The Tracing and Monitoring Framework in 2013

What will we see today

- Review
  - Why a trace viewer?
  - What is Eclipse/TMF
- Feature Recap
  - Developer features
  - User features
- New Developments
  - New features
- Trace Extensions
- Upcoming features

Why a Tracer or Trace Viewer

- **Production Machine Troubleshooting**: Tracing does not affect the program flow and can be used in the field.
- **Performance**: know where your performance is lost, don't guess it.
- **System understanding**: see the flow of a program to understand its functioning.

What is Eclipse? TMF?

- Eclipse is an IDE
- TMF is the Tracing and Monitoring Framework
- Eclipse-LTTng is the trace viewer for LTTng 2.x traces
- Part of the Eclipse Linux Tools Project
- Mentor, Freescale, MontaVista, Intel, Google and more are using TMF

Features for developers

- A trace and event data model
- Extension point to add new trace types
- Reusable views and widgets
- Integration into common navigator framework of Eclipse (e.g. project explorer)
- An event filter model
- Time window and event synchronization
- Generic state system
- Ability to hook own analysis tools

- Common Trace Format (CTF) parser v1.8.x
- Custom text & XML parser wizards (no code required!)
- Documentation
- Tested code!

TMF/LTTng features

- TMF/LTTng viewer has many tools and views:
  - Detailed events
  - Filters
  - Search
  - Highlighting
  - Bookmarking
  - Histogram (event density)
  - Time Chart View
  - Statistics
  - Sequence Diagram
  - Trace aggregation by experiments (sets of traces)
  - Integration into Project Explorer
  - Environment Variables (CTF)
  - Tracer Control (LTTng)
  - Control Flow (LTTng Kernel)
  - Resource (LTTng Kernel)

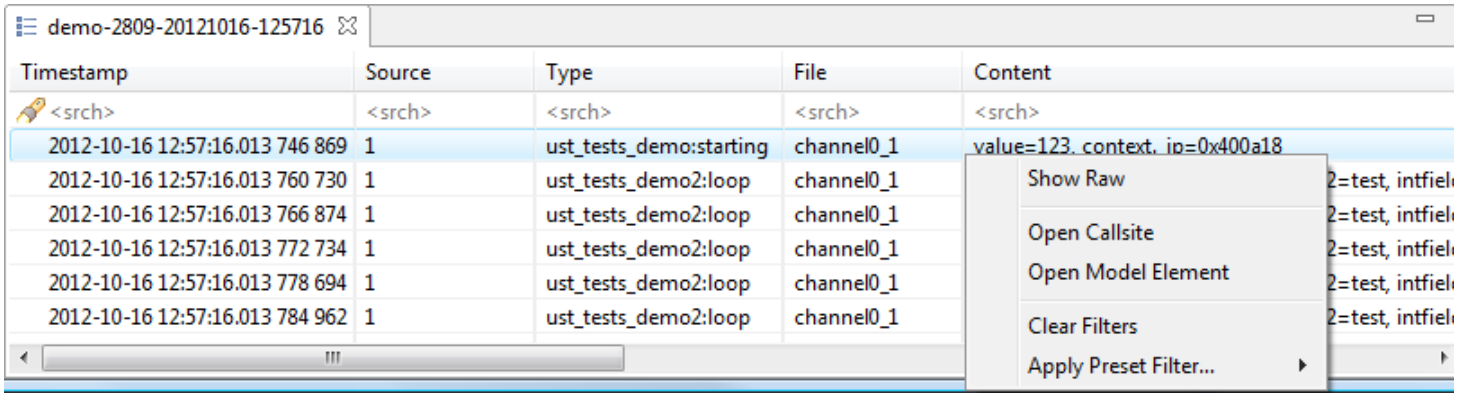
Recent features

- Navigate to source model and call-site from event
- Support for multiple state systems per trace
- State system now drives statistics
- Trace indexing progress / speed shown

- Selected event details in Properties view
- Process filtering in the control flow view(kernel)
- Support for LTTng Tools 2.1 (Tracer Control), 2.2 is waiting for 2.2
- Verbose trace error messages
- Call stack display vs time

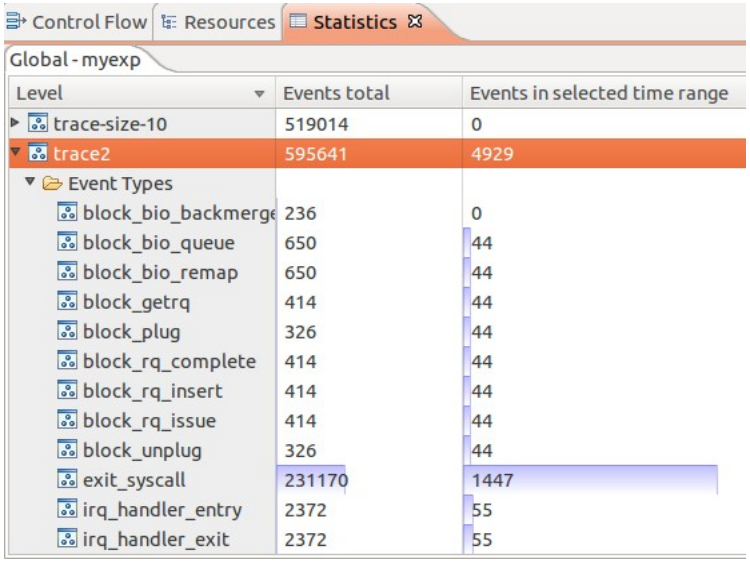
Event source navigation

- Select CTF event in trace editor, and if available, the context menu will allow the user to:
  - Open the source code in C editor at line where trace event was created
  - Open in EMF editor the model element where trace event was created



