

Operation Tracker



Have you ever hit an error in some code and been faced with a giant stack trace, and no clue what that means? Us too. We wished there was a way for the exception to describe the path to the error not (just) in terms of which methods called which methods, but what *operations* triggered what other operations. That's the OperationTracker.

The operation tracker is another aspect of Tapestry's commitment to feedback.

The [OperationTracker](#) is a resource; it's actually a singleton, and is available for injection into any IoC service (or Tapestry component).

Using the OperationTracker you may run a Runnable, or invoke an Invokable (returning a typed response). Associated with the operation is a description string.

If there are no exceptions, then no problem.

If there are exceptions, then you'll see the console output logged at the point of the exception:

```
qtp644826761-13 [ERROR] Registry Operations trace:
qtp644826761-13 [ERROR] Registry [ 1] Handling page render request for page DatumEditor
qtp644826761-13 [ERROR] Registry [ 2] Constructing instance of page class org.apache.tapestry5.integration.appl.
pages.DatumEditor
qtp644826761-13 [ERROR] Registry [ 3] Assembling root component for page DatumEditor
qtp644826761-13 [ERROR] Registry [ 4] Running component class transformations on org.apache.tapestry5.integration.
appl.pages.Datum
qtp644826761-13 [ERROR] RequestExceptionHandler Processing of request failed with uncaught exception: java.lang.
RuntimeException: Exception assembling root component of page DatumEditor: Unable to instantiate instance of
transformed class org.apache.tapestry5.integration.appl.pages.DatumEditor: java.lang.reflect.
InvocationTargetException
java.lang.RuntimeException: Exception assembling root component of page DatumEditor: Unable to instantiate
instance of transformed class org.apache.tapestry5.integration.appl.pages.DatumEditor: java.lang.reflect.
InvocationTargetException
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl.performAssembleRootComponent
(ComponentAssemblerImpl.java:129)
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl.access$000(ComponentAssemblerImpl.java:37)
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl$1.invoke(ComponentAssemblerImpl.java:81)
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl$1.invoke(ComponentAssemblerImpl.java:78)
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.invoke(OperationTrackerImpl.java:82)
at org.apache.tapestry5.ioc.internal.PerThreadOperationTracker.invoke(PerThreadOperationTracker.java:72)
at org.apache.tapestry5.ioc.internal.RegistryImpl.invoke(RegistryImpl.java:1258)
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl.assembleRootComponent(ComponentAssemblerImpl.
java:76)
at org.apache.tapestry5.internal.pageload.PageLoaderImpl$3.invoke(PageLoaderImpl.java:197)
at org.apache.tapestry5.internal.pageload.PageLoaderImpl$3.invoke(PageLoaderImpl.java:190)
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.invoke(OperationTrackerImpl.java:82)
at org.apache.tapestry5.ioc.internal.PerThreadOperationTracker.invoke(PerThreadOperationTracker.java:72)
at org.apache.tapestry5.ioc.internal.RegistryImpl.invoke(RegistryImpl.java:1258)
at org.apache.tapestry5.internal.pageload.PageLoaderImpl.loadPage(PageLoaderImpl.java:189)
at $PageLoader_13a0346ec83c4e52.loadPage(Unknown Source)
at org.apache.tapestry5.internal.services.PageSourceImpl.getPage(PageSourceImpl.java:104)
at $PageSource_13a0346ec83c4e51.getPage(Unknown Source)
at $PageSource_13a0346ec83c4e50.getPage(Unknown Source)
at org.apache.tapestry5.internal.services.RequestPageCacheImpl.get(RequestPageCacheImpl.java:86)
at $RequestPageCache_13a0346ec83c4e4f.get(Unknown Source)
at $RequestPageCache_13a0346ec83c4e4e.get(Unknown Source)
at org.apache.tapestry5.internal.services.PageRenderRequestHandlerImpl.handle(PageRenderRequestHandlerImpl.java:
56)
at org.apache.tapestry5.modules.TapestryModule$34.handle(TapestryModule.java:1978)
at $PageRenderRequestHandler_13a0346ec83c4f9c.handle(Unknown Source)
at $PageRenderRequestHandler_13a0346ec83c4f97.handle(Unknown Source)
at org.apache.tapestry5.internal.services.ComponentRequestHandlerTerminator.handlePageRender
(ComponentRequestHandlerTerminator.java:48)
at org.apache.tapestry5.internal.services.DeferredResponseRenderer.handlePageRender(DeferredResponseRenderer.java:
52)
at $ComponentRequestFilter_13a0346ec83c4f95.handlePageRender(Unknown Source)
at $ComponentRequestHandler_13a0346ec83c4f98.handlePageRender(Unknown Source)
at org.apache.tapestry5.services.InitializeActivePageName.handlePageRender(InitializeActivePageName.java:47)
at $ComponentRequestFilter_13a0346ec83c4f94.handlePageRender(Unknown Source)
at $ComponentRequestHandler_13a0346ec83c4f98.handlePageRender(Unknown Source)
at org.apache.tapestry5.internal.services.ProductionModeUnknownComponentFilter.handlePageRender
(ProductionModeUnknownComponentFilter.java:62)
at $ComponentRequestFilter_13a0346ec83c4f93.handlePageRender(Unknown Source)
at $ComponentRequestHandler_13a0346ec83c4f98.handlePageRender(Unknown Source)
at org.apache.tapestry5.internal.services.RequestOperationTracker$2.run(RequestOperationTracker.java:73)
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.run(OperationTrackerImpl.java:56)
at org.apache.tapestry5.ioc.internal.PerThreadOperationTracker.run(PerThreadOperationTracker.java:60)
at org.apache.tapestry5.ioc.internal.RegistryImpl.run(RegistryImpl.java:1252)
at org.apache.tapestry5.internal.services.RequestOperationTracker.handlePageRender(RequestOperationTracker.java:
```

