

new/usr/src/cmd/lofiadm/main.c

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*****
54666 Sun Jan 17 14:42:13 2016
new/usr/src/cmd/lofiadm/main.c
5857 add -o option to lofiadm
*****

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2  * CDDL HEADER START
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24 * Copyright 2012 Joyent, Inc. All rights reserved.
25 *
26 * Copyright 2013 Nexenta Systems, Inc. All rights reserved.
27 * Copyright (c) 2014 Gary Mills
28 * Copyright (c) 2016 Andrey Sokolov
29 #endif /* ! codereview */
30 */
31
32 /*
33 * lofiadm - administer lofi(7d). Very simple, add and remove file<->device
34 * associations, and display status. All the ioctl's are private between
35 * lofi and lofiadm, and so are very simple - device information is
36 * communicated via a minor number.
37 */
38
39 #include <sys/types.h>
40 #include <sys/param.h>
41 #include <sys/lofi.h>
42 #include <sys/stat.h>
43 #include <sys/sysmacros.h>
44 #include <netinet/in.h>
45 #include <stdio.h>
46 #include <fcntl.h>
47 #include <locale.h>
48 #include <string.h>
49 #include <strings.h>
50 #include <errno.h>
51 #include <stdlib.h>
52 #include <unistd.h>
53 #include <stropts.h>
54 #include <libdevinfo.h>
55 #include <libgen.h>
56 #include <ctype.h>
57 #include <dlfcn.h>
58 #include <limits.h>
59 #include <security/cryptoki.h>
60 #include <cryptoutil.h>
61 #include <sys/crypto/ioctl.h>
```

new/usr/src/cmd/lofiadm/main.c

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62 #include <sys/crypto/ioctladmin.h>
63 #include "utils.h"
64 #include <LzmaEnc.h>
65
66 /* Only need the IV len #defines out of these files, nothing else. */
67 #include <aes/aes_impl.h>
68 #include <des/des_impl.h>
69 #include <blowfish/blowfish_impl.h>
70
71 static const char USAGE[] =
72 "Usage: %s [-r] -a file [ device ]\n"
73 "         %s [-r] [-o] -c crypto_algorithm -a file [device]\n"
74 "         %s [-r] -c crypto_algorithm -a file [device]\n"
75 "         %s [-r] -c crypto_algorithm -k raw_key_file -a file [device]\n"
76 "         %s [-r] -c crypto_algorithm -T [token]:[manuf]:[serial]:key "
77 "         %s [-r] -c crypto_algorithm -T [token]:[manuf]:[serial]:key "
78 "         %s [-r] -c crypto_algorithm -k wrapped_key_file -a file [device]\n"
79 "         %s [-r] -c crypto_algorithm -e -a file [device]\n"
80 "         %s -d file | device\n"
81 "         %s -C [gzip|gzip-6|gzip-9|lzma] [-s segment_size] file\n"
82 "         %s -U file\n"
83 "         %s [ file | device ]\n";
84
85 typedef struct token_spec {
86     char    *name;
87     char    *mfr;
88     char    *serno;
89     char    *key;
90 } token_spec_t;
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92 #ifndef unchanged_portion_omitted
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```

```

869         goto cleanup;

871     /* get user passphrase with 8 byte minimum */
872     if (pkcs11_get_pass(NULL, &pass, &passlen, MIN_PASSLEN,
873         with_confirmation) < 0) {
874         if (pkcs11_get_pass(NULL, &pass, &passlen, MIN_PASSLEN, B_TRUE) < 0) {
875             die(gettext("passphrases do not match\n"));
876         }
877     }

878     /*
879     * salt should not be NULL, or else pkcs11_PasswdToKey() will
880     * complain about CKR_MECHANISM_PARAM_INVALID; the following is
881     * to make up for not having a salt until a proper one is used
882     */
883     salt = pass;
884     saltlen = passlen;

885     klen = cipher->max_keysize;
886     rv = pkcs11_PasswdToKey(sess, pass, passlen, salt, saltlen, ktype,
887         cipher->max_keysize, &kvalue, &klen);

889     (void) C_CloseSession(sess);

891     if (rv != CKR_OK) {
892         goto cleanup;
893     }

895     /* assert(klen == cipher->max_keysize); */
896     *raw_key_sz = klen;
897     *raw_key = (char *)kvalue;
898     return;

900 cleanup:
901     die(gettext("failed to generate %s key from passphrase: %s"),
902         cipher->alias, pkcs11_strerror(rv));
903 }

```

unchanged_portion_omitted

```

1802 int
1803 main(int argc, char *argv[])
1804 {
1805     int    lfd;
1806     int    c;
1807     const char *devicename = NULL;
1808     const char *filename = NULL;
1809     const char *alname = COMPRESS_ALGORITHM;
1810     int    openflag;
1811     int    minor;
1812     int    compress_index;
1813     uint32_t segsize = SEGSIZE;
1814     static char *lofictl = "/dev/" LOFI_CTL_NAME;
1815     boolean_t force = B_FALSE;
1816     const char *pname;
1817     boolean_t errflag = B_FALSE;
1818     boolean_t addflag = B_FALSE;
1819     boolean_t rdflag = B_FALSE;
1820     boolean_t deleteflag = B_FALSE;
1821     boolean_t ephflag = B_FALSE;
1822     boolean_t compressflag = B_FALSE;
1823     boolean_t uncompressflag = B_FALSE;
1824     /* the next two work together for -c, -k, -T, -e options only */
1825     boolean_t need_crypto = B_FALSE; /* if any -c, -k, -T, -e */
1826     boolean_t cipher_only = B_TRUE; /* if -c only */
1827     boolean_t with_confirmation = B_TRUE;
1828 #endif /* ! codereview */
1829     const char *keyfile = NULL;

```

