



Smart Network. **Smart** Business

ADC Software Troubleshooting Guide

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Item	Description	Description (French)	Beschreibung (German)
 Example	An example scenario	Un scénario d'exemple	Ein Beispielszenarium
 Caution:	Possible damage to equipment, software, or data	Endommagement possible de l'équipement, des données ou du logiciel	Mögliche Schäden an Gerät, Software oder Daten
 Note:	Additional information	Informations complémentaires	Zusätzliche Informationen
 To	A statement and instructions	Références et instructions	Eine Erklärung und Anweisungen
 Tip:	A suggestion or workaround	Une suggestion ou solution	Ein Vorschlag oder eine Umgehung
 Warning:	Possible physical harm to the operator	Blessure possible de l'opérateur	Verletzungsgefahr des Bedieners

Table of Contents

Important Notices	3
Copyright Notices	4
Document Conventions	9
Chapter 1 – Introduction.....	15
Prerequisites	15
Acronyms	15
Chapter 2 – Troubleshooting Fundamentals.....	17
Port Mirroring	17
Junos OS Port Mirroring	17
ADC Software Port Mirroring	17
Extended Port Mirroring Overview	18
Port Mirroring Configuration	18
Interface Statistics	19
System Log and Trace File	19
Configuring the Syslog File	20
Viewing the Syslog File	20
Accessing the Syslog File	21
Configuring the Trace File	21
Viewing the Trace File	21
Accessing the Trace File	22
Chapter 3 – Initial Troubleshooting.....	23
Gathering Information	23
Viewing Chassis Information	23
Viewing General System Information	24
Viewing the Software Version	26
Saving Technical Support Information	27
Viewing System Maintenance Information	27
Providing a Network Topology Map	28
Documenting System and Network Changes	28
Assessing Panic	28
Collecting System Statistics	28
Control Processor CPU Use	29
Switch Processor	29
Chapter 4 – Extended Troubleshooting.....	33
System and Hardware Troubleshooting	33
System Troubleshooting	33

Hardware Troubleshooting	34
Multiservices-DPC NPU Troubleshooting	34
Troubleshooting OSI layers	34
Layer 1 and Layer 2	34
Layer 3	35
Layer 4	36
Layer 7	38
Troubleshooting Tools	38
Filter Log Action	38
Server Operational Status	39
Connection Table Troubleshooting	39
Chapter 5 – Feature-Specific Troubleshooting	41
ADC Automatic Configuration	41
Commit-Script Automatic Configuration	41
Junos OS SDK API Automatic Configuration	43
The debug-enable Command	43
NAT IP Addresses	45
High Availability	46
RMS Troubleshooting	47
Connection Synchronization Troubleshooting	49
License Information	50
Chapter 6 – Emergency Recovery Tree	53
VIP Is Not Working	53
ADC Software Panic	58
Real Server Down	59
Index.....	63

Table of Figures

VIP Not Working Recovery Diagram 1	54
VIP Not Working Recovery Diagram 2	55
VIP Not Working Recovery Diagram 3	56
VIP Not Working Recovery Diagram 4	57
Switch Panic Recovery Diagram	58
Real Server Down Recovery Diagram 1	59
Real Server Down Recovery Diagram 2	60
Real Server Down Recovery Diagram 3	61
Real Server Down Recovery Diagram 4	62

Chapter 1 – Introduction

Juniper Networks® Application Delivery Controller (ADC) for the MX Series 3D Universal Edge Router offers advanced router-integrated ADC functions that enables service providers and enterprises to efficiently scale service capacity and increase service performance. Routers are already ubiquitously deployed throughout the network: at the network edge, in the network core, and in the data center. Integrating the advanced ADC with the carrier-grade MX3D router promotes network consolidation and reduces the number of network elements that providers must rack, power, cool, maintain, and upgrade. Furthermore, the ADC software, which is optionally licensed, improves service resiliency by monitoring server and application health and by automatically bypassing failures.

This guide describes the diagnostic tools available for the ADC software using the command-line interface (CLI).

- For more information on learning the basic structure and operation of the CLI, see the *ADC Software Reference Guide*.
- For more information on troubleshooting the Juniper Networks router, see the *Junos OS Baseline Operations Guide*, available at the following link:

https://www.juniper.net/techpubs/en_US/junos10.4/information-products/topic-collections/nog-baseline/index.html

Prerequisites

This guide is intended for network administrators with the following background:

- Basic knowledge of networks, Ethernet bridging, and IP routing
- Familiarity with networking concepts and terminology
- Basic knowledge of network topologies
- Basic knowledge of Junos OS

Acronyms

Table 1 on page 15 shows the acronyms used in this guide.

Table 1: Acronyms

Acronym	Description
CLI	command-line interface
CPU	central processing unit
DNS	Domain Name System
FTP	File Transfer Protocol
LDAP	Lightweight Directory Access Protocol
MAC	media access control
NAT	Network Address Translation
OSI	Open Systems Interconnection
SNMP	Simple Network Management Protocol

Table 1: Acronyms

Acronym	Description
SSH	Secure Shell
SSL	Secure Sockets Layer
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

Chapter 2 – Troubleshooting Fundamentals

This chapter provides conceptual information about the methods and tools used for troubleshooting and isolating problems in the Juniper Networks® Application Delivery Controller (ADC) software.

The types of problems that typically occur with networks are connectivity and performance. The ADC software and a Juniper Networks® MX3D Universal Edge Router support a diverse range of network architectures and protocols, some of which are used to maintain and monitor connectivity and isolate the connectivity faults.

This chapter includes the following topics:

- [Port Mirroring on page 17](#)
- [Interface Statistics on page 19](#)
- [System Log and Trace File on page 19](#)

Port Mirroring

Port mirroring involves sending a copy of a data packet from a routing platform to an external host.

This section includes the following topics:

- [Junos OS Port Mirroring on page 17](#)
- [ADC Software Port Mirroring on page 17](#)
- [Extended Port Mirroring Overview on page 18](#)
- [Port Mirroring Configuration on page 18](#)

Junos OS Port Mirroring

You can send a copy of an Internet Protocol version 4 (IPv4) or Internet Protocol version 6 (IPv6) packet from the routing platform to an external host address or a packet analyzer for analysis. This is known as port mirroring.

Port mirroring is different from traffic sampling. In traffic sampling, a sampling key based on the packet header is sent to the routing engine. There, the key can be placed in a file, or certain packets based on the key can be sent to a flow analysis server. In port mirroring, the entire packet is copied and sent out through a next-hop interface.

For more information on port mirroring, see the Juniper Networks documentation on port mirroring.

ADC Software Port Mirroring

The ADC software accomplishes port mirroring using port-mirroring filters that are applied to interfaces (IFLs). The port-mirroring filters can be applied to the input or output side of the IFL. However, the port-mirroring filters have an implied “accept” action that accepts all traffic that is mirrored, thus making it impossible for other filters on the same IFL to monitor or see traffic.

Because the ADC software uses filters to catch traffic, when the ADC software works with the IFL, the port-mirroring filters are applied only to the output side of the IFL.

You should fully understand applying port mirroring to the output side of an IFL; the mirrored traffic does not include the *requests* from this IFL. Rather, the mirrored traffic only includes the *responses* from the IFL, usually after being treated in the ADC software.



Caution: If you apply the port-mirroring filter to the input side of an IFL, which is set up in the ADC software configuration, one of the functions (either the ADC software or the mirroring) will not work on the traffic. You *should not* use this type of configuration.

Extended Port Mirroring Overview

This section discusses how the server-facing and client-facing interfaces perform port mirroring.

This section includes the following topics:

- [Server-Facing Interfaces on page 18](#)
- [Client-Facing Interfaces on page 18](#)

Server-Facing Interfaces

The ADC software uses input lists to add filters to the server-facing interfaces. If you configure a port-mirroring filter, it will be first in the input list (as the rest of the filters are configured by commit script after the user configuration). This implies that the ADC software will not see the traffic from these ports.

Client-Facing Interfaces

The ADC software is using the Junos OS SDK API to apply input filters on the client-facing logical interfaces. When using the API to set filters on an IFL, the API filter has higher priority over user-configured filters. This implies that if the port-mirroring filter is applied to a client-facing interface input, it will not see the traffic that is sent to the ADC software.

Port Mirroring Configuration

The following example illustrates how to correctly set up port mirroring for your device.



To correctly set up your port mirroring configuration

1. Define the port mirroring parameters.

```
forwarding-options {
  port-mirroring {
    input {
      rate 1; # copy all packets
      run-length 0; # copy all packets
    }
    family inet {
      output {
        interface ge-0/0/0.0 { # logical interface the packets go
                              # out of
                              next-hop 192.168.1.233;# next-hop for the packets
        }
      }
    }
  }
}
```

2. Define the port mirroring filter.

```
firewall {  
    filter mirroring-filter {  
        term term1 {  
            then {  
                port-mirror;  
                accept;  
            }  
        }  
    }  
}
```

3. Define the filter on the output side of an IFL (assuming this IFL is configured in the ADC configuration as a server- or client-facing interface).

```
interfaces {  
    fe-1/3/0 {  
        unit 0 {  
            family inet {  
                filter {  
                    output mirroring-filter;  
                }  
            }  
        }  
    }  
}
```

Interface Statistics

The interface statistics command lets you display information on received and transmitted packets at the ports. The command can be used on the client- and server-facing interfaces. Another option is to use the interface statistics command on the Network Processing Unit (NPU) in the Multiservices-DPC.

Like any other interface, each NPU interface in the Multiservices-DPC also has statistics. However, when viewing statistics of the NPU interfaces, you should be aware of the direction of these statistics, which is from the router point of view. The input direction is for packets coming from the Multiservices-DPC to the router. The output direction is for packets coming from the router to the Multiservices-DPC.

The interface statistics can be shown by using the following command:

```
user@host> show interface statistics <interface-name>
```

System Log and Trace File

You can use the system log (syslog) and trace file to discover more information about the ADC software. The syslog is used by the Multiservices-DPC to log messages, such as a real server coming up or going down, a virtual-server becoming available, and so on.

The trace file is used by the ADC software running in the routing engine (adc-mgmt) to print state and debug information.

This section includes the following topics:

- [Configuring the Syslog File on page 20](#)
- [Viewing the Syslog File on page 20](#)
- [Accessing the Syslog File on page 21](#)
- [Configuring the Trace File on page 21](#)
- [Viewing the Trace File on page 21](#)
- [Accessing the Trace File on page 22](#)

Configuring the Syslog File

The following example illustrates how to correctly set up your syslog for your device.



To configure the syslog for the device



Note: In this example, the syslog file is configured globally for the router under the system hierarchy.

```
[edit]
system {
  syslog {
    file device-log {
      any any;
    }
    file adc-log {
      any any;
      match adc;
    }
  }
}
```

Alternatively, you can configure the syslog server. See your Juniper Networks documentation for more information on the syslog.

