Trace Compass Cloud: Eclipse Trace Compass’s migration towards Theia

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Agenda

- What is tracing?
- Trace Compass Overview
- Migration steps
- New Architecture
- Theia trace extension
- Demo
- Project status
What is tracing?

- Instrument source code with tracepoints
- Use a tracer to collect tracepoint data during program execution
- Example tracers
  - LTTng, fTrace, Perf ...
- Characteristic of good tracers
  - Low overhead
What is a trace?

- A sequence of events collected on the execution path

![Diagram showing event timeline with attributes like time, type, content, attribute 1, attribute 2, process, cpu #, and ...]
Trace analysis and visualization flow

- Trace(s)
- Stream of events
- Persistence
- Views

Steps:
- Parse
- Analyze
- Query

Components:
- Events Table
- Intermediate Results
- Graphs and Charts
Eclipse Trace Compass is an open source application to solve performance and reliability issues by reading and analyzing traces and logs of a system. Its goal is to provide views, graphs, metrics, and more to help extract useful information from traces, in a way that is more user-friendly and informative than huge text dumps.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can it run in the browser?</td>
<td>No, it's a desktop application</td>
</tr>
<tr>
<td>Can we show results in Jenkins?</td>
<td>No, it's a desktop application</td>
</tr>
<tr>
<td>Can we run it in headless mode?</td>
<td>You can run custom scripts (EASE), but UI needs to be opened</td>
</tr>
<tr>
<td>What about custom graphs?</td>
<td>We are bound to SWT, Jface and Eclipse</td>
</tr>
<tr>
<td>Can we get it in Theia or VsCode?</td>
<td>No</td>
</tr>
</tbody>
</table>
Solution: Client – server architecture

- **Trace visualization front-end**
  - Request data from server
  - Deserializes data
  - Visualizes data in various graphs

- **Trace server back-end**
  - Trace parsing
  - Trace event processing
  - Domain-specific logic
  - Serializes data for visualization
  - Sends data over network to clients
Trace Compass re-architecture

Monolithic Application
- Trace Compass
  - Trace Compass UI
  - Trace Compass Core

Client-Server Application
- Front-end
  - Trace Server Protocol (TSP)
- Trace Server Back-end
  - Trace Services
  - Data Providers
  - Trace Compass Core
Trace analysis and visualization flow

Trace Server Back-end
- **parse**
- **stream of events**
- **analyze**
- **persistence**
- TSP
- **views**

Front-end
- **query**

- Trace(s)
- Stream of events
- Persistence
- Views
- Events Table
- Intermediate Results
Trace Server Protocol (0.1.0)

Download OpenAPI specification: [Download]

E-mail: tracecompass-dev@eclipse.org | License: Apache 2 | Terms of Service

Open source REST API for viewing and analyzing any type of logs or traces. Its goal is to provide models to populate views, graphs, metrics, and more to help extract useful information from traces, in a way that is more user-friendly and informative than huge text dumps.

Traces

How to manage physical traces on your server.

Get the list of physical traces imported on the server.

Responses
Eclipse Theia

- Extensible platform
- Uses modern web-technologies
- Allows integration with IDE workflow
  - LSP – for language support
  - DAP – for debug support
- Deployment
  - Browser or desktop
  - Workspace managers like Eclipse Che
- Open Source and community
- Vendor neutral
Architecture with Theia

Theia Application

- theia-traceviewer
  - Third-party libs
  - traceviewer-base
  - traceviewer-react-components
  - tsp-typescript-client

Theia - FE (platform)

Trace Server Back-end

- Trace Services
- Data Providers

Trace Compass Core

- REST-API over HTTP
  - (TSP)
- WebSockets
  - (JSON-RPC)

Theia - BE (platform)
theia-traceviewer
0.1.0 • Public • Published 3 days ago

Description
The Theia trace viewer extension is providing a trace viewing front-end to Trace Server applications implementing the Trace Server protocol.

Additional Information
• Theia Trace Viewer Extension
• Trace Server Protocol
• Reference Trace Server - Download (Eclipse Trace Compass)

Screenshots

Install
> npm i theia-traceviewer

Repository
🔗 github.com/theia-ide/theia-trace-ext...

Homepage
🔗 github.com/theia-ide/theia-trace-ext...

