Tracing Summit 2017

Babeltrace 2

Tailor-made trace analyses

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Maintainer of

- LTTng-Tools
- Babeltrace

Babeltrace 1.x

- MIT licensed Common Trace Format (CTF) reference implementation (2011)
  - Served as the *de facto* LTTng command line trace reader
- Introduced Python bindings to read traces (2013)
  - Provide users a way to prototype an analysis rapidly without using text-based tools (awk, sed, grep, etc.)
    - Debugging
    - Testing
  - Scripts maintained as internal tools by some users
  - Basis of LTTng-analyses
- Provides a CTF production library (CTF-Writer) (2014)
  - Used by perf to convert traces to CTF

Limitations of Babeltrace 1.x

- Only supports in-tree plug-in
  - Does not expose a stable ABI (for plug-ins)
  - No solution to support proprietary (or niche) trace formats out of tree
- Design made it impossible to implement “lttng-live” support as a plug-in
- API quirks
  - Does not allow caching of events,
  - One iterator per trace,
  - Hard/impossible to work with multiple clock sources

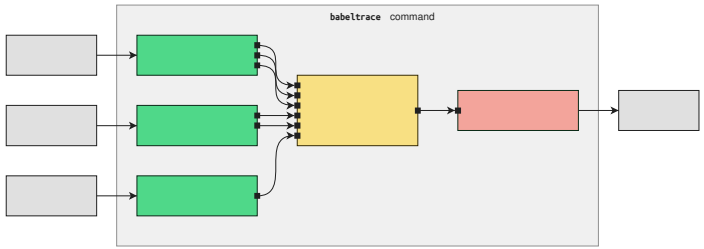
Redefining Babeltrace's scope

- Realized that trace analysis tools were not keeping up with the tracers
  - Capturing trace is only half of the battle
  - Use in production shows that working with huge traces is challenging
  - Text-based analyses do not scale and are hard to maintain... but they are useful!

- Project scope changed from a trace *converter* to a trace *manipulation* tool
  - Support more input and output formats,
  - Trim, filter, and add information to traces,
  - Make it easy to assemble "blocks" to build a custom trace analysis pipeline.

Redefining Babeltrace's scope

- Babeltrace becomes a "host" application for trace processing graphs



- User-defined processing graphs
  - Standardize trace processing (shareable graph configurations)
  - Can be assembled programatically
    - Usable from external tools, such as viewers
  - Can be used to process trace "chunks" independently

Building a graph

- Building a graph on the command line

```
$ babeltrace run
--component=my_source:src.plugin_name.my-src
--component=my_sink:sink.plug.my-sink
--connect=my_source:my_sink
```

Don’t worry, there are helpers for common scenarios...

- Graphs can be built using the C and Python APIs

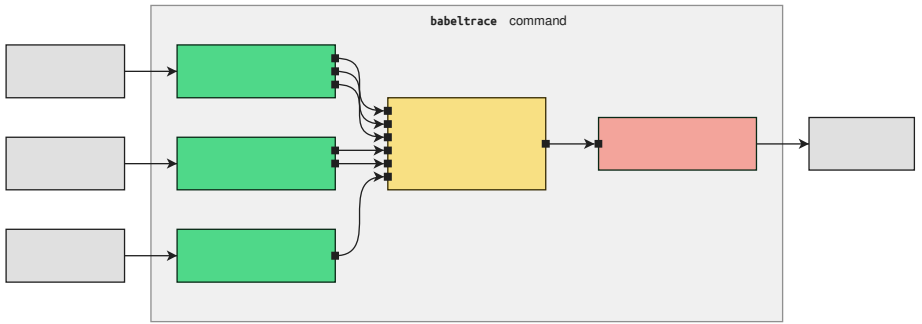
Redefining Babeltrace's scope

- Cross-platform
  - Linux
  - Windows (native and Cygwin)
  - Solaris
  - BSDs
  - macOS