```

1830     mech_alias_t *cipher = NULL;
1831     token_spec_t *token = NULL;
1832     char *rkey = NULL;
1833     size_t rksz = 0;
1834     char realfilename[MAXPATHLEN];

1836     pname = getpname(argv[0]);

1838     (void) setlocale(LC_ALL, "");
1839     (void) textdomain(TEXT_DOMAIN);

1841     while ((c = getopt(argc, argv, "a:c:Cd:efk:ors:T:U")) != EOF) {
1842         while ((c = getopt(argc, argv, "a:c:Cd:efk:ors:T:U")) != EOF) {
1843             switch (c) {
1844                 case 'a':
1845                     addflag = B_TRUE;
1846                     if ((filename = realpath(optarg, realfilename)) == NULL)
1847                         die("%s", optarg);
1848                     if (((argc - optind) > 0) && (*argv[optind] != '-')) {
1849                         /* optional device */
1850                         devicename = argv[optind];
1851                         optind++;
1852                     }
1853                     break;
1854                 case 'c':
1855                     compressflag = B_TRUE;
1856                     if (((argc - optind) > 1) && (*argv[optind] != '-')) {
1857                         /* optional algorithm */
1858                         alname = argv[optind];
1859                         optind++;
1860                     }
1861                     check_algorithm_validity(alname, &compress_index);
1862                     break;
1863                 case 'C':
1864                     /* is the chosen cipher allowed? */
1865                     if ((cipher = ciph2mech(optarg)) == NULL) {
1866                         errflag = B_TRUE;
1867                         warn(gettext("cipher %s not allowed\n"),
1868                             optarg);
1869                     }
1870                     need_crypto = B_TRUE;
1871                     /* cipher_only is already set */
1872                     break;
1873                 case 'd':
1874                     deleteflag = B_TRUE;
1875                     minor = name_to_minor(optarg);
1876                     if (minor != 0)
1877                         devicename = optarg;
1878                     else {
1879                         if ((filename = realpath(optarg,
1880                             realfilename)) == NULL)
1881                             die("%s", optarg);
1882                     }
1883                     break;
1884                 case 'e':
1885                     ephflag = B_TRUE;
1886                     need_crypto = B_TRUE;
1887                     cipher_only = B_FALSE; /* need to unset cipher_only */
1888                     break;
1889                 case 'f':
1890                     force = B_TRUE;
1891                     break;
1892                 case 'k':
1893                     keyfile = optarg;
1894                     need_crypto = B_TRUE;
1895                     cipher_only = B_FALSE; /* need to unset cipher_only */

```

```

1895         break;
1896     case 'r':
1897         rdflag = B_TRUE;
1898         break;
1899     case 's':
1900         segsize = convert_to_num(optarg);
1901         if (segsize < DEV_BSIZE || !ISP2(segsize))
1902             die(gettext("segment size %s is invalid "
1903                 "or not a multiple of minimum block "
1904                 "size %ld\n"), optarg, DEV_BSIZE);
1905         break;
1906     case 'T':
1907         if ((token = parsetoken(optarg)) == NULL) {
1908             errflag = B_TRUE;
1909             warn(
1910                 gettext("invalid token key specifier %s\n"),
1911                 optarg);
1912         }
1913         need_crypto = B_TRUE;
1914         cipher_only = B_FALSE; /* need to unset cipher_only */
1915         break;
1916     case 'U':
1917         uncompressflag = B_TRUE;
1918         break;
1919     case 'o':
1920         with_confirmation = B_FALSE;
1921         break;
1922 #endif /* ! codereview */
1923     case '?':
1924     default:
1925         errflag = B_TRUE;
1926         break;
1927 }
1928
1930 /* Check for mutually exclusive combinations of options */
1931 if (errflag ||
1932     (addflag && deleteflag) ||
1933     (rdflag && !addflag) ||
1934     (!addflag && need_crypto) ||
1935     (!with_confirmation && (!cipher_only || !need_crypto)) ||
1936 #endif /* ! codereview */
1937     ((compressflag || uncompressflag) && (addflag || deleteflag)))
1938     usage(pname);
1939
1940 /* ephemeral key, and key from either file or token are incompatible */
1941 if (ephflag && (keyfile != NULL || token != NULL)) {
1942     die(gettext("ephemeral key cannot be used with keyfile "
1943         "or token key\n"));
1944 }
1945
1946 /*
1947 * "-c" but no "-k", "-T", "-e", or "-T -k" means derive key from
1948 * command line passphrase
1949 */
1950
1951 switch (argc - optind) {
1952 case 0: /* no more args */
1953     if (compressflag || uncompressflag) /* needs filename */
1954         usage(pname);
1955     break;
1956 case 1:
1957     if (addflag || deleteflag)
1958         usage(pname);
1959     /* one arg means compress/uncompress the file ... */
1960     if (compressflag || uncompressflag) {

```

