NAME

perlintern - autogenerated documentation of purely **internal** Perl functions

DESCRIPTION

This file is the autogenerated documentation of functions in the Perl interpreter that are documented using Perl's internal documentation format but are not marked as part of the Perl API. In other words, **they are not for use in extensions**!

Compile-time scope hooks

BhkENTRY

NOTE: this function is experimental and may change or be removed without notice.

Return an entry from the BHK structure. `which` is a preprocessor token indicating which entry to return. If the appropriate flag is not set this will return `NULL`. The type of the return value depends on which entry you ask for.

```
void * BhkENTRY(BHK *hk, which)
```

BhkFLAGS

NOTE: this function is experimental and may change or be removed without notice.

Return the BHK's flags.

```
U32 BhkFLAGS(BHK *hk)
```

CALL_BLOCK_HOOKS

NOTE: this function is experimental and may change or be removed without notice.

Call all the registered block hooks for type `which`. `which` is a preprocessing token; the type of `arg` depends on `which`.

```
void CALL_BLOCK_HOOKS(which, arg)
```

Custom Operators

core_prototype

This function assigns the prototype of the named core function to `sv`, or to a new mortal SV if `sv` is `NULL`. It returns the modified `sv`, or `NULL` if the core function has no prototype. `code` is a code as returned by `keyword()`. It must not be equal to 0.

```
SV * core_prototype(SV *sv, const char *name,
                    const int code,
                    int * const opnum)
```

CV Manipulation Functions

docatch

Check for the cases 0 or 3 of cur_env.je_ret, only used inside an eval context.

0 is used as continue inside eval,

3 is used for a die caught by an inner eval - continue inner loop

See *cop.h*: je_mustcatch, when set at any runlevel to TRUE, means eval ops must establish a local jmpenv to handle exception traps.

```
OP* docatch(OP *o)
```

CV reference counts and CvOUTSIDE

CvWEAKOUTSIDE

Each CV has a pointer, `CvOUTSIDE()`, to its lexically enclosing CV (if any). Because pointers to anonymous sub prototypes are stored in `&` pad slots, it is a possible to get a circular reference, with the parent pointing to the child and vice-versa. To avoid the ensuing memory leak, we do not increment the reference count of the CV pointed to by `CvOUTSIDE` in the *one specific instance* that the parent has a `&` pad slot pointing back to us. In this case, we set the `CvWEAKOUTSIDE` flag in the child. This allows us to determine under what circumstances we should decrement the refcount of the parent when freeing the child.

There is a further complication with non-closure anonymous subs (i.e. those that do not refer to any lexicals outside that sub). In this case, the anonymous prototype is shared rather than being cloned. This has the consequence that the parent may be freed while there are still active children, *e.g.*,

```
BEGIN { $a = sub { eval '$x' } }
```

In this case, the BEGIN is freed immediately after execution since there are no active references to it: the anon sub prototype has `CvWEAKOUTSIDE` set since it's not a closure, and $a points to the same CV, so it doesn't contribute to BEGIN's refcount either. When $a is executed, the `eval '$x'` causes the chain of `CvOUTSIDE`s to be followed, and the freed BEGIN is accessed.

To avoid this, whenever a CV and its associated pad is freed, any `&` entries in the pad are explicitly removed from the pad, and if the refcount of the pointed-to anon sub is still positive, then that child's `CvOUTSIDE` is set to point to its grandparent. This will only occur in the single specific case of a non-closure anon prototype having one or more active references (such as $a above).

One other thing to consider is that a CV may be merely undefined rather than freed, eg `undef &foo`. In this case, its refcount may not have reached zero, but we still delete its pad and its `CvROOT` etc. Since various children may still have their `CvOUTSIDE` pointing at this undefined CV, we keep its own `CvOUTSIDE` for the time being, so that the chain of lexical scopes is unbroken. For example, the following should print 123:

```
my $x = 123;
sub tmp { sub { eval '$x' } }
my $a = tmp();
undef &tmp;
print  $a->();
```

```
bool CvWEAKOUTSIDE(CV *cv)
```

Embedding Functions

cv_dump

dump the contents of a CV

```
void cv_dump(CV *cv, const char *title)
```

cv_forget_slab

When a CV has a reference count on its slab (`CvSLABBED`), it is responsible for making sure it is freed. (Hence, no two CVs should ever have a reference count on the same slab.) The CV only needs to reference the slab during compilation. Once it is compiled and `CvROOT` attached, it has finished its job, so it can forget the slab.

```
void cv_forget_slab(CV *cv)
```

do_dump_pad

Dump the contents of a padlist

```
void do_dump_pad(I32 level, PerlIO *file,
                 PADLIST *padlist, int full)
```

pad_alloc_name

Allocates a place in the currently-compiling pad (via *"pad_alloc" in perlapi*) and then stores a name for that entry. `name` is adopted and becomes the name entry; it must already contain the name string. `typestash` and `ourstash` and the `padadd_STATE` flag get added to `name`. None of the other processing of *"pad_add_name_pvn" in perlapi* is done. Returns the offset of the allocated pad slot.

```
PADOFFSET pad_alloc_name(PADNAME *name, U32 flags,
                         HV *typestash, HV *ourstash)
```

pad_block_start

Update the pad compilation state variables on entry to a new block.

```
void pad_block_start(int full)
```

pad_check_dup

Check for duplicate declarations: report any of:

```
* a 'my' in the current scope with the same name;
* an 'our' (anywhere in the pad) with the same name and the
  same stash as 'ourstash'
```

