Introduction to the Chime Visualization Tool for DTrace

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Who Am I

- OpenSolaris Community Member since 2005
- Work for Sun Microsystems in the OpenSolaris Developer Collaboration Team
- Blog: http://blogs.sun.com/brushmore
- Mostly a Java developer and helped with some of Chime's user interface before I worked for Sun
- Chime project leader

What is Chime?

- Aggregation tool for DTrace
- Graphical tool
  - Graphs data
  - Plots data over time
  - Sorting
  - Stop, pause, and replay data
- Java based, relies on the DTrace Java API

The History of Chime

- Side Project Tom Erickson, DTrace Java API developer
- Name inspired by a tuning fork
- Project was meant to be demonstration of the Java DTrace API
- Open source community project

Chime Prerequisites

Solaris 10 update 4 or later

Nevada 35 or later

OpenSolaris

Java 6

Getting Chime

- NetBeans - DTrace GUI Plug-in
- Chime project - http://hub.opensolaris.org/bin/view/Project+dtrace-chime/install
  - Packages for both x86 and Sparc
- IPS soon (Netbeans DTrace plugin is in the opensolaris.org repo)

Permissions

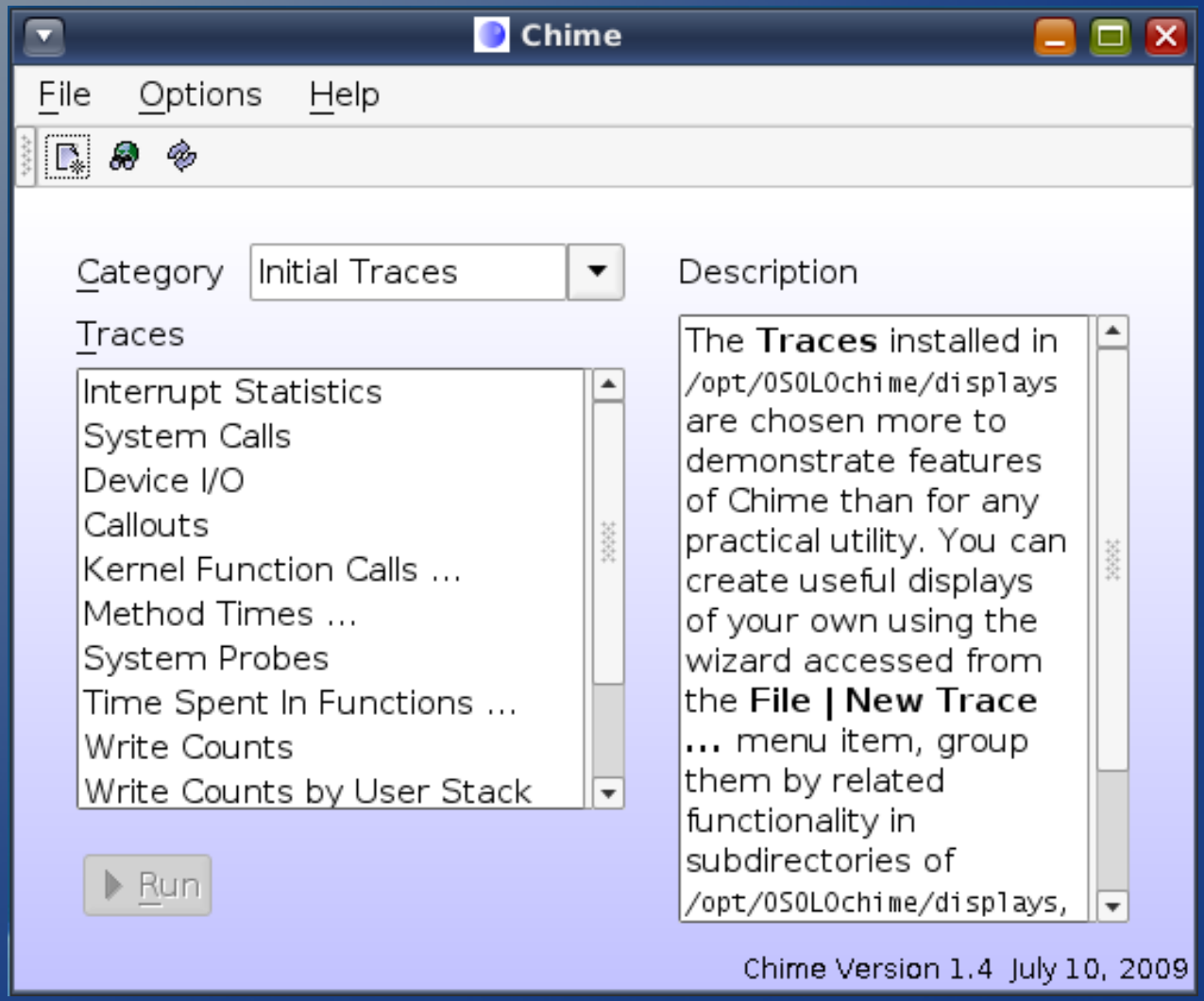
- Chime needs special privileges to run
- Simplest way is to run as root (pfexec under OpenSolaris)
- Preferred method is to give user DTrace permissions in */etc/user_attr*

```
<user>::::defaultpriv=basic,dtrace_proc,dtrace_kernel
```