```

1961         if ((filename = realpath(argv[optind],
1962             realfilename)) == NULL)
1963             die("%s", argv[optind]);
1964         /* ... or without options means print the association */
1965     } else {
1966         minor = name_to_minor(argv[optind]);
1967         if (minor != 0)
1968             devicename = argv[optind];
1969         else {
1970             if ((filename = realpath(argv[optind],
1971                 realfilename)) == NULL)
1972                 die("%s", argv[optind]);
1973         }
1974     }
1975     break;
1976 default:
1977     usage(pname);
1978     break;
1979 }
1980
1981 if (addflag || compressflag || uncompressflag)
1982     check_file_validity(filename);
1983
1984 if (filename && !valid_abspath(filename))
1985     exit(E_ERROR);
1986
1987 /*
1988 * Here, we know the arguments are correct, the filename is an
1989 * absolute path, it exists and is a regular file. We don't yet
1990 * know that the device name is ok or not.
1991 */
1992
1993 openflag = O_EXCL;
1994 if (addflag || deleteflag || compressflag || uncompressflag)
1995     openflag |= O_RDWR;
1996 else
1997     openflag |= O_RDONLY;
1998 lfd = open(lofictl, openflag);
1999 if (lfd == -1) {
2000     if ((errno == EPERM) || (errno == EACCES)) {
2001         die(gettext("you do not have permission to perform "
2002             "that operation.\n"));
2003     } else {
2004         die(gettext("open: %s"), lofictl);
2005     }
2006     /*NOTREACHED*/
2007 }
2008
2009 /*
2010 * No passphrase is needed for ephemeral key, or when key is
2011 * in a file and not wrapped by another key from a token.
2012 * However, a passphrase is needed in these cases:
2013 * 1. cipher with no ephemeral key, key file, or token,
2014 *    in which case the passphrase is used to build the key
2015 * 2. token with an optional cipher or optional key file,
2016 *    in which case the passphrase unlocks the token
2017 * If only the cipher is specified, reconfirm the passphrase
2018 * to ensure the user hasn't mis-entered it. Otherwise, the
2019 * token will enforce the token passphrase.
2020 */
2021 if (need_crypto) {
2022     CK_SESSION_HANDLE sess;
2023
2024     /* pick a cipher if none specified */
2025     if (cipher == NULL)
2026         cipher = DEFAULT_CIPHER;

```

```
2028         if (!kernel_cipher_check(cipher))
2029             die(gettext(
2030                 "use \"cryptoadm list -m\" to find available \"
2031                 \"mechanisms\\n\"));
2033         init_crypto(token, cipher, &sess);
2035         if (cipher_only) {
2036             getkeyfromuser(cipher, &rkey, &rksz, with_confirmation);
1858             getkeyfromuser(cipher, &rkey, &rksz);
2037         } else if (token != NULL) {
2038             getkeyfromtoken(sess, token, keyfile, cipher,
2039                             &rkey, &rksz);
2040         } else {
2041             /* this also handles ephemeral keys */
2042             getkeyfromfile(keyfile, cipher, &rkey, &rksz);
2043         }
2045         end_crypto(sess);
2046     }
2048     /*
2049     * Now to the real work.
2050     */
2051     if (addflag)
2052         add_mapping(lfd, devicename, filename, cipher, rkey, rksz,
2053                     rdflag);
2054     else if (compressflag)
2055         lofi_compress(&lfd, filename, compress_index, segsize);
2056     else if (uncompressflag)
2057         lofi_uncompress(lfd, filename);
2058     else if (deleteflag)
2059         delete_mapping(lfd, devicename, filename, force);
2060     else if (filename || devicename)
2061         print_one_mapping(lfd, devicename, filename);
2062     else
2063         print_mappings(lfd);
2065     if (lfd != -1)
2066         (void) close(lfd);
2067     closelib();
2068     return (E_SUCCESS);
2069 }
_____unchanged_portion_omitted_
```

new/usr/src/man/man1m/lofiadm.1m

1

18522 Sun Jan 17 14:42:14 2016

new/usr/src/man/man1m/lofiadm.1m

5857 add -o option to lofiadm

```
1 \" te
2.\" Copyright (c) 2016 Andrey Sokolov
3 #endif /* ! codereview */
4.\" Copyright 2013 Nexenta Systems, Inc. All rights reserved.
5.\" Copyright (c) 2008, Sun Microsystems, Inc. All Rights Reserved
6.\" The contents of this file are subject to the terms of the Common Development
7.\" See the License for the specific language governing permissions and limitat
8.\" the fields enclosed by brackets \"[]\" replaced with your own identifying info
9.TH LOFIADM 1M \"Aug 28, 2013\"
10.SH NAME
11 lofiadm \- administer files available as block devices through lofi
12.SH SYNOPSIS
13.LP
14.nf
15 \fBlofiadm\fR [\fB-r\fR] \fB-a\fR \fIfile\fR [\fIdevice\fR]
16.fi