Statistics

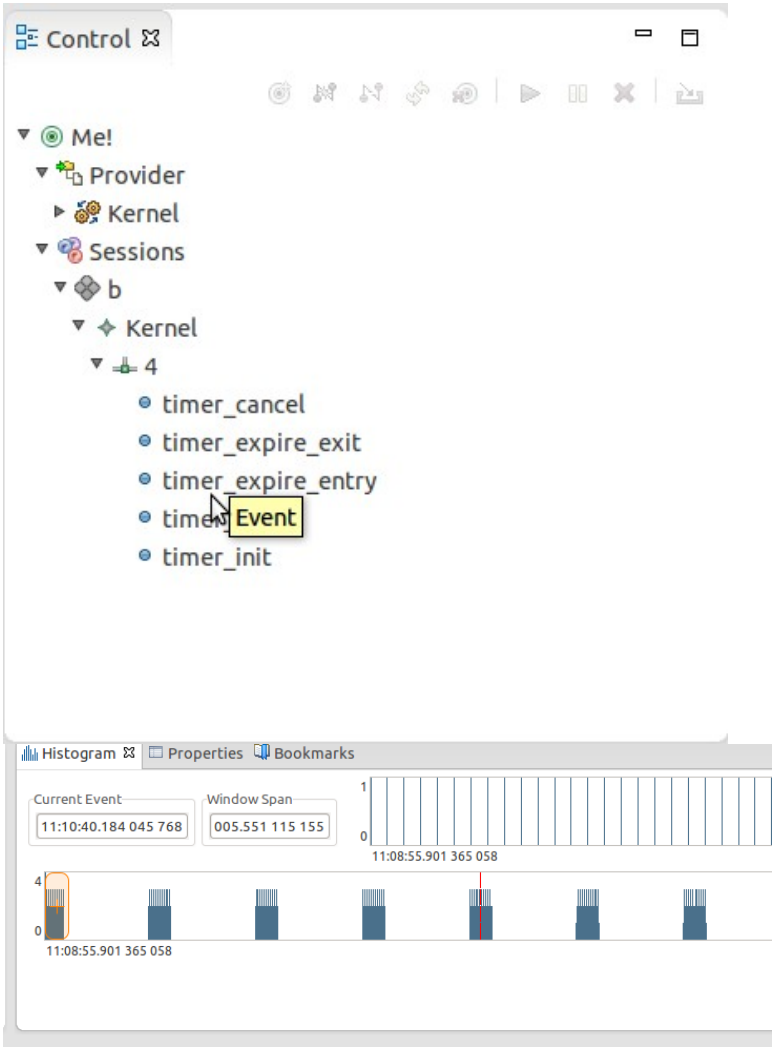
- Shows number of events by type per trace
- Shows number of events by type in selected time range
- Customizable statistics per trace type
- Fast computation thanks to state system



Level	Events total	Events in selected time range
trace-size-10	519014	0
trace2	595641	4929
Event Types		
block_bio_backmerge	236	0
block_bio_queue	650	44
block_bio_remap	650	44
block_getrq	414	44
block_plug	326	44
block_rq_complete	414	44
block_rq_insert	414	44
block_rq_issue	414	44
block_unplug	326	44
exit_syscall	231170	1447
irq_handler_entry	2372	55
irq_handler_exit	2372	55