Viewing the Syslog File

You can view the syslog file using one of the following methods:



Note: The syslog filename “adc-log” is a sample filename used for these examples. Your filename may be different. For more information, see ["Configuring the Syslog File" on page 20](#).



To use the show command to view the syslog file

```
user@host> show log adc-log
```



To set a separate connection that constantly shows the new messages in the syslog file

```
user@host> monitor start adc-log
```

Accessing the Syslog File

The syslog file itself is located in the directory `/var/log`. You can access the file using FTP to connect to the device, and then navigating to `/var/log`.

Old files are compressed (zipped) in the same location using the filename `adc-log.#.gz`.



Note: The syslog filename “adc-log” is a sample filename used for these examples. Your filename may be different. For more information, see ["Configuring the Syslog File" on page 20](#).

Configuring the Trace File

The trace file is configured in the ADC software using the Junos OS conventions for trace configuration.



To configure the trace file

```
[edit extensions adc]
traceoptions {
  file dynamic.txt size 500000 world-readable;
  flag all;
}
```

Viewing the Trace File

You can view the trace file using one of the following methods:



Note: The trace filename “dynamic.txt” is a sample filename used for these examples. Your filename may be different. For more information, see ["Configuring the Trace File" on page 21](#).



To view the trace file using the show command

```
user@host> show log ext/radware/dynamic.txt
```



To set a separate connection that constantly shows the new messages in the trace file

```
user@host> monitor start ext/radware/dynamic.txt
```

Accessing the Trace File

The trace file itself is located in `/var/log/ext/radware`. You can access the file using FTP to connect to the device and then navigating to `/var/log/ext/radware`.

Old files are compressed (zipped) in the same location using the filename `dynamic.txt.#.gz`.



Note: The trace filename “dynamic.txt” is a sample filename used for these examples. Your filename may be different. For more information, see ["Configuring the Trace File" on page 21](#).

Chapter 3 – Initial Troubleshooting

This chapter describes the actions you should take before calling Juniper Networks Technical Support. This involves gathering information, assessing the situation, and collecting certain system statistics that will be helpful to technical support personnel.

This chapter includes the following topics:

- [Gathering Information on page 23](#)
- [Assessing Panic on page 28](#)
- [Collecting System Statistics on page 28](#)

Gathering Information

Before contacting technical support, gather information that can help support personnel when troubleshooting. This includes the following information:

- ADC software status
- Software version
- Saving technical support dump
- System capacity
- System configuration details
- Session entry
- System log
- Topology of the network
- A list of any changes made prior to the issue (such as software, hardware, and upgrades)

This section includes the following topics:

- [Viewing Chassis Information on page 23](#)
- [Viewing General System Information on page 24](#)
- [Viewing the Software Version on page 26](#)
- [Saving Technical Support Information on page 27](#)
- [Viewing System Maintenance Information on page 27](#)
- [Providing a Network Topology Map on page 28](#)
- [Documenting System and Network Changes on page 28](#)

Viewing Chassis Information

The first thing you will need to gather is the chassis information: which chassis is used, what are the PICs inside it, and so on.

Use the hardware command to show this information.



To view the chassis information

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			JN1111111111	MX240
Midplane	REV 07	760-021404	ABAA8888	MX240 Backplane
FPM Board	REV 04	760-021392	YB2459	Front Panel Display
PEM 1	Rev 01	740-022697	QCS1002C0A1	PS 1.2-1.7kW; 100-
240V AC in				
PEM 2	Rev 01	740-022697	QCS1002C02E	PS 1.2-1.7kW; 100-
240V AC in				
Routing Engine 0	REV 09	740-015113	9009015040	RE-S-1300
CB 0	REV 07	710-021523	YC1029	MX SCB
FPC 0	REV 18	750-022766	XY4672	DPCE 20x 1GE + 2x
10GE X				
CPU	REV 03	710-022351	XX1139	DPC PMB
PIC 0		BUILTIN	BUILTIN	10x 1GE (LAN)
PIC 1		BUILTIN	BUILTIN	10x 1GE (LAN)
Xcvr 0	REV 02	740-011613	PH25T3E	SFP-SX
Xcvr 1	REV 02	740-011613	PH25T3Y	SFP-SX
Xcvr 2		NON-JNPR	PT5342883	SFP-SX
Xcvr 3		NON-JNPR	A0507085508	SFP-SX
PIC 2		BUILTIN	BUILTIN	1x 10GE (LAN/WAN)
Xcvr 0	REV 03	740-014289	CA05BQ035	XFP-10G-SR
PIC 3		BUILTIN	BUILTIN	1x 10GE (LAN/WAN)
Xcvr 0	REV 03	740-014289	CA05BQ039	XFP-10G-SR
FPC 1	REV 07	750-024064	XT0653	MS-DPC
CPU	REV 07	710-013713	XT4129	DPC PMB
PIC 0		BUILTIN	BUILTIN	MS-DPC PIC
PIC 1		BUILTIN	BUILTIN	MS-DPC PIC
FPC 2	REV 07	750-024064	XR6311	MS-DPC
CPU	REV 07	710-013713	XR6176	DPC PMB
PIC 0		BUILTIN	BUILTIN	MS-DPC PIC
PIC 1		BUILTIN	BUILTIN	MS-DPC PIC
Fan Tray 0	REV 01	710-030216	XV8381	Enhanced Fan Tray

Viewing General System Information

The `adc status` command displays technical information about the ADC software status. When troubleshooting a problem, use this command to obtain useful information about the ADC software.

The `adc status` command also has a "detail" option that shows more information on the `adc-mgmt` daemon.



Note: After the Multiservices-DPC is online, the Multiservices-DPC is starting to load the ADC software. This process takes some time. If the Multiservices-DPC is online but appears as down in the `adc status` command, it is probably loading the software.



To view the general system information

```

user@host> show extensions adc status
SLB daemon status : Up
Up Since Wed Mar 14 12:45:22 2012
adc instance lbl:
Interface      Status      Control Daemon  #Data Daemons up  #Disconnections
License
-----+-----+-----+-----+-----
-+-----+
ms-1/0/0      Up          Up              21                 0
  Licensed
- OR -
user@host> show extensions adc status detail
SLB daemon status : Up
Up Since Wed Mar 14 12:45:22 2012
SLB daemon to SDK Services daemon (SSD) connection:
  current status: Up
  number of disconnections: 0

SLB daemon to Dynamic Firewall Filters Daemon (DFWD) connection:
  current status: Up
  number of disconnections: 0

Interface status:
Interfaces running adc: ms-1/0/0, ms-1/1/0
Interfaces that appear in the configuration: ms-1/0/0

adc instance lbl:
Interface      Status      Control Daemon  #Data Daemons up  #Disconnections
License
-----+-----+-----+-----+-----
-+-----+
ms-1/0/0      Up          Up              21                 0
  Licensed

Unattached:
Interface      Status
-----+-----
ms-1/1/0      Down

```

Viewing the Software Version

The following examples illustrate how to view the software version on the device.



To view the software version



Note: The `show version` command displays the software version for all software running on the device.

```
user@host> show version
Hostname: host
Model: mx240
JUNOS Base OS boot [11.1R1.14]
JUNOS Base OS Software Suite [11.1R1.14]
JUNOS Kernel Software Suite [11.1R1.14]
JUNOS Packet Forwarding Engine Support (M/T Common) [11.1R1.14]
JUNOS Packet Forwarding Engine Support (MX Common) [11.1R1.14]
JUNOS Online Documentation [11.1R1.14]
JUNOS Voice Services Container package [11.1R1.14]
JUNOS Border Gateway Function package [11.1R1.14]
JUNOS Services AACL Container package [11.1R1.14]
JUNOS Services LL-PDF Container package [11.1R1.14]
JUNOS Services PTSP Container package [11.1R1.14]
JUNOS Services Stateful Firewall [11.1R1.14]
JUNOS Services NAT [11.1R1.14]
JUNOS Services Application Level Gateways [11.1R1.14]
JUNOS Services Captive Portal and Content Delivery Container package
[11.1R1.14]
JUNOS Services RPM [11.1R1.14]
JUNOS AppId Services [11.1R1.14]
JUNOS IDP Services [11.1R1.14]
JUNOS Runtime Software Suite [11.1R1.14]
JUNOS Routing Software Suite [11.1R1.14]
ADC MGMT Daemon [11.1R1.14_1.4R0.0_int092]
ADC Control Component [11.1R1.14_1.4R0.0_int092]
ADC Dataplane Component [11.1R1.14_1.4R0.0_int092]
```



To view additional information about the software version



Note: The `adc internal software-version` command displays detailed information about the current ADC software version.

```
user@host> show extensions adc internal software-version
Software Build Information:
  Software Version: 1.4R0.0
  Build ID: 092
  Build time: FW_VERSION: #2 Wed Apr 20 13:36:58 IDT 2011
```

Saving Technical Support Information

You can save the technical support file and send it to your technical support personnel for debugging purposes. The file contains device information, statistics, and configuration. The output of the support command is directed to the console screen. You can transfer the output into a file in order to save it.



To print the maintenance information to the console screen

```
user@host> request extensions radware maintenance information
```



To save the maintenance information to a file

```
user@host> request extensions radware maintenance information | save
<filename>
```

Viewing System Maintenance Information

The `maintenance` command displays information about the maximum and currently enabled capacity for the connection table, as well as various counters from Layer 3 to Layer 7, per Multiservices-DPC NPU.



To view system maintenance information

```
user@host> show extensions adc internal maintenance <Multiservices-DPC PIC
name>
```

Providing a Network Topology Map

Every network is designed differently. You should maintain a detailed and accurate topology diagram of your network showing the nodes and connections. This visual depiction of your network is very helpful to technical support personnel when they assess your problem.

Documenting System and Network Changes

When troubleshooting a problem, verify if anything has changed in the network recently. The following are a few questions that help you analyze and document changes to your system network:

- Have you recently changed or upgraded your system, your network, or a custom application? (For example, has any configuration or code been changed?)
- When were these changes made? Provide the date and time.
- Who made these changes? Were the changes made by a partner or customer? Provide the names of the individuals who made the changes.
- Which events, such as an upgrade, a LAN change, increased traffic, or new hardware, can be identified prior to the trouble occurring?

Assessing Panic

An ADC software crash is also called a “panic.” When a panic happens, the core-dump file saves the ADC software status in the file system prior to the panic. This is useful in backtracing the events which led to the panic. The information is held in core-dump files according to the process that had the panic. The files are numbered, starting from 0, for each process.

The files are created under the directory `/var/tmp` in the router.