Related Articles

- [Overriding Exception Reporting](#)
- [Specific Errors FAQ](#)
- [Error Page Recipe](#)
- [Runtime Exceptions](#)

```
66)
at $ComponentRequestFilter_13a0346ec83c4f92.handlePageRender(Unknown Source)
at $ComponentRequestHandler_13a0346ec83c4f98.handlePageRender(Unknown Source)
at $ComponentRequestHandler_13a0346ec83c4f81.handlePageRender(Unknown Source)
at org.apache.tapestry5.internal.services.PageRenderDispatcher.dispatch(PageRenderDispatcher.java:52)
at $Dispatcher_13a0346ec83c4f7f.dispatch(Unknown Source)
at $Dispatcher_13a0346ec83c4f80.dispatch(Unknown Source)
at $Dispatcher_13a0346ec83c4f74.dispatch(Unknown Source)
at org.apache.tapestry5.modules.TapestryModule$RequestHandlerTerminator.service(TapestryModule.java:304)
at org.apache.tapestry5.internal.services.RequestErrorFilter.service(RequestErrorFilter.java:26)
at $RequestFilter_13a0346ec83c4f73.service(Unknown Source)
at $RequestHandler_13a0346ec83c4f75.service(Unknown Source)
at org.apache.tapestry5.modules.TapestryModule$3.service(TapestryModule.java:854)
at $RequestHandler_13a0346ec83c4f75.service(Unknown Source)
at org.apache.tapestry5.modules.TapestryModule$2.service(TapestryModule.java:844)
at $RequestHandler_13a0346ec83c4f75.service(Unknown Source)
at org.apache.tapestry5.internal.services.StaticFilesFilter.service(StaticFilesFilter.java:89)
at $RequestHandler_13a0346ec83c4f75.service(Unknown Source)
at org.apache.tapestry5.integration.app1.services.AppModule$2.service(AppModule.java:111)
at $RequestFilter_13a0346ec83c4f71.service(Unknown Source)
at $RequestHandler_13a0346ec83c4f75.service(Unknown Source)
at $RequestHandler_13a0346ec83c4f6a.service(Unknown Source)
at org.apache.tapestry5.modules.TapestryModule$HttpServletRequestHandlerTerminator.service(TapestryModule.java:255)
at org.apache.tapestry5.internal.gzip.GZipFilter.service(GZipFilter.java:59)
at $HttpServletRequestHandler_13a0346ec83c4f6c.service(Unknown Source)
at org.apache.tapestry5.internal.services.IgnoredPathsFilter.service(IgnoredPathsFilter.java:62)
at $HttpServletRequestFilter_13a0346ec83c4f6d.service(Unknown Source)
at $HttpServletRequestFilter_13a0346ec83c4f68.service(Unknown Source)
at $HttpServletRequestHandler_13a0346ec83c4f6c.service(Unknown Source)
at org.apache.tapestry5.modules.TapestryModule$1.service(TapestryModule.java:804)
at $HttpServletRequestHandler_13a0346ec83c4f6c.service(Unknown Source)
at $HttpServletRequestHandler_13a0346ec83c4f67.service(Unknown Source)
at org.apache.tapestry5.TapestryFilter.doFilter(TapestryFilter.java:166)
at org.eclipse.jetty.servlet.ServletHandler$CachedChain.doFilter(ServletHandler.java:1291)
at org.eclipse.jetty.servlet.ServletHandler.doHandle(ServletHandler.java:443)
