

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` 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` 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(
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 } su

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

lseek 310
read 374
stat64 1056
```

Perl functions that execute the most opcodes

```
# dtrace -qZn 'sub-entry { self->fqn = strjoin(copyinstr(arg3), strjoin("::",

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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