

疑難解答RIB錯誤消息"ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label"

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簡介

本文描述如何對Cisco IOS® XR路由資訊庫(RIB)消息「%ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label」進行故障排除。

消息描述

為了明確其原因和目的，使用了一個示例，並將它劃分為不同的組成部分：

```
RP/0/0/CPU0:Feb 17 11:46:25.663 : ipv4_rib[1148]: %ROUTING-RIB-3-LABEL_ERR_ADD : Add local-label 16111
```

建立者	ipv4_rib
類別	路由
群組	RIB
嚴重性	3 (錯誤條件)
助記符	LABEL_ER_ADD
Message-Text	為表0xe0000000新增本地標籤 16111(2)，字首10.0.0.111/32，由proto isis client 17 isis node0_0_CPU0 — 由 proto-id 2 client 16新增現有標籤24005

根據訊息詳細資訊流程，ipv4_rib在嘗試從通訊協定中間系統到中間系統(IS-IS)- rib使用者端17 — 為字首10.0.0.111/32新增本機標籤位址時產生錯16111。RIB資料24005中已經存在另一個協定rib客戶端16之前新增的相同字首的標籤。總而言之，兩個不同的協定在RIB資料庫中為相同字首新增了一個不同的local-label。這是一個錯誤條件，必須更正並解決標籤衝突。

了解消息來源

當多個通訊協定交換標籤時(例如同時使用邊界閘道通訊協定 — 貼標單點傳播(BGP-LU)和區段路由(SR))，可能會發生錯誤情況。

請考慮以下場景：在同一自治系統(AS)內的主機之間使用BGP-LU來通告所選字首和相關標籤。透過IS-IS得知的字首10.0.0.111/32具有由BGP分配的本地標籤，如下所示：

```
<#root>
```

```
RP/0/0/CPU0:XR4#show route 10.0.0.111/32 detail private
Routing entry for 10.0.0.111/32
  Known via "isis core", distance 115, metric 30, type level-2
  Installed Feb 17 10:56:08.900 for 00:34:45
  Routing Descriptor Blocks
    10.3.4.3, from 10.0.0.111, via GigabitEthernet0/0/0/0
      Route metric is 30

      Label: None

      Tunnel ID: None
      Binding Label: None
      Extended communities count: 0
      Path id:1      Path ref count:0
      NHID:0x1(Ref:8)
      Path flags: 0x0 ()
      Private flags: 0x40 (rib_encap_id)
  Route version is 0x17 (23)
  Local Label: 0x5dc5 (24005)
  IP Precedence: Not Set
  QoS Group ID: Not Set
  Flow-tag: Not Set
  Fwd-class: Not Set
  Route Priority: RIB_PRIORITY_NON_RECURSIVE_MEDIUM (7) SVD Type RIB_SVD_TYPE_LOCAL
  Download Priority 1, Download Version 287
  Client-id: 17
  Route flags: 0x0 ()
  Route Extended flags: 0x0 ()
  Route private flags: 0x20 (priority_promotion)
  Route head pointer: 0x1201f5bc
  Local Label List

B 24005 (Client ID: 16, Distance: 200,)

  No advertising protos.
```

可以從MPLS標籤表確認和驗24005分配的本地標籤協定的協定所有者：

<#root>

```
RP/0/0/CPU0:XR4#show mpls label table label 24005 detail private
```

```
Table Label Owner State Rewrite
```

```
-----
```

```
0
```

```
24005
```

```
LDP(A) InUse Yes
```

```
BGP-VPNv4(A):bgp-default
```

```
InUse No
```

```
(IPv4, vers:0, 'default':4U, 10.0.0.111/32)
```

當網路中啟用SR時，當IS-IS在RIB資料庫中新增自己的標籤時，就會觸發錯誤條件。這會導致標籤與來自BGP-LU的現有和以前分配的標籤衝突。在這個階段，進程ipv4_rib生成錯誤消息，並發出警報，表示嘗試從協定IS-IS - rib client 17 — 為字首10.0.0.111/32新增本地標籤16111，該字首已經有一個本地標籤24005，該本地標籤先前已由協定BGP - rib client 16新增：

```
RP/0/0/CPU0:Feb 17 11:46:25.663 : ipv4_rib[1148]: %ROUTING-RIB-3-LABEL_ERR_ADD : Add local-label 16111
```

