NAME

life_cycle−pkey − The PKEY algorithm life−cycle

DESCRIPTION

All public keys (PKEYs) go through a number of stages in their life-cycle:

start
: This state represents the PKEY before it has been allocated. It is the starting state for any life-cycle transitions.

newed
: This state represents the PKEY after it has been allocated.

decapsulate
: This state represents the PKEY when it is ready to perform a private key decapsulation opeartion.

decrypt
: This state represents the PKEY when it is ready to decrypt some ciphertext.

derive
: This state represents the PKEY when it is ready to derive a shared secret.

digest sign
: This state represents the PKEY when it is ready to perform a private key signature operation.

encapsulate
: This state represents the PKEY when it is ready to perform a public key encapsulation opeartion.

encrypt
: This state represents the PKEY when it is ready to encrypt some plaintext.

key generation
: This state represents the PKEY when it is ready to generate a new public/private key.

parameter generation
: This state represents the PKEY when it is ready to generate key parameters.

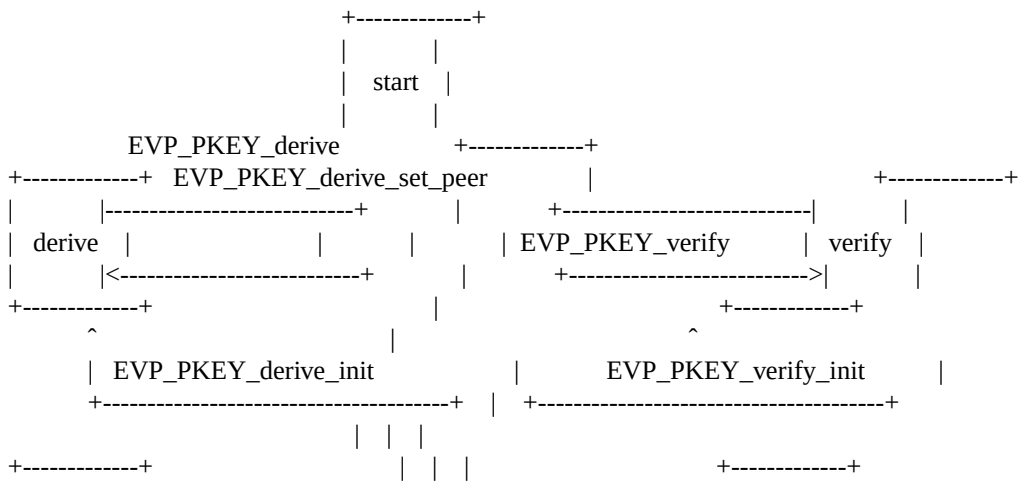
verify
: This state represents the PKEY when it is ready to verify a public key signature.

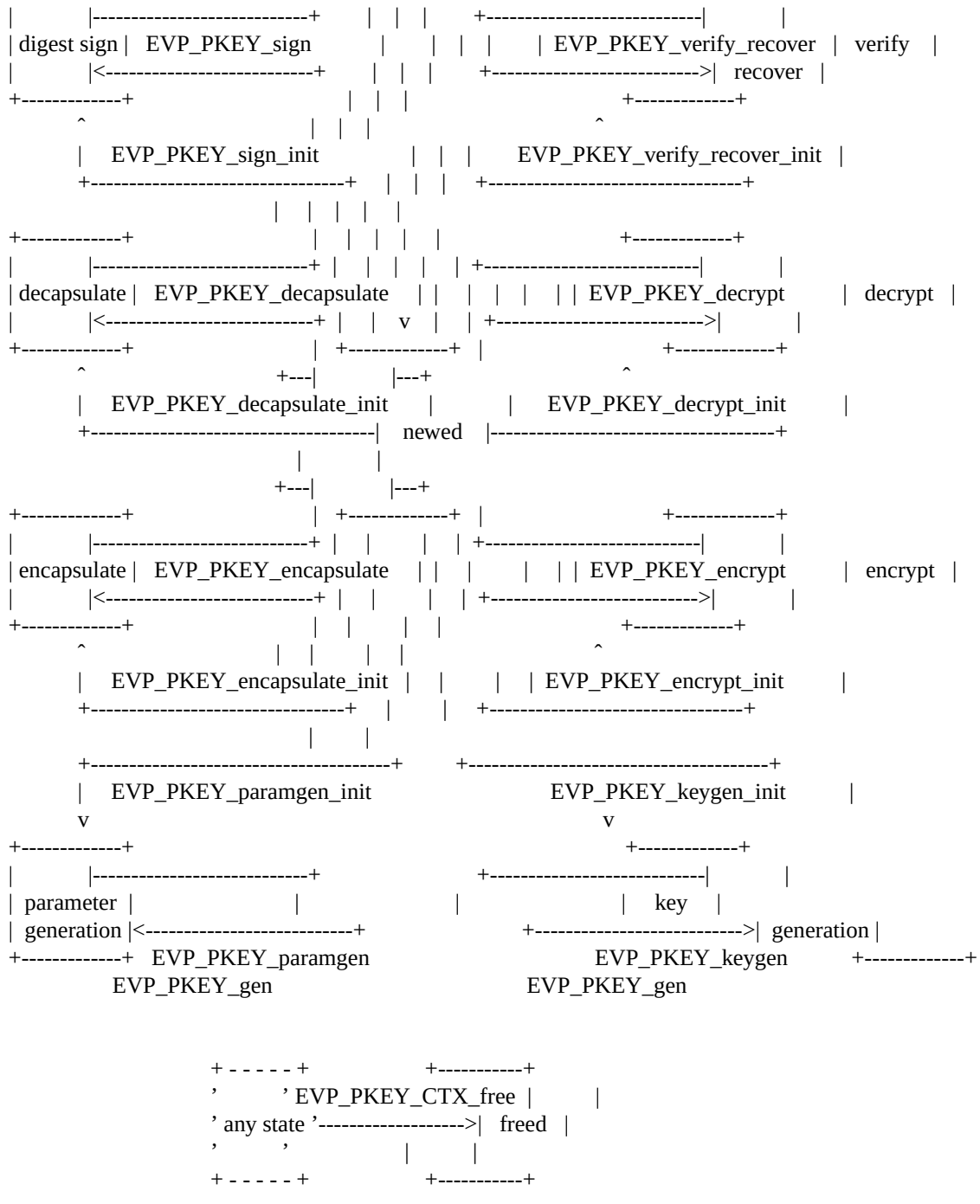
verify recover
: This state represents the PKEY when it is ready to recover a public key signature data.

