

## NAME

perldtrace - Perl's support for DTrace

## SYNOPSIS

```
# dtrace -Zn 'perl::sub-entry, perl::sub-return {
trace(copyinstr(arg0)) }'
dtrace: description 'perl::sub-entry, perl::sub-return ' matched 10
probes
```

```
# perl -E 'sub outer { inner(@_) } sub inner { say shift }
outer("hello")'
hello
```

(dtrace output)

CPU	ID	FUNCTION:NAME
0	75915	Perl_pp_entersub:sub-entry BEGIN
0	75915	Perl_pp_entersub:sub-entry import
0	75922	Perl_pp_leavesub:sub-return import
0	75922	Perl_pp_leavesub:sub-return BEGIN
0	75915	Perl_pp_entersub:sub-entry outer
0	75915	Perl_pp_entersub:sub-entry inner
0	75922	Perl_pp_leavesub:sub-return inner
0	75922	Perl_pp_leavesub:sub-return outer

## DESCRIPTION

DTrace is a framework for comprehensive system- and application-level tracing. Perl is a DTrace *provider*, meaning it exposes several *probes* for instrumentation. You can use these in conjunction with kernel-level probes, as well as probes from other providers such as MySQL, in order to diagnose software defects, or even just your application's bottlenecks.

Perl must be compiled with the `-Dusedtrace` option in order to make use of the provided probes. While DTrace aims to have no overhead when its instrumentation is not active, Perl's support itself cannot uphold that guarantee, so it is built without DTrace probes under most systems. One notable exception is that Mac OS X ships a `/usr/bin/perl` with DTrace support enabled.

## HISTORY

### 5.10.1

Perl's initial DTrace support was added, providing `sub-entry` and `sub-return` probes.

### 5.14.0

The `sub-entry` and `sub-return` probes gain a fourth argument: the package name of the function.

### 5.16.0

The `phase-change` probe was added.

### 5.18.0

The `op-entry`, `loading-file`, and `loaded-file` probes were added.

## PROBES

`sub-entry(SUBNAME, FILE, LINE, PACKAGE)`

Traces the entry of any subroutine. Note that all of the variables refer to the subroutine that is being invoked; there is currently no way to get ahold of any information about the subroutine's *caller* from a DTrace action.

```
:*perl*::sub-entry {
    printf("%s::%s entered at %s line %d\n",
        copyinstr(arg3), copyinstr(arg0), copyinstr(arg1),
arg2);
}
```

#### sub-return(SUBNAME, FILE, LINE, PACKAGE)

Traces the exit of any subroutine. Note that all of the variables refer to the subroutine that is returning; there is currently no way to get ahold of any information about the subroutine's *caller* from a DTrace action.

```
:*perl*::sub-return {
    printf("%s::%s returned at %s line %d\n",
        copyinstr(arg3), copyinstr(arg0), copyinstr(arg1),
arg2);
}
```

#### phase-change(NEWPHASE, OLDPHASE)

Traces changes to Perl's interpreter state. You can internalize this as tracing changes to Perl's `$_{^GLOBAL_PHASE}` variable, especially since the values for NEWPHASE and OLDPHASE are the strings that `$_{^GLOBAL_PHASE}` reports.

```
:*perl*::phase-change {
    printf("Phase changed from %s to %s\n",
        copyinstr(arg1), copyinstr(arg0));
}
```

#### op-entry(OPNAME)

Traces the execution of each opcode in the Perl runloop. This probe is fired before the opcode is executed. When the Perl debugger is enabled, the DTrace probe is fired *after* the debugger hooks (but still before the opcode itself is executed).

```
:*perl*::op-entry {
    printf("About to execute opcode %s\n", copyinstr(arg0));
}
```

#### loading-file(FILENAME)

Fires when Perl is about to load an individual file, whether from `use`, `require`, or `do`. This probe fires before the file is read from disk. The filename argument is converted to local filesystem paths instead of providing `Module::Name`-style names.

```
:*perl*::loading-file {
    printf("About to load %s\n", copyinstr(arg0));
}
```