可從字首路由本地標籤清單詳細資訊中檢視和確認標籤衝突條件，如下所示：

<#root>

```
RP/0/0/CPU0:XR4#show route 10.0.0.111/32 detail private
```

```
Routing entry for 10.0.0.111/32
```

```
Known via "isis core", distance 115, metric 30, labeled SR, type level-2
```

```
Installed Feb 17 11:46:25.663 for 00:21:45
```

```
Routing Descriptor Blocks
```

```
10.3.4.3, from 10.0.0.111, via GigabitEthernet0/0/0/0
```

```
Route metric is 30
```

```
Label: 0x3eef (16111)
```

```
Tunnel ID: None
```

```
Binding Label: None
```

```
Extended communities count: 0
```

```
Path id:1 Path ref count:0
```

```
NHID:0x1(Ref:8)
```

```
Path flags: 0x0 ()
```

```
Private flags: 0x42 (has_vpn_data, rib_encap_id)
```

```
Route version is 0x1e (30)
```

```
Local Label: 0x3eef (16111)
```

```
IP Precedence: Not Set
```

```
QoS Group ID: Not Set
```

```
Flow-tag: Not Set
```

```
Fwd-class: Not Set
```

```
Route Priority: RIB_PRIORITY_NON_RECURSIVE_MEDIUM (7) SVD Type RIB_SVD_TYPE_LOCAL
```

```
Download Priority 1, Download Version 309
```

```
Client-id: 17
Route flags: 0x8800000 (ldp_sr_merge_request, label_sr)
Route Extended flags: 0x8 (ldp_sr_merge_request)
Route private flags: 0x20 (priority_promotion)
Route head pointer: 0x1201f5bc
Local Label List
```

```
  i 16111 (Client ID: 17, Distance: 115,)
```

```
  B 24005 (Client ID: 16, Distance: 200,)
```

```
No advertising protos.
```

標籤發生衝突時，BGP-LU和IS-IS相關輸出都會提供每個特定協定分配的本地標籤的附加詳細資訊。接下來的輸出將突出顯示每個協定有關字首和指定標籤的具體資訊。

在標籤衝突方案中，請注意字首和標籤詳細資訊，如協定BGP-LU所示：

```
<#root>
```

```
RP/0/0/CPU0:XR4#show bgp ipv4 labeled-unicast 10.0.0.111/32 detail
BGP routing table entry for 10.0.0.111/32
```

```
Versions:
```

```
  Process          bRIB/RIB  SendTblVer
  Speaker          69        69
```

```
Local Label: 24005
```

```
(no rewrite);
```

```
  Flags: 0x01003001+0x00000200;
```

```
Last Modified: Feb 17 11:46:31.984 for 00:22:30
```

```
Paths: (1 available, best #1)
```

```
  Not advertised to any peer
```

```
  Path #1: Received by speaker 0
```

```
  Flags: 0x4080000009060005, import: 0x20
```

```
  Not advertised to any peer
```

```
Local
```

```
  10.0.0.111 (metric 30) from 10.0.0.111 (10.0.0.111)
```

```
Received Label 3
```

```
  Origin IGP, metric 0, localpref 100, valid, internal, best, group-best, labeled-unicast
```

```
  Received Path ID 0, Local Path ID 0, version 69
```

```
  Prefix SID Attribute Size: 10
```

```
  Label Index: 111
```

```
RP/0/0/CPU0:XR4#show bgp ipv4 labeled-unicast labels
```

```
<snip>
```

```
  Network          Next Hop          Rcvd Label          Local Label
*> 10.0.0.4/32      0.0.0.0           noLabel             3
*>i10.0.0.111/32    10.0.0.111        3
```

```
24005
```

Processed 2 prefixes, 2 paths

```
RP/0/0/CPU0:XR4#show mpls label table label 24005 detail internal
Table Label      Owner                               State Rewrite
-----
0
24005
    LDP(A)                               InUse Yes
        BGP-VPNv4(A):bgp-default         InUse No
        (IPv4, vers:0, 'default':4U, 10.0.0.111/32)
```

在標籤衝突方案中，請注意字首和標籤詳細資訊，如協定IS-IS所示：

<#root>

```
RP/0/0/CPU0:XR4#show isis ipv4 route 10.0.0.111/32 detail
L2 10.0.0.111/32 [30/115] medium priority
    via 10.3.4.3, GigabitEthernet0/0/0/0, XR3, SRGB Base: 16000, Weight: 0
    src XR111.00-00, 10.0.0.111,
```

prefix-SID index 111

, R:0 N:1 P:0 E:0 V:0 L:0

```
RP/0/0/CPU0:XR4#show isis segment-routing label 16111
IS-IS core IS Label Table
Label      Prefix/Interface
-----
```

```
16111
    10.0.0.111/32
```

```
RP/0/0/CPU0:XR4#show mpls label table label 16111 detail internal
Table Label      Owner                               State Rewrite
-----
0
```

```
16111
    ISIS(A):core                               InUse No
    (Lbl-blk SRGB, vers:0, (start_label=16000, size=8000))
```

