

Service Analysis

Dynatrace Training Module



Agenda

- Service Drilldowns
 - Details
 - Key Requests
 - Multidimensional Analysis Views
 - Compare
- Understand Dependencies
 - Service Flow
 - Service Backtrace
- Analyze Transactions
 - View Web Requests
 - Response Time Distribution
 - Response Time Hotspots
 - Failure Analysis
 - Exception Analysis
 - PurePaths
- Service Analysis during a Problem

Service Drilldowns

Service Drilldowns

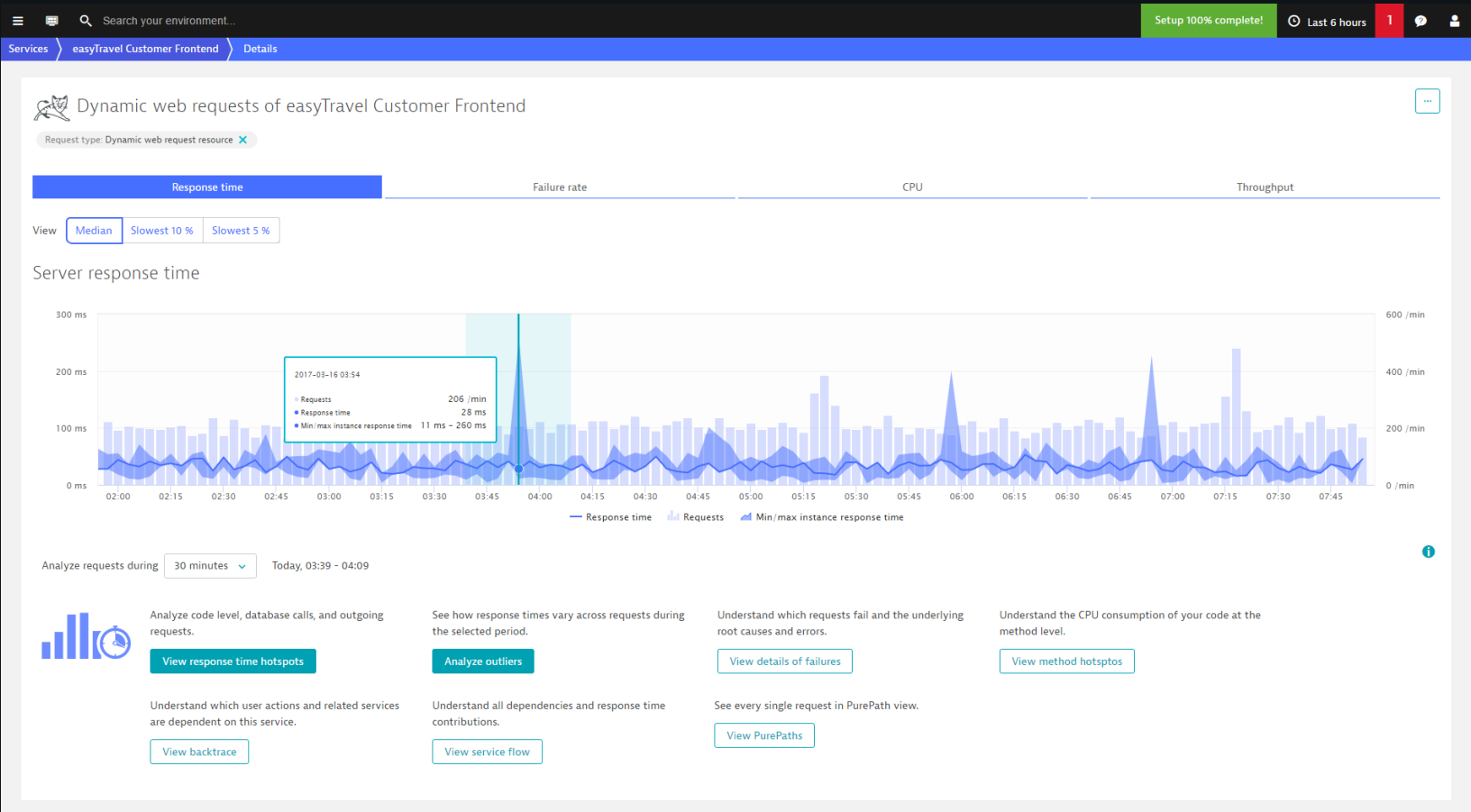
Details

Key Requests

Multidimensional Analysis Views

Compare

Details



Service Drilldowns

Details ◀

Key Requests

Multidimensional
Analysis Views

Compare

Details

- What is it?
 - Detailed overview of a service's performance
 - Starting point for further analysis
- When would I use it?
 - Understand the overall performance over time
 - Beginning manual hotspot and failure analysis
 - Landing view for several problem root causes

Service Drilldowns

Details

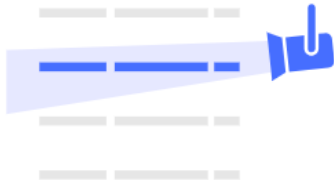
Key Requests ◀

Multidimensional Analysis Views

Compare

Key Requests

Key requests



Some requests are more important than others. These "key" requests might be more important for your business visibility or require different thresholds because of very complex calculations. Key requests provide some advantages:

- Long term metric history and offer dashboard tiles for charting and direct access from your dashboard
- They are always alerted on even if they contribute less than 1% of the throughput. Conversely non-key requests are not alerted on if they contribute less than 1% of the throughput
- They can have custom thresholds

