Troubleshooting ISG with Session Monitoring and Distributed Conditional Debugging

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Intelligent Services Gateway (ISG) is a Cisco IOS software feature set that provides a structured framework in which edge devices can deliver flexible and scalable services to subscribers. This document describes ISG session monitoring and distributed conditional debugging. Conditional debugging facilitates debug filtering for ISG and is available as distributed conditional debugging.

- Finding Feature Information, page 1
- Prerequisites for ISG Session Monitoring and Distributed Conditional Debugging, page 1
- Restrictions for Distributed Conditional Debugging, page 2
- Information About ISG Session Monitoring and Distributed Conditional Debugging, page 2
- How to Enable ISG Session Monitoring and Distributed Conditional Debugging, page 3
- Configuration Examples for ISG Distributed Conditional Debugging, page 10
- Additional References, page 11
- Feature Information for Distributed Conditional Debugging, page 12

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for ISG Session Monitoring and Distributed Conditional Debugging

Before using the information in this module, it is recommended that you be familiar with the use of Cisco IOS debug commands and conditional debugging. See the "Additional References" section to find information about these topics.
Restrictions for Distributed Conditional Debugging

Conditions that are set for an active session take effect only when the session is terminated and reestablished.

⚠️ **Caution**
Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use the Cisco IOS `debug` commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Moreover, it is best to use `debug` commands during periods of lower network traffic and fewer users, or on a debug chassis with a single active session. Debugging during these periods decreases the likelihood that increased `debug` command processing overhead will affect system use.

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Information About ISG Session Monitoring and Distributed Conditional Debugging

- ISG Session and Flow Monitoring, page 2
- ISG Distributed Conditional Debugging, page 2

ISG Session and Flow Monitoring

ISG introduces a mechanism that allows an administrator to monitor ISG sessions and flows continuously. The `show interface monitor` command, which displays interface statistics, and the `show process cpu monitor` command, which displays information about CPU usage, both update the information in their displays at specified intervals. These commands also provide the ability to freeze or clear the information in the display.

ISG Distributed Conditional Debugging

- Benefits of Enhanced Conditional Debugging for the ISG Platforms, page 2
- Cisco IOS Software Components Supported by Distributed Conditional Debugging, page 2

**Benefits of Enhanced Conditional Debugging for the ISG Platforms**

Because thousands of user sessions run on the ISG platforms, it is not practical to troubleshoot a problem with a session by enabling the various component `debug` commands that are available and trace through the messages for a single session or user. Instead, it is more practical to filter debugging messages for a single session or call across the various Cisco IOS XE components that a session traverses. For this reason, the conditional debugging previously offered in the Cisco IOS XE software has been enhanced to facilitate debug filtering for ISG and is available as distributed conditional debugging.

**Cisco IOS Software Components Supported by Distributed Conditional Debugging**

The following components are supported for ISG distributed conditional debugging:
• Authentication, authorization, and accounting (AAA) and RADIUS
• ATM components
• Feature Manager
• Policy Manager
• PPP
• PPP over Ethernet (PPPoE)
• Session Manager
• Virtual Private Dialup Network (VPDN)

See Table 1 and Table 2 for specific commands that are supported for distributed conditional debugging.

How to Enable ISG Session Monitoring and Distributed Conditional Debugging

• Monitoring ISG Sessions and Flows, page 3
• Configuring Distributed Conditional Debugging, page 4

Monitoring ISG Sessions and Flows
Perform this task to monitor interface and CPU statistics. The show commands are not required and may be entered in any order.

SUMMARY STEPS

1. enable
2. show interface type number monitor [interval seconds]
3. show processes cpu monitor [interval seconds]

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td></td>
</tr>
<tr>
<td>Step 2 show interface type number monitor [interval seconds]</td>
<td>Displays interface statistics that are updated at specified intervals.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router# show interface ethernet 3/0 monitor interval 10</td>
<td></td>
</tr>
</tbody>
</table>
**Command or Action**

**Step 3** show processes cpu monitor [interval *seconds*]

**Example:**

`Router# show processes cpu monitor`

**Purpose**

Displays detailed CPU utilization statistics that are updated at specified intervals.

