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 operation.

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 operation.

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

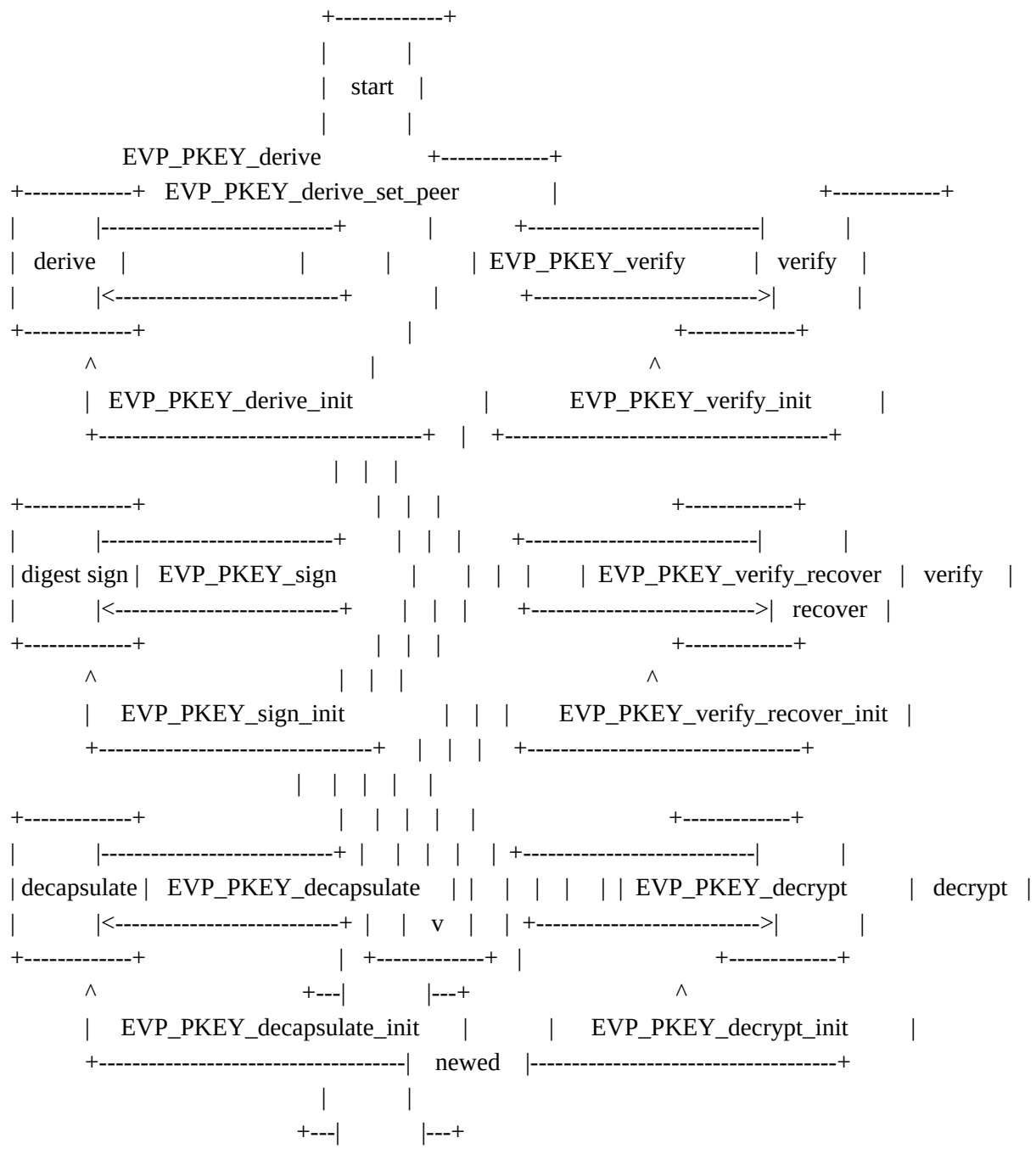
This state represents the PKEY when it is ready to recover a public key signature data.

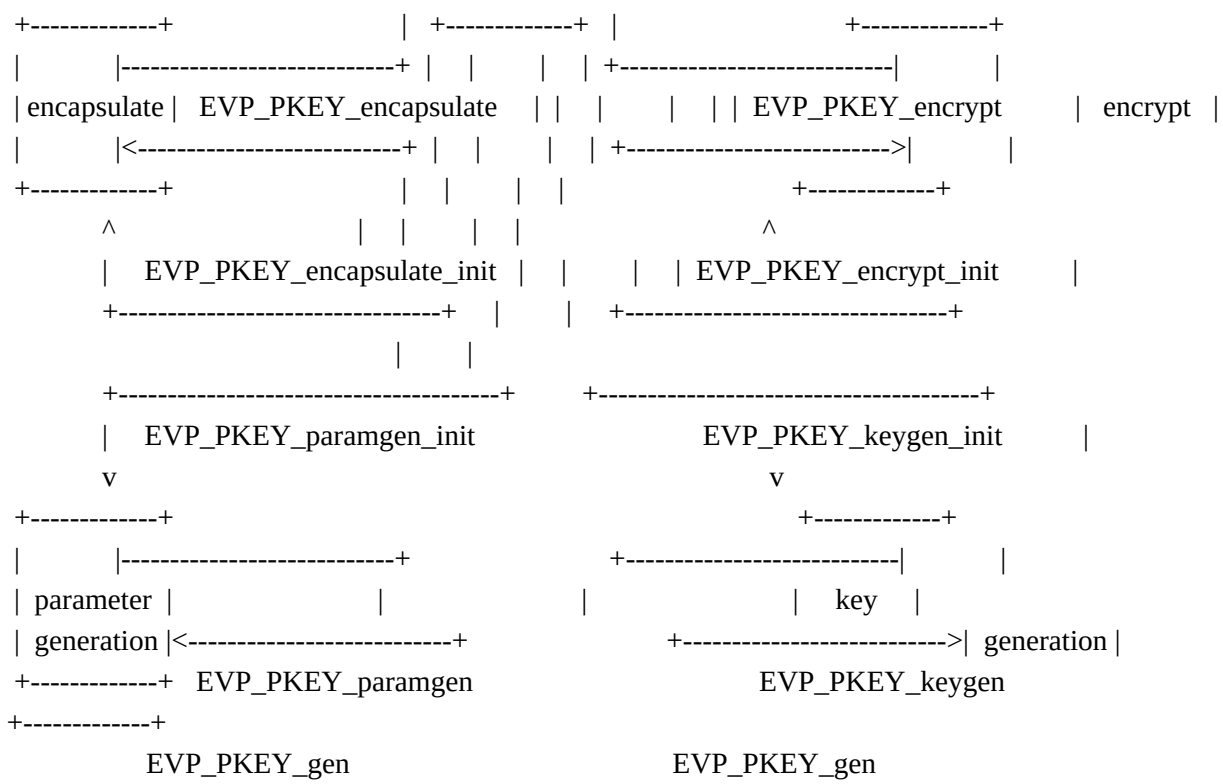
freed

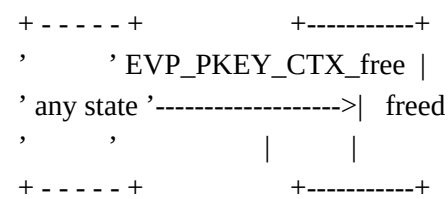
This state is entered when the PKEY is freed. It is the terminal state for all life-cycle transitions.

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	

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
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

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

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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