Full credit is given to the above companies including the OS that this PDF file was generated!

Red Hat Enterprise Linux Release 9.2 Manual Pages on 'EVP_PKEY_fromdata.3ossl' command

$ man EVP_PKEY_fromdata.3ossl

EVP_PKEY_FROMDATA(3ossl) OpenSSL EVP_PKEY_FROMDATA(3ossl)

NAME

EVP_PKEY_fromdata_init, EVP_PKEY_fromdata, EVP_PKEY_fromdata_settable - functions to create keys and key parameters from user data

SYNOPSIS

```
#include <openssl/evp.h>
int EVP_PKEY_fromdata_init(EVP_PKEY_CTX *ctx);
int EVP_PKEY_fromdata(EVP_PKEY_CTX *ctx, EVP_PKEY **ppkey, int selection,
                      OSSL_PARAM params[]);
const OSSL_PARAM *EVP_PKEY_fromdata_settable(EVP_PKEY_CTX *ctx, int selection);
```

DESCRIPTION

The functions described here are used to create new keys from user provided key data, such as n, e and d for a minimal RSA keypair.

These functions use an EVP_PKEY_CTX context, which should primarily be created with EVP_PKEY_CTX_new_from_name(3) or EVP_PKEY_CTX_new_id(3).

The exact key data that the user can pass depends on the key type.

These are passed as an OSSL_PARAM(3) array.

EVP_PKEY_fromdata_init() initializes a public key algorithm context for creating a key or key parameters from user data.

EVP_PKEY_fromdata() creates the structure to store a key or key parameters, given data from params, selection and a context that's been initialized with EVP_PKEY_fromdata_init(). The result is written to *ppkey. selection is described in "Selections". The parameters that

can be used for various types of key are as described by the diverse "Common parameters" sections of the EVP_PKEY-RSA(7), EVP_PKEY-DSA(7), EVP_PKEY-DH(7), EVP_PKEY-EC(7), EVP_PKEY-ED448(7), EVP_PKEY-X25519(7), EVP_PKEY-X448(7), and EVP_PKEY-ED25519(7) pages.

EVP_PKEY_fromdata_settable() gets a constant OSSL_PARAM array that describes the settable parameters that can be used with EVP_PKEY_fromdata(). selection is described in "Selections". See OSSL_PARAM(3) for the use of OSSL_PARAM as parameter descriptor.

Parameters in the params array that are not among the settable parameters for the given selection are ignored.

Selections

The following constants can be used for selection:

EVP_PKEY_KEY_PARAMETERS

Only key parameters will be selected.

EVP_PKEY_PUBLIC_KEY

Only public key components will be selected. This includes optional key parameters.

EVP_PKEY_KEYPAIR

Any keypair components will be selected. This includes the private key, public key and key parameters.

NOTES

These functions only work with key management methods coming from a provider. This is the mirror function to EVP_PKEY_todata(3).

RETURN VALUES

EVP_PKEY_fromdata_init() and EVP_PKEY_fromdata() return 1 for success and 0 or a negative value for failure. In particular a return value of -2 indicates the operation is not supported by the public key algorithm.

EXAMPLES

These examples are very terse for the sake of staying on topic, which is the EVP_PKEY_fromdata() set of functions. In real applications, BIGNUMs would be handled and converted to byte arrays with BN_bn2nativepad(), but that's off topic here.

Creating an RSA keypair using raw key data

```
#include <openssl/evp.h>
/*
 * These are extremely small to make this example simple.  A real
 * and secure application will not use such small numbers.  A real
 * and secure application is expected to use BIGNUMs, and to build
 * this array dynamically.
 */
unsigned long rsa_n = 0xbc747fc5;
unsigned long rsa_e = 0x10001;
unsigned long rsa_d = 0x7b133399;
OSSL_PARAM params[] = {
    OSSL_PARAM_ulong("n", &rsa_n),
    OSSL_PARAM_ulong("e", &rsa_e),
    OSSL_PARAM_ulong("d", &rsa_d),
    OSSL_PARAM_END
};
int main()
{
    EVP_PKEY_CTX *ctx = EVP_PKEY_CTX_new_from_name(NULL, "RSA", NULL);
    EVP_PKEY *pkey = NULL;
    if (ctx == NULL
        || EVP_PKEY_fromdata_init(ctx) <= 0
        || EVP_PKEY_fromdata(ctx, &pkey, EVP_PKEY_KEYPAIR, params) <= 0)
        exit(1);
    /* Do what you want with |pkey| */
}
```