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**Configuring Distributed Conditional Debugging**

Two main tasks are required for configuring distributed conditional debugging: enabling conditional debugging, and issuing one or more supported `debug` commands. These required tasks are described in the following sections:

- ISG Debug Condition Commands, page 4
- Debug Commands That Are Supported by ISG Conditional Debug, page 5
- Restrictions, page 7
- Enabling Distributed Conditional Debugging, page 8
- Displaying Debugging Conditions, page 8
- Troubleshooting Tips, page 9

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**ISG Debug Condition Commands**

The table below lists the `debug condition` commands that you can issue at the EXEC prompt to enable distributed conditional debugging. You can set more than one condition.

**Table 1** Supported Conditional Debug Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>debug condition domain domain-name</code></td>
<td>Filters messages on the specified domain name.</td>
</tr>
<tr>
<td>`debug condition interface atm ATM-interface vc {vci / vpi</td>
<td>vci}`</td>
</tr>
<tr>
<td>`debug condition interface {atm ATM-interface vc {vci / vpi</td>
<td>vci}</td>
</tr>
<tr>
<td><code>debug condition mac-address hexadecimal-MAC-address</code></td>
<td>Filters messages on the specified MAC address.</td>
</tr>
<tr>
<td><code>debug condition portbundle ip IP-address bundle bundle-number</code></td>
<td>Filters messages on the specified Port-Bundle Host Key (PBHK).</td>
</tr>
<tr>
<td><code>debug condition session-id session-ID</code></td>
<td>Filters messages on the specified session identifier.</td>
</tr>
<tr>
<td><code>debug condition username email-address</code></td>
<td>Filters messages on the specified Internet username.</td>
</tr>
</tbody>
</table>

*Note:* The session identifier can be obtained by entering the `show subscriber session` command.
Debug Commands That Are Supported by ISG Conditional Debug

The table below lists the Cisco IOS debugging commands that are supported for distributed conditional debugging. The commands are listed by component. One or more of these commands can be issued after enabling one of the debug condition commands listed in the table above.

Table 2: Debug Commands Supported by ISG Distributed Conditional Debugging

<table>
<thead>
<tr>
<th>AAA Debug Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug aaa accounting</td>
</tr>
<tr>
<td>debug aaa authentication</td>
</tr>
<tr>
<td>debug aaa authorization</td>
</tr>
<tr>
<td>debug aaa id</td>
</tr>
<tr>
<td>ATM Debug Commands</td>
</tr>
<tr>
<td>debug atm arp</td>
</tr>
<tr>
<td>debug atm error</td>
</tr>
<tr>
<td>debug atm event</td>
</tr>
<tr>
<td>debug atm oam</td>
</tr>
<tr>
<td>debug atm packet</td>
</tr>
<tr>
<td>debug atm state</td>
</tr>
<tr>
<td>PPP Debug Commands</td>
</tr>
<tr>
<td>debug ppp authentication</td>
</tr>
<tr>
<td>debug ppp bap error</td>
</tr>
<tr>
<td>debug ppp bap events</td>
</tr>
<tr>
<td>debug ppp bap negotiation</td>
</tr>
<tr>
<td>debug ppp cbcp</td>
</tr>
<tr>
<td>debug ppp error</td>
</tr>
<tr>
<td>debug ppp mppe detailed</td>
</tr>
<tr>
<td>debug ppp mppe events</td>
</tr>
<tr>
<td>debug ppp mppe pack</td>
</tr>
<tr>
<td>debug ppp multi data</td>
</tr>
<tr>
<td>debug ppp multi events</td>
</tr>
</tbody>
</table>
AAA Debug Commands

