

 f8f776dd18 [...](#)

TizenRT / [external](#) / [wpa\\_supplicant](#) / [src](#) / [l2\\_packet](#) / [l2\\_packet\\_pcap.c](#)



sunghan-chang wpa\_supplicant: move to external ...

[History](#)

 1 contributor

359 lines (312 sloc) | 9.41 KB [...](#)

```

1  /*
2   * WPA Supplicant - Layer2 packet handling with libpcap/libdnet and WinPcap
3   * Copyright (c) 2003-2006, Jouni Malinen <j@w1.fi>
4   *
5   * This software may be distributed under the terms of the BSD license.
6   * See README for more details.
7   */
8
9  #include "includes.h"
10 #ifndef CONFIG_NATIVE_WINDOWS
11 #include <sys/ioctl.h>
12 #endif /* CONFIG_NATIVE_WINDOWS */
13 #include <pcap.h>
14 #ifndef CONFIG_WINPCAP
15 #include <dnet.h>
16 #endif /* CONFIG_WINPCAP */
17
18 #include "common.h"
19 #include "eloop.h"
20 #include "l2_packet.h"
21
22 static const u8 pae_group_addr[ETH_ALEN] = { 0x01, 0x80, 0xc2, 0x00, 0x00, 0x03 };
23
24 struct l2_packet_data {
25     pcap_t *pcap;
26 #ifdef CONFIG_WINPCAP
27     unsigned int num_fast_poll;
28 #else /* CONFIG_WINPCAP */
29     eth_t *eth;

```

```

30  #endif                                     /* CONFIG_WINPCAP */
31      char ifname[100];
32      u8 own_addr[ETH_ALEN];
33      void (*rx_callback)(void *ctx, const u8 *src_addr, const u8 *buf, size_t len);
34      void *rx_callback_ctx;
35      int l2_hdr;                             /* whether to include layer 2 (Ethernet) h
36                                              * to rx_callback */
37  };
38
39  int l2_packet_get_own_addr(struct l2_packet_data *l2, u8 *addr)
40  {
41      os_memcpy(addr, l2->own_addr, ETH_ALEN);
42      return 0;
43  }
44
45  #ifndef CONFIG_WINPCAP
46  static int l2_packet_init_libdnet(struct l2_packet_data *l2)
47  {
48      eth_addr_t own_addr;
49
50      l2->eth = eth_open(l2->ifname);
51      if (!l2->eth) {
52          wpa_printf(MSG_ERROR, "Failed to open interface '%s' - eth_open: %s", l2->ifname,
53                      return -1;
54      }
55
56      if (eth_get(l2->eth, &own_addr) < 0) {
57          wpa_printf(MSG_ERROR, "Failed to get own hw address from interface '%s' - eth_get:
58                      eth_close(l2->eth);
59                      l2->eth = NULL;
60                      return -1;
61      }
62      os_memcpy(l2->own_addr, own_addr.data, ETH_ALEN);
63
64      return 0;
65  }
66  #endif                                     /* CONFIG_WINPCAP */
67
68  int l2_packet_send(struct l2_packet_data *l2, const u8 *dst_addr, u16 proto, const u8 *buf, size_t
69  {
70      int ret;
71      struct l2_ethhdr *eth;
72
73      if (l2 == NULL) {
74          return -1;
75      }
76
77      if (l2->l2_hdr) {
78  #ifdef CONFIG_WINPCAP

```

```

79         ret = pcap_sendpacket(l2->pcap, buf, len);
80     #else                                     /* CONFIG_WINPCAP */
81         ret = eth_send(l2->eth, buf, len);
82     #endif                                     /* CONFIG_WINPCAP */
83     } else {
84         size_t mlen = sizeof(*eth) + len;
85         eth = os_malloc(mlen);
86         if (eth == NULL) {
87             return -1;
88         }
89
90         os_memcpy(eth->h_dest, dst_addr, ETH_ALEN);
91         os_memcpy(eth->h_source, l2->own_addr, ETH_ALEN);
92         eth->h_proto = htons(proto);
93         os_memcpy(eth + 1, buf, len);
94
95     #ifdef CONFIG_WINPCAP
96         ret = pcap_sendpacket(l2->pcap, (u8 *)eth, mlen);
97     #else                                     /* CONFIG_WINPCAP */
98         ret = eth_send(l2->eth, (u8 *)eth, mlen);
99     #endif                                     /* CONFIG_WINPCAP */
100
101         os_free(eth);
102     }
103
104     return ret;
105 }
106
107 #ifndef CONFIG_WINPCAP
108 static void l2_packet_receive(int sock, void *eloop_ctx, void *sock_ctx)
109 {
110     struct l2_packet_data *l2 = eloop_ctx;
111     pcap_t *pcap = sock_ctx;
112     struct pcap_pkthdr hdr;
113     const u_char *packet;
114     struct l2_ethhdr *ethhdr;
115     unsigned char *buf;
116     size_t len;
117
118     packet = pcap_next(pcap, &hdr);
119
120     if (packet == NULL || hdr.caplen < sizeof(*ethhdr)) {
121         return;
122     }
123
124     ethhdr = (struct l2_ethhdr *)packet;
125     if (l2->l2_hdr) {
126         buf = (unsigned char *)ethhdr;
127         len = hdr.caplen;