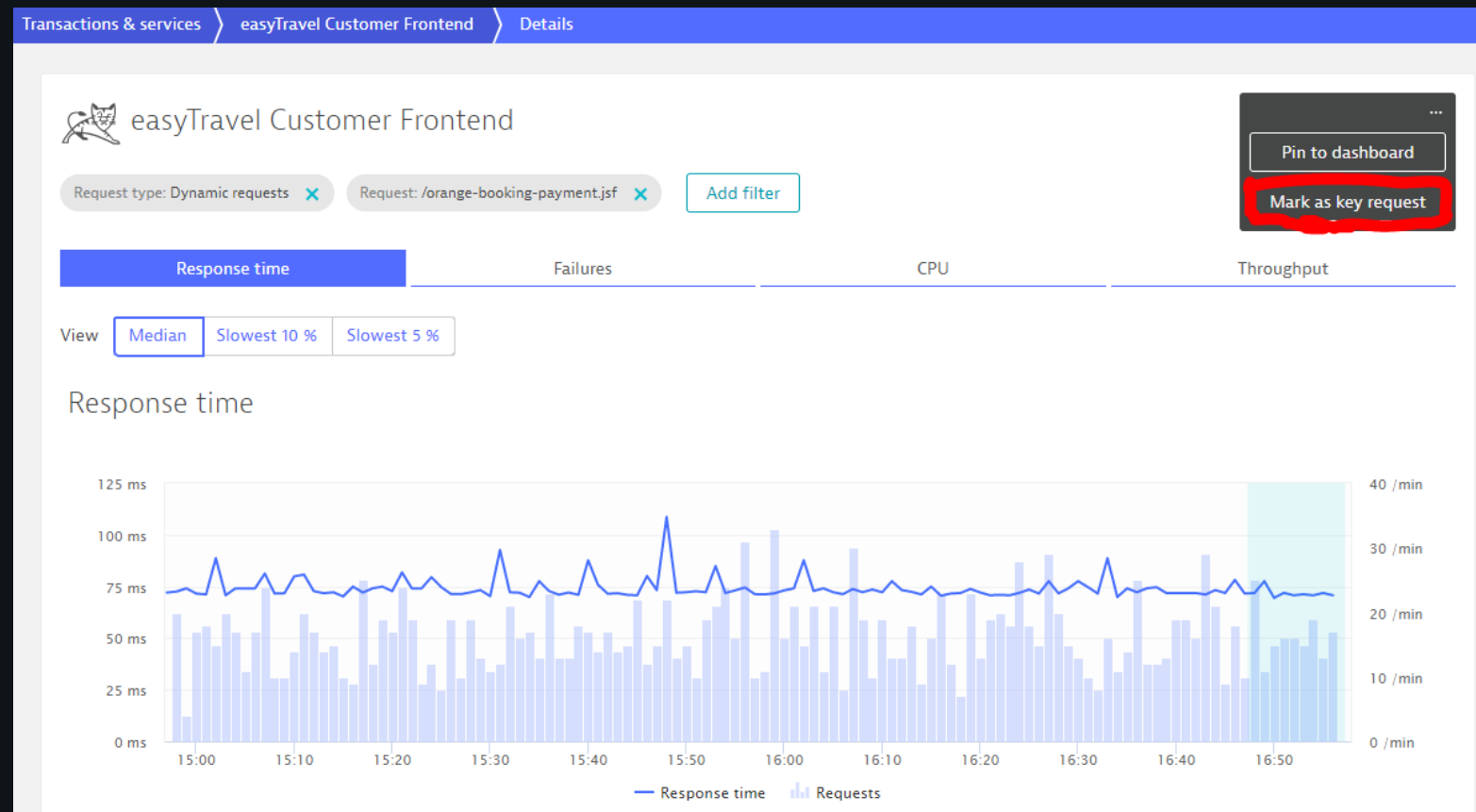
[Show less...](#)

Key Requests

- Not every request has the same importance to the success of your digital business. For example, visits to critical landing pages and shopping cart views can be particularly vital to your business operations and your customers' experience with your application.
- To give such critical requests the attention they deserve, Dynatrace enables you to flag certain requests as key requests. You can define your own response time and failure rate thresholds for key requests, access long-term monitoring data, and pin key requests to your dashboards in the form of dedicated tiles.
- Custom anomaly detection for key requests. (Discussed later)

Configure a Request as Key

- From the service details screen view the 'top requests'
- In the list of requests, select the request you'd like to make 'key' and filter on it
- When analyzing a single request, you can select the button 'mark as key request'