The ADC software running in the routing engine (`adc-mgmt`) core-dump file is called `adc-mgmt.core-tarball.X.tgz`.

The Multiservices-DPC NPU core-dump file is called `adc-ctrl.core.msXX.X.gz` AND/OR `adc-data.core.msXX.X.gz`. In many cases, both are created.



Caution: After the panic happens, the core-dump file is created. It can take up to 20 minutes before the file is ready.

Collecting System Statistics

In each Multiservices-DPC NPU, there is 1 control processor (CP) and 21 data processors (DP). While in the Junos OS these numbers are configurable, the ADC software only uses these specific numbers (1 control core and 7 data cores are translated into 1 control processor and 21 data processors).

This section explains in detail how to capture these statistics for troubleshooting. It includes the following topics:

- [Control Processor CPU Use on page 29](#)
- [Switch Processor on page 29](#)

Control Processor CPU Use

You can capture Controller Processor (CP) CPU use by using the `cpu` command.



To capture CP CPU information

```
user@host> show extensions adc cpu

CPU Utilization for interface  ms-1/0/0
  CP average for last 64 seconds: 15
  DP average for last 64 seconds: 40, max: 50, min: 31

CPU Utilization for interface  ms-2/0/0
  CP average for last 64 seconds: 2
  DP average for last 64 seconds: 41, max: 60, min: 31

CPU Utilization for interface  ms-2/1/0
  CP average for last 64 seconds: 2
  DP average for last 64 seconds: 44, max: 60, min: 37
```

Switch Processor

DP CPU is the main data-path processor for the ADC software. There are 21 DPs per Multiservices-DPC NPU. This section explains how to view DP statistics and trace the reasons for high DP CPU use.

High DP CPU use is usually due to high traffic volume or a denial of service (DoS) attack to client-facing interfaces. To verify that, check the interface statistics.

This section includes the following topics:

- [DP CPU Statistics on page 30](#)
- [DP Maintenance Statistics on page 31](#)

DP CPU Statistics

You can display statistics for all DP CPUs in a certain Multiservices-DPC NPU using the `cpu` command.



To display DP CPU statistics

```
user@host> show extensions adc cpu ms-1/0/0
CPU Utilization for interface ms-1/0/0
      DP average for last 64 seconds:      40
      DP max for last 64 seconds:         50
      DP min for last 64 seconds:         31

cpu threshold: 85
Alert is triggered when atleast half DPs cross this threshold
```

	1 second	4seconds	64seconds
CP	16	10	13
DP 1	35	35	35
DP 2	46	47	47
DP 3	40	41	41
DP 4	41	42	42
DP 5	38	39	39
DP 6	41	41	41
DP 7	41	41	42
DP 8	50	50	50
DP 9	36	36	37
DP 10	39	39	39
DP 11	36	36	36
DP 12	47	48	48
DP 13	38	39	39
DP 14	44	45	45
DP 15	37	38	38
DP 16	42	42	42
DP 17	31	31	31
DP 18	33	34	34
DP 19	38	39	39
DP 20	44	45	45
DP 21	40	41	41

DP Maintenance Statistics

The maintenance command displays DP maintenance statistics per DP.



To display DP maintenance statistics

```

user@host> show extensions adc internal maintenance ms-1/0/0 dp 12
Maintenance statistics for Interface ms-1/0/0 dp 12
RCV      Success from      RCV Errors from      SND Success to      SND failures to
-----+-----+-----+-----+-----+-----
CP                94003                0                85544                0
DP 1              2414337                0                1660339              0
DP 2              1354977                0                1167307              0
DP 3              2502375                0                985151               0
DP 4              2415755                0                1040409              0
DP 5              1275781                0                1102901              0
DP 6              2504818                0                1304601              0
DP 7              2381364                0                2028115              0
DP 8              1655359                0                982410               0
DP 9              2207492                0                1094261              0
DP 10             2350546                0                802970               0
DP 11             0                    0                0                   0
DP 12             2200316                0                1532456              0
DP 13             2347841                0                1404239              0
DP 14             1300620                0                742807               0
DP 15             2248642                0                1701184              0
DP 16             1981460                0                660126               0
DP 17             1674814                0                478408               0
DP 18             2030104                0                1119825              0
DP 19             1896073                0                1112334              0
DP 20             1639463                0                770817               0
DP 21             0                    0                0                   0

learn-err-noddw:      0          resolve-err-noddw:      0
age-mp-noddw:         0          delete-miss:           0
pfdb-free-empty:     0          udp-discards:          0
tcp-discards:         0

Dynamic Memory Statistics
-----+-----
Total memory in bytes      0
Current memory in bytes    0
allocs                     0
frees                      0
alloc failures             0
bytes hiwait               0

```


Chapter 4 – Extended Troubleshooting

This chapter explains extended troubleshooting using a step-by-step model to systematically identify and rule out problems with hardware, software layers, and different software features. Therefore, it is recommended to follow the procedures in this chapter in the order they appear. This approach helps you to maximize your time by minimizing the chance that the problem you are attempting to resolve resides in a different troubleshooting layer than the layer you are currently analyzing.

This chapter includes the following topics:

- [System and Hardware Troubleshooting on page 33](#)
- [Troubleshooting OSI layers on page 34](#)
- [Troubleshooting Tools on page 38](#)

System and Hardware Troubleshooting

This section explains troubleshooting that is related to the device system and the device hardware. This section is only a small portion of the possible troubleshooting actions for such issues. For more information, see your Juniper Networks troubleshooting documentation.

This section includes the following topics:

- [System Troubleshooting on page 33](#)
- [Hardware Troubleshooting on page 34](#)
- [Multiservices-DPC NPU Troubleshooting on page 34](#)

System Troubleshooting

Use the following commands to troubleshoot system issues:



To verify general system-related issues

```
user@host> show hardware ?
```



To ensure no alarms are raised for your device

```
user@host> show chassis alarms
```

Hardware Troubleshooting

Use the following command to troubleshoot hardware issues:



To verify chassis and hardware issues

```
user@host> show chassis ?
```

Multiservices-DPC NPU Troubleshooting

Use the following commands to troubleshoot issues with the Multiservices-DPC NPU:



To verify the Multiservices-DPC status

```
user@host> show chassis fpc pic-status
```



Note: This command may show a Multiservices-DPC as being “up,” but that does not mean that it is ready to run ADC traffic. It may mean that it is in the process of loading the ADC software and is not yet ready to process traffic. Use the `adc status` command to verify the status of the ADC software.



To change the Multiservices-DPC status between offline and online

```
user@host> request chassis pic offline fpc-slot <slot #> pic-slot <pic #>
-OR-
user@host> request chassis pic online fpc-slot <slot #> pic-slot <pic #>
```

Troubleshooting OSI layers

This section explains troubleshooting using the Open Systems Interconnection (OSI) model to systematically identify and rule out problems at Layers 1 through 4 and Layer 7.

This section includes the following topics:

- [Layer 1 and Layer 2 on page 34](#)
- [Layer 3 on page 35](#)
- [Layer 4 on page 36](#)
- [Layer 7 on page 38](#)

Layer 1 and Layer 2

Use the following commands to diagnose the Layer 1 and Layer 2 issues:



To verify which interfaces exist in the device and what their status is

```
user@host> show interface terse
```



To verify packet statistics on a specific interface

```
user@host> show interface <interface-name>
```



To verify errors and extensive statistics on a specific interface

```
user@host> show interfaces extensive <interface name>
```



To verify spanning tree issues

```
user@host> show spanning-tree ?
```



To verify link-aggregation and LACP issues

```
user@host> show lacp ?
```

Layer 3

Check the following to diagnose issues in Layer 3:

- The interfaces are up and assigned to the correct VLAN.
- Local networks are defined for any route or interface. Check if they are defined for all interfaces and each static route. Otherwise all non-local, net-defined traffic is sent to the default gateway.
- The routing table uses the correct next-hops and interfaces. Also, ensure that local networks are defined for each static route and that the routes for dynamic networks appear in the routing table.

Use the following commands to diagnosis issues with Layer 3:



To verify the interfaces configuration and status

```
user@host> show configuration interface
-AND-
user@host> show interface terse
```



To verify that the routing table uses the correct next hops and interfaces

```
user@host> show route ?
```



To display information on the routes in the device

```
user@host> show route table <all>
-AND-
user@host> show route forwarding-table
```



To verify VRRP issues

```
user@host> show vrrp ?
```

Layer 4

Check the following to diagnose issues in Layer 4:

- The correct interfaces are configured as client and server interfaces
- There are failed or blocked services. Blocked services indicate that another real service is failing a health check within the same group.
- Real servers are up.
- Real servers are part of the desired group.
- The correct Layer 4 configuration (client, server, NAT, hot-standby, and filtering) is configured.
- Verify the virtual server and service status. If the status of the services is "down," then make sure that the associated real-server status is "up" and functioning.
- Verify the virtual-server routes are added to the front-end routing-instance (fe-ri).
- Verify if the real servers are passing health checks. If the health check fails, then do the following:
 - Confirm that the appropriate gateway is on the real server. The gateway needs to be the device interface or next-hop toward the device.

- Confirm that health check replies are forwarded by the appropriate interface for a multihomed real server.
- Confirm that there are no routing loops between the real server and the router.

Use the following commands to diagnose issues with Layer 4:



To verify correct interfaces are configured as client- and server-interfaces

```
user@host> show configuration extensions adc adc-instance <name> router-interfaces
```



To verify real server and failed or blocked services (per server name)

```
user@host> show extensions adc real-server <server name>
```



To verify group status and traffic distribution

```
user@host> show extensions adc group [group name]
```



To verify the virtual server status

```
user@host> show extensions adc virtual-server [virtual-server-name]
```



To verify the virtual service status and statistics

```
user@host> show extensions adc <protocol> virtual-server <virtual-server-name>
```



To verify the virtual server routes and automatic configuration

```
user@host> show extensions adc internal generated-configuration
```

Layer 7

Verify Layer 7 to diagnose issues in Secure Sockets Layer ID (SSL ID), URL parsing, scripted and content-based health check, and Domain Name System (DNS) load balancing.

- Check SSL ID persistency.
Sniff the connection and check the server logs for the SSL IDs. Correlate this information. For example, if a client connects to the device, check the initial request to the real server coming on a 0 valued Session ID. The server issues an SSL ID back to the client. As long as the client uses the same SSL ID for incoming connections, the session is bound to the same real server. If there is a change in SSL ID (due to a client or server issue), it is easily captured in the sniffer traces.
- Check URL parsing.
Configure content-match strings. Map the requests and verify them using a sniffer to ensure that the correct content is specified.
- Perform script- and content-based health checks.
Check if there is any configuration error in the script or content. Verify the script using a telnet client to ensure that you are getting a 200 OK (or the expected response in the script) back from the server.
- Check DNS-based load balancing.
Verify the string associated with the DNS name specified.
- Check URL hashing and header-hash load balancing.