`is_our` indicates that the name to check is an `"our"` declaration.

```
void pad_check_dup(PADNAME *name, U32 flags,
                   const HV *ourstash)
```

pad_findlex

Find a named lexical anywhere in a chain of nested pads. Add fake entries in the inner pads if it's found in an outer one.

Returns the offset in the bottom pad of the lex or the fake lex. `cv` is the CV in which to start the search, and seq is the current `cop_seq` to match against. If `warn` is true, print appropriate warnings. The `out_*` vars return values, and so are pointers to where the returned values should be stored. `out_capture`, if non-null, requests that the innermost instance of the lexical is captured; `out_name` is set to the innermost matched pad name or fake pad name; `out_flags` returns the flags normally associated with the `PARENT_FAKELEX_FLAGS` field of a fake pad name.

Note that `pad_findlex()` is recursive; it recurses up the chain of CVs, then comes back down, adding fake entries as it goes. It has to be this way because fake names in anon protoypes have to store in `xlow` the index into the parent pad.

```
PADOFFSET pad_findlex(const char *namepv,
                      STRLEN namelen, U32 flags,
                      const CV* cv, U32 seq, int warn,
                      SV** out_capture,
                      PADNAME** out_name,
                      int *out_flags)
```

pad_fixup_inner_anons

For any anon CVs in the pad, change `CvOUTSIDE` of that CV from `old_cv` to `new_cv` if necessary. Needed when a newly-compiled CV has to be moved to a pre-existing CV struct.

```
void pad_fixup_inner_anons(PADLIST *padlist,
                           CV *old_cv, CV *new_cv)
```

pad_free

Free the SV at offset po in the current pad.

```
void pad_free(PADOFFSET po)
```

pad_leavemy

Cleanup at end of scope during compilation: set the max seq number for lexicals in this scope and warn of any lexicals that never got introduced.

```
void pad_leavemy()
```

padlist_dup

Duplicates a pad.

```
PADLIST * padlist_dup(PADLIST *srcpad,
                      CLONE_PARAMS *param)
```

padname_dup

Duplicates a pad name.

```
PADNAME * padname_dup(PADNAME *src, CLONE_PARAMS *param)
```

padnamelist_dup

Duplicates a pad name list.

```
PADNAMELIST * padnamelist_dup(PADNAMELIST *srcpad,
                              CLONE_PARAMS *param)
```

pad_push

Push a new pad frame onto the padlist, unless there's already a pad at this depth, in which case don't bother creating a new one. Then give the new pad an @_ in slot zero.

```
void pad_push(PADLIST *padlist, int depth)
```

pad_reset

Mark all the current temporaries for reuse

```
void pad_reset()
```

pad_swipe

Abandon the tmp in the current pad at offset po and replace with a new one.

```
void pad_swipe(PADOFFSET po, bool refadjust)
```

GV Functions

gv_try_downgrade

NOTE: this function is experimental and may change or be removed without notice.

If the typeglob gv can be expressed more succinctly, by having something other than a real GV in its place in the stash, replace it with the optimised form. Basic requirements for this are that gv is a real typeglob, is sufficiently ordinary, and is only referenced from its package. This function is meant to be used when a GV has been looked up in part to see what was there, causing upgrading, but based on what was

found it turns out that the real GV isn't required after all.

If gv is a completely empty typeglob, it is deleted from the stash.

If gv is a typeglob containing only a sufficiently-ordinary constant sub, the typeglob is replaced with a scalar-reference placeholder that more compactly represents the same thing.

```
void gv_try_downgrade(GV* gv)
```

Hash Manipulation Functions

hv_ename_add

Adds a name to a stash's internal list of effective names. See *hv_ename_delete*.

This is called when a stash is assigned to a new location in the symbol table.

```
void hv_ename_add(HV *hv, const char *name, U32 len,
                  U32 flags)
```

hv_ename_delete

Removes a name from a stash's internal list of effective names. If this is the name returned by HvENAME, then another name in the list will take its place (HvENAME will use it).