- Preserve the current Babeltrace Python interface

Babeltrace 2.0

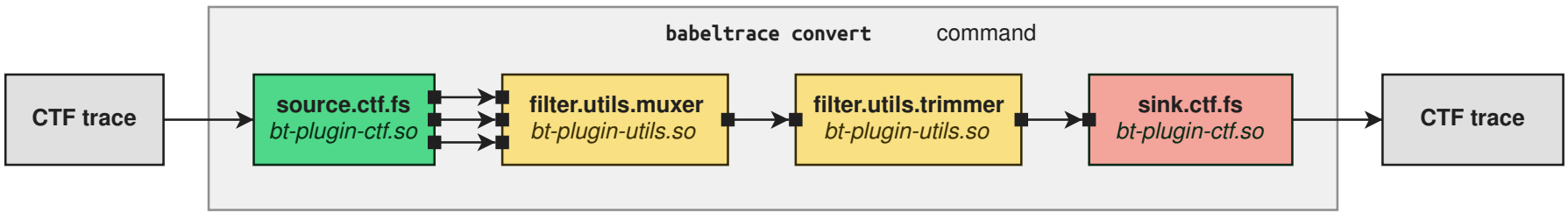
- Provides components which allow everything Babeltrace 1.x could do
  - CTF source (reader)
  - CTF sink (writer)
  - LTTng-live source
  - dmesg source
  - Muxer
  - Trimmer
  - Debug info



- Components can be written in C, C++ and Python
  - Stable ABI allows out-of-tree components

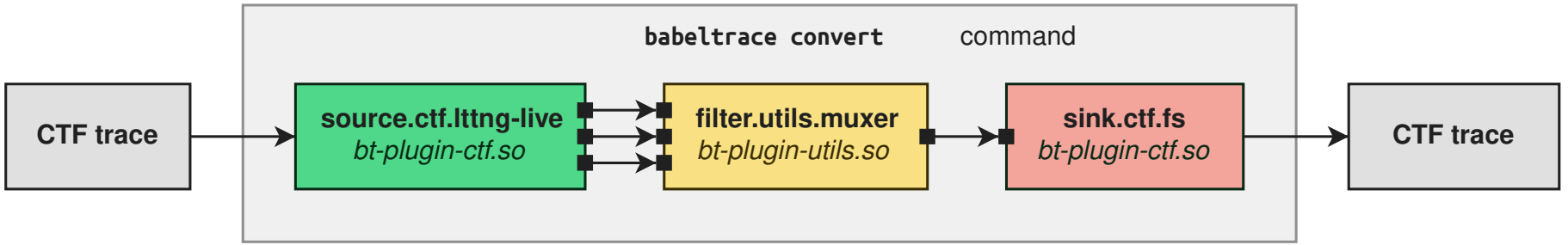
Scenarios – Trimming a trace

```
$ babeltrace /path/to/trace --begin=22:14:38
                            --end=22:15:07
```



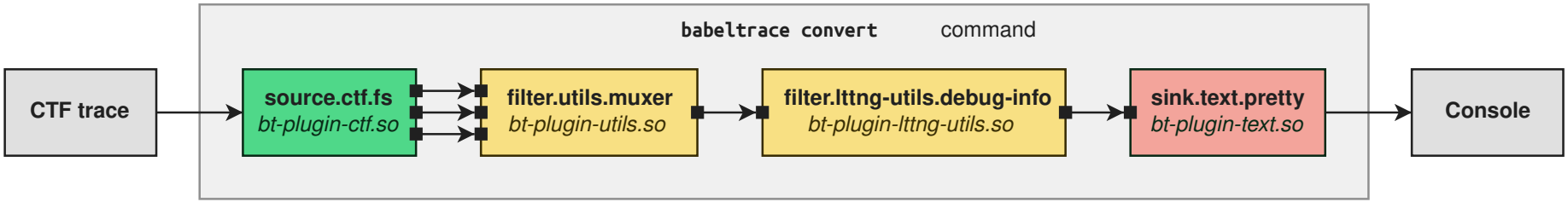
Scenarios – Record part of a live trace

```
$ babeltrace --input-format=lttng-live
  net://localhost/host/my_host/my_session
  --begin=22:05:00 --end=22:06:00
```