18.LP
19.nf
20 \fBlofiadm\fR [\fB-r\fR] [\fB-o\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-a\fR \fI
2 \fBlofiadm\fR [\fB-r\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-a\fR \fIfile\fR [\f
21.fi

23.LP
24.nf
25 \fBlofiadm\fR [\fB-r\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-k\fR \fIraw_key_fil
26.fi

28.LP
29.nf
30 \fBlofiadm\fR [\fB-r\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-T\fR \fItoken_key\f
31.fi

33.LP
34.nf
35 \fBlofiadm\fR [\fB-r\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-T\fR \fItoken_key\f
36 \fB-k\fR \fIwrapped_key_file\fR \fB-a\fR \fIfile\fR [\fIdevice\fR]
37.fi

39.LP
40.nf
41 \fBlofiadm\fR [\fB-r\fR] \fB-c\fR \fIcrypto_algorithm\fR \fB-e\fR \fB-a\fR \fIfi
42.fi

44.LP
45.nf
46 \fBlofiadm\fR \fB-C\fR \fIalgorithm\fR [\fB-s\fR \fIsegment_size\fR] \fIfile\fR
47.fi

49.LP
50.nf
51 \fBlofiadm\fR \fB-d\fR \fIfile\fR | \fIdevice\fR
52.fi

54.LP
55.nf
56 \fBlofiadm\fR \fB-U\fR \fIfile\fR
57.fi

59.LP
60.nf
```

new/usr/src/man/man1m/lofiadm.1m

2

```
61 \fBlofiadm\fR [ \fIfile\fR | \fIdevice\fR]
62 .fi

64 .SH DESCRIPTION
65 .sp
66 \fBlofiadm\fR administers \fBlofi\fR, the loopback file driver. \fBlofi\fR
67 allows a file to be associated with a block device. That file can then be
68 accessed through the block device. This is useful when the file contains an
69 image of some filesystem (such as a floppy or \fBCD-ROM\fR image), because the
70 block device can then be used with the normal system utilities for mounting,
71 checking or repairing filesystems. See \fBfsck\fR(1M) and \fBmount\fR(1M).
72 .sp
73 .LP
74 Use \fBlofiadm\fR to add a file as a loopback device, remove such an
75 association, or print information about the current associations.
76 .sp
77 .LP
78 Encryption and compression options are mutually exclusive on the command line.
79 Further, an encrypted file cannot be compressed later, nor can a compressed
80 file be encrypted later.

82 In the global zone, \fBlofiadm\fR can be used on both the global
83 zone devices and all devices owned by other non-global zones on the system.
84 .sp
85 .SH OPTIONS
86 .LP
87 The following options are supported:
88 .sp
89 .ne 2
90 .na
91 \fB-a\fR \fIfile\fR [\fIdevice\fR]\fR
92 .ad
93 .sp .6
94 .RS 4n
95 Add \fIfile\fR as a block device.
96 .sp
97 If \fIdevice\fR is not specified, an available device is picked.
98 .sp
99 If \fIdevice\fR is specified, \fBlofiadm\fR attempts to assign it to
100 \fIfile\fR. \fIdevice\fR must be available or \fBlofiadm\fR will fail. The
101 ability to specify a device is provided for use in scripts that wish to
102 reestablish a particular set of associations.
103 .RE

105 .sp
106 .ne 2
107 .na
108 \fB-C\fR {\fIgzip\fR | \fIgzip-N\fR | \fIlzma\fR}\fR
109 .ad
110 .sp .6
111 .RS 4n
112 Compress the file with the specified compression algorithm.
113 .sp
114 The \fBgzip\fR compression algorithm uses the same compression as the
115 open-source \fBgzip\fR command. You can specify the \fBgzip\fR level by using
116 the value \fBgzip-\fR\fIN\fR where \fIN\fR is 6 (fast) or 9 (best compression
117 ratio). Currently, \fBgzip\fR, without a number, is equivalent to \fBgzip-6\fR
118 (which is also the default for the \fBgzip\fR command).
119 .sp
120 \fIlzma\fR stands for the LZMA (Lempel-Ziv-Markov) compression algorithm.
121 .sp
122 Note that you cannot write to a compressed file, nor can you mount a compressed
123 file read/write.
124 .RE
```

```

126 .sp
127 .ne 2
128 .na
129 \fB\fB-d\fR \fIfile\fR | \fIdevice\fR\fR
130 .ad
131 .sp .6
132 .RS 4n
133 Remove an association by \fIfile\fR or \fIdevice\fR name, if the associated
134 block device is not busy, and deallocates the block device.
135 .RE

137 .sp
138 .ne 2
139 .na
140 \fB\fB-o\fR
141 .ad
142 .sp .6
143 .RS 4n
144 If the \fB-o\fR option is specified lofiadm will prompt for a passphrase once.
145 .RE

147 .sp
148 .ne 2
149 .na
150 #endif /* ! codereview */
151 \fB\fB-r\fR
152 .ad
153 .sp .6
154 .RS 4n
155 If the \fB-r\fR option is specified before the \fB-a\fR option, the
156 \fIdevice\fR will be opened read-only.
157 .RE