Service Drilldowns

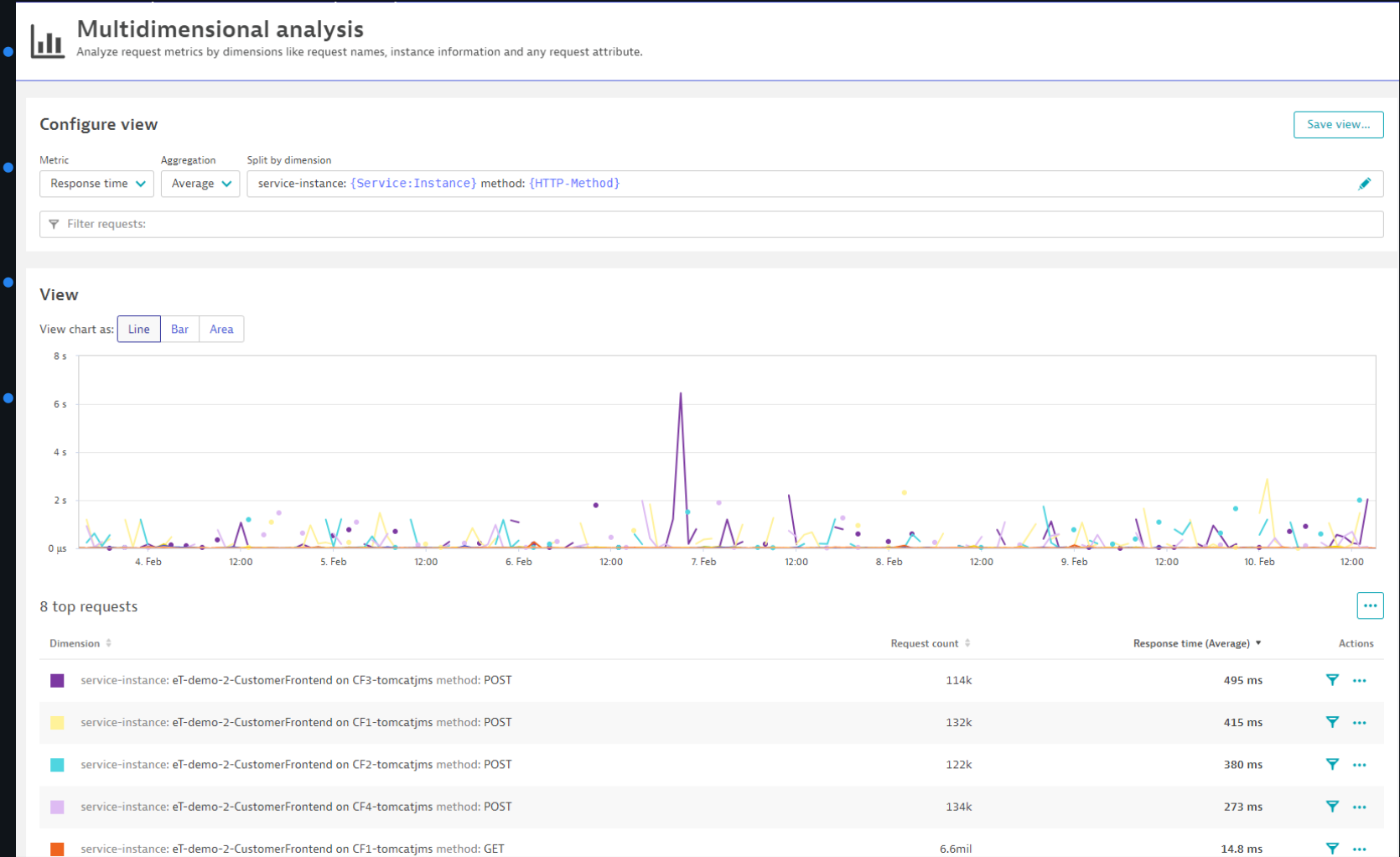
Details

Key Requests

Multidimensional Analysis Views

Compare


Multidimensional Analysis Views



Service Drilldowns

Details

Key Requests

Multidimensional Analysis Views 

Compare

Multidimensional Analysis Views

- What is it?
 - Book marked trending analysis of specific metrics relative to selected service
 - Drill into long-term trends
- When would I use it?
 - Bookmark metrics for others to view
 - Combine metrics for deeper understanding of transaction behavior
 - Set filters
 - Show only specific instance of service request
- Environment wide MDA view available under *diagnostic tools*
- Soon you will be able to define calculated service metrics from this view