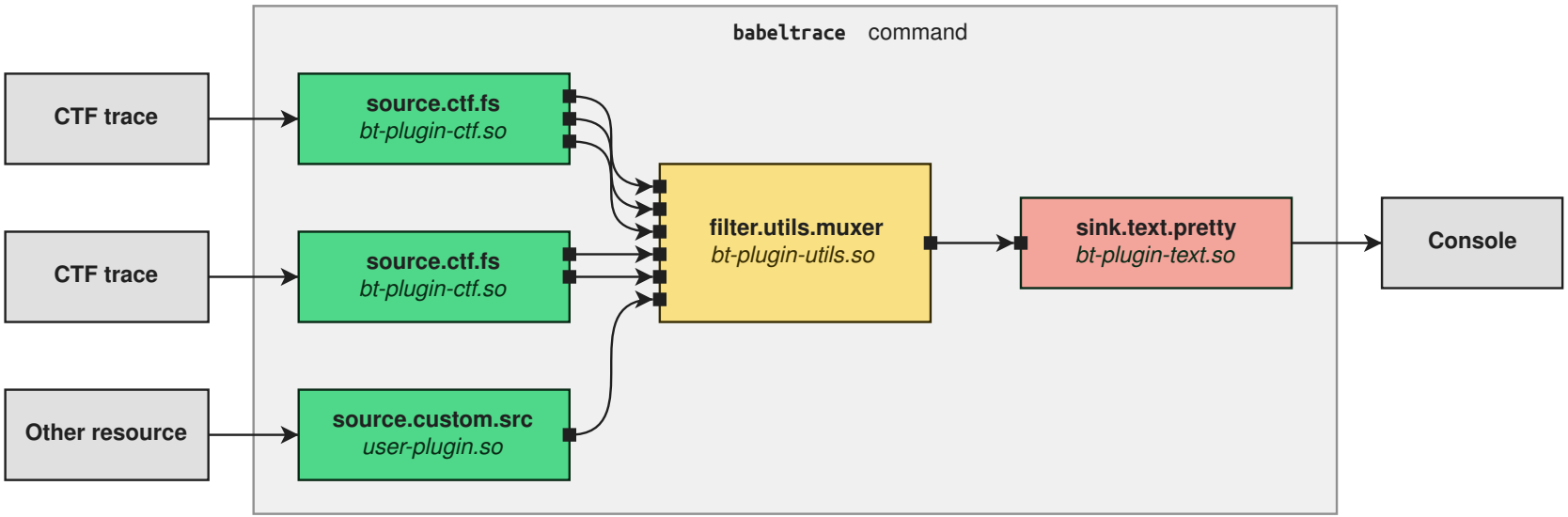
Scenarios – Print debug info

```
$ babeltrace --debug-info /path/to/trace
```



Scenarios – Mux multiple formats

```
$ babeltrace
  --component source.ctf.fs --path /path/to/trace
  --component source.text.dmesg --path /tmp/my_dmesg.log
```



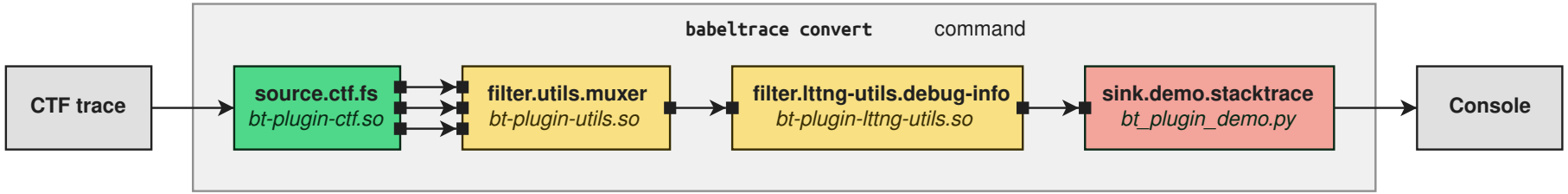
Easy to prototype new components

- Components can be written in Python and used from the command line
  - Insert only the logic you need to build your analysis

- Quick example: a callstack view inspired by *uftrace* in ~50 lines
  - https://github.com/jgalar/TracingSummit2017

Userspace callstack view

- Build binary using `-finstrument-functions`
- Enable userspace tracing with LTTng (see GitHub link)
- `LD_PRELOAD="liblttng-ust-cyg-profile-fast.so" ./my_binary`



Demo

Future Work

- Currently at `v2.0.0-pre4`
  - APIs are not frozen yet
  - Works on all supported platforms
- Targetting the first Release Candidate for November
  - Optimizations which may affect the APIs
  - Documentation
- Support for CTF 2 (`v2.1`, if the spec is finalized soon)
- Future components
  - Filtering (`v2.1`)
  - State tracker, Period/span tracking, ideas?

Questions ?

Babeltrace

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- github.com/efficios/babeltrace
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EfficiOS

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