Troubleshooting Tools

This section explains how to use specific troubleshooting tools available in the ADC software.

This section includes the following topics:

- [Filter Log Action on page 38](#)
- [Server Operational Status on page 39](#)
- [Connection Table Troubleshooting on page 39](#)

Filter Log Action

When working with filters (transparent load balancing), you can add a “log” action to a filter. This will cause each packet that matched the filter conditions send a syslog message. The log action can be configured in parallel with other filter actions.



Caution: Using the log action on filters has a severe impact on performance as it sends a syslog message for every relevant packet.



To configure filter log action

```
[edit extensions adc adc-instance <name> filters term <name>]  
user@host# set then log
```

Server Operational Status

While debugging, you may want to disable or enable a server. This is called changing the server operational status. Changing the server operational status also lets you replace a server or put it into a temporary down state.



Note: The disable and enable states are not saved after reboot. After reboot, all servers are considered enabled. If you want the server not to participate in load balancing after reboot, you should deactivate the server in configuration mode.



To disable a server from an ADC instance

```
user@host> request extensions adc disable real-server <server name>
```



To enable a server from an ADC instance

```
user@host> request extensions adc enable real-server <server name>
```



To disable all servers from an ADC instance

```
user@host> request extensions adc disable adc-instance <adc-name>
```



To enable all servers from an ADC instance

```
user@host> request extensions adc enable adc-instance <adc-name>
```

Connection Table Troubleshooting

The connection table contains all tracked connections in the ADC software. Each connection that is not part of a "per-packet-load-balance" service or filter will appear in the connection table. Information in the connection table can help you determine if a session is recognized by the ADC software. Each connection table entry displays information on which server was chosen for the connection, and if the connection is involved in extended processing such as NAT or persistency.



To show connection table counters for an open connections

```
user@host> show extensions adc connection-table
```



To show the connection table entries

```
user@host> show extensions adc connection-table extensive adc-instance lb1
```

Connection table entries can be filtered by each of the following parameters:

- destination-address
- destination-port
- destination address and port
- filter-term
- nat-address
- real-server
- source-address
- source-port



To delete an entry in the connection table

```
user@host> clear extensions adc connection-entry <instance-name>  
<destination-address> <destination-port> <source-address> <source-port>  
<tcp|udp>
```



To delete the entire connection table for an ADC instance

```
user@host> clear extensions adc connection-table <instance-name>
```

Chapter 5 – Feature-Specific Troubleshooting

This chapter describes the feature-specific troubleshooting tools available in the ADC software. It includes the following topics:

- [ADC Automatic Configuration on page 41](#)
- [NAT IP Addresses on page 45](#)
- [High Availability on page 46](#)
- [License Information on page 50](#)

ADC Automatic Configuration

The ADC software uses automatic configuration to handle packet receiving and sending to and from the device. This section describes how to troubleshoot the automatic configuration and how to use it for further troubleshooting.

This section includes the following topics:

- [Commit-Script Automatic Configuration on page 41](#)
- [Junos OS SDK API Automatic Configuration on page 43](#)

Commit-Script Automatic Configuration

The ADC software uses the `commit-script` to configure static automatic configuration.



To view the automatic configuration set up using the `commit-script`

```
user@host> show configuration | display commit script
```



Note: The ADC automatic configuration added by the `commit-script` is marked using the "apply macro" attribute.



Example

```
user@host> show configuration interfaces | display commit-scripts
ge-0/2/0 {
  unit 0 {
    family inet {
      filter {
        apply-macro "Input was added by automatic script";
        input-list rdwr-default-accept;
      }
      address 100.0.0.1/16;
    }
  }
}
ge-0/3/0 {
  unit 0 {
    family inet {
      filter {
        apply-macro "Input was added by automatic script";
        input-list [ rdwr-lbl-be-filt rdwr-default-accept ];
      }
      address 200.0.0.1/16;
    }
  }
}
ms-1/0/0 {
  unit 0 {
    family inet;
  }
  unit 10000 {
    family inet {
      filter {
        apply-macro "This term was added by a commit script";
        input rdwr-ms-100-filt;
      }
    }
  }
}
```

Junos OS SDK API Automatic Configuration

The ADC software uses the dynamic Junos OS SDK API for automatic configuration.

A firewall filter is added to the client-facing interfaces using the Junos OS SDK API. This firewall filter is dynamic since it only catches ("from" container) traffic with destination IP as VIP, and only when the VIP is marked as up in the ADC software.



To view the firewall filter that is added on the client-facing interfaces

```
user@host> show extensions adc internal generated-configuration
Front End firewall Filter name: rdwr-fe-filt
  Related interfaces: ge-0/2/0.0
  Adc instance lb1:
    Active VIPs: 150.0.0.120 (routes added)
    Non-active VIPs: None
    Routing instance: rdwr-lb1-fe-ri
    Packet counter: 0
    Total Bytes: 0
```

The ADC software also adds routes to the routing instances on the device. These routes can be displayed, as well as all other routes, using the appropriate command.



To view the routes on the device

```
user@host> show route all
```

The debug-enable Command

The debug-enable command is a hidden debug command under the ADC hierarchy. When the debug-enable command is set, the ADC software does two additional activities for debugging purposes:

- The ADC software sends more syslog messages with debug information on the internal ADC software processes.
- The ADC software configures counters per firewall filter term to count the traffic that is caught by each term. This configuration is performed both for the commit-script filters and for the Junos OS SDK API filters.

As a result of the above additional activities, the debug-enable command results in a performance penalty, and reduces the capacity of the Multiservices-DPC NPUs running the ADC software.



To configure the debug-enable flag

```
[edit extensions adc]
user@host# set debug-enable
```

Since the `commit-script` uses an input list to bind filters to the device interfaces, the counter names for these filters are changed by the Junos OS. The relevant counter name is always the interface name followed by an "-i" string.



Example

A To view the firewall filters counters configured by the `commit-script` for `fe-1/3/3`:

```
user@host> show firewall filter fe-1/3/3.0-i
Filter: fe-1/3/3.0-i
Counters:
Name                                     Bytes      Packets
default-accept-fe-1/3/3.0-i             0           0
demo-accept-to-serv-if-fe-1/3/3.0-i      0           0
demo-first-fragment-fe-1/3/3.0-i         0           0
demo-icmp-fe-1/3/3.0-i                   0           0
demo-non-first-fragment-fe-1/3/3.0-i     0           0
rdwr-ms-100-be-counter-fe-1/3/3.0-i    13398625    186045
```

B To view the counters for the firewall filters configured by the Junos OS SDK API:

```
user@host> show extensions adc internal generated-configuration
Front End firewall Filter name: rdwr-fe-filt
  Related interfaces: ge-0/2/0.0
  Adc instance lbl:
    Active VIPs: 150.0.0.120 (routes added)
    Non-active VIPs: None
    Routing instance: rdwr-lbl-fe-ri
    Packet counter: 10
    Total Bytes: 1244
```

NAT IP Addresses

Use the following procedure to troubleshoot NAT addresses in the ADC software.



To troubleshoot NAT addresses for the ADC software

1. Check that the `client-nat` parameter is enabled for the servers.

```
user@host> show configuration extensions adc adc-instance lb1 real-servers

r1 {
    address 200.0.0.10;
    client-nat;
}
r2 {
    address 200.0.0.11;
    client-nat;
}
```



Note: The `client-nat` parameter must be enabled on the servers.

2. For filters with action load balancing, `client-nat` should be configured per each filter.

```
user@host> show configuration extensions adc adc-instance <adc-name>
filters term <name> then

load-balance {
    group g1;
    client-nat;
}
```

3. Check the number of NAT addresses configured on all Multiservices-DPC CPUs. At least one NAT address must be configured per NPU.

```
user@host> show configuration extensions adc adc-instance lb1 router-  
interfaces ms-interfaces
```

```
ms-1/0/0 {  
  unit 0 {  
    family {  
      inet {  
        nat-address 1.1.1.1;  
      }  
    }  
  }  
}
```

Or:

```
ms-1/0/0 {  
  unit 0 {  
    family {  
      inet {  
        nat-address-range 1.1.1.2 to 1.1.1.5;  
      }  
    }  
  }  
}
```



Note: The configured NAT address cannot be the same as to any other IP address defined in the configuration (such as a real-server address, virtual-server address, and so on).

4. Check NAT statistics.

```
user@host> show extensions adc nat
```

High Availability

The ADC software uses the Junos OS based high-availability mechanism called Redundant Multiservices-PIC (RMS) for high availability. As part of the high-availability solution, the ADC software passes the connection-table data from the active Multiservices-DPC NPU in the RMS to the backup Multiservices-DPC NPU. This process is called connection synchronization. This section explains how to troubleshoot the RMS and connection synchronization mechanisms.

This section includes the following topics:

- [RMS Troubleshooting on page 47](#)
- [Connection Synchronization Troubleshooting on page 49](#)

RMS Troubleshooting

Use the following procedure to troubleshoot RMS issues:



To troubleshoot high availability for the ADC software

1. Check that the RMS configuration is set up correctly in Junos OS.

```
user@host> show configuration interfaces

rms0 {
  redundancy-options {
    primary ms-0/2/0;
    secondary ms-0/3/0;
    hot-standby;
  }
}
```

2. Check that the adc-instance is configured to use the RMS and not the Multiservices-DPCs.

```
user@host> show configuration extensions adc

adc-instance demo {
  router-interfaces {
    ms-interfaces {
      rms0;
    }
  }
}
```

3. Verify that the RMS appears in the ADC status command as an active interface.

```
user@host> show extensions adc status

SLB daemon status : Up
Up Since Tue Mar 15 18:56:33 2011
adc instance kobis:
Interface      Status      Control Daemon  #Data Daemons up #Disconn License
-----+-----+-----+-----+-----+-----
rms0           Up          Up              21                0           Licensed
```

4. Verify that the routes in the front-end routing instance point to the RMS and not to the Multiservices-DPCs. Look for the virtual server routes in the `rdwr-<adc-instance-name>-fe-ri`. The following example uses the `adc-instance-name` "demo" and the virtual-server address 6.2.2.50.