Service Drilldowns

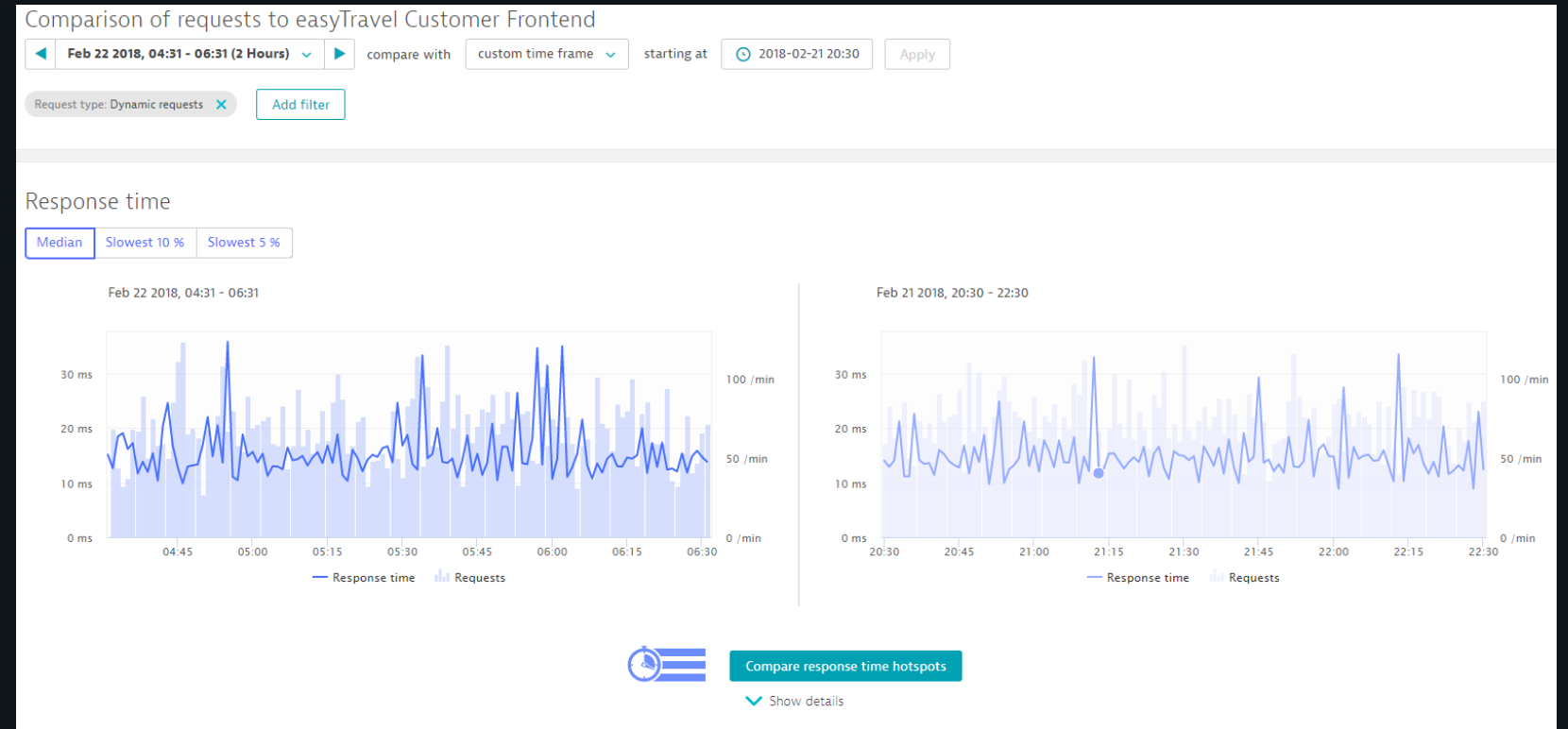
Details

Key Requests

Multidimensional Analysis Views

Compare

Compare



Service Drilldowns

Details

Key Requests

Multidimensional
Analysis Views

Compare ◀

Compare

- What is it?
 - Compare view enables you to compare critical service-request metrics across two time frames
- When would I use it?
 - View performance metrics for Requests, Attributes, or Instances
 - Response time
 - Failures
 - CPU
 - Load