Getting Started - Running Traces

- Most system wide traces take no parameters, just click on trace and press “Run”
- Some traces take a parameter (such as a PID)
- Running traces can be sorted on single or multiple columns
- Traces can be paused and readings can be viewed at your own pace

Demo


Chime
File
Options
Help
Category
Initial Traces
Description
Traces
Interrupt Statistics
System Calls
Device I/O
Callouts
Kernel Function Calls ...
Method Times ...
System Probes
Time Spent In Functions ...
Write Counts
Write Counts by User Stack
The Traces installed in /opt/OSOLOchime/displays are chosen more to demonstrate features of Chime than for any practical utility. You can create useful displays of your own using the wizard accessed from the File | New Trace ... menu item, group them by related functionality in subdirectories of /opt/OSOLOchime/displays,
Run
Chime Version 1.4 July 10, 2009

Advanced Trace Settings

- Some big traces may need default settings changed
- Right click on trace and modify DTrace '-x' options
- Common options that might need adjusted are bufsize and dynavarsize

Chime Pros and Cons

Pros

- GUI Interface
- Easy to use
- Pause
- Plot over time
- Recording
- Drill down
- Run traces on remote machines

Cons

- Java overhead
- Will not make you a DTrace expert automatically!

Default Traces

- Six categories
  - Initial Traces
  - Zones
  - DTrace Toolkit
  - Language specific traces

Language Specific Traces

- Python
- Ruby
- Java
  - In Initial Traces – “Method Times ...”

Demo
Chime's Traces

Remote Chime

- Often you need to diagnose issues on a server
- Exporting a display is an option but slow. Chime has client and server modes that provide a significantly better user experience
- Requires an open port, 5088 is default, but others can be used
- Utilizes Java Management Extensions (JMX) and does not currently provide user authentication

Remote Chime

Remote Chime Commands

Command on Server

```
% /opt/OSOL0chime/bin/chime server
```

Command on the client:

```
% /opt/OSOL0chime/bin/chime <hostname>
```

Utilizing Different Ports

Command on the server:

```
% /opt/OSOL0chime/bin/chime <hostname>:6000
```

Command on the client:

```
% /opt/OSOL0chime/bin/chime clinker 6000
```

Drilling Down

- Most effective way of diagnosing system issues is to use the “Drill Down” technique
- Chime provides functionality to provide drill down features in traces
- Good example is the “System Calls” trace

Demo
Drilling Down

Recording Traces

- Often traces display a lot of data and it can take time to find what you are looking for
- Sometimes you might need to show trace outputs to someone else
- Traces can recorded and played back later