Example

```
user@host> show route all

rdwr-demo-fe-ri.inet.0: 6 destinations, 7 routes (6 active, 0 holddown, 0
hidden)
+ = Active Route, - = Last Active, * = Both

2.2.2.0/24          *[Direct/0] 22:49:28
                    > via fe-0/0/1.0
2.2.2.1/32          *[Local/0] 22:49:28
                    Local via fe-0/0/1.0
3.3.3.0/24          *[Direct/0] 22:49:28
                    > via fe-0/0/3.0
                    [Direct/0] 22:49:28
                    > via fe-0/0/3.0
3.3.3.1/32          *[Local/0] 22:49:28
                    Local via fe-0/0/3.0
3.3.3.44/32         *[Local/0] 22:49:28
                    Local via fe-0/0/3.0
6.2.2.50/32         *[Static/1] 14:57:40
                    > via rms0.0
```

5. Verify the RMS filter counter is defined and catching traffic.



Note: The counters are defined only when the `debug-enable` command is set. For more information, see ["The debug-enable Command" on page 43](#).

```
user@host> show firewall filter rdwr-rms0-filt

Filter: rdwr-rms0-filt
Counters:
Name          Bytes          Packets
all           0              0
```

Connection Synchronization Troubleshooting

Use the following procedure to troubleshoot issues relating to connection synchronization.



To troubleshoot connection synchronization for the ADC software

1. When using virtual-server load balancing, verify the connection synchronization is configured for your virtual service.

```
user@host# show extensions adc adc-instance <adc-name> virtual-server <name>
http-virtual-service <name> {
    ...
    sync-connections;
}
```

2. When using filter load balancing, verify the sync-connections parameter is configured for your filter.

```
user@host# show extensions adc adc-instance <adc-name> filters term <name>
then {
    load-balance {
        ...
        sync-connections;
    }
}
```

3. Verify connection synchronization is not disabled for the entire ADC instance. Do this by ensuring the no-connections-sync parameter is not set in the adc-instance.



Caution: If the no-connections-sync parameter is used at the adc-instance level, the sync-connections parameter at any other level of the hierarchy will not function.

```
user@host# show extensions adc
adc-instance <name> {
    ...
    no-connections-sync;
}
```

4. Use the hidden passive switch to find the connection table that is synchronized. When using this switch with the connection table, the ADC software takes the connection-table information from the backup Multiservices-DPC NPU inside the RMS. This lets you view the synchronized data.

```
user@host> show extensions adc connection-table extensive passive adc-
instance <adc-name>
```

License Information

The ADC software must be licensed in order to run on your Multiservices-DPC. The license is set per chassis serial number, and determines the maximum number of Multiservices-DPC NPUs that can run the ADC software.



To verify the chassis serial number

```
user@host> show chassis hardware
```

Hardware inventory:

Item	Version	Part number	Serial number	Description
Chassis			JN1111111111	MX240
Midplane	REV 07	760-021404	ABAA8888	MX240 Backplane
FPM Board	REV 04	760-021392	YB2459	Front Panel Display
PEM 1	Rev 01	740-022697	QCS1002C0A1	PS 1.2-1.7kW; 100-
240V AC in				
PEM 2	Rev 01	740-022697	QCS1002C02E	PS 1.2-1.7kW; 100-
240V AC in				
Routing Engine 0	REV 09	740-015113	9009015040	RE-S-1300
CB 0	REV 07	710-021523	YC1029	MX SCB
FPC 0	REV 18	750-022766	XY4672	DPCE 20x 1GE + 2x
10GE X				
CPU	REV 03	710-022351	XX1139	DPC PMB
PIC 0		BUILTIN	BUILTIN	10x 1GE (LAN)
PIC 1		BUILTIN	BUILTIN	10x 1GE (LAN)
Xcvr 0	REV 02	740-011613	PH25T3E	SFP-SX
Xcvr 1	REV 02	740-011613	PH25T3Y	SFP-SX
Xcvr 2		NON-JNPR	PT5342883	SFP-SX
Xcvr 3		NON-JNPR	A0507085508	SFP-SX
PIC 2		BUILTIN	BUILTIN	1x 10GE (LAN/WAN)
Xcvr 0	REV 03	740-014289	CA05BQ035	XFP-10G-SR
PIC 3		BUILTIN	BUILTIN	1x 10GE (LAN/WAN)
Xcvr 0	REV 03	740-014289	CA05BQ039	XFP-10G-SR
FPC 1	REV 07	750-024064	XT0653	MS-DPC
CPU	REV 07	710-013713	XT4129	DPC PMB
PIC 0		BUILTIN	BUILTIN	MS-DPC PIC
PIC 1		BUILTIN	BUILTIN	MS-DPC PIC
FPC 2	REV 07	750-024064	XR6311	MS-DPC
CPU	REV 07	710-013713	XR6176	DPC PMB
PIC 0		BUILTIN	BUILTIN	MS-DPC PIC
PIC 1		BUILTIN	BUILTIN	MS-DPC PIC
Fan Tray 0	REV 01	710-030216	XV8381	Enhanced Fan Tray



To verify the license installed in your chassis

```
user@host> show system license
```



To verify the license defined and Multiservices PICs allowed by the license

```
user@host> show extensions adc license-info
```


Chapter 6 – Emergency Recovery Tree

This chapter outlines the procedures for recovering as quickly as possible from field outages. It includes the following topics:

- [VIP Is Not Working on page 53](#)
- [ADC Software Panic on page 58](#)
- [Real Server Down on page 59](#)

VIP Is Not Working

[Figure 1 on page 54](#) through [Figure 4 on page 57](#) illustrate the emergency recovery tree to follow when the VIP is not working.