at org.eclipse.jetty.server.handler.ScopedHandler.handle(ScopedHandler.java:137)
at org.eclipse.jetty.security.SecurityHandler.handle(SecurityHandler.java:556)
at org.eclipse.jetty.server.session.SessionHandler.doHandle(SessionHandler.java:227)
at org.eclipse.jetty.server.handler.ContextHandler.doHandle(ContextHandler.java:1044)
at org.eclipse.jetty.servlet.ServletHandler.doScope(ServletHandler.java:372)
at org.eclipse.jetty.server.session.SessionHandler.doScope(SessionHandler.java:189)
at org.eclipse.jetty.server.handler.ContextHandler.doScope(ContextHandler.java:978)
at org.eclipse.jetty.server.handler.ScopedHandler.handle(ScopedHandler.java:135)
at org.eclipse.jetty.server.handler.HandlerWrapper.handle(HandlerWrapper.java:116)
at org.eclipse.jetty.server.Server.handle(Server.java:369)
at org.eclipse.jetty.server.AbstractHttpConnection.handleRequest(AbstractHttpConnection.java:486)
at org.eclipse.jetty.server.AbstractHttpConnection.headerComplete(AbstractHttpConnection.java:933)
at org.eclipse.jetty.server.AbstractHttpConnection$RequestHandler.headerComplete(AbstractHttpConnection.java:995)
at org.eclipse.jetty.http.HttpParser.parseNext(HttpParser.java:644)
at org.eclipse.jetty.http.HttpParser.parseAvailable(HttpParser.java:235)
at org.eclipse.jetty.server.AsyncHttpConnection.handle(AsyncHttpConnection.java:82)
at org.eclipse.jetty.io.nio.SelectChannelEndPoint.handle(SelectChannelEndPoint.java:668)
at org.eclipse.jetty.io.nio.SelectChannelEndPoint$1.run(SelectChannelEndPoint.java:52)
at org.eclipse.jetty.util.thread.QueuedThreadPool.runJob(QueuedThreadPool.java:608)
at org.eclipse.jetty.util.thread.QueuedThreadPool$3.run(QueuedThreadPool.java:543)
at java.lang.Thread.run(Thread.java:724)
Caused by: java.lang.RuntimeException: Unable to instantiate instance of transformed class org.apache.tapestry5.integration.app1.pages.DatumEditor: java.lang.reflect.InvocationTargetException
at org.apache.tapestry5.internal.plastic.ClassInstantiatorImpl.newInstance(ClassInstantiatorImpl.java:113)
at org.apache.tapestry5.internal.services.ComponentInstantiatorSourceImpl$2$1.newInstance(ComponentInstantiatorSourceImpl.java:235)
at org.apache.tapestry5.internal.structure.InternalComponentResourcesImpl.<init>(InternalComponentResourcesImpl.java:163)
at org.apache.tapestry5.internal.structure.ComponentPageElementImpl.<init>(ComponentPageElementImpl.java:555)
at org.apache.tapestry5.internal.structure.ComponentPageElementImpl.<init>(ComponentPageElementImpl.java:579)
at org.apache.tapestry5.internal.pageload.ComponentAssemblerImpl.performAssembleRootComponent(ComponentAssemblerImpl.java:97)
... 94 more
Caused by: java.lang.reflect.InvocationTargetException