This is called when a stash is deleted from the symbol table.

```
void hv_ename_delete(HV *hv, const char *name,
                     U32 len, U32 flags)
```

refcounted_he_chain_2hv

Generates and returns a HV * representing the content of a refcounted_he chain. flags is currently unused and must be zero.

```
HV * refcounted_he_chain_2hv(
     const struct refcounted_he *c, U32 flags
 )
```

refcounted_he_fetch_pv

Like *refcounted_he_fetch_pvn*, but takes a nul-terminated string instead of a string/length pair.

```
SV * refcounted_he_fetch_pv(
     const struct refcounted_he *chain,
     const char *key, U32 hash, U32 flags
 )
```

refcounted_he_fetch_pvn

Search along a refcounted_he chain for an entry with the key specified by keypv and keylen. If flags has the REFCOUNTED_HE_KEY_UTF8 bit set, the key octets are interpreted as UTF-8, otherwise they are interpreted as Latin-1. hash is a precomputed hash of the key string, or zero if it has not been precomputed. Returns a mortal scalar representing the value associated with the key, or &PL_sv_placeholder if there is no value associated with the key.

```
SV * refcounted_he_fetch_pvn(
     const struct refcounted_he *chain,
     const char *keypv, STRLEN keylen, U32 hash,
     U32 flags
 )
```

refcounted_he_fetch_pvs

Like *refcounted_he_fetch_pvn*, but takes a NUL-terminated literal string instead of a string/length pair, and no precomputed hash.

```
SV * refcounted_he_fetch_pvs(
     const struct refcounted_he *chain,
     const char *key, U32 flags
 )
```

refcounted_he_fetch_sv

Like *refcounted_he_fetch_pvn*, but takes a Perl scalar instead of a string/length pair.

```
SV * refcounted_he_fetch_sv(
     const struct refcounted_he *chain, SV *key,
     U32 hash, U32 flags
 )
```

refcounted_he_free

Decrements the reference count of a `refcounted_he` by one. If the reference count reaches zero the structure's memory is freed, which (recursively) causes a reduction of its parent `refcounted_he`'s reference count. It is safe to pass a null pointer to this function: no action occurs in this case.

```
void refcounted_he_free(struct refcounted_he *he)
```

refcounted_he_inc

Increment the reference count of a `refcounted_he`. The pointer to the `refcounted_he` is also returned. It is safe to pass a null pointer to this function: no action occurs and a null pointer is returned.

```
struct refcounted_he * refcounted_he_inc(
                           struct refcounted_he *he
                       )
```

refcounted_he_new_pv

Like *refcounted_he_new_pvn*, but takes a nul-terminated string instead of a string/length pair.

```
struct refcounted_he * refcounted_he_new_pv(
                           struct refcounted_he *parent,
                           const char *key, U32 hash,
                           SV *value, U32 flags
                       )
```

refcounted_he_new_pvn

Creates a new `refcounted_he`. This consists of a single key/value pair and a reference to an existing `refcounted_he` chain (which may be empty), and thus forms a longer chain. When using the longer chain, the new key/value pair takes precedence over any entry for the same key further along the chain.

The new key is specified by `keypv` and `keylen`. If `flags` has the `REFCOUNTED_HE_KEY_UTF8` bit set, the key octets are interpreted as UTF-8, otherwise they are interpreted as Latin-1. `hash` is a precomputed hash of the key string, or zero if it has not been precomputed.

`value` is the scalar value to store for this key. `value` is copied by this function, which thus does not take ownership of any reference to it, and later changes to the scalar will

not be reflected in the value visible in the `refcounted_he`. Complex types of scalar will not be stored with referential integrity, but will be coerced to strings. `value` may be either null or `&PL_sv_placeholder` to indicate that no value is to be associated with the key; this, as with any non-null value, takes precedence over the existence of a value for the key further along the chain.

`parent` points to the rest of the `refcounted_he` chain to be attached to the new `refcounted_he`. This function takes ownership of one reference to `parent`, and returns one reference to the new `refcounted_he`.

```
struct refcounted_he * refcounted_he_new_pvn(
                           struct refcounted_he *parent,
                           const char *keypv,
                           STRLEN keylen, U32 hash,
                           SV *value, U32 flags
                       )
```

refcounted_he_new_pvs

Like *refcounted_he_new_pvn*, but takes a `NUL`-terminated literal string instead of a string/length pair, and no precomputed hash.

```
struct refcounted_he * refcounted_he_new_pvs(
                           struct refcounted_he *parent,
                           const char *key, SV *value,
                           U32 flags
                       )
```

refcounted_he_new_sv

Like *refcounted_he_new_pvn*, but takes a Perl scalar instead of a string/length pair.

```
struct refcounted_he * refcounted_he_new_sv(
                           struct refcounted_he *parent,
                           SV *key, U32 hash, SV *value,
                           U32 flags
                       )
```

IO Functions

start_glob

NOTE: this function is experimental and may change or be removed without notice.

Function called by `do_readline` to spawn a glob (or do the glob inside perl on VMS). This code used to be inline, but now perl uses `File::Glob` this glob starter is only used by miniperl during the build process, or when PERL_EXTERNAL_GLOB is defined. Moving it away shrinks *pp_hot.c*; shrinking *pp_hot.c* helps speed perl up.

```
PerlIO* start_glob(SV *tmpglob, IO *io)
```

Lexer interface

validate_proto

NOTE: this function is experimental and may change or be removed without notice.

This function performs syntax checking on a prototype, `proto`. If `warn` is true, any illegal characters or mismatched brackets will trigger illegalproto warnings, declaring that they were detected in the prototype for `name`.