Figure 1: VIP Not Working Recovery Diagram 1

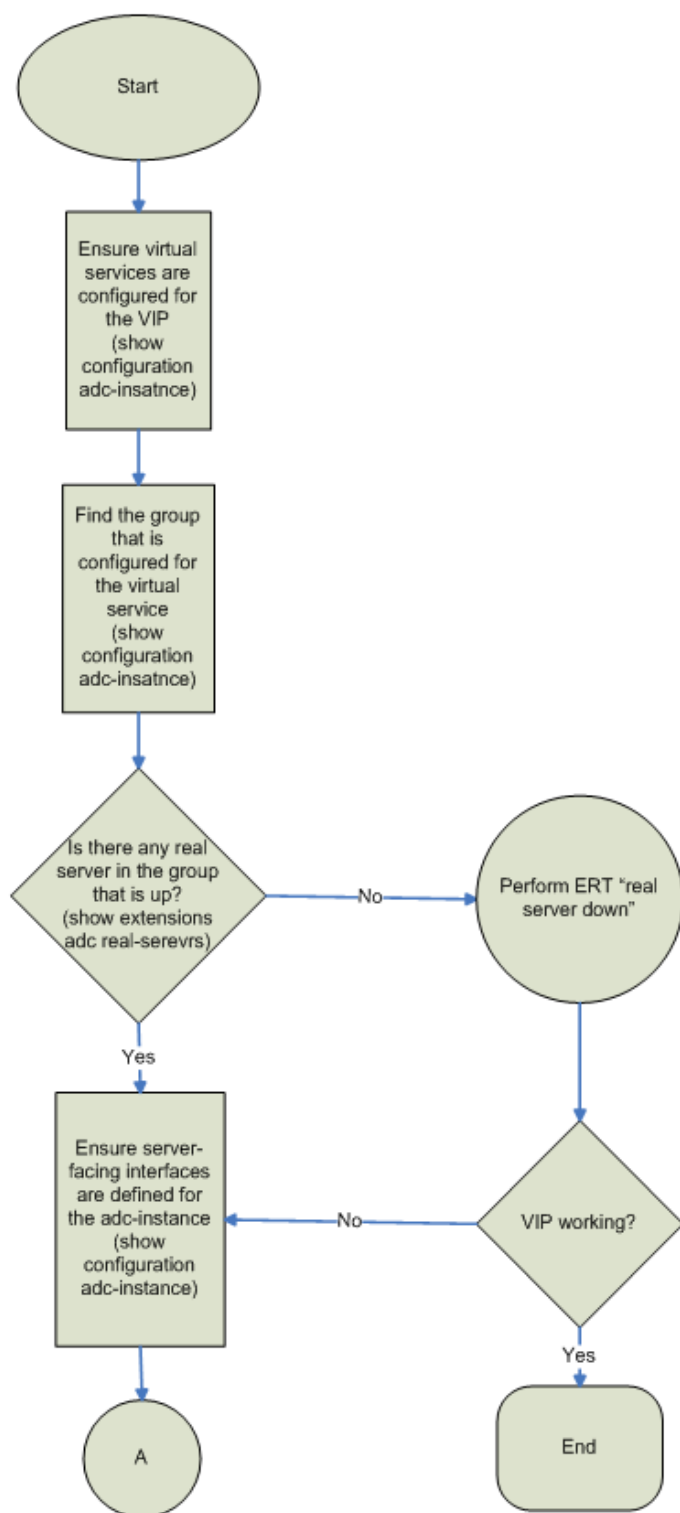


Figure 2: VIP Not Working Recovery Diagram 2

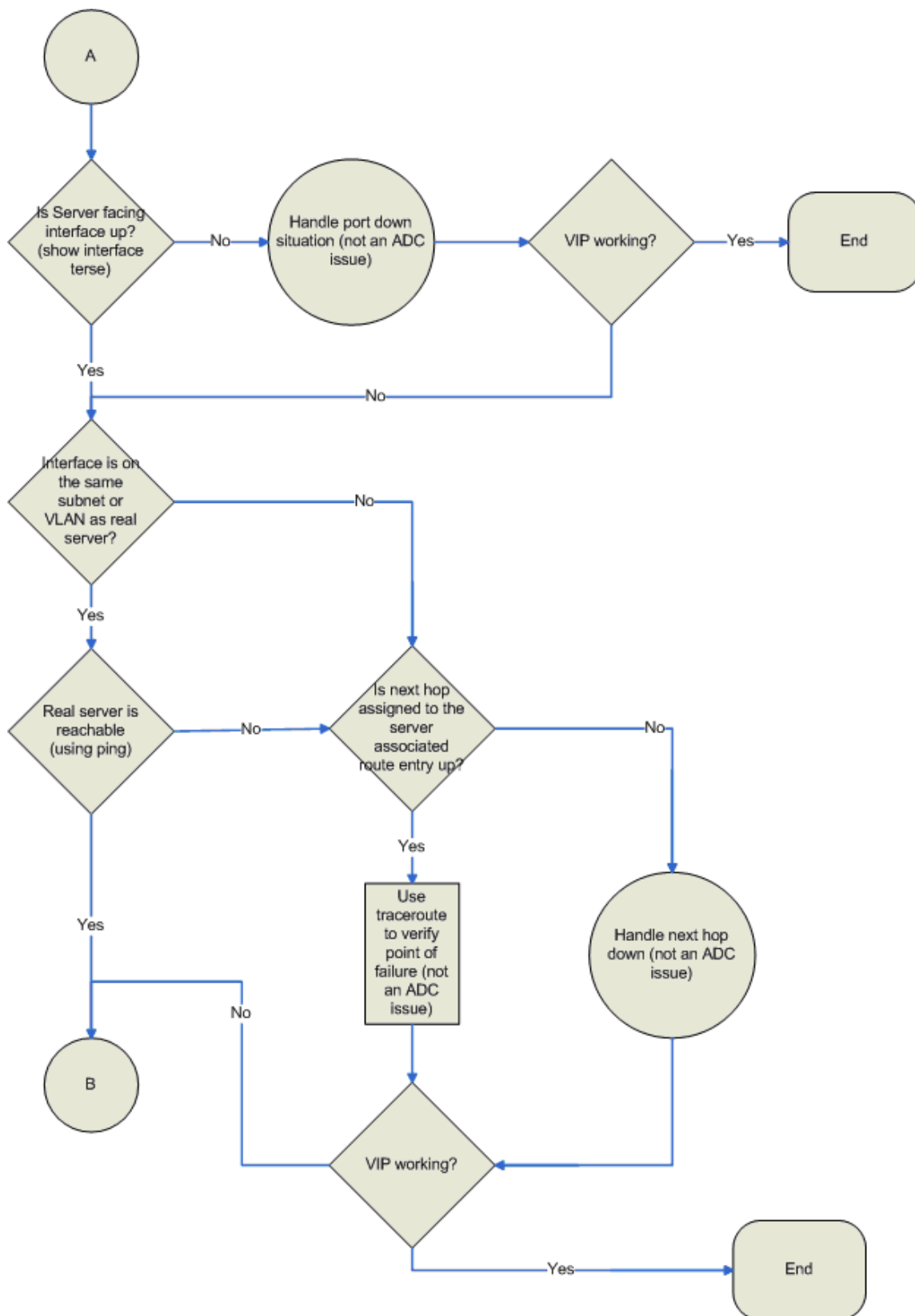


Figure 3: VIP Not Working Recovery Diagram 3

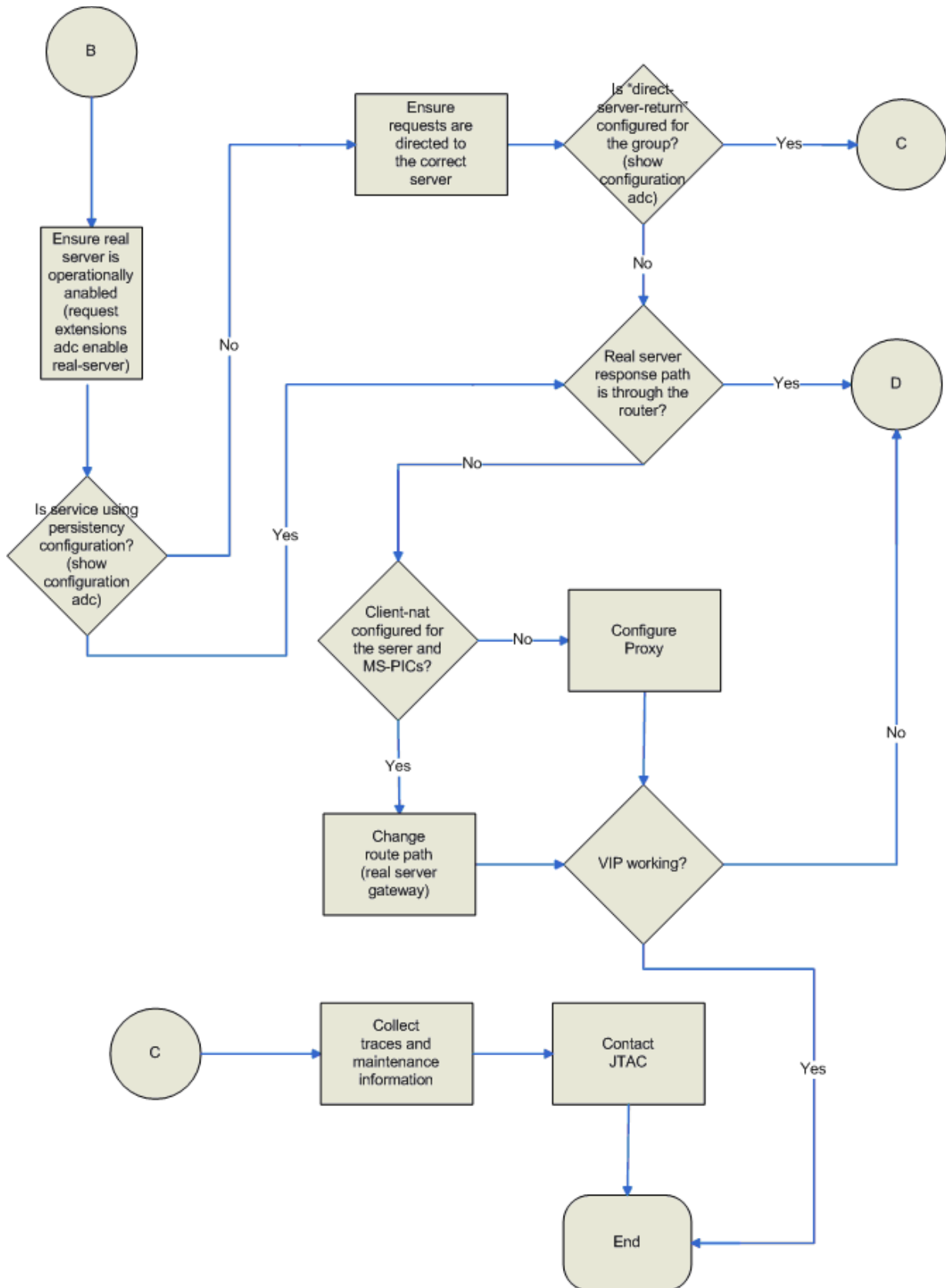
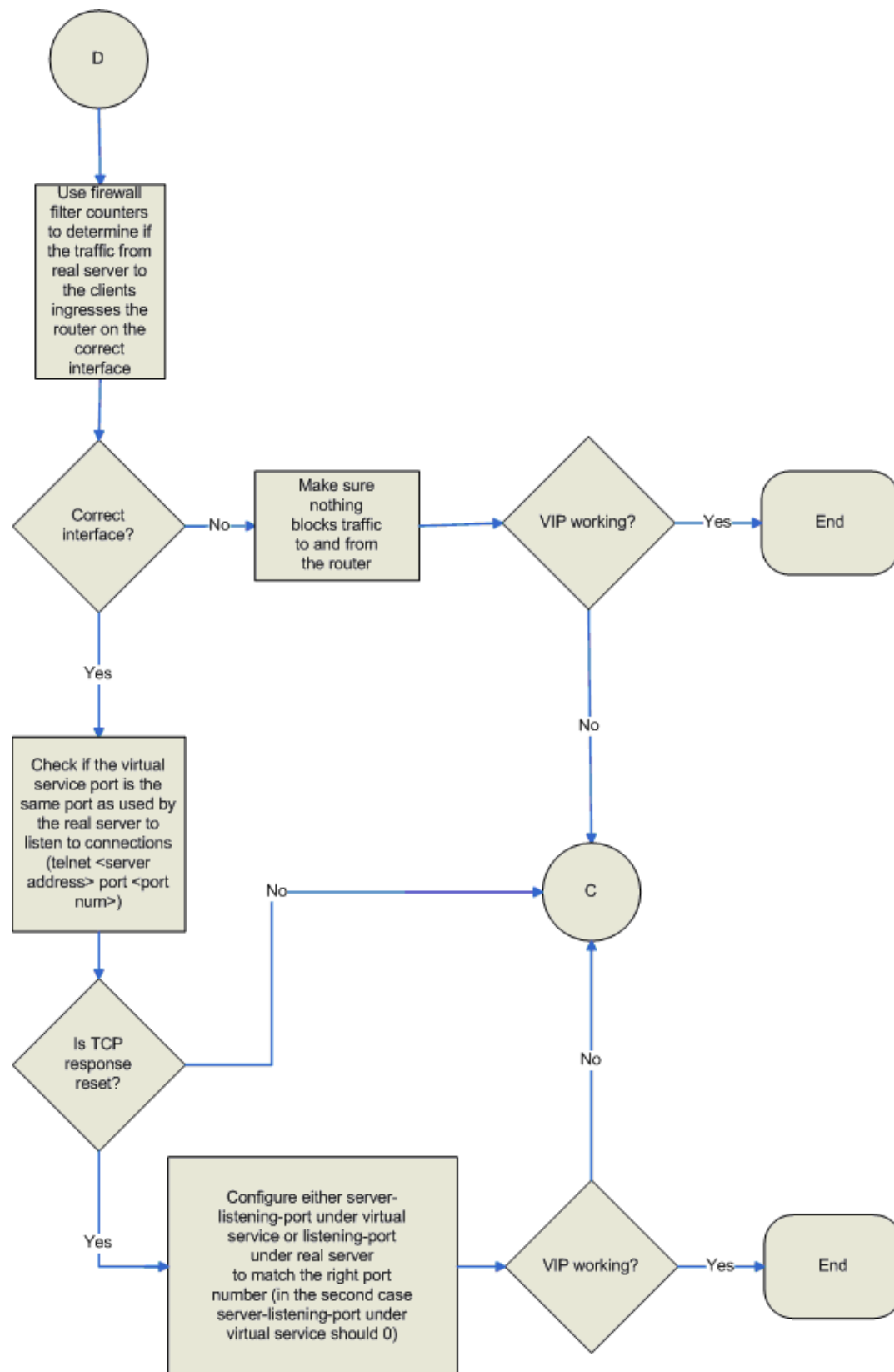