協定和相關標籤現在均已程式設計，可以從MPLS轉發詳細資訊中觀察到：

<#root>

```
RP/0/0/CPU0:XR4#show mpls forwarding labels 24005 detail private
Local  Outgoing  Prefix      Outgoing  Next Hop  Bytes
Label Label    or ID       Interface
-----
24005
```

```

24004      10.0.0.111/32      Gi0/0/0/0      10.3.4.3      3055
  Updated: Feb 17 11:46:25.703
  Version: 217, Priority: 3
  Label Stack (Top -> Bottom): { 24004 }
  NHID: 0x0, Encap-ID: N/A, Path idx: 0, Backup path idx: 0, Weight: 0
  MAC/Encaps: 14/18, MTU: 1500
  Outgoing Interface: GigabitEthernet0/0/0/0 (ifhandle 0x00000040)
  Packets Switched: 56
  Traffic-Matrix Packets/Bytes Switched: 0/0
  Traffic-Matrix Packets/Bytes Switched: 0/0

```

```
RP/0/0/CPU0:XR4#show mpls forwarding labels 16111 detail private
```

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched
-------------	----------------	--------------	--------------------	----------	----------------

```
16111
```

```

16111      SR Pfx (idx 111)  Gi0/0/0/0      10.3.4.3      0
  Updated: Feb 17 11:46:25.703
  Version: 309, Priority: 15
  Label Stack (Top -> Bottom): { 16111 }
  NHID: 0x0, Encap-ID: N/A, Path idx: 0, Backup path idx: 0, Weight: 0
  MAC/Encaps: 14/18, MTU: 1500
  Outgoing Interface: GigabitEthernet0/0/0/0 (ifhandle 0x00000040)
  Packets Switched: 0
  Traffic-Matrix Packets/Bytes Switched: 0/0
  Traffic-Matrix Packets/Bytes Switched: 0/0

```

但是，從字首10.0.0.111/32轉發詳細資訊中，您可以觀察到初始分配的24005簽仍在使用中，如下所示：

```
<#root>
```

```
RP/0/0/CPU0:XR4#show mpls forwarding prefix 10.0.0.111/32 detail private
```

Local Label	Outgoing Label	Prefix or ID	Outgoing Interface	Next Hop	Bytes Switched
-------------	----------------	--------------	--------------------	----------	----------------

```
24005
```

```

24004      10.0.0.111/32      Gi0/0/0/0      10.3.4.3      3225
  Updated: Feb 17 11:46:25.703
  Version: 217, Priority: 3
  Label Stack (Top -> Bottom): { 24004 }
  NHID: 0x0, Encap-ID: N/A, Path idx: 0, Backup path idx: 0, Weight: 0
  MAC/Encaps: 14/18, MTU: 1500
  Outgoing Interface: GigabitEthernet0/0/0/0 (ifhandle 0x00000040)
  Packets Switched: 59
  Traffic-Matrix Packets/Bytes Switched: 0/0

```

```
RP/0/0/CPU0:XR4#show cef 10.0.0.111/32 detail
```

```
10.0.0.111/32, version 217,
```

```
labeled SR
```

```
, internal 0x1000001 0x81 (ptr 0xa12dc0ec) [1], 0x0 (0xa12c1638), 0xa28 (0xa1527348)
```

```
Updated Feb 17 11:46:31.652
```

```
local adjacency 10.3.4.3
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
```

Extensions:

context-label:16111

```
gateway array (0xa12264f0) reference count 9, flags 0x68, source lsd (5), 1 backups
      [4 type 5 flags 0x8401 (0xa154153c) ext 0x0 (0x0)]
LW-LDI[type=5, refc=3, ptr=0xa12c1638, sh-ldi=0xa154153c]
gateway array update type-time 1 Feb 17 11:46:25.702
LDI Update time Feb 17 11:46:25.702
LW-LDI-TS Feb 17 11:46:25.702
  via 10.3.4.3/32, GigabitEthernet0/0/0/0, 11 dependencies, weight 0, class 0 [flags 0x0]
    path-idx 0 NHID 0x0 [0xa168816c 0x0]
    next hop 10.3.4.3/32
    local adjacency
```

local label 24005

```
  labels imposed {24004}
```

```
  Load distribution: 0 (refcount 4)
```

```
  Hash  OK  Interface                Address
  0      Y  GigabitEthernet0/0/0/0    10.3.4.3
```