The return value is `true` if this is a valid prototype, and `false` if it is not, regardless of whether `warn` was `true` or `false`.

Note that `NULL` is a valid `proto` and will always return `true`.

NOTE: the perl_ form of this function is deprecated.

```
bool validate_proto(SV *name, SV *proto, bool warn)
```

Magical Functions

magic_clearhint

Triggered by a delete from %^H, records the key to PL_compiling.cop_hints_hash.

```
int magic_clearhint(SV* sv, MAGIC* mg)
```

magic_clearhints

Triggered by clearing %^H, resets PL_compiling.cop_hints_hash.

```
int magic_clearhints(SV* sv, MAGIC* mg)
```

magic_methcall

Invoke a magic method (like FETCH).

sv and mg are the tied thingy and the tie magic.

meth is the name of the method to call.

argc is the number of args (in addition to $self) to pass to the method.

The flags can be:

```
    G_DISCARD     invoke method with G_DISCARD flag and don't
                  return a value
    G_UNDEF_FILL  fill the stack with argc pointers to
                  PL_sv_undef
```

The arguments themselves are any values following the flags argument.

Returns the SV (if any) returned by the method, or NULL on failure.

```
SV* magic_methcall(SV *sv, const MAGIC *mg,
                   SV *meth, U32 flags, U32 argc,
                   ...)
```

magic_sethint

Triggered by a store to %^H, records the key/value pair to PL_compiling.cop_hints_hash. It is assumed that hints aren't storing anything that would need a deep copy. Maybe we should warn if we find a reference.

```
int magic_sethint(SV* sv, MAGIC* mg)
```

mg_localize

Copy some of the magic from an existing SV to new localized version of that SV. Container magic (*e.g.*, %ENV, $1, tie) gets copied, value magic doesn't (*e.g.*, taint, pos).

If setmagic is false then no set magic will be called on the new (empty) SV. This typically means that assignment will soon follow (e.g. 'local $x = $y'), and that will handle the magic.

```
void mg_localize(SV* sv, SV* nsv, bool setmagic)
```

Miscellaneous Functions

free_c_backtrace

Deallocates a backtrace received from get_c_bracktrace.

```
void free_c_backtrace(Perl_c_backtrace* bt)
```

get_c_backtrace

Collects the backtrace (aka "stacktrace") into a single linear malloced buffer, which the caller **must** `Perl_free_c_backtrace()`.

Scans the frames back by `depth + skip`, then drops the `skip` innermost, returning at most `depth` frames.

```
Perl_c_backtrace* get_c_backtrace(int max_depth,
                                  int skip)
```

MRO Functions

mro_get_linear_isa_dfs

Returns the Depth-First Search linearization of `@ISA` the given stash. The return value is a read-only AV*. `level` should be 0 (it is used internally in this function's recursion).

You are responsible for `SvREFCNT_inc()` on the return value if you plan to store it anywhere semi-permanently (otherwise it might be deleted out from under you the next time the cache is invalidated).

```
AV* mro_get_linear_isa_dfs(HV* stash, U32 level)
```

mro_isa_changed_in

Takes the necessary steps (cache invalidations, mostly) when the `@ISA` of the given package has changed. Invoked by the `setisa` magic, should not need to invoke directly.

```
void mro_isa_changed_in(HV* stash)
```

mro_package_moved

Call this function to signal to a stash that it has been assigned to another spot in the stash hierarchy. `stash` is the stash that has been assigned. `oldstash` is the stash it replaces, if any. `gv` is the glob that is actually being assigned to.

This can also be called with a null first argument to indicate that `oldstash` has been deleted.

This function invalidates isa caches on the old stash, on all subpackages nested inside it, and on the subclasses of all those, including non-existent packages that have corresponding entries in `stash`.

It also sets the effective names (`HvENAME`) on all the stashes as appropriate.

If the `gv` is present and is not in the symbol table, then this function simply returns. This checked will be skipped if `flags & 1`.

```
void mro_package_moved(HV * const stash,
                       HV * const oldstash,
                       const GV * const gv,
                       U32 flags)
```

Optree Manipulation Functions

finalize_optree

This function finalizes the optree. Should be called directly after the complete optree is

built. It does some additional checking which can't be done in the normal ck_xxx functions and makes the tree thread-safe.

```
void finalize_optree(OP* o)
```

Pad Data Structures

CX_CURPAD_SAVE

Save the current pad in the given context block structure.

```
void CX_CURPAD_SAVE(struct context)
```

CX_CURPAD_SV

Access the SV at offset po in the saved current pad in the given context block structure (can be used as an lvalue).

```
SV * CX_CURPAD_SV(struct context, PADOFFSET po)
```

PAD_BASE_SV

Get the value from slot po in the base (DEPTH=1) pad of a padlist

```
SV * PAD_BASE_SV(PADLIST padlist, PADOFFSET po)
```