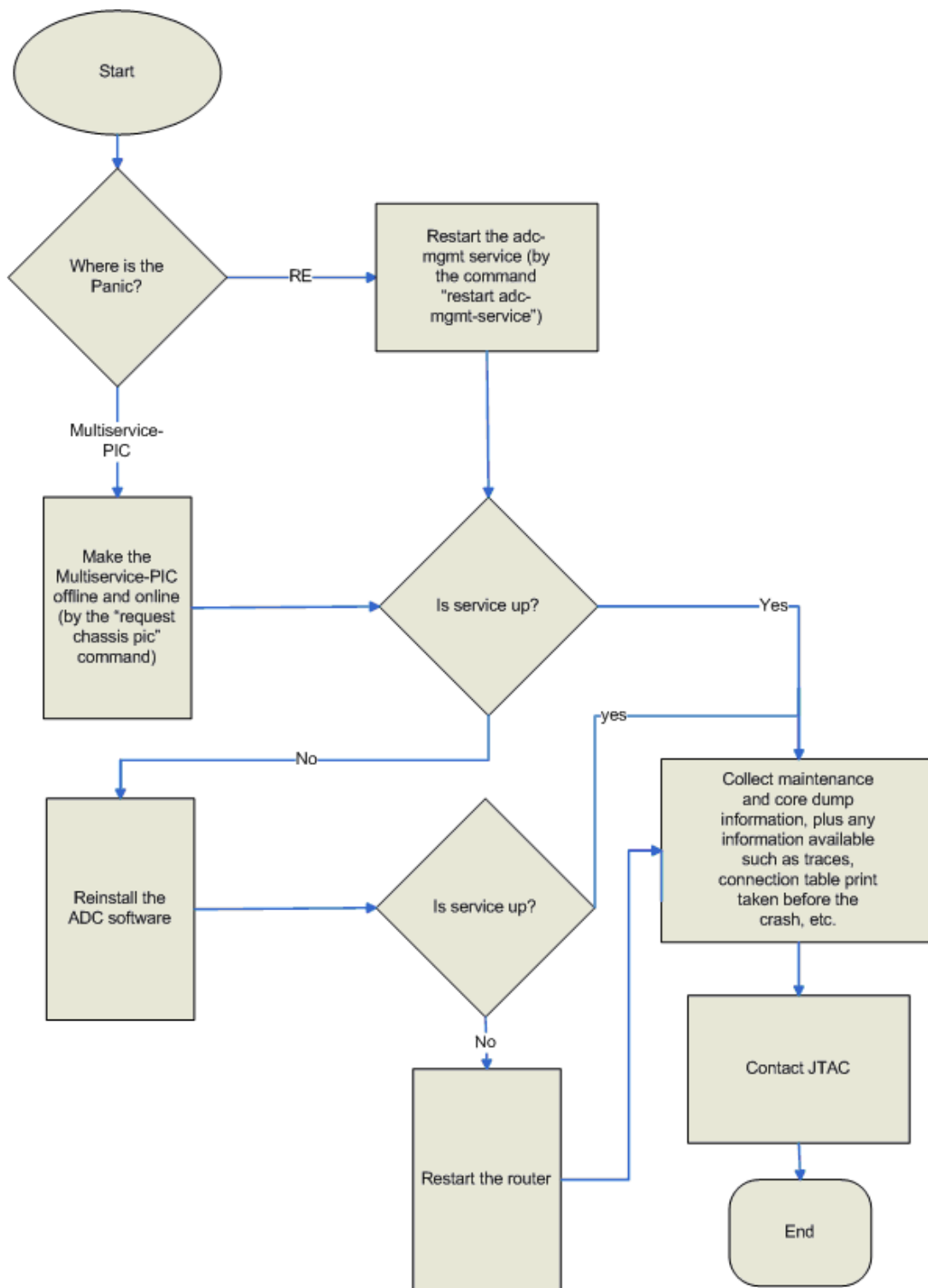
Figure 4: VIP Not Working Recovery Diagram 4



ADC Software Panic

[Figure 5 on page 58](#) illustrates the emergency recovery tree for switch panics.

Figure 5: Switch Panic Recovery Diagram



Real Server Down

Figure 6 on page 59 through Figure 9 on page 62 illustrate the emergency recovery tree to follow when a real server becomes unavailable.