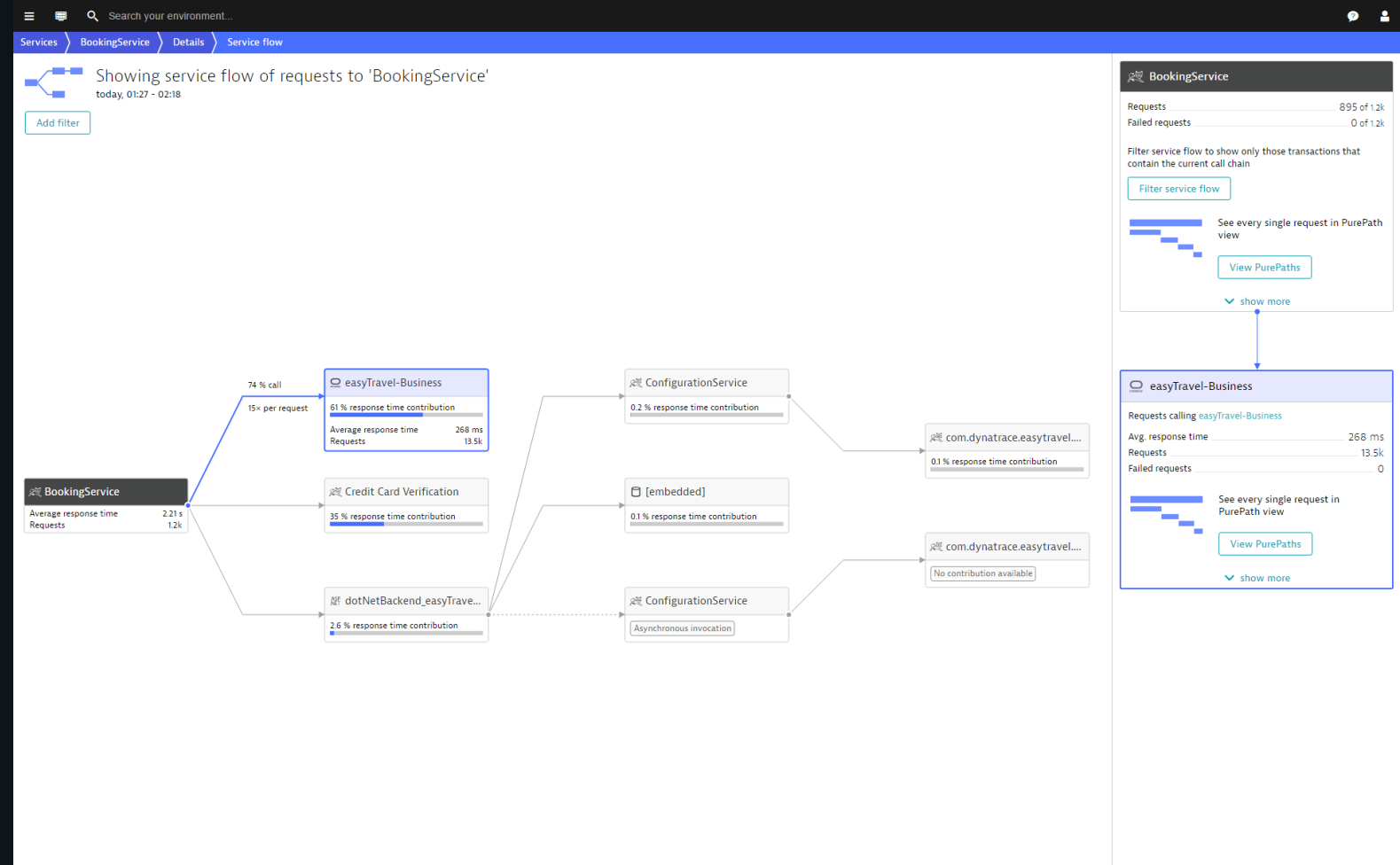
Understand Dependencies

Understand Dependencies

Service Flow

Service Backtrace

Service Flow



Understand Dependencies

Service Flow ◀

Service Backtrace

Service Flow

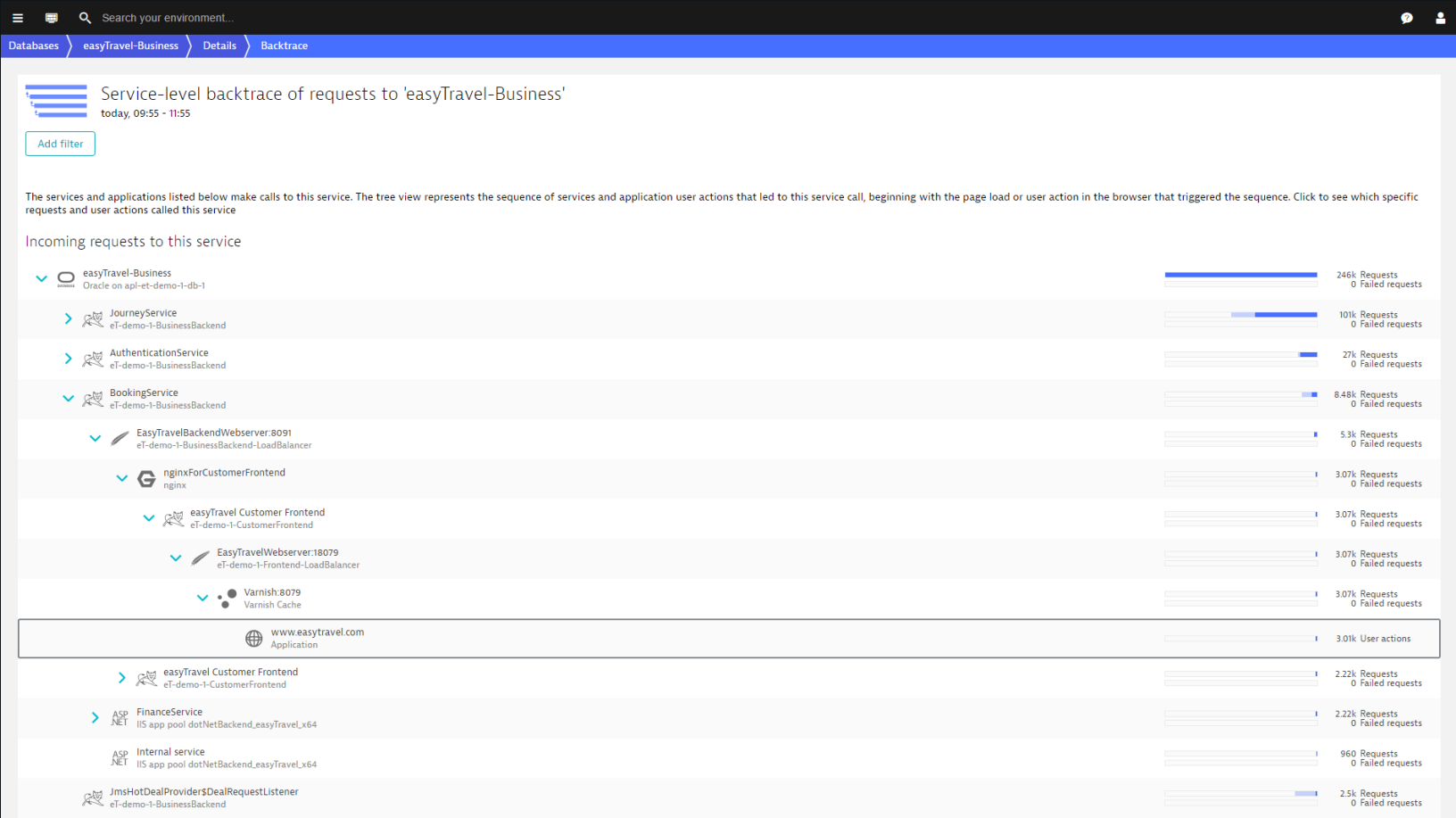
- What is it?
 - Overview of all services and queues that a selected service makes requests to and the time spent within those services
- When would I use it?
 - Understand the call chain sequence of a service
 - View all the response time contributors for a service
 - View affected tiers during active or resolved problems

Understand Dependencies

Service Flow

Service Backtrace

Service Backtrace



Understand Dependencies

Service Flow

Service Backtrace ◀

Service Backtrace

- What is it?
 - A view that shows information about who makes calls to a particular service
- When would I use it?
 - Understand what services call the selected service
 - Analyze the performance of a service from the perspective of the calling clients