Weekly Downloads
193

Version License
0.1.0 MIT

Unpacked Size Total Files
243 kB 95
traceviewer-base

0.1.0 • Public • Published 3 days ago

Description

The Trace Viewer base package contains trace management utilities for managing traces using Trace Server applications that implement the Trace Server Protocol (TSP). While being initially used within the Theia Trace Viewer extension, its code base is independent to any Theia APIs and hence can be integrated in other web applications.

Additional Information

- Theia Trace Viewer Extension
- Trace Server Protocol
- Reference Trace Server - Download (Eclipse Trace Compass)

Keywords

none
**traceviewer-react-components**

0.1.0 • Public • Published 3 days ago

[Readme] [Explore] [17 Dependencies] [2 Dependents] [14 Versions] [Settings]

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**Description**

The Trace Viewer react-components package contains views and utilities for visualizing traces and logs via the Trace Server Protocol connected a Trace Server applications. While being initially used within the Theia Trace Viewer extension, its code base is independent to any Theia APIs and hence can be integrated in other web applications.

**Additional Information**

- Theia Trace Viewer Extension
- Trace Server Protocol
- Reference Trace Server - Download (Eclipse Trace Compass)

**Keywords**

none

---

**Install**

> npm i traceviewer-react-components

**Repository**

🔗 github.com/theia-ide/theia-trace-ext...

**Homepage**

🔗 github.com/theia-ide/theia-trace-ext...

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**Weekly Downloads**

199

**Version**

0.1.0

**License**

MIT

**Unpacked Size**

683 kB

**Total Files**

184
Other Javascript libraries under development

- **timeline-chart**
  - Timeline / Gantt chart library for large data (e.g. traces)
  - Nano-second precision (bigint)

- **tsp-typescript-client**
  - TSP ready client to perform your requests
  - Abstract the technology used (REST, HTTP)
Project status
https://github.com/theia-ide/theia-trace-extension

- Development ongoing
- Project Planning
- Issues trackers
- NPM packages
  - theia-traceviewer
  - traceviewer-base
  - traceviewer-react-components
- MVP release end-of year
Python Client (tsp-python-client)

- Can be used to automate analysis (Headless mode)
- Rapid prototyping
  - Run REST API calls from command-line
  - Verify server responses
- No UI needed
- TSP ready client to perform your requests
VsCode Plugin
https://github.com/theia-ide/vscode-trace-extension

- Prove of concept
- Uses traceviewer-base and traceviewer-react-components
- Glue code to integrate with VsCode
  - WebViews for each react-component
  - Side panel
  - Menus and commands
- Misses some features that are implemented in theia-traceviewer (Theia APIs)
  - Issue trackers available
- Not a focus right now
  - If interested, contributions are very welcome
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<td>Yes, trace visualization front-end can run in the browser</td>
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<td>Can we show results in Jenkins?</td>
<td>Jenkins plug-in can query trace server and show results</td>
</tr>
<tr>
<td>Can we run it in headless mode?</td>
<td>Command-line client can start analysis in a trace server BE</td>
</tr>
<tr>
<td>What about custom graphs?</td>
<td>Many modern web-technologies and libraries exit</td>
</tr>
<tr>
<td>Can we get it in Theia or VsCode?</td>
<td>Yes, trace visualization front-end integrates with both</td>
</tr>
</tbody>
</table>
Q & A
References

• Theia trace extension and project page
  • [https://github.com/theia-ide/theia-trace-extension](https://github.com/theia-ide/theia-trace-extension)

• Trace Server Protocol (TSP)
  • [https://github.com/theia-ide/trace-server-protocol](https://github.com/theia-ide/trace-server-protocol)

• Client-side TSP implementation
  • [https://github.com/theia-ide/tsp-typescript-client](https://github.com/theia-ide/tsp-typescript-client)

• VsCode Plug-in
  • [https://github.com/theia-ide/vscode-trace-extension](https://github.com/theia-ide/vscode-trace-extension)

• Timeline-chart
  • [https://github.com/theia-ide/timeline-chart](https://github.com/theia-ide/timeline-chart)
References

• Trace Compass
  • https://www.eclipse.org/tracecompass/
  • https://projects.eclipse.org/projects/tools.tracecompass
  • https://projects.eclipse.org/projects/tools.tracecompass.incubator
Contacts

• Presenter
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• theia-trace-extension
  • https://github.com/theia-ide/theia-trace-extension

• Eclipse Trace Compass
  • Mailing list: tracecompass-dev@eclipse.org
  • IRC: oftc.net #tracecompass