PAD_CLONE_VARS

Clone the state variables associated with running and compiling pads.

```
void PAD_CLONE_VARS(PerlInterpreter *proto_perl,
                    CLONE_PARAMS* param)
```

PAD_COMPNAME_FLAGS

Return the flags for the current compiling pad name at offset po. Assumes a valid slot entry.

```
U32 PAD_COMPNAME_FLAGS(PADOFFSET po)
```

PAD_COMPNAME_GEN

The generation number of the name at offset po in the current compiling pad (lvalue).

```
STRLEN PAD_COMPNAME_GEN(PADOFFSET po)
```

PAD_COMPNAME_GEN_set

Sets the generation number of the name at offset po in the current ling pad (lvalue) to gen. STRLEN PAD_COMPNAME_GEN_set(PADOFFSET po, int gen)

PAD_COMPNAME_OURSTASH

Return the stash associated with an our variable. Assumes the slot entry is a valid our lexical.

```
HV * PAD_COMPNAME_OURSTASH(PADOFFSET po)
```

PAD_COMPNAME_PV

Return the name of the current compiling pad name at offset po. Assumes a valid slot entry.

```
char * PAD_COMPNAME_PV(PADOFFSET po)
```

PAD_COMPNAME_TYPE

Return the type (stash) of the current compiling pad name at offset po. Must be a valid name. Returns null if not typed.

```
HV * PAD_COMPNAME_TYPE(PADOFFSET po)
```

PadnameIsOUR

Whether this is an "our" variable.

```
bool PadnameIsOUR(PADNAME pn)
```

PadnameIsSTATE

Whether this is a "state" variable.

```
bool PadnameIsSTATE(PADNAME pn)
```

PadnameOURSTASH

The stash in which this "our" variable was declared.

```
HV * PadnameOURSTASH()
```

PadnameOUTER

Whether this entry belongs to an outer pad. Entries for which this is true are often referred to as 'fake'.

```
bool PadnameOUTER(PADNAME pn)
```

PadnameTYPE

The stash associated with a typed lexical. This returns the %Foo:: hash for my Foo $bar.

```
HV * PadnameTYPE(PADNAME pn)
```

PAD_RESTORE_LOCAL

Restore the old pad saved into the local variable opad by PAD_SAVE_LOCAL()

```
void PAD_RESTORE_LOCAL(PAD *opad)
```

PAD_SAVE_LOCAL

Save the current pad to the local variable opad, then make the current pad equal to npad

```
void PAD_SAVE_LOCAL(PAD *opad, PAD *npad)
```

PAD_SAVE_SETNULLPAD

Save the current pad then set it to null.

```
void PAD_SAVE_SETNULLPAD()
```

PAD_SETSV

Set the slot at offset po in the current pad to sv

```
SV * PAD_SETSV(PADOFFSET po, SV* sv)
```

PAD_SET_CUR

Set the current pad to be pad n in the padlist, saving the previous current pad. NB currently this macro expands to a string too long for some compilers, so it's best to

replace it with

```
SAVECOMPPAD();
PAD_SET_CUR_NOSAVE(padlist,n);
```

```
void PAD_SET_CUR(PADLIST padlist, I32 n)
```

PAD_SET_CUR_NOSAVE

like PAD_SET_CUR, but without the save

```
void PAD_SET_CUR_NOSAVE(PADLIST padlist, I32 n)
```

PAD_SV

Get the value at offset `po` in the current pad

```
SV * PAD_SV(PADOFFSET po)
```

PAD_SVl

Lightweight and lvalue version of `PAD_SV`. Get or set the value at offset `po` in the current pad. Unlike `PAD_SV`, does not print diagnostics with -DX. For internal use only.

```
SV * PAD_SVl(PADOFFSET po)
```

SAVECLEARSV

Clear the pointed to pad value on scope exit. (i.e. the runtime action of `my`)

```
void SAVECLEARSV(SV **svp)
```

SAVECOMPPAD

save `PL_comppad` and `PL_curpad`

```
void SAVECOMPPAD()
```

SAVEPADSV

Save a pad slot (used to restore after an iteration)

XXX DAPM it would make more sense to make the arg a PADOFFSET void SAVEPADSV(PADOFFSET po)

Per-Interpreter Variables

PL_DBsingle

When Perl is run in debugging mode, with the **-d** switch, this SV is a boolean which indicates whether subs are being single-stepped. Single-stepping is automatically turned on after every step. This is the C variable which corresponds to Perl's $DB::single variable. See *`PL_DBsub`*.

```
SV * PL_DBsingle
```

PL_DBsub

When Perl is run in debugging mode, with the **-d** switch, this GV contains the SV which holds the name of the sub being debugged. This is the C variable which corresponds to Perl's $DB::sub variable. See *`PL_DBsingle`*.

```
GV * PL_DBsub
```

PL_DBtrace

Trace variable used when Perl is run in debugging mode, with the **-d** switch. This is the C variable which corresponds to Perl's $DB::trace variable. See *PL_DBsingle*.

```
SV * PL_DBtrace
```

PL_dowarn

The C variable which corresponds to Perl's $^W warning variable.

```
bool PL_dowarn
```

