

## NAME

Exporter - Implements default import method for modules

## SYNOPSIS

In module YourModule.pm:

```
package YourModule;
require Exporter;
@ISA = qw(Exporter);
@EXPORT_OK = qw(munge frobnicate); # symbols to export on request
```

or

```
package YourModule;
use Exporter 'import'; # gives you Exporter's import() method directly
@EXPORT_OK = qw(munge frobnicate); # symbols to export on request
```

In other files which wish to use YourModule:

```
use ModuleName qw(frobnicate); # import listed symbols
frobnicate ($left, $right) # calls YourModule::frobnicate
```

## DESCRIPTION

The Exporter module implements an `import` method which allows a module to export functions and variables to its users' namespaces. Many modules use Exporter rather than implementing their own `import` method because Exporter provides a highly flexible interface, with an implementation optimised for the common case.

Perl automatically calls the `import` method when processing a `use` statement for a module. Modules and `use` are documented in *perlfunc* and *perlmod*. Understanding the concept of modules and how the `use` statement operates is important to understanding the Exporter.

## How to Export

The arrays `@EXPORT` and `@EXPORT_OK` in a module hold lists of symbols that are going to be exported into the users name space by default, or which they can request to be exported, respectively. The symbols can represent functions, scalars, arrays, hashes, or typeglobs. The symbols must be given by full name with the exception that the ampersand in front of a function is optional, e.g.

```
@EXPORT      = qw(afunc $scalar @array); # afunc is a function
@EXPORT_OK  = qw(&bfunc %hash *typeglob); # explicit prefix on &bfunc
```

If you are only exporting function names it is recommended to omit the ampersand, as the implementation is faster this way.

## Selecting What To Export

Do **not** export method names!

Do **not** export anything else by default without a good reason!

Exports pollute the namespace of the module user. If you must export try to use `@EXPORT_OK` in preference to `@EXPORT` and avoid short or common symbol names to reduce the risk of name clashes.

Generally anything not exported is still accessible from outside the module using the `ModuleName::item_name` (or `$blessed_ref->method`) syntax. By convention you can use a leading underscore on names to informally indicate that they are 'internal' and not for public use.

(It is actually possible to get private functions by saying:

```
my $subref = sub { ... };
$subref->(@args);           # Call it as a function
$obj->$subref(@args);       # Use it as a method
```

However if you use them for methods it is up to you to figure out how to make inheritance work.)

As a general rule, if the module is trying to be object oriented then export nothing. If it's just a collection of functions then `@EXPORT_OK` anything but use `@EXPORT` with caution. For function and method names use barewords in preference to names prefixed with ampersands for the export lists.

Other module design guidelines can be found in *perlmod*.

## How to Import

In other files which wish to use your module there are three basic ways for them to load your module and import its symbols:

```
use ModuleName;
```

This imports all the symbols from ModuleName's `@EXPORT` into the namespace of the `use` statement.

```
use ModuleName ();
```

This causes perl to load your module but does not import any symbols.

```
use ModuleName qw(...);
```

This imports only the symbols listed by the caller into their namespace. All listed symbols must be in your `@EXPORT` or `@EXPORT_OK`, else an error occurs. The advanced export features of Exporter are accessed like this, but with list entries that are syntactically distinct from symbol names.

Unless you want to use its advanced features, this is probably all you need to know to use Exporter.

## Advanced features

### Specialised Import Lists

If any of the entries in an import list begins with `!`, `:` or `/` then the list is treated as a series of specifications which either add to or delete from the list of names to import. They are processed left to right. Specifications are in the form:

<code>[!]name</code>	This name only
<code>[!]:DEFAULT</code>	All names in <code>@EXPORT</code>
<code>[!]:tag</code>	All names in <code>\$EXPORT_TAGS{tag}</code> anonymous list
<code>[!]/pattern/</code>	All names in <code>@EXPORT</code> and <code>@EXPORT_OK</code> which match

A leading `!` indicates that matching names should be deleted from the list of names to import. If the first specification is a deletion it is treated as though preceded by `:DEFAULT`. If you just want to import extra names in addition to the default set you will still need to include `:DEFAULT` explicitly.

e.g., Module.pm defines:

```
@EXPORT      = qw(A1 A2 A3 A4 A5);
@EXPORT_OK   = qw(B1 B2 B3 B4 B5);
%EXPORT_TAGS = (T1 => [qw(A1 A2 B1 B2)], T2 => [qw(A1 A2 B3 B4)]);
```

Note that you cannot use tags in `@EXPORT` or `@EXPORT_OK`. Names in `EXPORT_TAGS` must also appear in `@EXPORT` or `@EXPORT_OK`.

An application using Module can say something like:

```
use Module qw(:DEFAULT :T2 !B3 A3);
```

Other examples include:

```
use Socket qw(!/^([AP]F_/ !SOMAXCONN !SOL_SOCKET);
use POSIX qw(:errno_h :termios_h !TCSADRAIN !/^EXIT/);
```

Remember that most patterns (using //) will need to be anchored with a leading ^, e.g., /^EXIT/ rather than /EXIT/.

You can say BEGIN { \$Exporter::Verbose=1 } to see how the specifications are being processed and what is actually being imported into modules.

### Exporting without using Exporter's import method

Exporter has a special method, 'export\_to\_level' which is used in situations where you can't directly call Exporter's import method. The export\_to\_level method looks like:

```
MyPackage->export_to_level($where_to_export, $package,
@what_to_export);
```

where \$where\_to\_export is an integer telling how far up the calling stack to export your symbols, and @what\_to\_export is an array telling what symbols \*to\* export (usually this is @\_). The \$package argument is currently unused.

