

Exhibit 15

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1 /*-----
2 * key.h :   Declarations and Definitions for Key Engine for BSD.
3 *
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67

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Defendants' Exhibit
 Exhibit No. 035
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69 are those of the authors and should not be interpreted as representing
70 official policies, either expressed or implied, of the US Naval
71 Research Laboratory (NRL).
72
73 -----*/
74
75
76 /*
77  * PF_KEY messages
78  */
79
80 #define KEY ADD          1
81 #define KEY DELETE      2
82 #define KEY UPDATE      3
83 #define KEY GET         4
84 #define KEY ACQUIRE    5
85 #define KEY GETSPI      6
86 #define KEY REGISTER    7
87 #define KEY EXPIRE      8
88 #define KEY DUMP        9
89 #define KEY_FLUSH      10
90
91 #define KEY VERSION     1
92 #define POLICY_VERSION  1
93
94 /*
95  * Security association state
96  */
97
98 #define K USED          0x1  /* Key used/not used */
99 #define K UNIQUE        0x2  /* Key unique/reusable */
100 #define K LARVAL        0x4  /* SPI assigned, but sa incomplete */
101 #define K ZOMBIE        0x8  /* sa expired but still useable */
102 #define K DEAD          0x10 /* sa marked for deletion, ready for
    reaping */
103 #define K_INBOUND      0x20 /* sa for inbound packets, ie. dst=myhost
    */
104 #define K_OUTBOUND     0x40 /* sa for outbound packets, ie.
    src=myhost */
105
106 /*
107  * Structure for key message header.
108  * PF_KEY message consists of key msghdr followed by
109  * src sockaddr, dest sockaddr, from sockaddr, key, and iv.
110  * Assumes size of key message header less than MHLEN.
111  */
112
113 struct key msghdr {
114     u_short key msglen; /* length of message including
    src/dst/from/key/iv */
115     u_char  key msgvers; /* key version number */
116     u_char  key msgtype; /* key message type, eg. KEY ADD */
117     pid_t   key pid;     /* process id of message sender */
118     int     key seq;     /* message sequence number */
119     int     key errno;   /* error code */
120     u_int8  type;       /* type of security association */
121     u_int8  state;      /* state of security association */
122     u_int8  label;      /* sensitivity level */
123     u_int32 spi;        /* spi value */
124     u_int8  keylen;     /* key length */
125     u_int8  ivlen;     /* iv length */
126     u_int8  algorithm;  /* algorithm identifier */
127     u_int8  lifetype;   /* type of lifetime */
128     u_int32 lifetimel;  /* lifetime value 1 */
129     u_int32 lifetime2;  /* lifetime value 2 */
130 };

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131
132 struct key msgdata {
133     struct sockaddr *src;      /* source host address */
134     struct sockaddr *dst;      /* destination host address */
135     struct sockaddr *from;     /* originator of security association */
136     caddr_t iv;                /* initialization vector */
137     caddr_t key;               /* key */
138     int ivlen;                 /* key length */
139     int keylen;                /* iv length */
140 };
141
142 struct policy msghdr {
143     u_short policy_msglen;     /* message length */
144     u_char  policy_msgvers;    /* message version */
145     u_char  policy_msgtype;    /* message type */
146     int     policy_seq;        /* message sequence number */
147     int     policy_errno;      /* error code */
148 };
149
150
151 #ifdef KERNEL
152
153 /*
154  * Key engine table structures
155  */
156
157 struct socketlist {
158     struct socket *socket;     /* pointer to socket */
159     struct socketlist *next;   /* next */
160 };
161
162 struct key tblnode {
163     int alloc_count;           /* number of sockets allocated to
164     secassoc */
165     int ref_count;            /* number of sockets referencing secassoc
166     */
167     struct socketlist *solist; /* list of sockets allocated to secassoc
168     */
169     struct ipsec assoc *secassoc; /* security association */
170     struct key_tblnode *next;   /* next node */
171 };
172
173 struct key allocnode {
174     struct key_tblnode *keynode;
175     struct key_allocnode *next;
176 };
177
178 struct key so2spinode {
179     struct socket *socket;     /* socket pointer */
180     struct key_tblnode *keynode; /* pointer to tblnode containing secassoc
181     */
182     /* info for socket */
183     struct key_so2spinode *next;
184 };
185
186 struct key registry {
187     u_int8 type;               /* secassoc type that key mgnt. daemon can
188     acquire */
189     struct socket *socket;     /* key management daemon socket pointer */
190     struct key_registry *next;
191 };
192
193 struct key acquirelist {
194     u_int8 type;               /* secassoc type to acquire */
195     struct sockaddr_in6 target; /* destination address of secassoc */
196     u_int32 count;             /* number of acquire messages sent */
197     u_long expiretime;        /* expiration time for acquire message */

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193     struct key_acquirelist *next;
194 };
195
196 struct keyso cb {
197     int ip4 count;           /* IPv4 */
198     int ip6 count;           /* IPv6 */
199     int any_count;          /* Sum of above counters */
200 };
201
202 #endif
203
204 /*
205  * Useful macros
206  */
207
208 #ifndef KERNEL
209 #define K Malloc(p, t, n) (p = (t) malloc((unsigned int)(n)))
210 #define KFree(p) free((char *)p);
211 #else
212 #define K Malloc(p, t, n) (p = (t) malloc((unsigned long)(n), M_SECA,
M DONTWAIT))
213 #define KFree(p) free((caddr_t)p, M_SECA);
214 #endif /* KERNEL */
215
216 #ifdef KERNEL
217 void key_init _P((void));
218 void key cbinit _P((void));
219 void key inittables _P((void));
220 int key_secassoc2msgHdr __P((struct ipsec_assoc *, struct key_msgHdr
*,
221                               struct key_msgdata *));
222 int key_msgHdr2secassoc __P((struct ipsec_assoc *, struct key_msgHdr
*,
223                               struct key_msgdata *));
224 int key add _P((struct ipsec assoc *));
225 int key delete _P((struct ipsec assoc *));
226 int key_get _P((u int, struct sockAddr *, struct sockAddr *, u_int32,
227                struct ipsec assoc **));
228 void key flush _P((void));
229 int key dump _P((struct socket *));
230 int key_getspi _P((u int, struct sockAddr *, struct sockAddr *,
231                  u_int32 *));
232 int key update _P((struct ipsec assoc *));
233 int key register _P((struct socket *, u_int));
234 void key unregister _P((struct socket *, u_int, int));
235 int key acquire _P((u int, struct sockAddr *, struct sockAddr *));
236 int getassocbyspi _P((u int, struct sockAddr *, struct sockAddr *,
237                      u_int32, struct key_tblnode **));
238 int getassocbysocket _P((u_int, struct sockAddr *, struct sockAddr *,
239                          struct socket *, u_int, struct key_tblnode **));
240 void key free _P((struct key_tblnode *));
241 int key output _P((struct mbuf *, struct socket *));
242 int key_usrreq __P((struct socket *, int, struct mbuf *, struct mbuf
*,
243                    struct mbuf *));
244 #endif
245

```