159 .sp
160 .ne 2
161 .na
162 \fB\fB-s\fR \fIsegment_size\fR\fR
163 .ad
164 .sp .6
165 .RS 4n
166 The segment size to use to divide the file being compressed. \fIsegment_size\fR
167 can be an integer multiple of 512.
168 .RE

170 .sp
171 .ne 2
172 .na
173 \fB\fB-U\fR \fIfile\fR\fR
174 .ad
175 .sp .6
176 .RS 4n
177 Uncompress a compressed file.
178 .RE

180 .sp
181 .LP
182 The following options are used when the file is encrypted:
183 .sp
184 .ne 2
185 .na
186 \fB\fB-c\fR \fIcrypto_algorithm\fR\fR
187 .ad
188 .sp .6
189 .RS 4n
190 Select the encryption algorithm. The algorithm must be specified when

```

```

191 encryption is enabled because the algorithm is not stored in the disk image.
192 .sp
193 If none of \fB-e\fR, \fB-k\fR, or \fB-T\fR is specified, \fBlofiadm\fR prompts
194 for a passphrase, with a minimum length of eight characters, to be entered .
195 The passphrase is used to derive a symmetric encryption key using PKCS#5 PBKDF2.
196 .RE

198 .sp
199 .ne 2
200 .na
201 \fB\fB-k\fR \fIraw_key_file\fR | \fIwrapped_key_file\fR\fR
202 .ad
203 .sp .6
204 .RS 4n
205 Path to raw or wrapped symmetric encryption key. If a PKCS#11 object is also
206 given with the \fB-T\fR option, then the key is wrapped by that object. If
207 \fB-T\fR is not specified, the key is used raw.
208 .RE

210 .sp
211 .ne 2
212 .na
213 \fB\fB-T\fR \fItoken_key\fR\fR
214 .ad
215 .sp .6
216 .RS 4n
217 The key in a PKCS#11 token to use for the encryption or for unwrapping the key
218 file.
219 .sp
220 If \fB-k\fR is also specified, \fB-T\fR identifies the unwrapping key, which
221 must be an RSA private key.
222 .RE

224 .sp
225 .ne 2
226 .na
227 \fB\fB-e\fR\fR
228 .ad
229 .sp .6
230 .RS 4n
231 Generate an ephemeral symmetric encryption key.
232 .RE

234 .SH OPERANDS
235 .sp
236 .LP
237 The following operands are supported:
238 .sp
239 .na
240 \fB\fIcrypto_algorithm\fR\fR
241 .ad
242 .sp .6
243 .RS 4n
244 One of: \fBbaes-128-cbc\fR, \fBbaes-192-cbc\fR, \fBbaes-256-cbc\fR,
245 \fBdes3-cbc\fR, \fBblowfish-cbc\fR.
246 .RE

248 .sp
249 .ne 2
250 .na
251 \fB\fIdevice\fR\fR
252 .ad
253 .sp .6
254 .RS 4n
255 Display the file name associated with the block device \fIdevice\fR.

```

```

256 .sp
257 Without arguments, print a list of the current associations. Filenames must be
258 valid absolute pathnames.
259 .sp
260 When a file is added, it is opened for reading or writing by root. Any
261 restrictions apply (such as restricted root access over \fBNFS\fR). The file is
262 held open until the association is removed. It is not actually accessed until
263 the block device is used, so it will never be written to if the block device is
264 only opened read-only.

```

```

266 Note that the filename may appear as "?" if it is not possible to resolve the
267 path in the current context (for example, if it's an NFS path in a non-global
268 zone).
269 .RE

```

```

271 .sp
272 .ne 2
273 .na
274 \fB\fIfile\fR\fR
275 .ad
276 .sp .6
277 .RS 4n
278 Display the block device associated with \fIfile\fR.
279 .RE

```

```

281 .sp
282 .ne 2
283 .na
284 \fB\fIRaw_key_file\fR\fR
285 .ad
286 .sp .6
287 .RS 4n
288 Path to a file of the appropriate length, in bits, to use as a raw symmetric
289 encryption key.
290 .RE

```

```

292 .sp
293 .ne 2
294 .na
295 \fB\fIToken_key\fR\fR
296 .ad
297 .sp .6
298 .RS 4n
299 PKCS#11 token object in the format:
300 .sp
301 .in +2
302 .nf
303 \fIToken_name\fR:\fIManufacturer_id\fR:\fISerial_number\fR:\fIkey_label\fR
304 .fi
305 .in -2
306 .sp

```

```

308 All but the key label are optional and can be empty. For example, to specify a
309 token object with only its key label \fBMylofiKey\fR, use:

```

```

310 .sp
311 .in +2
312 .nf
313 -T ::MylofiKey
314 .fi
315 .in -2
316 .sp

```

```

318 .RE

```

```

320 .sp
321 .ne 2

```

```

322 .na
323 \fB\fIwrapped_key_file\fR\fR
324 .ad
325 .sp .6
326 .RS 4n
327 Path to file containing a symmetric encryption key wrapped by the RSA private
328 key specified by \fB-T\fR.
329 .RE

```