Analyze Transactions

Analyze Transactions

View Web Requests

Response Time Distribution

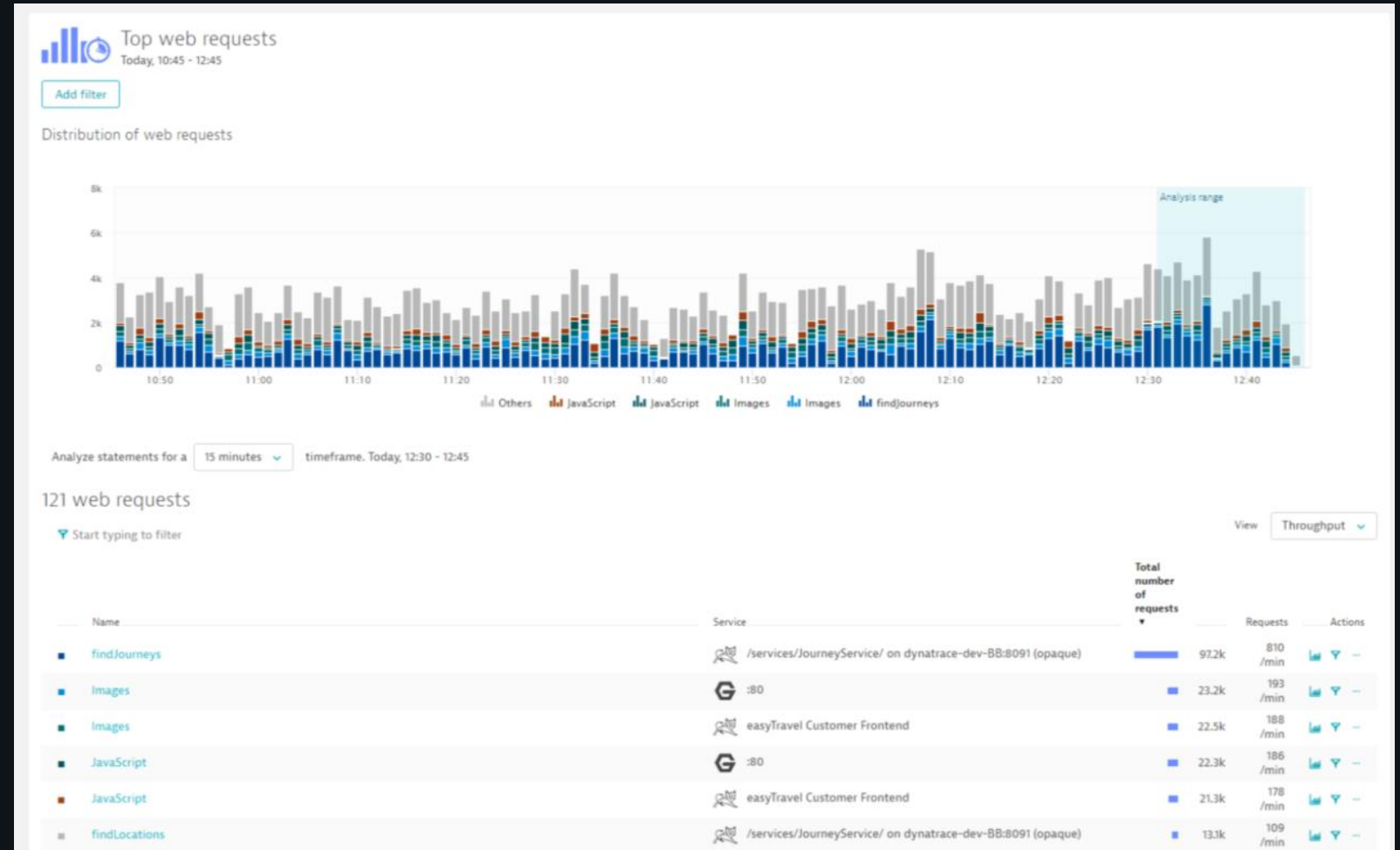
Response Time Hotspots

Failure Analysis

Exception Analysis

PurePaths

View Web Requests



Analyze Transactions

View Web Requests ◀

Response Time
Distribution

Response Time
Hotspots

Failure Analysis

Exception Analysis

PurePaths

View Web Requests

- What is it?
 - A feature that allows you to quickly view all of the web requests within the currently selected timeframe
- When would I use it?
 - Find a specific request by filtering on different aspects, such as:
 - Response Time
 - HTTP Method
 - HTTP Response Code
 - Request Attribute

