



# OSGi<sup>TM</sup> Alliance

## RFC 234 - Framework Tracing

Final

12 Pages

### Abstract

Currently there is no API to define how the framework should do tracing; code launching a framework needs to know implementation details when it wants to configure this with the launching API. This RFC proposes a framework implementation independent way to be used by the framework for tracing.

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## 0 Document Information

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## 0.3 Feedback

This document can be downloaded from the OSGi Alliance design repository at <https://github.com/osgi/design>. The public can provide feedback about this document by opening a bug at <https://www.osgi.org/bugzilla/>.

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## 0.5 Terminology and Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in 10.1.

Source code is shown in this typeface.

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## 0.6 Revision History

The last named individual in this history is currently responsible for this document.

| Revision | Date                       | Comments   |
|----------|----------------------------|--|
| Initial  | March 15 2017              | Initial version based on #2974 and F2F discussions in Montpellier<br>Carsten Ziegeler,<br>Adobe Systems Incorporated, <a href="mailto:ctiegele@adobe.com">ctiegele@adobe.com</a> |
| 1        | April 11 2017              | Changed to debug logging only after CPEG call<br>Carsten Ziegeler  |
| 2        | May 4 <sup>th</sup> , 2017 | Changed to tracing as discussed in the CPEG<br>David Bosschaert, <a href="mailto:bosschae@adobe.com">bosschae@adobe.com</a>  |

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# 1 Introduction

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This RFC defines a way to configure the tracing of the framework itself independent from the framework implementation.

## 2 Application Domain

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The launch API allows to start a framework in an implementation independent way. While this works, there is at least one thing which needs to be setup depending on the implementation: tracing of the framework. As framework tracing is an essential part of an application, the current launch API does not provide a full abstraction.

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## 3 Problem Description

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The framework launch API defines an implementation independent way to launch any framework implementation. This API covers creating a framework and configuring it. However, one aspect is not covered by this API: Tracing of the framework. This requires launch code like Apache Karaf to use implementation dependent solutions.

For example, by default the Apache Felix framework is logging to system out. But an implementation can provide a `org.apache.felix.framework.Logger` instance either through the framework properties (tricking the compiler) or by using reflection and checking for a `setLogger` method on the framework object. Eclipse Equinox is using the embedded `LogService` to log errors and has a separate tracing mechanism which eventually logs to system out as well.

Usually code that launches a framework also wants to tell the framework in what detail it should log and how to log.

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## 4 Requirements

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L0010 - The solution **MUST** define a way to set the domains for tracing used by the framework implementation when emitting trace log messages.

L0020 – The solution **MUST** provide a way for the framework to detect the current enabled domains for tracing to avoid unnecessary calls into the tracing mechanism.

L0030 – The solution **MUST** provide a way to capture the trace messages emitted by the framework.

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## 5 Technical Solution

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The technical solution describes two parts, a tracer instance created by the code launching the framework and how to pass that instance to the framework.

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### 5.1 The Tracer

An instance of the Tracer is created by the launching code. Before the framework logs on a certain topic, it can use one of the `isTraceTopicEnabled()` to check whether trace log messages should be emitted. The framework can also directly call `traceTopic()` methods to emit trace log messages, if producing these does not requires additional computation. The Tracer implementation is free to change its enabled topics during runtime. The `traceTopic()` methods take a format string as first argument which supports parameterized logging. The token `{}` can be used to insert the value of the corresponding parameter passed through the `args` array instead of the token. If the last object in the `args` array is an exception/throwable this will be logged as an exception in addition to the message.

```
package org.osgi.framework.launch;

public interface Tracer {

    boolean isTraceClassLoaderEnabled();
    boolean isTraceModuleEnabled();
    boolean isTraceResolverEnabled();
    boolean isTraceSecurityEnabled();
    boolean isTraceServiceEnabled();
    boolean isTraceStartLevelEnabled();
    boolean isTraceOtherEnabled();

    void traceClassLoader(String fmt, Object ... args);
    void traceModule(String fmt, Object ... args);
    void traceResolver(String fmt, Object ... args);
    void traceSecurity(String fmt, Object ... args);
    void traceService(String fmt, Object ... args);
    void traceStartLevel(String fmt, Object ... args);
    void traceOther(String fmt, Object ... args);}
```

Code launching a framework just needs to create an implementation of `Tracer` and implement the methods. An `org.osgi.framework.launch.NullTracer` class will also be provided.

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### 5.2 Providing the Tracer to the Framework

The `FrameworkFactory` interface is extended with a new method to construct a framework which in addition to the configuration map a `Tracer` instance. The `Tracer` instance is optional. Calling the existing method `newFramework(Map)` is equivalent with calling this new method passing in `null` as the second argument:

```
public interface FrameworkFactory {
```

```
Framework newFramework(Map<String, String> configuration, Tracer tracer);  
}
```

If no logger instance is provided to the framework it is up to the framework implementation how to deal with debug log messages from the framework implementation. It may use an instance of the `NullTracer` class in this case.

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### 5.3 Required Framework Tracing

If a tracer instance is provided to the framework factory, the framework implementation must use this instance to emit trace messages in the enabled domains. It is up to the framework implementation to decide when to emit a trace message though. An implementation might decide to not trace at all.

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## 6 Data Transfer Objects

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This RFC does not define any DTOs



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## 7 Java API

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## 8 Considered Alternatives

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## 9 Security Considerations

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This RFC does not need any new security considerations.

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# 10 Document Support

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## 10.1 References

- [1] Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, RFC2119, March 1997.
- [2] Software Requirements & Specifications. Michael Jackson. ISBN 0-201-87712-0
- [3] Data Transfer Objects, Core Release 6

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## 10.3 Acronyms and Abbreviations

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## 10.4 End of Document