debug ppp multi frag

debug ppp negotiation

debug ppp pack

debug ppp subscriber

PPPoE Debug Commands

debug pppoe data

debug pppoe error

debug pppoe event

debug pppoe packet

Session Manager Debug Commands

debug subscriber aaa authorization event

debug subscriber aaa authorization fsm

debug subscriber error

debug subscriber event

Feature Manager Debug Commands

debug subscriber feature access-list error

debug subscriber feature access-list event

debug subscriber feature compression detail

debug subscriber feature compression error

debug subscriber feature compression event

debug subscriber feature detail

debug subscriber feature error

debug subscriber feature event

debug subscriber feature interface-config error

debug subscriber feature interface-config event

debug subscriber feature modem-on-hold detail

debug subscriber feature modem-on-hold error

debug subscriber feature modem-on-hold event
AAA Debug Commands

debug subscriber feature portbundle error

debug subscriber feature portbundle event

debug subscriber feature portbundle packet

debug subscriber feature qos-policy error

debug subscriber feature qos-policy event

debug subscriber feature static-routes error

debug subscriber feature static-routes event

debug subscriber feature traffic-classification detail

debug subscriber feature traffic-classification error

debug subscriber feature traffic-classification event

Policy Manager Debug Commands

debug subscriber fsm

debug subscriber policy condition

debug subscriber policy detail

debug subscriber policy error

debug subscriber policy event

debug subscriber policy fsm

debug subscriber policy rule

debug subscriber session error

debug subscriber session event

VPDN Debug Commands

debug vpdn call event

debug vpdn call fsm

debug vpdn error

debug vpdn event

debug vpdn event disconnect

Restrictions
The `debug condition session-id` command filters a session only after the session has been established. The session identifier is a unique dynamic number generated internally by the Cisco IOS software and assigned to each session when the session is established.

In VPDN, the `debug` commands and messages associated with tunnels cannot be filtered because they are not associated with a session, but are displayed during the tunnel-establishment phase. The debugging messages will be displayed even if filtering is enabled by one of the conditions.

If multiple conditions are set, the debugging messages corresponding to all the sessions that meet any of the conditions will be displayed. Some conditions, such as domain name, will trigger debugging messages for all the sessions that belong to the particular domain.

### Enabling Distributed Conditional Debugging

Perform this task to enable distributed conditional debugging for ISG.

**SUMMARY STEPS**

1. `enable`
2. `debug condition command`
3. `debug command`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router&gt; enable</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> <code>debug condition command</code></td>
<td>Enter one or more of the <code>debug condition</code> commands listed in Table 1 to enable distributed conditional debugging.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router# debug condition username <a href="mailto:user@cisco.com">user@cisco.com</a></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> <code>debug command</code></td>
<td>Enter one or more of the supported <code>debug</code> commands from Table 2.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Router# debug subscriber aaa authorization fsm</td>
<td></td>
</tr>
</tbody>
</table>

### Displaying Debugging Conditions

To display the debugging conditions that have been set, perform the following task:
SUMMARY STEPS

1. enable
2. show debug condition

DETAILED STEPS

<table>
<thead>
<tr>
<th>Command or Action</th>
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</tr>
<tr>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>Example:</td>
<td>Router&gt; enable</td>
</tr>
<tr>
<td>Step 2 show debug condition</td>
<td>Displays conditions that have been set for debugging.</td>
</tr>
<tr>
<td>Example:</td>
<td>Router# show debug condition</td>
</tr>
</tbody>
</table>

Troubleshooting Tips

The Cisco IOS software displays messages as you set the conditions for filtering the debugging. When a condition is set, it is assigned a number, as follows:

Condition 1 set

If a condition has already been set, the following message is displayed:

% Condition already set

The following messages and prompt are displayed when you attempt to disable the last condition using the no form of a debug condition command:

This condition is the last interface condition set.
Removing all conditions may cause a flood of debugging messages to result, unless specific debugging flags are first removed.

