Linux Cross Reference

Free Electrons[1]

Embedded Linux Experts

• *source navigation* • diff markup[2] • identifier search[3] • freetext search[4] •

Linux[5]/net[6]/ipv4[7]/ip_forward.c[8]

```
1   /*
2    * INET        An implementation of the TCP/IP protocol suite for the LINUX
3    *             operating system.  INET is implemented using the  BSD Socket
4    *             interface as the means of communication with the user level.
5    *
6    *             The IP forwarding functionality.
7    *
8    * Authors:     see ip.c
9    *
10   * Fixes:
11   *             Many            :       Split from ip.c , see ip_input.c for
12   *                                     history.
13   *             Dave Gregorich  :       NULL ip_rt_put fix for multicast
14   *                                     routing.
15   *             Jos Vos         :       Add call_out_firewall before sending,
16   *                                     use output device for accounting.
17   *             Jos Vos         :       Call forward firewall after routing
18   *                                     (always use output device).
19   *             Mike McLagan    :       Routing by source
20   */
21
22  #include <linux/types.h>
23  #include <linux/mm.h>
24  #include <linux/skbuff.h>
25  #include <linux/ip.h>
26  #include <linux/icmp.h>
27  #include <linux/netdevice.h>
28  #include <linux/slab.h>
29  #include <net/sock.h>
30  #include <net/ip.h>
31  #include <net/tcp.h>
32  #include <net/udp.h>
33  #include <net/icmp.h>
34  #include <linux/tcp.h>
35  #include <linux/udp.h>
36  #include <linux/netfilter_ipv4.h>
37  #include <net/checksum.h>
38  #include <linux/route.h>
```

```
39 #include <net/route.h>
40 #include <net/xfrm.h>
41
42 static bool[9] ip_exceeds_mtu[10](const struct sk_buff[11] *skb[12], unsigned int mtu[13])
43 {
44         if (skb[14]->len[15] <= mtu[16])
45                 return false[17];
46
47         if (unlikely[18]((ip_hdr[19](skb[20])->frag_off & htons[21](IP_DF[22])) == 0))
48                 return false[23];
49
50         /* original fragment exceeds mtu and DF is set */
51         if (unlikely[24](IPCB[25](skb[26])->frag_max_size > mtu[27]))
52                 return true[28];
53
54         if (skb[29]->ignore_df)
55                 return false[30];
56
57         if (skb_is_gso[31](skb[32]) && skb_gso_network_seglen[33](skb[34]) <= mtu[35])
58                 return false[36];
59
60         return true[37];
61 }
62
63
64 static int ip_forward_finish[38](struct sock[39] *sk, struct sk_buff[40] *skb[41])
65 {
66         struct ip_options[42] *opt  = &(IPCB[43](skb[44])->opt);
67
68         IP_INC_STATS_BH[45](dev_net[46](skb_dst[47](skb[48])->dev[49]), IPSTATS_MIB_OUTFORWDATAGRAMS);
69         IP_ADD_STATS_BH[50](dev_net[51](skb_dst[52](skb[53])->dev[54]), IPSTATS_MIB_OUTOCTETS, skb[55]->len[56]);
70
71         if (unlikely[57](opt->optlen[58]))
72                 ip_forward_options[59](skb[60]);
73
74         skb_sender_cpu_clear[61](skb[62]);
75         return dst_output_sk[63](sk, skb[64]);
76 }
77
78 int ip_forward[65](struct sk_buff[66] *skb[67])
79 {
80         u32[68] mtu[69];
81         struct iphdr[70] *iph;       /* Our header */
82         struct rtable[71] *rt[72];      /* Route we use */
83         struct ip_options[73] *opt  = &(IPCB[74](skb[75])->opt);
84
85         /* that should never happen */
86         if (skb[76]->pkt_type != PACKET_HOST[77])