Tracer Control

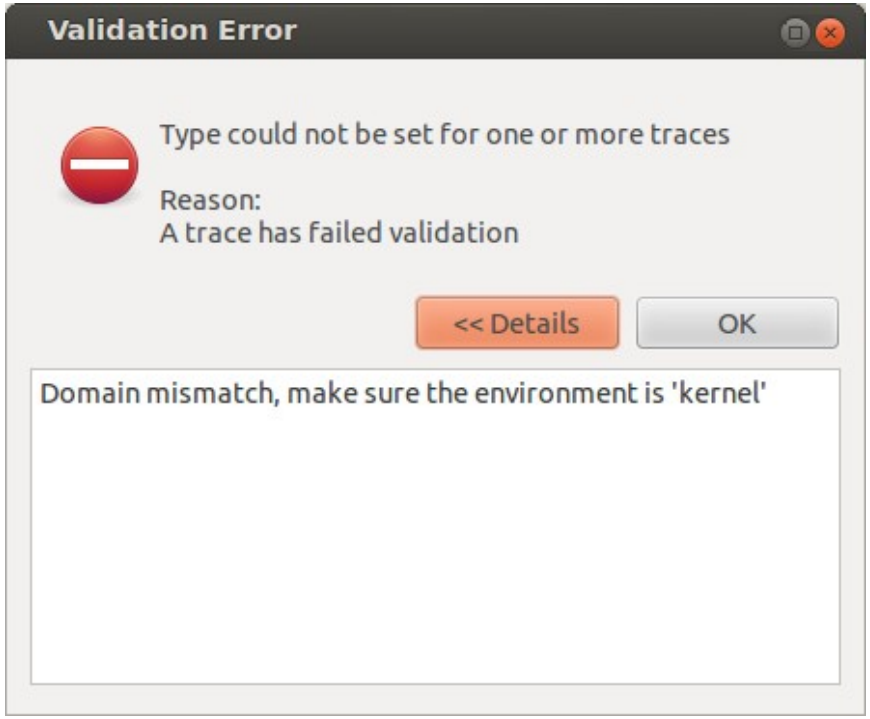
- Control the LTTng tracer on local or remote systems
- Works using RSE, SSH/SFTP (industry standard)
- Configure tracer, control trace session and import trace into projects
- Supports Kernel and UST
- Users do not need to go to the command line
- Configure event filtering at tracer level
- Network streaming



CTF 1.8.2 support

- Support for call-sites added
  - When the trace point is written, the code location is stored. It can be re-opened, allowing navigation between an event and the corresponding source code.
- Support for models added
  - A model site can be attached to a trace event, this feature allows back navigation from the trace to the model.

Detailed error messages



- Relays more information to users
- Helpful for developing your traces or seeing why your friend's trace didn't work.

State System Support

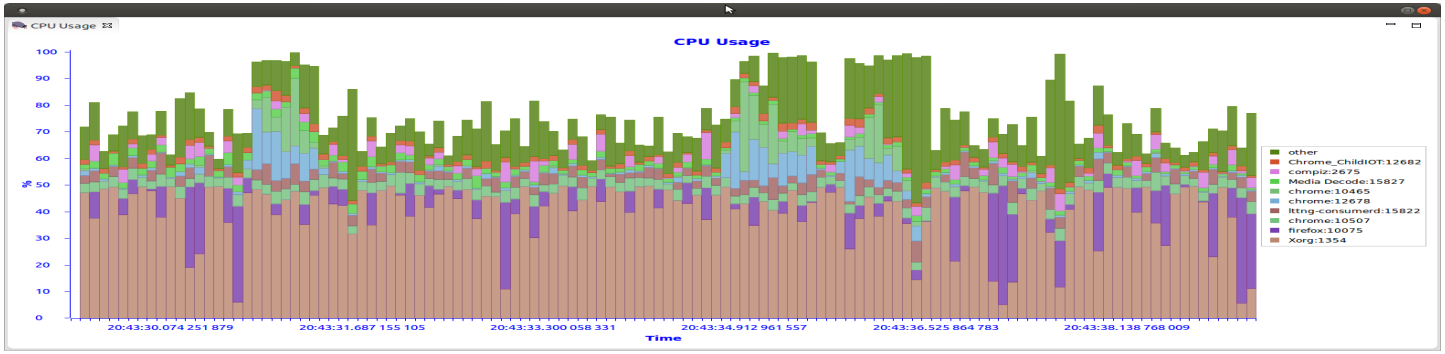
- State system abstracts events, analyses traces and creates models to be displayed
- Persistent on disk, does not need to be rebuilt between runs
- Allows fast (O(log n)) queries of state attributes by time or type
- Support for several state systems in parallel
- Supports multiple backends:
  - Full
  - In memory
  - Partial
- Each trace type can define its own state system (example)
  - TmfTrace (base class) defines a state system for statistics
  - LttngKernelTrace (specific) defines a state system for kernel traces

Trace Extensions

- GDB Tracepoint Analysis
  - Integrated with CDT Debug which supports creating of GDB Tracepoints and collection of tracepoint information
  - Visualization of GDB Trace Log in TMF
  - Synchronization of TMF with CDT Debug
  - Part of open source

Upcoming features

- Trace synchronization of traces from multiple hosts
- Data driven state systems (Thanks to collaborators!)
- Batch import trace wizard (So close!)
- Exporting of bookmarks
- CTF Writer
- Live traces (reading and viewing while tracing is ongoing)
- New analysis views (ie: generic charts, latency, CPU usage, network usage, data x-y plots…)



Demo

REFERENCES

- Download at http://www.eclipse.org
  - Git: http://git.eclipse.org/c/linuxtools/org.eclipse.linuxtools.git
  - User guide http://wiki.eclipse.org/Linux_Tools_Project/LTTng2/User_Guide
  - Development Environment Setup http://wiki.eclipse.org/Linux_Tools_Project/LTTng_Eclipse_Plug-in_Development
  - More instructions: http://lttng.org/eclipse
- LTTng: http://lttng.org

Contact:

{matthew.khouzam|alexandre.montplaisir-gon.alves|patrick.tasse|marc-andre.laperle|bernd.hufmann} <at> ericsson.com

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