freed
: This state is entered when the PKEY is freed. It is the terminal state for all life-cycle transitions.

State Transition Diagram

The usual life-cycle of a PKEY object is illustrated:





Formal State Transitions

This section defines all of the legal state transitions. This is the canonical list.

Function Call	Current State											
	start	newed	digest sign	verify recover	verify	encrypt	decrypt	derive	encapsulate	decapsulate	parameter generation	key generation	freed
EVP_PKEY_CTX_new	newed												
EVP_PKEY_CTX_new_id	newed												
EVP_PKEY_CTX_new_from_name	newed												

EVP_PKEY_CTX_new_from_pkey newed
EVP_PKEY_sign_init digest digest digest digest digest digest digest digest digest digest digest digest
sign sign sign sign sign sign sign sign sign sign sign
EVP_PKEY_sign digest
sign
EVP_PKEY_verify_init verify verify verify verify verify verify verify verify verify verify verify verify
EVP_PKEY_verify verify
EVP_PKEY_verify_recover_init verify verify verify verify verify verify verify verify verify verify verify
recover recover recover recover recover recover recover recover recover recover recover
EVP_PKEY_verify_recover verify
recover
EVP_PKEY_encrypt_init encrypt encrypt encrypt encrypt encrypt encrypt encrypt encrypt encrypt encrypt encrypt
EVP_PKEY_encrypt encrypt
EVP_PKEY_decrypt_init decrypt decrypt decrypt decrypt decrypt decrypt decrypt decrypt decrypt decrypt decrypt
EVP_PKEY_decrypt decrypt
EVP_PKEY_derive_init derive derive derive derive derive derive derive derive derive derive derive
EVP_PKEY_derive_set_peer derive
EVP_PKEY_derive derive
EVP_PKEY_encapsulate_init encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate encapsulate
EVP_PKEY_encapsulate encapsulate
EVP_PKEY_decapsulate_init decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate decapsulate
EVP_PKEY_decapsulate
decapsulate
EVP_PKEY_paramgen_init parameter parameter parameter parameter parameter parameter parameter parameter parameter parameter parameter
generation generation generation generation generation generation generation generation generation generation generation
EVP_PKEY_paramgen
parameter
generation
EVP_PKEY_keygen_init key key key key key key key key key key key
generation generation generation generation generation generation generation generation generation generation generation
EVP_PKEY_keygen
key
generation
EVP_PKEY_gen
parameter key
generation
generation
EVP_PKEY_CTX_get_params newed digest verify verify encrypt decrypt derive encapsulate decapsulate parameter key
sign recover

	generation	generation												
EVP_PKEY_CTX_set_params	newed	digest	verify	verify	encrypt	decrypt	derive	encapsulate	decapsulate	parameter	key			
											sign			recover
	generation	generation												
EVP_PKEY_CTX_gettable_params	newed	digest	verify	verify	encrypt	decrypt	derive	encapsulate	decapsulate	parameter	key			
											sign			recover
	generation	generation												
EVP_PKEY_CTX_settable_params	newed	digest	verify	verify	encrypt	decrypt	derive	encapsulate	decapsulate	parameter	key			
											sign			recover
	generation	generation												
EVP_PKEY_CTX_free	freed	freed	freed	freed	freed	freed	freed	freed	freed	freed	freed	freed	freed	freed

NOTES

At some point the EVP layer will begin enforcing the transitions described herein.

SEE ALSO

EVP_PKEY_new (3), **EVP_PKEY_decapsulate** (3), **EVP_PKEY_decrypt** (3), **EVP_PKEY_encapsulate** (3), **EVP_PKEY_encrypt** (3), **EVP_PKEY_derive** (3), **EVP_PKEY_keygen** (3), **EVP_PKEY_sign** (3), **EVP_PKEY_verify** (3), **EVP_PKEY_verify_recover** (3)

HISTORY

The provider PKEY interface was introduced in OpenSSL 3.0.

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