at sun.reflect.NativeConstructorAccessorImpl.newInstance0(Native Method)
at sun.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccessorImpl.java:57)
at sun.reflect.DelegatingConstructorAccessorImpl.newInstance(DelegatingConstructorAccessorImpl.java:45)
at java.lang.reflect.Constructor.newInstance(Constructor.java:526)
at org.apache.tapestry5.internal.plastic.ClassInstantiatorImpl.newInstance(ClassInstantiatorImpl.java:109)
... 99 more
Caused by: org.apache.tapestry5.ioc.internal.OperationErrorException: Field _value of class org.apache.tapestry5.integration.app1.pages.Datum must be instrumented, and may not be public.
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.logAndRethrow(OperationTrackerImpl.java:184)
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.run(OperationTrackerImpl.java:62)
at org.apache.tapestry5.ioc.internal.PerThreadOperationTracker.run(PerThreadOperationTracker.java:60)
at org.apache.tapestry5.ioc.internal.RegistryImpl.run(RegistryImpl.java:1252)
at org.apache.tapestry5.internal.services.ComponentInstantiatorSourceImpl.transform(ComponentInstantiatorSourceImpl.java:266)
```

```

at org.apache.tapestry5.internal.plastic.PlasticClassPool.loadAndTransformClass(PlasticClassPool.java:368)
at org.apache.tapestry5.internal.plastic.PlasticClassLoader.loadClass(PlasticClassLoader.java:38)
at java.lang.ClassLoader.loadClass(ClassLoader.java:357)
at org.apache.tapestry5.integration.appl.pages.DatumEditor.initializeInstance(DatumEditor.java:22)
at org.apache.tapestry5.integration.appl.pages.DatumEditor.<init>(DatumEditor.java)
... 104 more
Caused by: java.lang.IllegalArgumentException: Field _value of class org.apache.tapestry5.integration.appl.pages.
Datum must be instrumented, and may not be public.
at org.apache.tapestry5.internal.plastic.PlasticFieldImpl.ensureNotPublic(PlasticFieldImpl.java:166)
at org.apache.tapestry5.internal.plastic.PlasticFieldImpl.replaceFieldReadAccess(PlasticFieldImpl.java:423)
at org.apache.tapestry5.internal.plastic.PlasticFieldImpl.setComputedConduit(PlasticFieldImpl.java:292)
at org.apache.tapestry5.internal.transform.UnclaimedFieldWorker.transformField(UnclaimedFieldWorker.java:99)
at org.apache.tapestry5.internal.transform.UnclaimedFieldWorker.transform(UnclaimedFieldWorker.java:88)
at $ComponentClassTransformWorker2_13a0346ec83c4e9a.transform(Unknown Source)
at $ComponentClassTransformWorker2_13a0346ec83c4e9c.transform(Unknown Source)
at $ComponentClassTransformWorker2_13a0346ec83c4e7f.transform(Unknown Source)
at org.apache.tapestry5.internal.services.ComponentInstantiatorSourceImpl$3.run(ComponentInstantiatorSourceImpl.
java:316)
at org.apache.tapestry5.ioc.internal.OperationTrackerImpl.run(OperationTrackerImpl.java:56)
... 112 more