#### loaded-file(FILENAME)

Fires when Perl has successfully loaded an individual file, whether from `use`, `require`, or `do`. This probe fires after the file is read from disk and its contents evaluated. The filename argument is converted to local filesystem paths instead of providing `Module::Name`-style names.

```
:*perl*::loaded-file {
    printf("Successfully loaded %s\n", copyinstr(arg0));
}
```

## EXAMPLES

### Most frequently called functions

```
# dtrace -qZn 'sub-entry {
@[strjoin(strjoin(copyinstr(arg3), ":"), copyinstr(arg0))] = count() }
END {trunc(@, 10)}'
```

```
Class::MOP::Attribute::slots
400
Try::Tiny::catch
411
Try::Tiny::try
411
Class::MOP::Instance::inline_slot_access
451
Class::MOP::Class::Immutable::Trait::around
472
Class::MOP::Mixin::AttributeCore::has_initializer
496
Class::MOP::Method::Wrapped::__ANON__
544
Class::MOP::Package::_package_stash
737
Class::MOP::Class::initialize
1128
Class::MOP::get_metaclass_by_name
1204
```

### Trace function calls

```
# dtrace -qFZn 'sub-entry, sub-return { trace(copyinstr(arg0)) }'
```

```
0  -> Perl_pp_entersub          BEGIN
0  <- Perl_pp_leavesub         BEGIN
0  -> Perl_pp_entersub          BEGIN
0    -> Perl_pp_entersub        import
0    <- Perl_pp_leavesub        import
0  <- Perl_pp_leavesub         BEGIN
0  -> Perl_pp_entersub          BEGIN
0    -> Perl_pp_entersub        dress
0    <- Perl_pp_leavesub        dress
0    -> Perl_pp_entersub        dirty
0    <- Perl_pp_leavesub        dirty
0    -> Perl_pp_entersub        whiten
0    <- Perl_pp_leavesub        whiten
0  <- Perl_pp_dounwind         BEGIN
```

### Function calls during interpreter cleanup

```
# dtrace -Zn 'phase-change /copyinstr(arg0) == "END"/ {
self->ending = 1 } sub-entry /self->ending/ { trace(copyinstr(arg0))
}'
```

CPU	ID	FUNCTION:NAME	
1	77214	Perl_pp_entersub:sub-entry	END
1	77214	Perl_pp_entersub:sub-entry	END
1	77214	Perl_pp_entersub:sub-entry	cleanup

```
1 77214 Perl_pp_entersub:sub-entry _force_writable
1 77214 Perl_pp_entersub:sub-entry _force_writable
```

#### System calls at compile time

```
# dtrace -qZn 'phase-change /copyinstr(arg0) == "START"/ {
self->interesting = 1 } phase-change /copyinstr(arg0) == "RUN"/ {
self->interesting = 0 } syscall:: /self->interesting/ { @[probefunc]
= count() } END { trunc(@, 3) }'

lseek
310
read
374
stat64
1056
```

#### Perl functions that execute the most opcodes

```
# dtrace -qZn 'sub-entry { self->fqn = strjoin(copyinstr(arg3),
strjoin("::", copyinstr(arg0))) } op-entry /self->fqn != ""/ {
@[self->fqn] = count() } END { trunc(@, 3) }'

warnings::unimport
4589
Exporter::Heavy::_rebuild_cache
5039
Exporter::import
14578
```

## REFERENCES

DTrace User Guide

<http://download.oracle.com/docs/cd/E19082-01/819-3620/index.html>

DTrace: Dynamic Tracing in Oracle Solaris, Mac OS X and FreeBSD

<http://www.amazon.com/DTrace-Dynamic-Tracing-Solaris-FreeBSD/dp/0132091518/>

## SEE ALSO

*Devel::DTrace::Provider*

This CPAN module lets you create application-level DTrace probes written in Perl.

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