Proceed with removal? [yes/no]: yes
Condition 1 has been removed

Tip

Use the no form of the commands to disable all debug commands before disabling all of the debugging conditions that have been set.
Configuration Examples for ISG Distributed Conditional Debugging

- Monitoring Interface Statistics Example, page 10
- Monitoring CPU Statistics Example, page 10
- Enabling ISG Distributed Conditional Debugging Example, page 11
- Displaying Debugging Conditions Example, page 11
- Filtering Debug Output Example, page 11

Monitoring Interface Statistics Example

The following example shows sample output for the `show interface monitor` command. The display will be updated every 10 seconds.

```
Router> show interface ethernet 0/0 monitor interval 10
```

```
Router Name: Scale3-Router8       Update Secs: 10
Interface Name: Ethernet 0/0          Interface Status: UP, line is up
Line Statistics: Total: Rate(/s) Delta
Input Bytes: 123456 123 7890
Input Packets: 3456 56 560
Broadcast: 1333 6 60
OutputBytes: 75717 123 1230
Output Packets: 733 44 440
Error Statistics: Total: Delta:
Input Errors: 0 0
CRC Errors: 0 0
Frame Errors: 0 0
Ignored: 0 0
Output Errors: 0 0
Collisions: 0 0
No. Interface Resets: 2
End = e       Clear = c      Freeze = f
Enter Command:
```

Monitoring CPU Statistics Example

The following example shows sample output for the `show processes cpu monitor` command:

```
Router> show processes cpu monitor
```

```
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
PID Runtime(ms) Invoked uSecs SSec IMin SMin TTY Process
3 772 712 1084 0.08% 0.04% 0.02% 0 Exec
67 276 4151 66 0.08% 0.03% 0.01% 0 L2TP mgmt daemon
116 604 2263 266 0.16% 0.05% 0.01% 0 IDMGR CORE
End = e       Freeze = f
Enter Command:
```
Enabling ISG Distributed Conditional Debugging Example

The following example shows how to filter PPP, PPPoE, and Session Manager debugs for a PPPoE session with username “user@cisco.com”. Only debugging messages for the defined user are displayed on the console. Any other debugging messages associated with other users will not be displayed.

Router# debug condition username user@cisco.com
Condition 1 set

Router# debug ppp negotiation
Router# debug pppoe event
Router# debug subscriber session event

Displaying Debugging Conditions Example

The following example shows how to display debugging conditions that have been set.

Router# show debug condition
Condition 1: domain cisco.com (0 flags triggered)
Condition 2: username user@cisco.com (0 flags triggered)
Condition 3: ip 172.19.200.10 (0 flags triggered)

Filtering Debug Output Example

In the following example, the output of the debug subscriber packet detail command is filtered on the basis of the username “cpe6_1@isp.com”:

Router# debug condition username cpe6_1@isp.com
Condition 1 set
Router# show debug

Condition 1: username cpe6_1@isp.com (0 flags triggered)

Router# debug subscriber packet detail
SSS packet detail debugging is on

Router# show debug
SSS:
  SSS packet detail debugging is on

Condition 1: username cpe6_1@isp.com (0 flags triggered)

Additional References

Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISG commands</td>
<td>Cisco IOS Intelligent Services Gateway Command Reference</td>
</tr>
<tr>
<td>Debug commands</td>
<td>Cisco IOS Debug Command Reference</td>
</tr>
</tbody>
</table>
Feature Information for Distributed Conditional Debugging

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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### Table 3: Feature Information for ISG Session Monitoring and Distributed Conditional Debugging

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Releases</th>
<th>Feature Configuration Information</th>
</tr>
</thead>
</table>
| ISG: Instrumentation: Session and Flow Monitoring | 12.2(28)SB 12.2(33)SRC 15.0(1)S | ISG provides a mechanism for continuously monitoring interface and CPU statistics. This feature introduces the `show interface monitor` and `show processes cpu monitor` commands, which display statistics that are updated at specified intervals.  
In Cisco IOS Release 12.2(28)SB, this feature was introduced.  
This feature was integrated into Cisco IOS Release 12.2(33)SRC. |
| ISG: Instrumentation: Advanced Conditional Debugging | 12.2(28)SB 12.2(33)SRC | ISG provides the ability to define various conditions for filtering debug output. Conditional debugging generates very specific and relevant information that can be used for session, flow, subscriber, and service diagnostics.  
In Cisco IOS Release 12.2(28)SB, this feature was introduced.  
This feature was integrated into Cisco IOS Release 12.2(33)SRC. |

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