PL_last_in_gv

The GV which was last used for a filehandle input operation. (<FH>)

```
GV* PL_last_in_gv
```

PL_ofsgv

The glob containing the output field separator - *, in Perl space.

```
GV* PL_ofsgv
```

PL_rs

The input record separator - $/ in Perl space.

```
SV* PL_rs
```

Stack Manipulation Macros

djSP

Declare Just SP. This is actually identical to dSP, and declares a local copy of perl's stack pointer, available via the SP macro. See *"SP" in perlapi*. (Available for backward source code compatibility with the old (Perl 5.005) thread model.)

```
djSP;
```

LVRET

True if this op will be the return value of an lvalue subroutine

SV-Body Allocation

sv_2num

NOTE: this function is experimental and may change or be removed without notice.

Return an SV with the numeric value of the source SV, doing any necessary reference or overload conversion. The caller is expected to have handled get-magic already.

```
SV* sv_2num(SV *const sv)
```

sv_copypv

Copies a stringified representation of the source SV into the destination SV. Automatically performs any necessary mg_get and coercion of numeric values into strings. Guaranteed to preserve UTF8 flag even from overloaded objects. Similar in nature to sv_2pv[_flags] but operates directly on an SV instead of just the string. Mostly uses sv_2pv_flags to do its work, except when that would lose the UTF-8'ness of the PV.

```
void sv_copypv(SV *const dsv, SV *const ssv)
```

SV Manipulation Functions

An SV (or AV, HV, etc.) is allocated in two parts: the head (struct sv, av, hv...) contains type and reference count information, and for many types, a pointer to the body (struct xrv, xpv, xpviv...), which contains fields specific to each type. Some types store all they need in the head, so don't have a body.

In all but the most memory-paranoid configurations (ex: PURIFY), heads and bodies are allocated out of arenas, which by default are approximately 4K chunks of memory parcelled up into N heads or bodies. Sv-bodies are allocated by their sv-type, guaranteeing size consistency needed to allocate safely from arrays.

For SV-heads, the first slot in each arena is reserved, and holds a link to the next arena, some flags, and a note of the number of slots. Snaked through each arena chain is a linked list of free items; when this becomes empty, an extra arena is allocated and divided up into N items which are threaded into the free list.

SV-bodies are similar, but they use arena-sets by default, which separate the link and info from the arena itself, and reclaim the 1st slot in the arena. SV-bodies are further described later.

The following global variables are associated with arenas:

```
PL_sv_arenaroot     pointer to list of SV arenas
PL_sv_root          pointer to list of free SV structures

PL_body_arenas      head of linked-list of body arenas
PL_body_roots[]     array of pointers to list of free bodies of svtype
                    arrays are indexed by the svtype needed
```

A few special SV heads are not allocated from an arena, but are instead directly created in the interpreter structure, eg PL_sv_undef. The size of arenas can be changed from the default by setting PERL_ARENA_SIZE appropriately at compile time.

The SV arena serves the secondary purpose of allowing still-live SVs to be located and destroyed during final cleanup.

At the lowest level, the macros new_SV() and del_SV() grab and free an SV head. (If debugging with -DD, del_SV() calls the function S_del_sv() to return the SV to the free list with error checking.) new_SV() calls more_sv() / sv_add_arena() to add an extra arena if the free list is empty. SVs in the free list have their SvTYPE field set to all ones.

At the time of very final cleanup, sv_free_arenas() is called from perl_destruct() to physically free all the arenas allocated since the start of the interpreter.

The function visit() scans the SV arenas list, and calls a specified function for each SV it finds which is still live - ie which has an SvTYPE other than all 1's, and a non-zero SvREFCNT. visit() is used by the following functions (specified as [function that calls visit()] / [function called by visit() for each SV]):

```
    sv_report_used() / do_report_used()
  dump all remaining SVs (debugging aid)

    sv_clean_objs() / do_clean_objs(),do_clean_named_objs(),
        do_clean_named_io_objs(),do_curse()
  Attempt to free all objects pointed to by RVs,
  try to do the same for all objects indir-
  ectly referenced by typeglobs too, and
  then do a final sweep, cursing any
  objects that remain.  Called once from
  perl_destruct(), prior to calling sv_clean_all()
```

```
below.

 sv_clean_all() / do_clean_all()
SvREFCNT_dec(sv) each remaining SV, possibly
triggering an sv_free(). It also sets the
SVf_BREAK flag on the SV to indicate that the
refcnt has been artificially lowered, and thus
stopping sv_free() from giving spurious warnings
about SVs which unexpectedly have a refcnt
of zero.  called repeatedly from perl_destruct()
until there are no SVs left.
```

sv_add_arena

Given a chunk of memory, link it to the head of the list of arenas, and split it into a list of free SVs.

```
void sv_add_arena(char *const ptr, const U32 size,
                  const U32 flags)
```

sv_clean_all

Decrement the refcnt of each remaining SV, possibly triggering a cleanup. This function may have to be called multiple times to free SVs which are in complex self-referential hierarchies.

```
I32 sv_clean_all()
```

sv_clean_objs

Attempt to destroy all objects not yet freed.

```
void sv_clean_objs()
```

sv_free_arenas

Deallocate the memory used by all arenas. Note that all the individual SV heads and bodies within the arenas must already have been freed.

```
void sv_free_arenas()
```

SvTHINKFIRST

A quick flag check to see whether an `sv` should be passed to `sv_force_normal` to be "downgraded" before `SvIVX` or `SvPVX` can be modified directly.