```

```

128     } else {
129         buf = (unsigned char *)(ethhdr + 1);
130         len = hdr.caplen - sizeof(*ethhdr);
131     }
132     l2->rx_callback(l2->rx_callback_ctx, ethhdr->h_source, buf, len);
133 }
134 #endif /* CONFIG_WINPCAP */
135
136 #ifdef CONFIG_WINPCAP
137 static void l2_packet_receive_cb(u_char *user, const struct pcap_pkthdr *hdr, const u_char *pkt_da
138 {
139     struct l2_packet_data *l2 = (struct l2_packet_data *)user;
140     struct l2_ethhdr *ethhdr;
141     unsigned char *buf;
142     size_t len;
143
144     if (pkt_data == NULL || hdr->caplen < sizeof(*ethhdr)) {
145         return;
146     }
147
148     ethhdr = (struct l2_ethhdr *)pkt_data;
149     if (l2->l2_hdr) {
150         buf = (unsigned char *)ethhdr;
151         len = hdr->caplen;
152     } else {
153         buf = (unsigned char *)(ethhdr + 1);
154         len = hdr->caplen - sizeof(*ethhdr);
155     }
156     l2->rx_callback(l2->rx_callback_ctx, ethhdr->h_source, buf, len);
157     /*
158      * Use shorter poll interval for 3 seconds to reduce latency during key
159      * handshake.
160      */
161     l2->num_fast_poll = 3 * 50;
162 }
163
164 static void l2_packet_receive_timeout(void *eloop_ctx, void *timeout_ctx)
165 {
166     struct l2_packet_data *l2 = eloop_ctx;
167     pcap_t *pcap = timeout_ctx;
168     int timeout;
169
170     if (l2->num_fast_poll > 0) {
171         timeout = 20000;
172         l2->num_fast_poll--;
173     } else {
174         timeout = 100000;
175     }
176

```

```

177     /* Register new timeout before calling l2_packet_receive() since
178      * receive handler may free this l2_packet instance (which will
179      * cancel this timeout). */
180     eloop_register_timeout(0, timeout, l2_packet_receive_timeout, l2, pcap);
181     pcap_dispatch(pcap, 10, l2_packet_receive_cb, (u_char *)l2);
182 }
183 #endif                                     /* CONFIG_WINPCAP */
184
185 static int l2_packet_init_libpcap(struct l2_packet_data *l2, unsigned short protocol)
186 {
187     bpf_u_int32 pcap_maskp, pcap_netp;
188     char pcap_filter[200], pcap_err[PCAP_ERRBUF_SIZE];
189     struct bpf_program pcap_fp;
190
191     #ifdef CONFIG_WINPCAP
192     char ifname[128];
193     os_snprintf(ifname, sizeof(ifname), "\\Device\\NPF_%s", l2->ifname);
194     pcap_lookupnet(ifname, &pcap_netp, &pcap_maskp, pcap_err);
195     l2->pcap = pcap_open_live(ifname, 2500, 0, 10, pcap_err);
196     if (l2->pcap == NULL) {
197         fprintf(stderr, "pcap_open_live: %s\n", pcap_err);
198         fprintf(stderr, "ifname='%s'\n", ifname);
199         return -1;
200     }
201     if (pcap_setnonblock(l2->pcap, 1, pcap_err) < 0) {
202         fprintf(stderr, "pcap_setnonblock: %s\n", pcap_geterr(l2->pcap));
203     }
204     #else                                     /* CONFIG_WINPCAP */
205     pcap_lookupnet(l2->ifname, &pcap_netp, &pcap_maskp, pcap_err);
206     l2->pcap = pcap_open_live(l2->ifname, 2500, 0, 10, pcap_err);
207     if (l2->pcap == NULL) {
208         fprintf(stderr, "pcap_open_live: %s\n", pcap_err);
209         fprintf(stderr, "ifname='%s'\n", l2->ifname);
210         return -1;
211     }
212     if (pcap_datalink(l2->pcap) != DLT_EN10MB && pcap_set_datalink(l2->pcap, DLT_EN10MB) < 0)
213         fprintf(stderr, "pcap_set_datalink(DLT_EN10MB): %s\n", pcap_geterr(l2->pcap));
214     return -1;
215 }
216 #endif                                     /* CONFIG_WINPCAP */
217     os_snprintf(pcap_filter, sizeof(pcap_filter), "not ether src " MACSTR " and " "( ether dst
218                 MAC2STR(l2->own_addr), MAC2STR(pae_group_addr), protocol);
219     if (pcap_compile(l2->pcap, &pcap_fp, pcap_filter, 1, pcap_netp) < 0) {
220         fprintf(stderr, "pcap_compile: %s\n", pcap_geterr(l2->pcap));
221         return -1;
222     }
223
224     if (pcap_setfilter(l2->pcap, &pcap_fp) < 0) {
225         fprintf(stderr, "pcap_setfilter: %s\n", pcap_geterr(l2->pcap));