Figure 6: Real Server Down Recovery Diagram 1

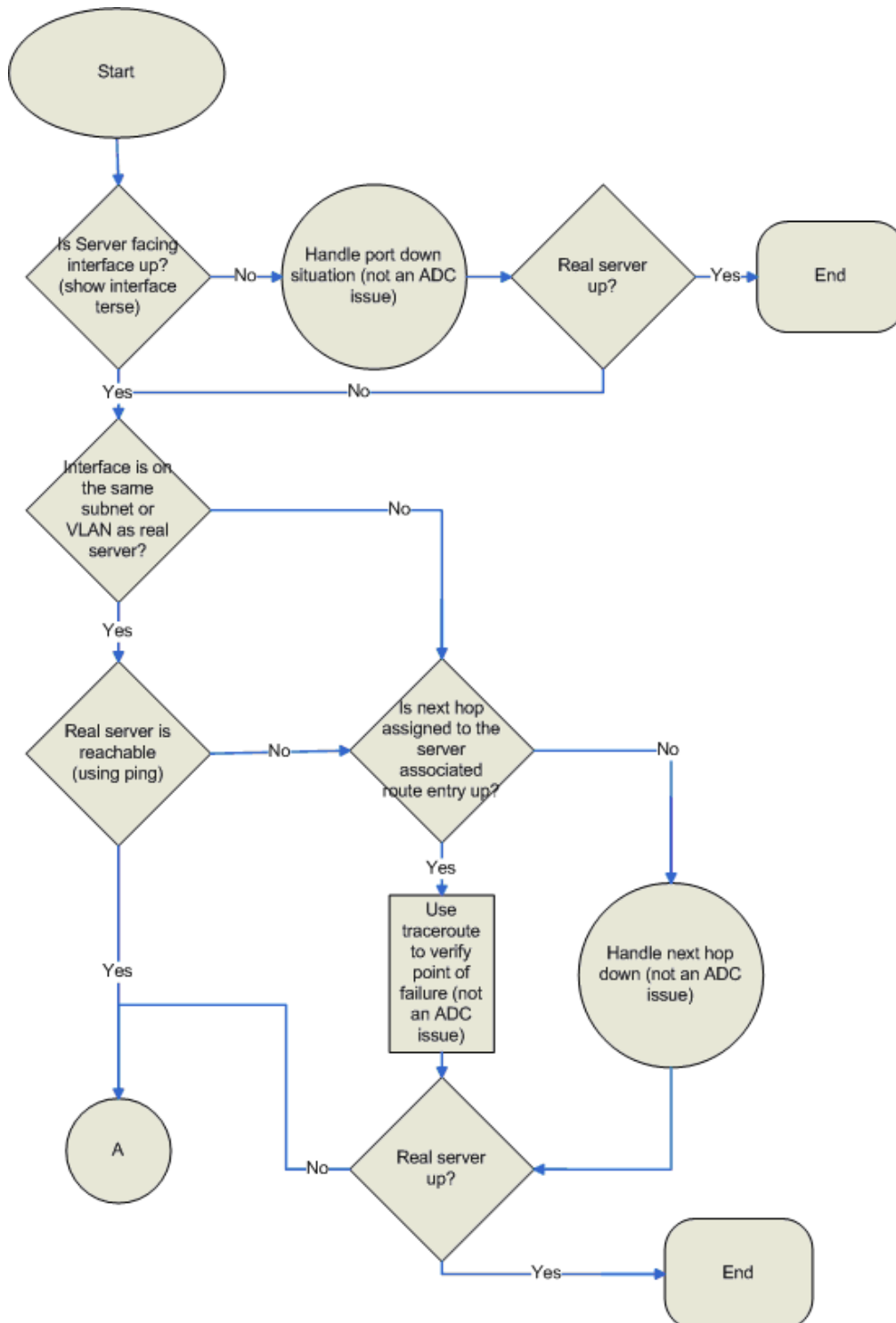


Figure 7: Real Server Down Recovery Diagram 2

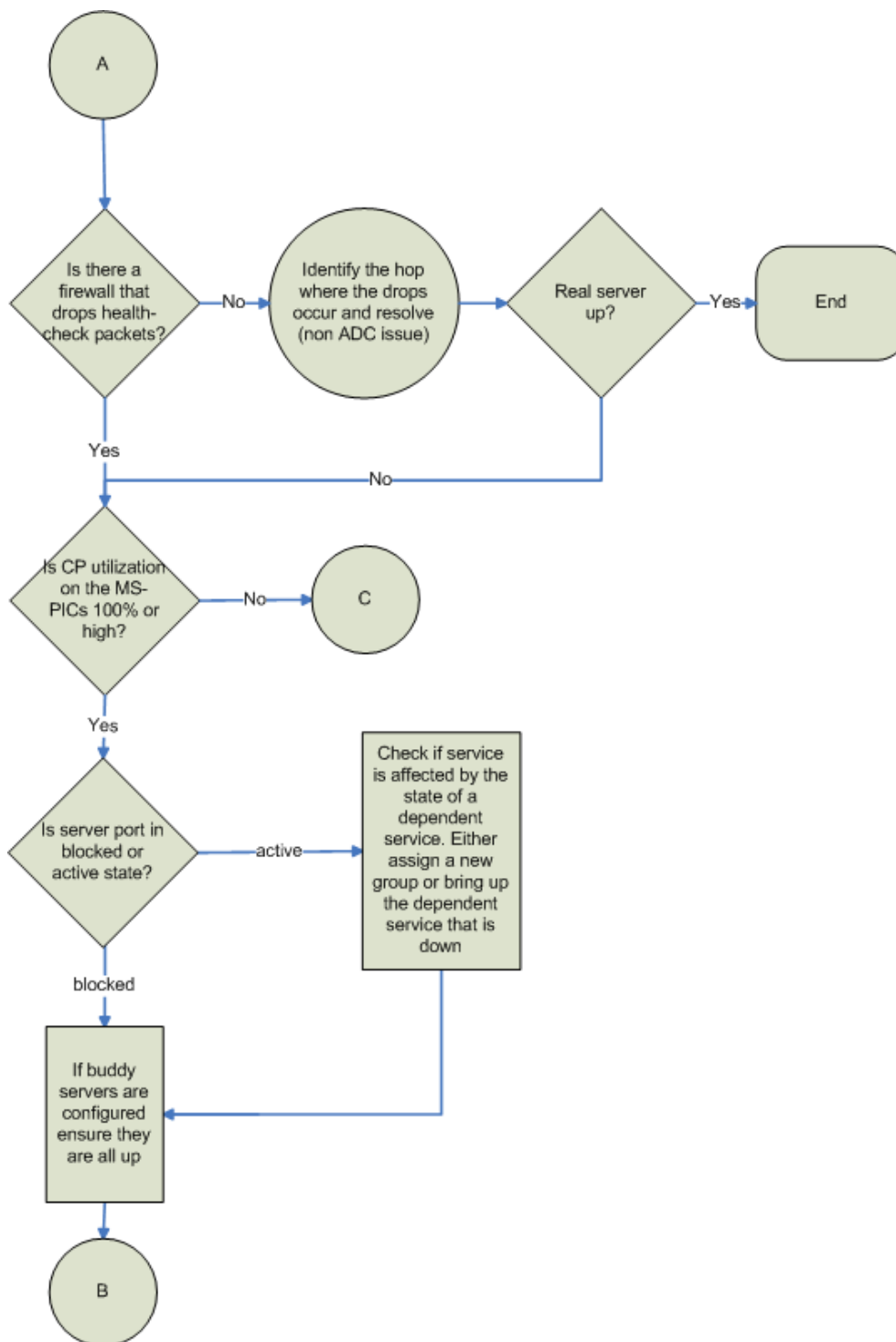


Figure 8: Real Server Down Recovery Diagram 3

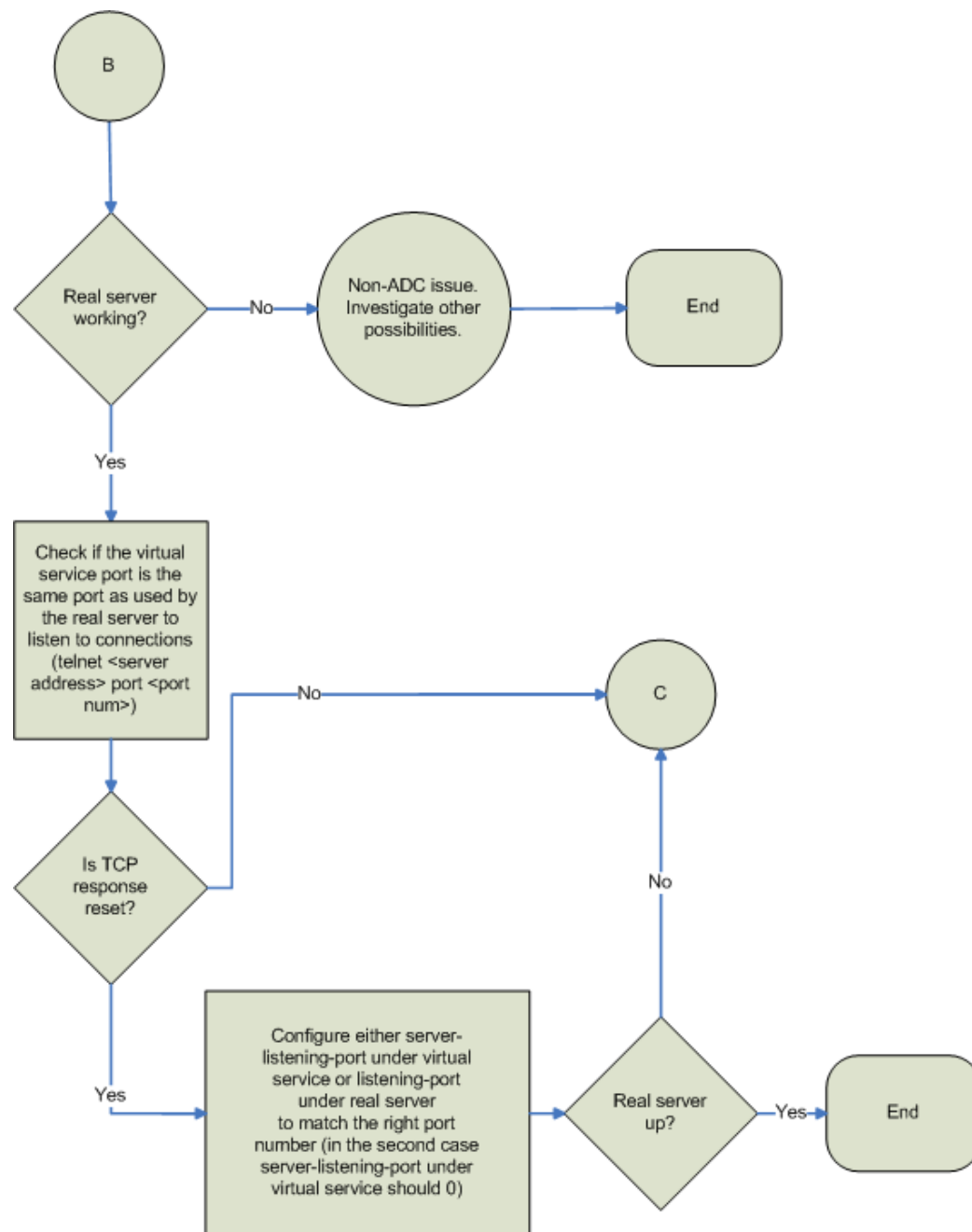
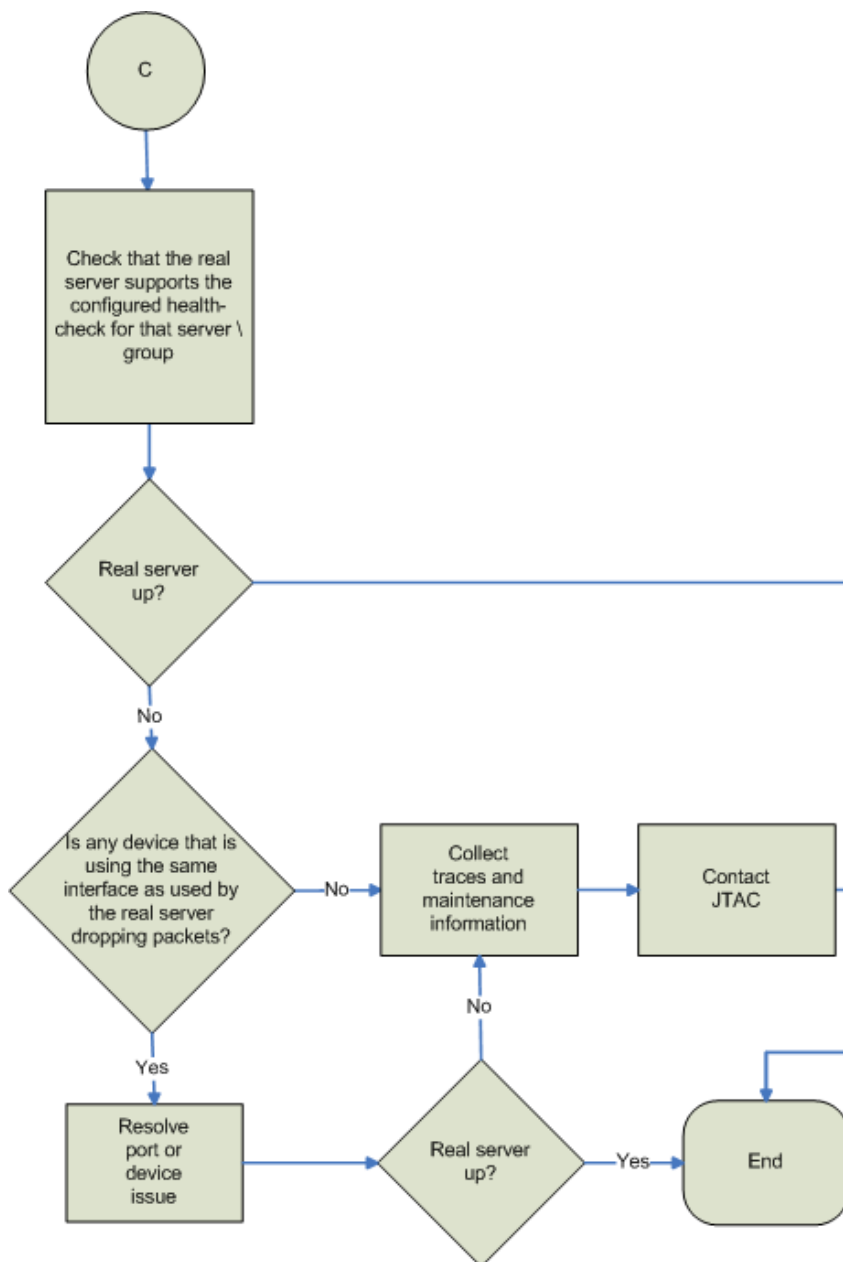


Figure 9: Real Server Down Recovery Diagram 4



Index

A

- accessing the syslog file 21
- accessing the trace file 22
- acronyms 15
- ADC automatic configuration 41
- ADC software panic 58
- ADC software port mirroring 17
- assessing panic 28

C

- chassis information
 - viewing 23
- client-facing interfaces 18
- commit-script automatic configuration 41
- configuring the syslog 20
- configuring the trace file 21
- connection synchronization 49
- connection table 39
- control processor CPU use 29
- cp
 - CPU use 29
- CPU use
 - control processor 29
 - cp 29
- crash
 - panic 28

D

- debug-enable flag 43
- documenting
 - network changes 28
 - system changes 28
- down
 - emergency recovery
 - real server down 59
- DP CPU statistics 30
- DP maintenance statistics 31

E

- emergency recovery
 - ADC software panic 58
 - VIP not working 53
- emergency recovery tree 53
- extended discussion
 - client-facing interfaces 18
 - server-facing interfaces 18
- extended port mirroring discussion 18
- extended troubleshooting 33
 - hardware 33
 - system 33

F

- feature-specific troubleshooting 41
- filter log action 38

G

- gathering information 23
 - chassis information 23
 - general system information 24
 - software version 26
 - system and network changes 28
 - system maintenance 27
- gathering information
 - network topology map 28
- general system information
 - viewing 24

H

- hardware troubleshooting 33, 34
- high availability 46
 - connection synchronization 49
 - RMS troubleshooting 47

I

- initial troubleshooting 23
 - assessing panic 28
 - gathering information 23
 - system statistics 28
 - technical support information 27
- interface statistics 19
- introduction 15

J

- Junos OS port mirroring 17

L

- layer 1 34
- layer 2 34
- layer 3 35
- layer 4 36
- layer 7 38
- license information 50

M

- map
 - network topology 28

multiservices-dpc npu troubleshooting 34

N

NAT IP address 45

network topology map 28

O

OSI layers 34

layer 1 34

layer 2 34

layer 3 35

layer 4 36

layer 7 38

P

panic

assessing 28

crash 28

port mirroring 17

ADC software 17

configuration 18

extended discussion 18

Junos OS 17

port mirroring configuration 18

prerequisites 15

R

real server down 59

RMS troubleshooting 47

S

saving technical support information 27

SDK API automatic configuration 43

server operational status 39

server-facing interfaces 18

software version

viewing 26

statistics

DP CPU 30

dp maintenance 31

switch processor 29

dp cpu 30

dp maintenance statistics 31

syslog

accessing 21

configuring 20

viewing 20

system log 19

system maintenance information

viewing 27

system statistics

collecting 28

control processor cpu use 29

switch processor 29

system troubleshooting 33

T

technical support information

saving 27

tools 38

filter log action 38

server operational status 39

trace file 19

accessing 22

configuring 21

viewing 21

troubleshooting

ADC automatic configuration 41

commit-script automatic configuration 41

connection synchronization 49

connection table 39

debug-enable flag 43

feature-specific 41

high availability 46

license information 50

multiservices-dpc npu 34

NAT IP address 45

OSI layers 34

SDK API automatic configuration 43

tools 38

troubleshooting fundamentals 17

interface statistics 19

port mirroring 17

system log 19

trace file 19

V

viewing chassis information 23

viewing the syslog file 20

viewing the trace file 21

VIP not working 53