For example, if your scalar is a reference and you want to modify the `SvIVX` slot, you can't just do `SvROK_off`, as that will leak the referent.

This is used internally by various sv-modifying functions, such as `sv_setsv`, `sv_setiv` and `sv_pvn_force`.

One case that this does not handle is a gv without SvFAKE set. After

```
    if (SvTHINKFIRST(gv)) sv_force_normal(gv);
```

it will still be a gv.

`SvTHINKFIRST` sometimes produces false positives. In those cases `sv_force_normal` does nothing.

```
U32 SvTHINKFIRST(SV *sv)
```

Unicode Support

find_uninit_var

NOTE: this function is experimental and may change or be removed without notice.

Find the name of the undefined variable (if any) that caused the operator to issue a "Use of uninitialized value" warning. If match is true, only return a name if its value matches `uninit_sv`. So roughly speaking, if a unary operator (such as `OP_COS`) generates a warning, then following the direct child of the op may yield an `OP_PADSV` or `OP_GV` that gives the name of the undefined variable. On the other hand, with `OP_ADD` there are two branches to follow, so we only print the variable name if we get an exact match. `desc_p` points to a string pointer holding the description of the op. This may be updated if needed.

The name is returned as a mortal SV.

Assumes that `PL_op` is the OP that originally triggered the error, and that `PL_comppad`/`PL_curpad` points to the currently executing pad.

```
SV* find_uninit_var(const OP *const obase,
                    const SV *const uninit_sv,
                    bool match, const char **desc_p)
```

report_uninit

Print appropriate "Use of uninitialized variable" warning.

```
void report_uninit(const SV *uninit_sv)
```

Undocumented functions

The following functions are currently undocumented. If you use one of them, you may wish to consider creating and submitting documentation for it.

PerlIO_restore_errno

PerlIO_save_errno

Slab_Alloc

Slab_Free

Slab_to_ro

Slab_to_rw

_add_range_to_invlist

_core_swash_init

_get_encoding

_get_swash_invlist

_invlistEQ

_invlist_array_init

_invlist_contains_cp

_invlist_dump

_invlist_intersection

_invlist_intersection_maybe_complement_2nd

_invlist_invert

_invlist_len

_invlist_populate_swatch

_invlist_search

_invlist_subtract
_invlist_union
_invlist_union_maybe_complement_2nd
_load_PL_utf8_foldclosures
_new_invlist
_setup_canned_invlist
_swash_inversion_hash
_swash_to_invlist
_to_fold_latin1
_to_upper_title_latin1
_warn_problematic_locale
add_cp_to_invlist
alloc_maybe_populate_EXACT
allocmy
amagic_is_enabled
apply
av_extend_guts
av_reify
bind_match
boot_core_PerlIO
boot_core_UNIVERSAL
boot_core_mro
cando
check_utf8_print
ck_anoncode
ck_backtick
ck_bitop
ck_cmp
ck_concat
ck_defined
ck_delete
ck_each
ck_entersub_args_core
ck_eof
ck_eval
ck_exec
ck_exists
ck_ftst
ck_fun
ck_glob
ck_grep
ck_index

ck_join
ck_length
ck_lfun
ck_listiob
ck_match
ck_method
ck_null
ck_open
ck_prototype
ck_readline
ck_refassign
ck_repeat
ck_require
ck_return
ck_rfun
ck_rvconst
ck_sassign
ck_select
ck_shift
ck_smartmatch
ck_sort
ck_spair
ck_split
ck_stringify
ck_subr
ck_substr
ck_svconst
ck_tell
ck_trunc
closest_cop
compute_EXACTish
coresub_op
create_eval_scope
croak_no_mem
croak_popstack
current_re_engine
custom_op_get_field
cv_ckproto_len_flags
cv_clone_into
cv_const_sv_or_av
cv_undef_flags
cvgv_from_hek

cvgv_set
cvstash_set
deb_stack_all
defelem_target
delete_eval_scope
die_unwind
do_aexec
do_aexec5
do_eof
do_exec
do_exec3
do_execfree
do_ipcctl
do_ipcget
do_msgrcv
do_msgsnd
do_ncmp
do_open6
do_open_raw
do_print
do_readline
do_seek
do_semop
do_shmio
do_sysseek
do_tell
do_trans
do_vecget
do_vecset
do_vop
dofile
drand48_init_r
drand48_r
dtrace_probe_call
dtrace_probe_load
dtrace_probe_op
dtrace_probe_phase
dump_all_perl
dump_packsubs_perl
dump_sub_perl
dump_sv_child
emulate_cop_io