```

Notice how the operation trace at the top of the text succinctly explains how execution arrived at the point of failure and why, information that isn't captured in a stack trace.

This operation trace appears in the Tapestry web applications, as part of the [default exception report page](#).

There are times, especially when tracking down startup failures, where it is useful to see the operations log even without explicit exceptions.

Enabling **debug** level logging for the **org.apache.tapestry5.ioc.Registry** logging category will provide huge volumes of output in the console:

```

[DEBUG] Registry [ 1] --> Creating non-proxied instance of service ServiceConfigurationListenerHub
[DEBUG] Registry [ 2] --> Creating plan to instantiate org.apache.tapestry5.ioc.services.
ServiceConfigurationListenerHub via public org.apache.tapestry5.ioc.services.ServiceConfigurationListenerHub(java.
util.List)
[DEBUG] Registry [ 3] --> Determining injection value for parameter #1 (java.util.List)
[DEBUG] Registry [ 4] --> Collecting ordered configuration for service ServiceConfigurationListenerHub
[DEBUG] Registry [ 5] --> Invoking org.apache.tapestry5.ioc.FredModule.configureServiceConfigurationListener
(OrderedConfiguration, CatchAllServiceConfigurationListener) (at FredModule.java:141)
[DEBUG] Registry [ 6] --> Determining injection value for parameter #1 (org.apache.tapestry5.ioc.
OrderedConfiguration)
[DEBUG] Registry [ 6] <-- Determining injection value for parameter #1 (org.apache.tapestry5.ioc.
OrderedConfiguration) [0.17 ms]
[DEBUG] Registry [ 6] --> Determining injection value for parameter #2 (org.apache.tapestry5.ioc.
CatchAllServiceConfigurationListener)
[DEBUG] Registry [ 7] --> Creating proxy for service MasterObjectProvider
[DEBUG] Registry [ 7] <-- Creating proxy for service MasterObjectProvider [2.82 ms]
[DEBUG] Registry [ 7] --> Realizing service MasterObjectProvider
[DEBUG] Registry [ 8] --> Instantiating service MasterObjectProvider implementation via org.apache.tapestry5.ioc.
internal.services.MasterObjectProviderImpl(List, OperationTracker) (at MasterObjectProviderImpl.java:33) via org.
apache.tapestry5.ioc.modules.TapestryIOCMModule.bind(ServiceBinder) (at TapestryIOCMModule.java:50)
[DEBUG] Registry [ 9] --> Creating plan to instantiate org.apache.tapestry5.ioc.internal.services.
MasterObjectProviderImpl via public org.apache.tapestry5.ioc.internal.services.MasterObjectProviderImpl(java.util.
List,org.apache.tapestry5.ioc.OperationTracker)
[DEBUG] Registry [ 10] --> Determining injection value for parameter #1 (java.util.List)
[DEBUG] Registry [ 11] --> Collecting ordered configuration for service MasterObjectProvider
[DEBUG] Registry [ 12] --> Invoking org.apache.tapestry5.ioc.modules.TapestryIOCMModule.setupObjectProviders
(OrderedConfiguration, ServiceOverride) (at TapestryIOCMModule.java:136)
[DEBUG] Registry [ 13] --> Determining injection value for parameter #1 (org.apache.tapestry5.ioc.
OrderedConfiguration)
[DEBUG] Registry [ 13] <-- Determining injection value for parameter #1 (org.apache.tapestry5.ioc.
OrderedConfiguration) [0.17 ms]
[DEBUG] Registry [ 13] --> Determining injection value for parameter #2 (org.apache.tapestry5.ioc.services.
ServiceOverride)
[DEBUG] Registry [ 14] --> Creating proxy for service ServiceOverride
[DEBUG] Registry [ 14] <-- Creating proxy for service ServiceOverride [2.15 ms]
[DEBUG] Registry [ 13] <-- Determining injection value for parameter #2 (org.apache.tapestry5.ioc.services.
ServiceOverride) [2.62 ms]
[DEBUG] Registry [ 13] --> Creating proxy for service UpdateListenerHub
[DEBUG] Registry [ 13] <-- Creating proxy for service UpdateListenerHub [2.28 ms]
...

```

The output identifies operation depth (the number in square brackets), whether the operation is starting (→) or finishing (←), and even the execution time of the operation.