter (**tos-value**) to its default using normal means. The work-around follows:

1. Make the following changes in the diameter-director-interface:
   • Set **tos-value** to **0x00**
   • Set **state** to **disabled**
2. Save and activate the configuration
3. Change the diameter-director-interface as follows:
   • Set **state** to **enabled**
4. Save and activate the configuration

Inbound Connections Not RTC Enabled

When the Net-Net DD acts as the server and accepts inbound connections from peers, RTC configuration on the Diameter Director Interface is unsupported.

The work-around follows:

1. Disconnect all peers from the Net-Net DD
2. Make appropriate configuration changes
3. Save and activate the configuration

Reconnect all peers

Message Rejection

When a message constraint applied to either a Diameter Director Agent or Diameter Director Interface is exceeded, that element is set to Constraints Exceeded status.

The Net-Net Diameter Director can then take one of two actions: gracefully reject Diameter message with an error message returned to the sender or silently drop the Diameter message.

When set to **REJECT** messages upon constraints being exceeded, the default behavior, the Net-Net Diameter Director sends an error message to the network element that initiated that message. You can configure the numeric value returned to the message's orginator in a Result-Code AVP by configuring the *result code* parameter, the default being 3004.

When set to **DROP** messages upon constraints being exceeded, the Net-Net Diameter Director drops all messages to or from the element in the Constraints Exceeded state without notifying any external element.

Some Diameter agents, upon receiving an error message signifying a reject, attempt to retransmit the message that was rejected, thus creating more traffic and exacerbating the existing overload condition. Setting the constraints exceeded action to **DROP** mitigates this problem. Further, dropping messages ultimately triggers a timeout and provides a longer duration of time before the in-bound or out-bound agent attempts to re-transmit the message.

Dropped and Rejected messages are counted and displayed in the **show diameter-director agent**, **show diameter-director interface**, and **show diameter-director errors** show commands.

Once the constraints are exceeded, the Net-Net Diameter Director begins counting the **time to resume** period. This period represents the length of time while new messages are being rejected or dropped. After the **time to resume** counter expires, the Net-Net Diameter Director is set to an in-service state and accepts messages again. Message counts begin and are applied to the existing burst and sustain windows. Rate windows continue starting and stopping irrespective of **time to resume** period expirations.

ACLI Instructions

Global Constraints

To configure global Diameter Director Constraints:

1. In Superuser mode, type **configure terminal** and press <Enter>.

   ACMEPACKET# **configure terminal**

2. Type **session-router** and press <Enter> to access the session-router path.

   ACMEPACKET(configure)# **session-router**

3. Type **diameter-director-constraints a**nd press <Enter>. The system prompt changes to let you know that you can begin configuring individual parameters.

   ACMEPACKET(session-router)# **diameter-director-constraints**
   ACMEPACKET(diameter-director-constraints)#

4. **action**—Enter the action to take when this constraint profile sets the referencing element to Constraints Exceeded. Setting this parameter to **REJECT** sends an error message as a reply to network element that initiated that message. Setting this parameter to **DROP** silently drops the message without any error response.

show diameter-director errors

The **show diameter-director errors** command displays global error counts for recent and lifetime time frames for the Net-Net Diameter Director.

```
ACMESYSTEM# show diameter-director errors
13:16:54-175
Diameter Director Errors/Events
                             -------- Lifetime --------
                             Recent    Total   PerMax
No Route Found               120        584      70
Malformed Messages            0          0        0
Rejected Messages             0          0        0
Dropped Messages              0          0        0
Inbound Constraints          27         88       27
Inbound Rejected              0         36       10
Inbound Dropped              27         52       27
Outbound Constraints          0          0        0
Outbound Rejected             0          0        0
Outbound Dropped              0          0        0
```

These global error KPIs for inbound and outbound constraints will reflect the total number of messages rejected due to constraints being exceeded, across all the interfaces and/or agent configured to check for constraints.

show diameter-director interface

The **show diameter-director interface** command displays the diameter-director-interface level statistics. The command is entered as

```
show diameter-director interface [<realm-name>] [<message-type> |
errors]
```

[...]

With a realm ID and error argument, this command displays the diameter-director-interface errors within the specified realm. The output is identical to the show diameter-director errors (12) output.

show diameter-director agent

The **show diameter-director agent** command displays the diameter-director-agent level statistics. The command is entered as

```
show diameter-director agent [<hostname>] [errors]
```

[...]

With a hostname indicating a specific Diameter Director Agent and error argument, this command displays the errors for the specified agent. The output is identical to the show diameter-director errors (12) output.