Analyze Transactions

View Web Requests

Response Time Distribution

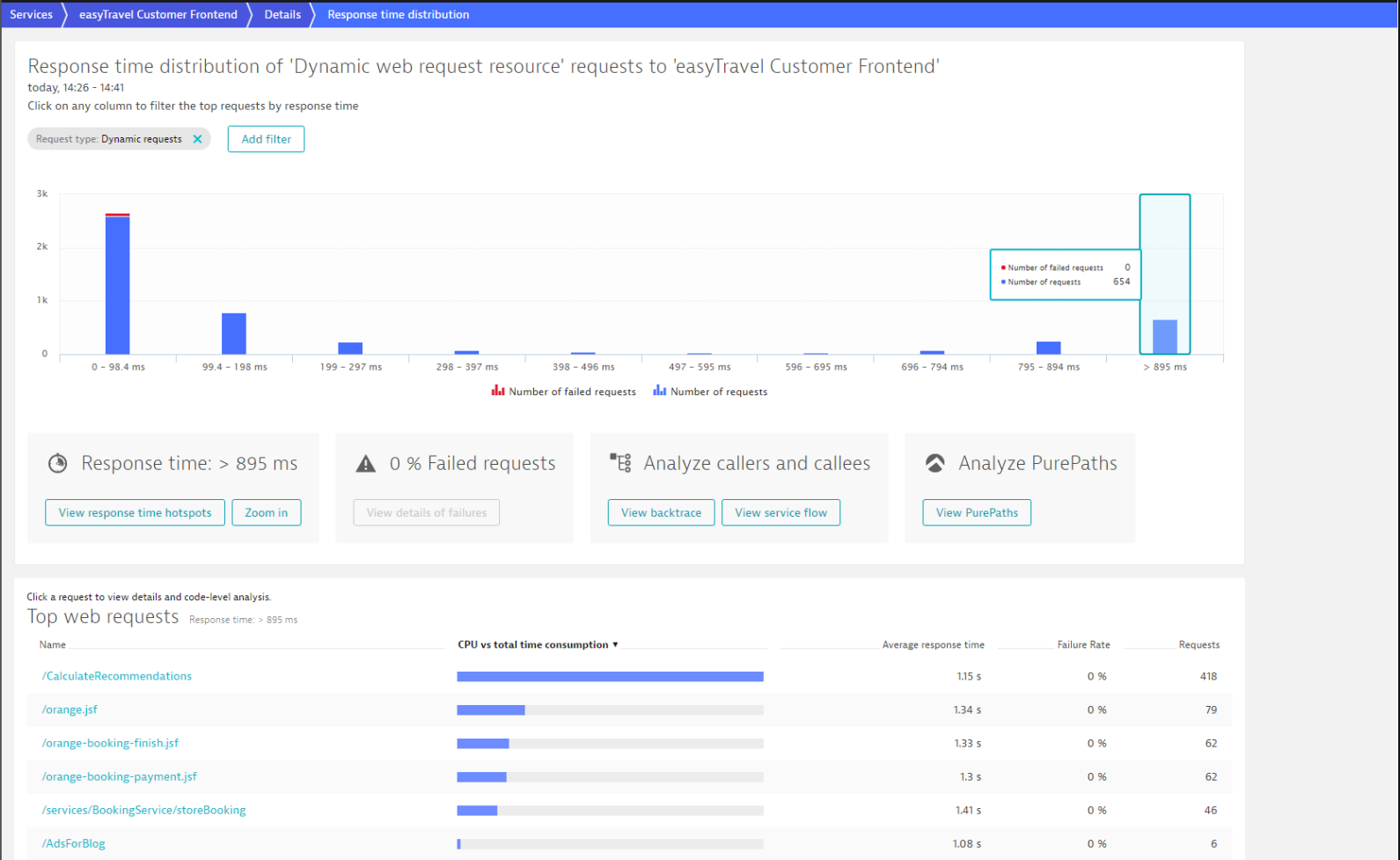
Response Time Hotspots

Failure Analysis

Exception Analysis

PurePaths

Response Time Distribution



Analyze Transactions

View Web Requests

Response Time Distribution ◀

Response Time Hotspots

Failure Analysis

Exception Analysis

PurePaths

Response Time Distribution

- What is it?
 - A feature that allows you to quickly view the variance in request duration
- When would I use it?
 - Easily view performance outliers and pick them out for deeper analysis
 - Quickly view changes in performance duration during problems vs normal behavior

Analyze Transactions

View Web Requests

Response Time Distribution

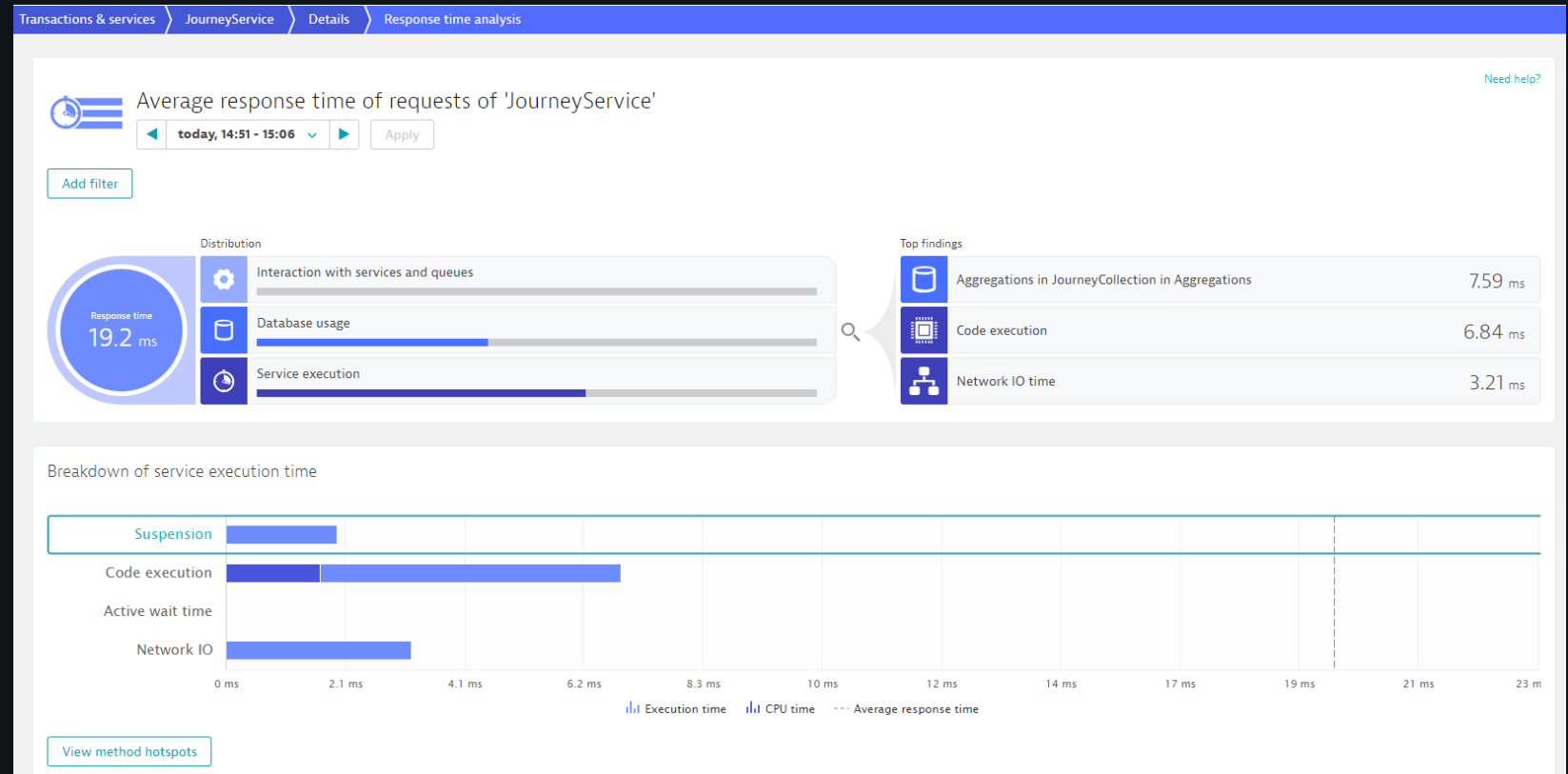
Response Time Hotspots

Failure Analysis

Exception Analysis

PurePaths

Response Time Hotspots



Analyze Transactions

View Web Requests

Response Time Distribution

Response Time Hotspots ◀

Failure Analysis

Exception Analysis

PurePaths

Response Time Hotspots

- What is it?
 - A feature that allows you to breakdown time spent in any service or even individual requests
- When would I use it?
 - Performance analysis of any instrumented service
 - Understand total impact of code, DB queries, calls to other services
 - Analyzing performance degradation during problems related to a service or request

