

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_downwind	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 Dynamic Tracing Guide

<http://dtrace.org/guide/preface.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.

AUTHORS

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