feature_is_enabled
find_lexical_cv
find_runcv_where
find_script
form_short_octal_warning
free_tied_hv_pool
get_and_check_backslash_N_name
get_db_sub
get_debug_opts
get_hash_seed
get_invlist_iter_addr
get_invlist_offset_addr
get_invlist_previous_index_addr
get_no_modify
get_opargs
get_re_arg
getenv_len
grok_atoUV
grok_bslash_c
grok_bslash_o
grok_bslash_x
gv_fetchmeth_internal
gv_override
gv_setref
gv_stashpvn_internal
gv_stashsvpvn_cached
handle_named_backref
hfree_next_entry
hv_backreferences_p
hv_kill_backrefs
hv_placeholders_p
hv_undef_flags
init_argv_symbols
init_constants
init_dbargs
init_debugger
invert
invlist_array
invlist_clear
invlist_clone
invlist_highest
invlist_is_iterating

invlist_iterfinish
invlist_iterinit
invlist_max
invlist_previous_index
invlist_set_len
invlist_set_previous_index
invlist_trim
io_close
isGCB
is_utf8_common
isinfnansv
jmaybe
keyword
keyword_plugin_standard
list
localize
magic_clear_all_env
magic_cleararylen_p
magic_clearenv
magic_clearisa
magic_clearpack
magic_clearsig
magic_copycallchecker
magic_existspack
magic_freearylen_p
magic_freeovrld
magic_get
magic_getarylen
magic_getdebugvar
magic_getdefelem
magic_getnkeys
magic_getpack
magic_getpos
magic_getsig
magic_getsubstr
magic_gettaint
magic_getuvar
magic_getvec
magic_killbackrefs
magic_nextpack
magic_regdata_cnt
magic_regdatum_get

magic_regdatum_set
magic_scalarpack
magic_set
magic_set_all_env
magic_setarylen
magic_setcollxfrm
magic_setdbline
magic_setdebugvar
magic_setdefelem
magic_setenv
magic_setisa
magic_setlvref
magic_setmglob
magic_setnkeys
magic_setpack
magic_setpos
magic_setregexp
magic_setsig
magic_setsubstr
magic_settaint
magic_setutf8
magic_setuvar
magic_setvec
magic_sizepack
magic_wipepack
malloc_good_size
malloced_size
mem_collxfrm
mem_log_alloc
mem_log_free
mem_log_realloc
mg_find_mglob
mode_from_discipline
more_bodies
mro_meta_dup
mro_meta_init
multideref_stringify
my_attrs
my_clearenv
my_lstat_flags
my_stat_flags
my_unexec

newATTRSUB_x
newGP
newMETHOP_internal
newSTUB
newSVavdefelem
newXS_deffile
newXS_len_flags
new_warnings_bitfield
nextargv
noperl_die
oopsAV
oopsHV
op_clear
op_integerize
op_lvalue_flags
op_refcnt_dec
op_refcnt_inc
op_relocate_sv
op_std_init
op_unscope
opmethod_stash
opslab_force_free
opslab_free
opslab_free_nopad
package
package_version
pad_add_weakref
padlist_store
padname_free
padnamelist_free
parse_subsignature
parse_unicode_opts
parser_free
parser_free_nexttoke_ops
path_is_searchable
peep
pmruntime
populate_isa
ptr_hash
qerror
re_exec_indentf
re_indentf

re_op_compile
re_printf
reg_named_buff
reg_named_buff_iter
reg_numbered_buff_fetch
reg_numbered_buff_length
reg_numbered_buff_store
reg_qr_package
reg_skipcomment
reg_temp_copy
regcurly
regprop
report_evil_fh
report_redefined_cv
report_wrongway_fh
rpeep
rsignal_restore
rsignal_save
rxres_save
same_dirent
save_strlen
sawparens
scalar
scalarvoid
set_caret_X
set_padlist
should_warn_nl
sighandler
softref2xv
ssc_add_range
ssc_clear_locale
ssc_cp_and
ssc_intersection
ssc_union
sub_crush_depth
sv_add_backref
sv_buf_to_ro
sv_del_backref
sv_free2
sv_kill_backrefs
sv_len_utf8_nomg
sv_magicext_mglob

sv_mortalcopy_flags
sv_only_taint_gmagic
sv_or_pv_pos_u2b
sv_resetpvn
sv_sethek
sv_setsv_cow
sv_unglob
tied_method
tmps_grow_p
translate_substr_offsets
try_amagic_bin
try_amagic_un
unshare_hek
utilize
varname
vivify_defelem
vivify_ref
wait4pid
was_lvalue_sub
watch
win32_croak_not_implemented
write_to_stderr
xs_boot_epilog
xs_handshake
yyerror
yyerror_pv
yyerror_pvn
yylex
yyparse
yyunlex

AUTHORS

The autodocumentation system was originally added to the Perl core by Benjamin Stuhl. Documentation is by whoever was kind enough to document their functions.

SEE ALSO

perlguts, *perlapi*