87                 goto drop[78];
88
89         if (unlikely[79](skb[80]->sk))
90                 goto drop[81];
91
92         if (skb_warn_if_lro[82](skb[83]))
```

```
93              goto drop[84];
94
95      if (!xfrm4_policy_check[85](NULL[86], XFRM_POLICY_FWD, skb[87]))
96              goto drop[88];
97
98      if (IPCB[89](skb[90])->opt.router_alert && ip_call_ra_chain[91](skb[92]))
99              return NET_RX_SUCCESS[93];
100
101     skb_forward_csum[94](skb[95]);
102
103     /*
104      *      According to the RFC, we must first decrease the TTL field. If
105      *      that reaches zero, we must reply an ICMP control message telling
106      *      that the packet's lifetime expired.
107      */
108     if (ip_hdr[96](skb[97])->ttl[98] <= 1)
109             goto too_many_hops;
110
111     if (!xfrm4_route_forward[99](skb[100]))
112             goto drop[101];
113
114     rt[102] = skb_rtable[103](skb[104]);
115
116     if (opt->is_strictroute && rt[105]->rt_uses_gateway)
117             goto sr_failed;
118
119     IPCB[106](skb[107])->flags[108] |= IPSKB_FORWARDED[109];
120     mtu[110] = ip_dst_mtu_maybe_forward[111](&rt[112]->dst[113], true[114]);
121     if (ip_exceeds_mtu[115](skb[116], mtu[117])) {
122             IP_INC_STATS[118](dev_net[119](rt[120]->dst[121].dev[122]), IPSTATS_MIB_FRAGFAILS);
123             icmp_send[123](skb[124], ICMP_DEST_UNREACH[125], ICMP_FRAG_NEEDED[126],
124                     htonl[127](mtu[128]));
125             goto drop[129];
126     }
127
128     /* We are about to mangle packet. Copy it! */
129     if (skb_cow[130](skb[131], LL_RESERVED_SPACE[132](rt[133]->dst[134].dev[135])+rt[136]->dst[137].header_len[138]))
130             goto drop[139];
131     iph = ip_hdr[140](skb[141]);
132
133     /* Decrease ttl after skb cow done */
134     ip_decrease_ttl[142](iph);
135
136     /*
137      *      We now generate an ICMP HOST REDIRECT giving the route
138      *      we calculated.
139      */
140     if (IPCB[143](skb[144])->flags[145] & IPSKB_DOREDIRECT[146] && !opt->srr[147] &&
141         !skb_sec_path[148](skb[149]))
142             ip_rt_send_redirect[150](skb[151]);
143
144     skb[152]->priority[153] = rt_tos2priority[154](iph->tos);
145
146     return NF_HOOK[155](NFPROTO_IPV4, NF_INET_FORWARD, NULL[156], skb[157],
147             skb[158]->dev[159], rt[160]->dst[161].dev[162], ip_forward_finish[163]);
```

```
148
149 sr_failed:
150         /*
151          *       Strict routing permits no gatewaying
152          */
153         icmp_send[164](skb[165], ICMP_DEST_UNREACH[166], ICMP_SR_FAILED[167], 0);
154         goto drop[168];
155
156 too_many_hops:
157         /* Tell the sender its packet died... */
158         IP_INC_STATS_BH[169](dev_net[170](skb_dst[171](skb[172])->dev[173]), IPSTATS_MIB_INHDRERRORS);
159         icmp_send[174](skb[175], ICMP_TIME_EXCEEDED[176], ICMP_EXC_TTL[177], 0);
160 drop[178]:
161         kfree_skb[179](skb[180]);
162         return NET_RX_DROP[181];
163 }
164
```

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Links

1. http://free-electrons.com/

2. http://lxr.free-electrons.com/diff/net/ipv4/ip_forward.c

3. http://lxr.free-electrons.com/ident

4. http://lxr.free-electrons.com/search

5. http://lxr.free-electrons.com/source/

6. http://lxr.free-electrons.com/source/net/

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184. http://free-electrons.com/company/contact/