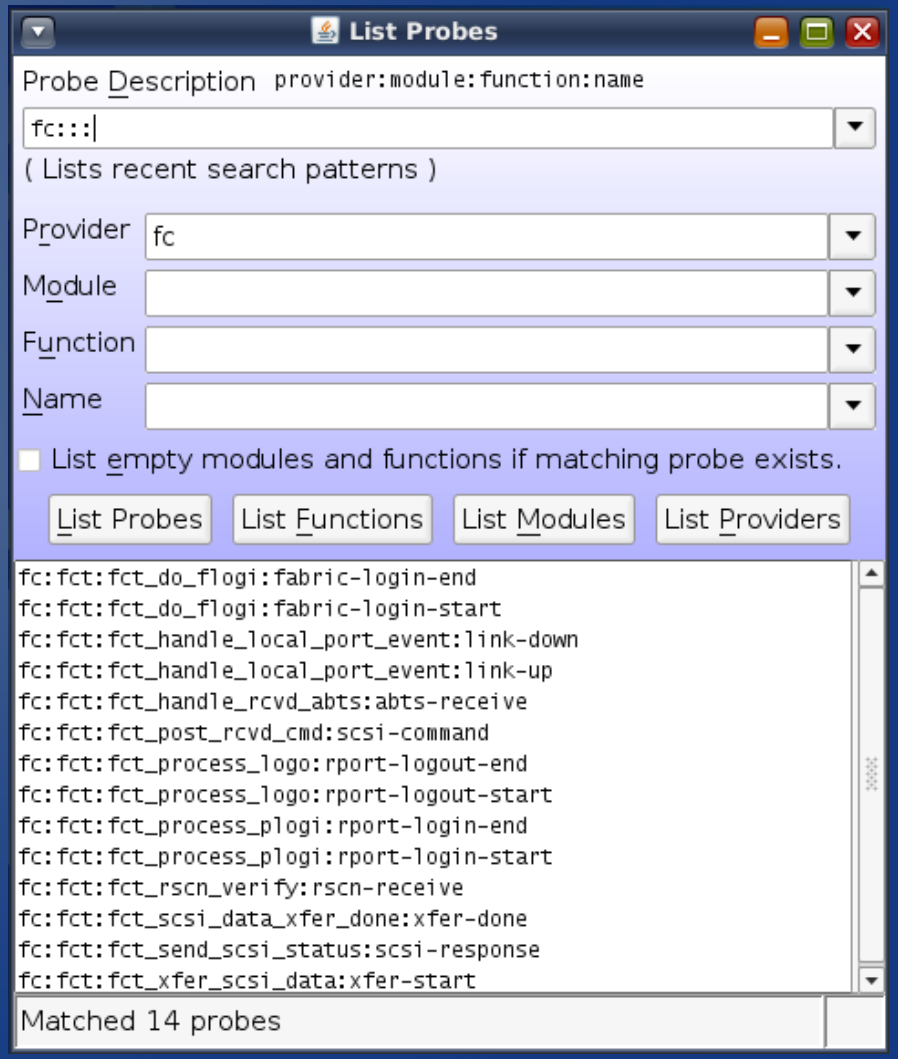
Recording Traces – Two Formats

- Object Serialization
  - Fastest and most efficient method
- XML
  - Portable but much bigger

Demo
Recording a Trace

Listing Probes

Convenient GUI feature for searching through DTrace probes on a system



Adding Your Own Trace

- Rich set of options available
- Existing traces can be modified and viewed
- Wizard is provided to simplify adding a trace
- Simple Traces can be run from the command line for one time use

Command Line Example

```
% /opt/OSOL0chime/bin/chime -n 'sysinfo:::readch \
% { @bytes[execname] = sum(arg0); }'
```

Demo
Adding A Trace

More Information

Chime Community

http://hub.opensolaris.org/bin/view/Project+dtrace-chime/

Solaris Dynamic Tracing Guide:

http://www.sun.com/bigadmin/content/dtrace/d10_latest.pdf

Solaris Performance and Tools by Richard McDougall, Jim Mauro, and Brendan Gregg, Sun Microsystems Press

Solaris Internals by Richard McDougall and Jim Mauro, Sun Microsystems Press

Questions