```

331 .SH EXAMPLES
332 .LP
333 \fBExample 1 \fRMounting an Existing CD-ROM Image
334 .sp
335 .LP
336 You should ensure that Solaris understands the image before creating the
337 \fBCD\fR. \fBLofi\fR allows you to mount the image and see if it works.

```

```

339 .sp
340 .LP
341 This example mounts an existing \fBCD-ROM\fR image (\fBsparc.iso\fR), of the
342 \fBRed Hat 6.0 CD\fR which was downloaded from the Internet. It was created
343 with the \fBmkisofs\fR utility from the Internet.

```

```

345 .sp
346 .LP
347 Use \fBlofiadm\fR to attach a block device to it:

```

```

349 .sp
350 .in +2
351 .nf
352 # \fBlofiadm -a /home/mike_s/RH6.0/sparc.iso\fR
353 /dev/lofi/1
354 .fi
355 .in -2
356 .sp

```

```

358 .sp
359 .LP
360 \fBLofiadm\fR picks the device and prints the device name to the standard
361 output. You can run \fBLofiadm\fR again by issuing the following command:

```

```

363 .sp
364 .in +2
365 .nf
366 # \fBlofiadm\fR
367 Block Device      File      Options
368 /dev/lofi/1      /home/mike_s/RH6.0/sparc.iso  -
369 .fi
370 .in -2
371 .sp

```

```

373 .sp
374 .LP
375 Or, you can give it one name and ask for the other, by issuing the following
376 command:

```

```

378 .sp
379 .in +2
380 .nf
381 # \fBlofiadm /dev/lofi/1\fR
382 /home/mike_s/RH6.0/sparc.iso
383 .fi
384 .in -2
385 .sp

```

```

387 .sp

```

```

388 .LP
389 Use the \fBmount\fR command to mount the image:

391 .sp
392 .in +2
393 .nf
394 # \fBmount -F hsfs -o ro /dev/lofi/1 /mnt\fR
395 .fi
396 .in -2
397 .sp

399 .sp
400 .LP
401 Check to ensure that Solaris understands the image:

403 .sp
404 .in +2
405 .nf
406 # \fBdf -k /mnt\fR
407 Filesystem          kbytes    used    avail capacity  Mounted on
408 /dev/lofi/1         512418    512418         0    100%      /mnt
409 # \fBls /mnt\fR
410 \&./                RedHat/      doc/         ls-lR        rr_moved/
411 \&../                TRANS.TBL    dosutils/    ls-lR.gz     sbin@
412 \&.buildlog         bin@         etc@         misc/        tmp/
413 COPYING             boot/        images/      mnt/         usr@
414 README              boot.cat*    kernels/     modules/
415 RPM-PGP-KEY         dev@         lib@         proc/
416 .fi
417 .in -2
418 .sp

420 .sp
421 .LP
422 Solaris can mount the CD-ROM image, and understand the filenames. The image was
423 created properly, and you can now create the \fBCD-ROM\fR with confidence.

425 .sp
426 .LP
427 As a final step, unmount and detach the images:

429 .sp
430 .in +2
431 .nf
432 # \fBumount /mnt\fR
433 # \fBblofiadm -d /dev/lofi/1\fR
434 # \fBblofiadm\fR
435 Block Device          File          Options
436 .fi
437 .in -2
438 .sp

440 .LP
441 \fBExample 2 \fRMounting a Floppy Image
442 .sp
443 .LP
444 This is similar to the first example.

446 .sp
447 .LP
448 Using \fBblofi\fR to help you mount files that contain floppy images is helpful
449 if a floppy disk contains a file that you need, but the machine which you are
450 on does not have a floppy drive. It is also helpful if you do not want to take
451 the time to use the \fBdd\fR command to copy the image to a floppy.

453 .sp

```

```

454 .LP
455 This is an example of getting to \fBMBD\fR floppy for Solaris on an x86
456 platform:

458 .sp
459 .in +2
460 .nf
461 # \fBblofiadm -a /export/s28/MBD_s28x_wos/latest/boot.3\fR
462 /dev/lofi/1
463 # \fBmount -F pcfs /dev/lofi/1 /mnt\fR
464 # \fBls /mnt\fR
465 \&./                COMMENT.BAT*  RC.D/        SOLARIS.MAP*
466 \&../                IDENT*        REPLACE.BAT*  X/
467 APPEND.BAT*        MAKEDIR.BAT*  SOLARIS/
468 # \fBumount /mnt\fR
469 # \fBblofiadm -d /export/s28/MBD_s28x_wos/latest/boot.3\fR
470 .fi
471 .in -2
472 .sp

474 .LP
475 \fBExample 3 \fRMaking a \fBUFS\fR Filesystem on a File
476 .sp
477 .LP
478 Making a \fBUFS\fR filesystem on a file can be useful, particularly if a test
479 suite requires a scratch filesystem. It can be painful (or annoying) to have to
480 repartition a disk just for the test suite, but you do not have to. You can
481 \fBnewfs\fR a file with \fBblofi\fR

483 .sp
484 .LP
485 Create the file:

487 .sp
488 .in +2
489 .nf
490 # \fBmkfile 35m /export/home/test\fR
491 .fi
492 .in -2
493 .sp

495 .sp
496 .LP
497 Attach it to a block device. You also get the character device that \fBnewfs\fR
498 requires, so \fBnewfs\fR that:

500 .sp
501 .in +2
502 .nf
503 # \fBblofiadm -a /export/home/test\fR
504 /dev/lofi/1
505 # \fBnewfs /dev/rlofi/1\fR
506 newfs: construct a new file system /dev/rlofi/1: (y/n)? \fBy\fR
507 /dev/rlofi/1: 71638 sectors in 119 cylinders of 1 tracks, 602 sectors
508 35.0MB in 8 cyl groups (16 c/g, 4.70MB/g, 2240 i/g)
509 super-block backups (for fsck -F ufs -o b=#) at:
510 32, 9664, 19296, 28928, 38560, 48192, 57824, 67456,
511 .fi
512 .in -2
513 .sp

515 .sp
516 .LP
517 Note that \fBbufs\fR might not be able to use the entire file. Mount and use the
518 filesystem:

```



```

520 .sp
521 .in +2
522 .nf
523 # \fBmount /dev/lofi/1 /mnt\fR
524 # \fBdf -k /mnt\fR
525 Filesystem          kbytes    used    avail capacity  Mounted on
526 /dev/lofi/1          33455      9    30101      1%    /mnt
527 # \fBls /mnt\fR
528 \&./                ../      lost+found/
529 # \fBumount /mnt\fR
530 # \fBlofiadm -d /dev/lofi/1\fR
531 .fi
532 .in -2
533 .sp

535 .LP
536 \fBExample 4 \fRCreating a PC (FAT) File System on a Unix File
537 .sp
538 .LP
539 The following series of commands creates a \fBFAT\fR file system on a Unix
540 file. The file is associated with a block device created by \fBlofiadm\fR.

542 .sp
543 .in +2
544 .nf
545 # \fBmkfile 10M /export/test/testfs\fR
546 # \fBlofiadm -a /export/test/testfs\fR
547 /dev/lofi/1
548 \fBNote use of\fR rlofi\fB, not\fR lofi\fB, in following command.\fR
549 # \fBmkfs -F pcfs -o nofdisk,size=20480 /dev/rlofi/1\fR
550 \fBConstruct a new FAT file system on /dev/rlofi/1: (y/n)?\fR y
551 # \fBmount -F pcfs /dev/lofi/1 /mnt\fR
552 # \fBcd /mnt\fR
553 # \fBdf -k .\fR
554 Filesystem          kbytes    used    avail capacity  Mounted on
555 /dev/lofi/1          10142      0    10142      0%    /mnt
556 .fi
557 .in -2
558 .sp

560 .LP
561 \fBExample 5 \fRCompressing an Existing CD-ROM Image
562 .sp
563 .LP
564 The following example illustrates compressing an existing CD-ROM image
565 (\fBsolaris.iso\fR), verifying that the image is compressed, and then
566 uncompressing it.

568 .sp
569 .in +2
570 .nf
571 # \fBlofiadm -C gzip /export/home/solaris.iso\fR
572 .fi
573 .in -2
574 .sp

576 .sp
577 .LP
578 Use \fBlofiadm\fR to attach a block device to it:

580 .sp
581 .in +2
582 .nf
583 # \fBlofiadm -a /export/home/solaris.iso\fR
584 /dev/lofi/1
585 .fi

```

```

586 .in -2
587 .sp

589 .sp
590 .LP
591 Check if the mapped image is compressed:

593 .sp
594 .in +2
595 .nf
596 # \fBlofiadm\fR
597 Block Device      File      Options
598 /dev/lofi/1       /export/home/solaris.iso  Compressed(gzip)
599 /dev/lofi/2       /export/home/regular.iso  -
600 .fi
601 .in -2
602 .sp

604 .sp
605 .LP
606 Unmap the compressed image and uncompress it:

608 .sp
609 .in +2
610 .nf
611 # \fBlofiadm -d /dev/lofi/1\fR
612 # \fBlofiadm -U /export/home/solaris.iso\fR
613 .fi
614 .in -2
615 .sp

617 .LP
618 \fBExample 6 \fRCreating an Encrypted UFS File System on a File
619 .sp
620 .LP
621 This example is similar to the example of making a UFS filesystem on a file,
622 above.

624 .sp
625 .LP
626 Create the file:

628 .sp
629 .in +2
630 .nf
631 # \fBmkfile 35m /export/home/test\fR
632 .fi
633 .in -2
634 .sp

636 .sp
637 .LP
638 Attach the file to a block device and specify that the file image is encrypted.
639 As a result of this command, you obtain the character device, which is
640 subsequently used by \fBnewfs\fR:

642 .sp
643 .in +2
644 .nf
645 # \fBlofiadm -c aes-256-cbc -a /export/home/secrets\fR
646 Enter passphrase: \fBMy-M0th3r;l0v3s_m3+4lw4ys!\fR      (\fBnot echoed\fR)
647 Re-enter passphrase: \fBMy-M0th3r;l0v3s_m3+4lw4ys!\fR      (\fBnot echoed\fR)
648 /dev/lofi/1

650 # \fBnewfs /dev/rlofi/1\fR
651 newfs: construct a new file system /dev/rlofi/1: (y/n)? \fBy\fR

```