```

```

226         return -1;
227     }
228
229     pcap_freecode(&pcap_fp);
230 #ifdef BIOCIMMEDIATE
231     /*
232      * When libpcap uses BPF we must enable "immediate mode" to
233      * receive frames right away; otherwise the system may
234      * buffer them for us.
235      */
236     {
237         unsigned int on = 1;
238         if (ioctl(pcap_fileno(l2->pcap), BIOCIMMEDIATE, &on) < 0) {
239             fprintf(stderr, "%s: cannot enable immediate mode on " "interface %s: %s\n",
240                     /* XXX should we fail? */
241             );
242         }
243 #endif
244
245         /* BIOCIMMEDIATE */
246
247 #ifdef CONFIG_WINPCAP
248         eloop_register_timeout(0, 100000, l2_packet_receive_timeout, l2, l2->pcap);
249 #else
250         /* CONFIG_WINPCAP */
251         eloop_register_read_sock(pcap_get_selectable_fd(l2->pcap), l2_packet_receive, l2, l2->pcap);
252 #endif
253         /* CONFIG_WINPCAP */
254
255         return 0;
256     }
257
258 struct l2_packet_data *l2_packet_init(const char *ifname, const u8 *own_addr, unsigned short proto)
259 {
260     struct l2_packet_data *l2;
261
262     l2 = os_zalloc(sizeof(struct l2_packet_data));
263     if (l2 == NULL) {
264         return NULL;
265     }
266     os_strlcpy(l2->ifname, ifname, sizeof(l2->ifname));
267     l2->rx_callback = rx_callback;
268     l2->rx_callback_ctx = rx_callback_ctx;
269     l2->l2_hdr = l2_hdr;
270
271 #ifdef CONFIG_WINPCAP
272     if (own_addr) {
273         os_memcpy(l2->own_addr, own_addr, ETH_ALEN);
274     }
275 #else
276     /* CONFIG_WINPCAP */
277     if (l2_packet_init_libdnet(l2)) {
278         return NULL;
279     }
280 }

```

```

275     #endif                                     /* CONFIG_WINPCAP */
276
277         if (l2_packet_init_libpcap(l2, protocol)) {
278     #ifndef CONFIG_WINPCAP
279             eth_close(l2->eth);
280     #endif                                     /* CONFIG_WINPCAP */
281             os_free(l2);
282             return NULL;
283         }
284
285         return l2;
286     }
287
288 void l2_packet_deinit(struct l2_packet_data *l2)
289 {
290     if (l2 == NULL) {
291         return;
292     }
293
294     #ifdef CONFIG_WINPCAP
295         eloop_cancel_timeout(l2_packet_receive_timeout, l2, l2->pcap);
296     #else                                     /* CONFIG_WINPCAP */
297         if (l2->eth) {
298             eth_close(l2->eth);
299         }
300         eloop_unregister_read_sock(pcap_get_selectable_fd(l2->pcap));
301     #endif                                     /* CONFIG_WINPCAP */
302     if (l2->pcap) {
303         pcap_close(l2->pcap);
304     }
305     os_free(l2);
306 }
307
308 int l2_packet_get_ip_addr(struct l2_packet_data *l2, char *buf, size_t len)
309 {
310     pcap_if_t *devs, *dev;
311     struct pcap_addr *addr;
312     struct sockaddr_in *saddr;
313     int found = 0;
314     char err[PCAP_ERRBUF_SIZE + 1];
315
316     if (pcap_findalldevs(&devs, err) < 0) {
317         wpa_printf(MSG_DEBUG, "pcap_findalldevs: %s\n", err);
318         return -1;
319     }
320
321     for (dev = devs; dev && !found; dev = dev->next) {
322         if (os_strcmp(dev->name, l2->ifname) != 0) {
323             continue;

```

```

324         }
325
326         addr = dev->addresses;
327         while (addr) {
328             saddr = (struct sockaddr_in *)addr->addr;
329             if (saddr && saddr->sin_family == AF_INET) {
330                 os_strlcpy(buf, inet_ntoa(saddr->sin_addr), len);
331                 found = 1;
332                 break;
333             }
334             addr = addr->next;
335         }
336     }
337
338     pcap_freealldevs(devs);
339
340     return found ? 0 : -1;
341 }
342
343 void l2_packet_notify_auth_start(struct l2_packet_data *l2)
344 {
345     #ifdef CONFIG_WINPCAP
346         /*
347          * Use shorter poll interval for 3 seconds to reduce latency during key
348          * handshake.
349          */
350         l2->num_fast_poll = 3 * 50;
351         eloop_cancel_timeout(l2_packet_receive_timeout, l2, l2->pcap);
352         eloop_register_timeout(0, 10000, l2_packet_receive_timeout, l2, l2->pcap);
353     #endif
354 }
355
356 int l2_packet_set_packet_filter(struct l2_packet_data *l2, enum l2_packet_filter_type type)
357 {
358     return -1;
359 }

```