For example, suppose that you have a module, A, which already has an import function:

```
package A;

@ISA = qw(Exporter);
@EXPORT_OK = qw ($b);

sub import
{
    $A::b = 1;      # not a very useful import method
}
```

and you want to Export symbol \$A::b back to the module that called package A. Since Exporter relies on the import method to work, via inheritance, as it stands Exporter::import() will never get called. Instead, say the following:

```
package A;
@ISA = qw(Exporter);
@EXPORT_OK = qw ($b);

sub import
{
    $A::b = 1;
    A->export_to_level(1, @_);
}
```

This will export the symbols one level 'above' the current package - ie: to the program or module that used package A.

Note: Be careful not to modify @\_ at all before you call export\_to\_level - or people using your package

will get very unexplained results!

## Exporting without inheriting from Exporter

By including Exporter in your @ISA you inherit an Exporter's import() method but you also inherit several other helper methods which you probably don't want. To avoid this you can do

```
package YourModule;
use Exporter qw( import );
```

which will export Exporter's own import() method into YourModule. Everything will work as before but you won't need to include Exporter in @YourModule::ISA.

## Module Version Checking

The Exporter module will convert an attempt to import a number from a module into a call to \$module\_name->require\_version(\$value). This can be used to validate that the version of the module being used is greater than or equal to the required version.

The Exporter module supplies a default require\_version method which checks the value of \$VERSION in the exporting module.

Since the default require\_version method treats the \$VERSION number as a simple numeric value it will regard version 1.10 as lower than 1.9. For this reason it is strongly recommended that you use numbers with at least two decimal places, e.g., 1.09.

## Managing Unknown Symbols

In some situations you may want to prevent certain symbols from being exported. Typically this applies to extensions which have functions or constants that may not exist on some systems.

The names of any symbols that cannot be exported should be listed in the @EXPORT\_FAIL array.

If a module attempts to import any of these symbols the Exporter will give the module an opportunity to handle the situation before generating an error. The Exporter will call an export\_fail method with a list of the failed symbols:

```
@failed_symbols = $module_name->export_fail(@failed_symbols);
```

If the export\_fail method returns an empty list then no error is recorded and all the requested symbols are exported. If the returned list is not empty then an error is generated for each symbol and the export fails. The Exporter provides a default export\_fail method which simply returns the list unchanged.

Uses for the export\_fail method include giving better error messages for some symbols and performing lazy architectural checks (put more symbols into @EXPORT\_FAIL by default and then take them out if someone actually tries to use them and an expensive check shows that they are usable on that platform).

## Tag Handling Utility Functions

Since the symbols listed within %EXPORT\_TAGS must also appear in either @EXPORT or @EXPORT\_OK, two utility functions are provided which allow you to easily add tagged sets of symbols to @EXPORT or @EXPORT\_OK:

```
%EXPORT_TAGS = (foo => [qw(aa bb cc)], bar => [qw(aa cc dd)]);
```

```
Exporter::export_tags('foo'); # add aa, bb and cc to @EXPORT
Exporter::export_ok_tags('bar'); # add aa, cc and dd to @EXPORT_OK
```

Any names which are not tags are added to @EXPORT or @EXPORT\_OK unchanged but will trigger

a warning (with `-w`) to avoid misspelt tags names being silently added to `@EXPORT` or `@EXPORT_OK`. Future versions may make this a fatal error.

### Generating combined tags

If several symbol categories exist in `%EXPORT_TAGS`, it's usually useful to create the utility `":all"` to simplify `"use"` statements.

The simplest way to do this is:

```
%EXPORT_TAGS = (foo => [qw(aa bb cc)], bar => [qw(aa cc dd)]);

# add all the other ":class" tags to the ":all" class,
# deleting duplicates
{
    my %seen;

    push @{$EXPORT_TAGS{all}},
        grep { !$seen{$_}++ } @{$EXPORT_TAGS{$_}} foreach keys %EXPORT_TAGS;
}
```

`CGI.pm` creates an `":all"` tag which contains some (but not really all) of its categories. That could be done with one small change:

```
# add some of the other ":class" tags to the ":all" class,
# deleting duplicates
{
    my %seen;

    push @{$EXPORT_TAGS{all}},
        grep { !$seen{$_}++ } @{$EXPORT_TAGS{$_}}
        foreach qw/html2 html3 netscape form cgi internal/;
}
```

Note that the tag names in `%EXPORT_TAGS` don't have the leading `':`.

### AUTOLOADED Constants

Many modules make use of `AUTOLOADING` for constant subroutines to avoid having to compile and waste memory on rarely used values (see *perlsub* for details on constant subroutines). Calls to such constant subroutines are not optimized away at compile time because they can't be checked at compile time for constancy.

Even if a prototype is available at compile time, the body of the subroutine is not (it hasn't been `AUTOLOADED` yet). `perl` needs to examine both the `()` prototype and the body of a subroutine at compile time to detect that it can safely replace calls to that subroutine with the constant value.

A workaround for this is to call the constants once in a `BEGIN` block:

```
package My ;

use Socket ;

foo( SO_LINGER );      ## SO_LINGER NOT optimized away; called at runtime
BEGIN { SO_LINGER }
foo( SO_LINGER );      ## SO_LINGER optimized away at compile time.
```

This forces the `AUTOLOAD` for `SO_LINGER` to take place before `SO_LINGER` is encountered later in `My` package.

If you are writing a package that `AUTOLOADS`, consider forcing an `AUTOLOAD` for any constants explicitly imported by other packages or which are usually used when your package is `used`.