在上述情況下，「%ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label」(ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label)，可以通過配置BGP(SR-BGP)的分段路由並使用BGP字首SID來避免發生。

有關SR-BGP的詳細資訊，請參閱[Cisco ASR 9000系列路由器的分段路由配置指南](#)。下面是所需步驟的快速參考。

在所有節點上配置全域性段路由全域性塊(SRGB)，它將自動啟用SR-BGP:

```
!
segment-routing
  global-block 16000 23999
!
```

配置後，BGP將使用全域性SRGB進行標籤分配，如「show mpls label table detail」命令輸出所示：

<#root>

```
!
! Note: If SR BGP was enabled after configuring BGP then you may need to process restart BGP for global
!
RP/0/0/CPU0:XR1111#show mpls label table detail
Table Label  Owner                State Rewrite
-----
<snip>
0      16000
```

```
ISIS(A):core
```

```
InUse No
```

```
BGP-VPNv4(A):bgp-default
```

```
InUse No
```

```
(Lbl-blk SRGB, vers:0, (
```

```
start_label=16000, size=8000
```

```
)
```

```
<snip>
```

在發起路由的BGP節點上，通過路由策略配置BGP字首SID。下面是節點通告字首10.0.0.111/32的配置示例：

```
<#root>
```

```
!  
route-policy
```

```
SID($SID)
```

```
    set label-index $SID  
end-policy
```

```
!  
router bgp 65000  
  address-family ipv4 unicast  
    network 10.0.0.111/32 route-policy
```

```
SID(111)
```

```
    allocate-label all  
!
```

有了SR-BGP後，將不再出現「ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label」情況。如下所示，BGP將使用通過字首通告接收的BGP-Prefix SID索引作為從全域性SRGB分配本地標籤的提示。

```
<#root>
```

```
RP/0/0/CPU0:XR4#show route 10.0.0.111/32 detail private  
Routing entry for 10.0.0.111/32  
  Known via "isis core", distance 115, metric 30, labeled SR, type level-2  
  Installed Feb 17 14:48:26.512 for 02:59:18  
  Routing Descriptor Blocks  
    10.3.4.3, from 10.0.0.111, via GigabitEthernet0/0/0/0  
    Route metric is 30  
  
    Label: 0x3eef (16111)
```



```
Tunnel ID: None
Binding Label: None
Extended communities count: 0
Path id:1      Path ref count:0
NHID:0x2(Ref:8)
Path flags: 0x0 ( )
Private flags: 0x42 (has_vpn_data, rib_encap_id)
Route version is 0xd (13)
Local Label: 0x3eef (16111)
IP Precedence: Not Set
QoS Group ID: Not Set
Flow-tag: Not Set
Fwd-class: Not Set
Route Priority: RIB_PRIORITY_NON_RECURSIVE_MEDIUM (7) SVD Type RIB_SVD_TYPE_LOCAL
Download Priority 1, Download Version 438
Client-id: 19
Route flags: 0x9800000 (ldp_sr_merge_request, rib_precedence_over_ldp, label_sr)
Route Extended flags: 0x48 (ldp_sr_merge_request, rib_precedence_over_ldp)
Route private flags: 0x0 ( )
Route head pointer: 0x1201f32c
Local Label List

    i 16111 (Client ID: 19, Distance: 115,)

    B 16111 (Client ID: 18, Distance: 200,)

No advertising protos.
```

結論

當兩個不同的協定在RIB資料庫中為相同字首新增不同的本地標籤時，觸發該消息，需要保留的一個重要方面是必須避免這種標籤衝突錯誤情況，並且必須瞭解並糾正其起源。

使用SR-BGP和BGP Prefix-SID可以避免此行為。

如需有用且有用的輸出，以便繼續分類並了解消息「%ROUTING-RIB-3-LABEL_ERR_ADD: Add local-label」，請參閱所示的命令清單：

```
show rib clients
show rib clients redistribution history all
show route <prefix> detail private
show isis ipv4 route <prefix> detail
show bgp ipv4 labeled-unicast <prefix> detail
show bgp ipv4 labeled-unicast labels
show cef <> detail
show mpls label table label <prefix> detail private
show mpls label table label <prefix> history
show mpls forwarding labels <prefix> detail private
show mpls forwarding prefix <prefix> detail private
show mpls lsd forwarding labels <prefix> detail
show mpls ldp forwarding detail
show isis segment-routing label table
show isis database verbose detail internal
```


關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。