Creating an ECC keypair using raw key data

```
#include <openssl/evp.h>
#include <openssl/param_build.h>
#include <openssl/ec.h>
/*
 * Fixed data to represent the private and public key.
```

```
 */
const unsigned char priv_data[] = {
    0xb9, 0x2f, 0x3c, 0xe6, 0x2f, 0xfb, 0x45, 0x68,
    0x39, 0x96, 0xf0, 0x2a, 0xaf, 0x6c, 0xda, 0xf2,
    0x89, 0x8a, 0x27, 0xbf, 0x39, 0x9b, 0x7e, 0x54,
    0x21, 0xc2, 0xa1, 0xe5, 0x36, 0x12, 0x48, 0x5d
};
/* UNCOMPRESSED FORMAT */
const unsigned char pub_data[] = {
    POINT_CONVERSION_UNCOMPRESSED,
    0xcf, 0x20, 0xfb, 0x9a, 0x1d, 0x11, 0x6c, 0x5e,
    0x9f, 0xec, 0x38, 0x87, 0x6c, 0x1d, 0x2f, 0x58,
    0x47, 0xab, 0xa3, 0x9b, 0x79, 0x23, 0xe6, 0xeb,
    0x94, 0x6f, 0x97, 0xdb, 0xa3, 0x7d, 0xbd, 0xe5,
    0x26, 0xca, 0x07, 0x17, 0x8d, 0x26, 0x75, 0xff,
    0xcb, 0x8e, 0xb6, 0x84, 0xd0, 0x24, 0x02, 0x25,
    0x8f, 0xb9, 0x33, 0x6e, 0xcf, 0x12, 0x16, 0x2f,
    0x5c, 0xcd, 0x86, 0x71, 0xa8, 0xbf, 0x1a, 0x47
};
int main()
{
    EVP_PKEY_CTX *ctx;
    EVP_PKEY *pkey = NULL;
    BIGNUM *priv;
    OSSL_PARAM_BLD *param_bld;
    OSSL_PARAM *params = NULL;
    int exitcode = 0;
    priv = BN_bin2bn(priv_data, sizeof(priv_data), NULL);
    param_bld = OSSL_PARAM_BLD_new();
    if (priv != NULL && param_bld != NULL
        && OSSL_PARAM_BLD_push_utf8_string(param_bld, "group",
                                           "prime256v1", 0)
        && OSSL_PARAM_BLD_push_BN(param_bld, "priv", priv)
```

```
            && OSSL_PARAM_BLD_push_octet_string(param_bld, "pub",
                                                pub_data, sizeof(pub_data)))
            params = OSSL_PARAM_BLD_to_param(param_bld);
        ctx = EVP_PKEY_CTX_new_from_name(NULL, "EC", NULL);
        if (ctx == NULL
            || params == NULL
            || EVP_PKEY_fromdata_init(ctx) <= 0
            || EVP_PKEY_fromdata(ctx, &pkey, EVP_PKEY_KEYPAIR, params) <= 0) {
            exitcode = 1;
        } else {
            /* Do what you want with |pkey| */
        }
        EVP_PKEY_free(pkey);
        EVP_PKEY_CTX_free(ctx);
        OSSL_PARAM_free(params);
        OSSL_PARAM_BLD_free(param_bld);
        BN_free(priv);
        exit(exitcode);
    }
```

Finding out params for an unknown key type

```
    #include <openssl/evp.h>
    #include <openssl/core.h>
    /* Program expects a key type as first argument */
    int main(int argc, char *argv[])
    {
        EVP_PKEY_CTX *ctx = EVP_PKEY_CTX_new_from_name(NULL, argv[1], NULL);
        const OSSL_PARAM *settable_params = NULL;
        if (ctx == NULL)
            exit(1);
        settable_params = EVP_PKEY_fromdata_settable(ctx, EVP_PKEY_KEYPAIR);
        if (settable_params == NULL)
            exit(1);
        for (; settable_params->key != NULL; settable_params++) {
```

```
        const char *datatype = NULL;
        switch (settable_params->data_type) {
        case OSSL_PARAM_INTEGER:
            datatype = "integer";
            break;
        case OSSL_PARAM_UNSIGNED_INTEGER:
            datatype = "unsigned integer";
            break;
        case OSSL_PARAM_UTF8_STRING:
            datatype = "printable string (utf-8 encoding expected)";
            break;
        case OSSL_PARAM_UTF8_PTR:
            datatype = "printable string pointer (utf-8 encoding expected)";
            break;
        case OSSL_PARAM_OCTET_STRING:
            datatype = "octet string";
            break;
        case OSSL_PARAM_OCTET_PTR:
            datatype = "octet string pointer";
            break;
        }
        printf("%s : %s ", settable_params->key, datatype);
        if (settable_params->data_size == 0)
            printf("(unlimited size)\n");
        else
            printf("(maximum size %zu)\n", settable_params->data_size);
    }
}
```

The descriptor OSSL_PARAM(3) returned by EVP_PKEY_fromdata_settable() may also be used programmatically, for example with OSSL_PARAM_allocate_from_text(3).

SEE ALSO

EVP_PKEY_CTX_new(3), provider(7), EVP_PKEY_gettable_params(3),

OSSL_PARAM(3), EVP_PKEY_todata(3), EVP_PKEY-RSA(7), EVP_PKEY-DSA(7), EVP_PKEY-DH(7), EVP_PKEY-EC(7), EVP_PKEY-ED448(7), EVP_PKEY-X25519(7), EVP_PKEY-X448(7), EVP_PKEY-ED25519(7)

HISTORY

These functions were added in OpenSSL 3.0.

COPYRIGHT