```

652 /dev/rlofi/1: 71638 sectors in 119 cylinders of 1 tracks, 602 sectors
653 35.0MB in 8 cyl groups (16 c/g, 4.70MB/g, 2240 i/g)
654 super-block backups (for fsck -F ufs -o b=#) at:
655 32, 9664, 19296, 28928, 38560, 48192, 57824, 67456,
656 .fi
657 .in -2
658 .sp

660 .sp
661 .LP
662 The mapped file system shows that encryption is enabled:

664 .sp
665 .in +2
666 .nf
667 # \fBlofiadm\fR
668 Block Device File Options
669 /dev/lofi/1 /export/home/secrets Encrypted
670 .fi
671 .in -2
672 .sp

674 .sp
675 .LP
676 Mount and use the filesystem:

678 .sp
679 .in +2
680 .nf
681 # \fBmount /dev/lofi/1 /mnt\fR
682 # \fBcp moms_secret_*_recipe /mnt\fR
683 # \fBls /mnt\fR
684 \&./ moms_secret_cookie_recipe moms_secret_soup_recipe
685 \&./ moms_secret_fudge_recipe moms_secret_stuffing_recipe
686 lost+found/ moms_secret_meatloaf_recipe moms_secret_waffle_recipe
687 # \fBumount /mnt\fR
688 # \fBlofiadm -d /dev/lofi/1\fR
689 .fi
690 .in -2
691 .sp

693 .sp
694 .LP
695 Subsequent attempts to map the filesystem with the wrong key or the wrong
696 encryption algorithm will fail:

698 .sp
699 .in +2
700 .nf
701 # \fBlofiadm -c blowfish-cbc -a /export/home/secrets\fR
702 Enter passphrase: \fBmommy\fR (\fInot echoed\fR)
703 Re-enter passphrase: \fBmommy\fR (\fInot echoed\fR)
704 lofiadm: could not map file /root/lofi: Invalid argument
705 # \fBlofiadm\fR
706 Block Device File Options
707 #
708 .fi
709 .in -2
710 .sp

712 .sp
713 .LP
714 Attempts to map the filesystem without encryption will succeed, however
715 attempts to mount and use the filesystem will fail:

717 .sp

```

```

718 .in +2
719 .nf
720 # \fBlofiadm -a /export/home/secrets\fR
721 /dev/lofi/1
722 # \fBlofiadm\fR
723 Block Device File Options
724 /dev/lofi/1 /export/home/secrets -
725 # \fBmount /dev/lofi/1 /mnt\fR
726 mount: /dev/lofi/1 is not this fstype
727 #
728 .fi
729 .in -2
730 .sp

732 .SH ENVIRONMENT VARIABLES
733 .sp
734 .LP
735 See \fBenvron\fR(5) for descriptions of the following environment variables
736 that affect the execution of \fBlofiadm\fR: \fBLC_CTYPE\fR, \fBLC_MESSAGES\fR
737 and \fBNLSPATH\fR.
738 .SH EXIT STATUS
739 .sp
740 .LP
741 The following exit values are returned:
742 .sp
743 .ne 2
744 .na
745 \fB\fB0\fR\fR
746 .ad
747 .sp .6
748 .RS 4n
749 Successful completion.
750 .RE

752 .sp
753 .ne 2
754 .na
755 \fB\fB>0\fR\fR
756 .ad
757 .sp .6
758 .RS 4n
759 An error occurred.
760 .RE

762 .SH SEE ALSO
763 .sp
764 .LP
765 \fBfsck\fR(1M), \fBmount\fR(1M), \fBmount_ufs\fR(1M), \fBnewfs\fR(1M),
766 \fBattributes\fR(5), \fBlofi\fR(7D), \fBblofs\fR(7FS)
767 .SH NOTES
768 .sp
769 .LP
770 Just as you would not directly access a disk device that has mounted file
771 systems, you should not access a file associated with a block device except
772 through the \fBlofi\fR file driver. It might also be appropriate to ensure that
773 the file has appropriate permissions to prevent such access.
774 .sp
775 .LP
776 The abilities of \fBlofiadm\fR, and who can use them, are controlled by the
777 permissions of \fB/dev/lofi1\fR. Read-access allows query operations, such as
778 listing all the associations. Write-access is required to do any state-changing
779 operations, like adding an association. As shipped, \fB/dev/lofi1\fR is owned
780 by \fBroot\fR, in group \fBsys\fR, and mode \fB0644\fR, so all users can do
781 query operations but only root can change anything. The administrator can give
782 users write-access, allowing them to add or delete associations, but that is
783 very likely a security hole and should probably only be given to a trusted

```

780 group.
781 .sp
782 .LP
783 When mounting a filesystem image, take care to use appropriate mount options.
784 In particular, the \fBnosuid\fR mount option might be appropriate for \fBUFS\fR
785 images whose origin is unknown. Also, some options might not be useful or
786 appropriate, like \fBlogging\fR or \fBforcedirectio\fR for \fBUFS\fR. For
787 compatibility purposes, a raw device is also exported along with the block
788 device. For example, \fBnewfs\fR(1M) requires one.
789 .sp
790 .LP
791 The output of \fBlofiadm\fR (without arguments) might change in future
792 releases.