Analyze Transactions

View Web Requests

Response Time Distribution

Response Time Hotspots

Failure Analysis ◀

Exception Analysis

PurePaths


Failure Analysis

Transactions & services

easyTravel Customer Frontend

Details

Failure analysis



Failed request of 'easyTravel Customer Frontend'

◀

Today, 17:32 - 17:47

▶


Apply

Request type: Dynamic requests

Failed state: only failed

Add filter

(Analyzed the server side)



301

Failed requests

View PurePaths

Service backtrace

Reasons for failed requests

Following are the reasons for failed requests. Click a specific reason to view the exception message and code-level details.

Reasons for failed requests

	Failed requests
Unknown exception / No message	97 % 291
▼ java.lang.IllegalStateException	3.32 % 10
Cannot create a session after the response has been committed	1.99 % 6
Cannot call sendRedirect() after the response has been committed	1 % 3
Cannot change buffer size after data has been written	0.33 % 1

Requests that failed with Unknown exception / No message

/CalculateRecommendations

Failed requests ▼

291

Potential root causes for requests that failed with Unknown exception / No message

100 % likely failed due to a java.lang.IllegalStateException

Details

Analyze Transactions

View Web Requests

Response Time
Distribution

Response Time
Hotspots

Failure Analysis ◀

Exception Analysis

PurePaths

Failure Analysis

- What is it?
 - View the details of failures occurring at any instrumented tier
- When would I use it?
 - Ad hoc failure analysis of any instrumented service
 - Analyzing failure rate increase during problems related to a service or request

What counts as a Failure?

Custom Error detection

- Dynatrace automatically captures HTTP errors
- It also detects programming exceptions as the reason for failed requests when the exceptions result in the abort of service calls
- Many web containers provide error pages for handled exceptions, which are also detected

Server side refers to response codes that indicate an error with the service itself

Failed request detection

Dynatrace detects failed requests, automatically alerts you when the failure rate rises and automatically detects the root cause of failed requests. You can adjust which requests Dynatrace detects as having failed.

The following HTTP response codes indicate an error on the server side:

500-599 ☐ Treat missing HTTP response code as server side error

The following HTTP response codes indicate an error on the client side:

400-599 ☐ Treat missing HTTP response code as client side error

HTTP 404 - broken link configuration

HTTP 404 errors occur when a request for a missing resource is received. For server side errors you should add it to the list of http codes where the referer indicates a request originating at the same site.

Treat broken links as server side errors ☒

Client side refers to response codes that indicate an error on the client side (rather than the service)

Custom Exceptions

- Beyond this, however, there are situations where application code handles exceptions gracefully in a manner that isn't detected
- When this happens, Dynatrace doesn't detect failed requests or alert you to errors
- Dynatrace can find the defined exception (and optional defined exception message) on any request and mark it as a failure

Custom handled exceptions

Dynatrace usually automatically detects exceptions that lead to failed requests. Some error exception but will not mark the request as failed. Define exceptions here that are handled g

Add exception

Exception class that should result in a failed request.

Optionally define a string that must be found in the exception message. If this string is not found then the exception will not lead to a failed request.

Custom Errors

- There are many cases where requests fail for reasons that are related to business logic
- While such situations often aren't detectable via exceptions or HTTP response codes, they are nevertheless indicative of problems
- To handle these situations, Dynatrace now allows you to use request attributes as indicators for error situations

Custom errors

Not all custom error situations are triggered by exceptions. Some might be just available as request attributes. In this case, this you can define a request attribute that captures the required data. You can then define a condition based on the request attribute to decide if the request has failed or not.

Add custom error rule

Amount of Recommendations ▼ equals ▼

-1

Cancel Save

Client Abort Exceptions

- There are exceptions that indicate a call was aborted and as such shouldn't be considered as failed under any circumstances

Client abort exceptions

Some exceptions indicate that the client aborted the operation. While a technical error this is something that is the services fault. When a service request ends with such an exception, Dynatrace failed. This even overrules the HTTP status code.

Add exception

Exception

org.apache.catalina.connector.ClientAbortException

Exception class that indicates a client abort situation.

org.apache.catalina.connector.ClientAbortException

Optionally define a string that must be found in the exception message for it to indicate a client abort situation.

Ignore Exceptions

- In a perfect world, every request that triggers an exception would be considered a failed request.
- There are however cases where your code returns exceptions that indicate a certain response and not an error

Ignore exceptions

Some exceptions do not indicate a failed request but are either a valid response in themselves or indicate a failed request. Dynatrace will ignore exceptions listed here when it considers it appropriate.

[Add exception](#)

Exception

org.apache.cassandra.thrift.NotFoundException

Exception class that must be ignored during failure detection.

org.apache.cassandra.thrift.NotFoundException

Optionally define a string that must be found in the exception message for it to be ignored.

Analyze Transactions

View Web Requests

Response Time Distribution

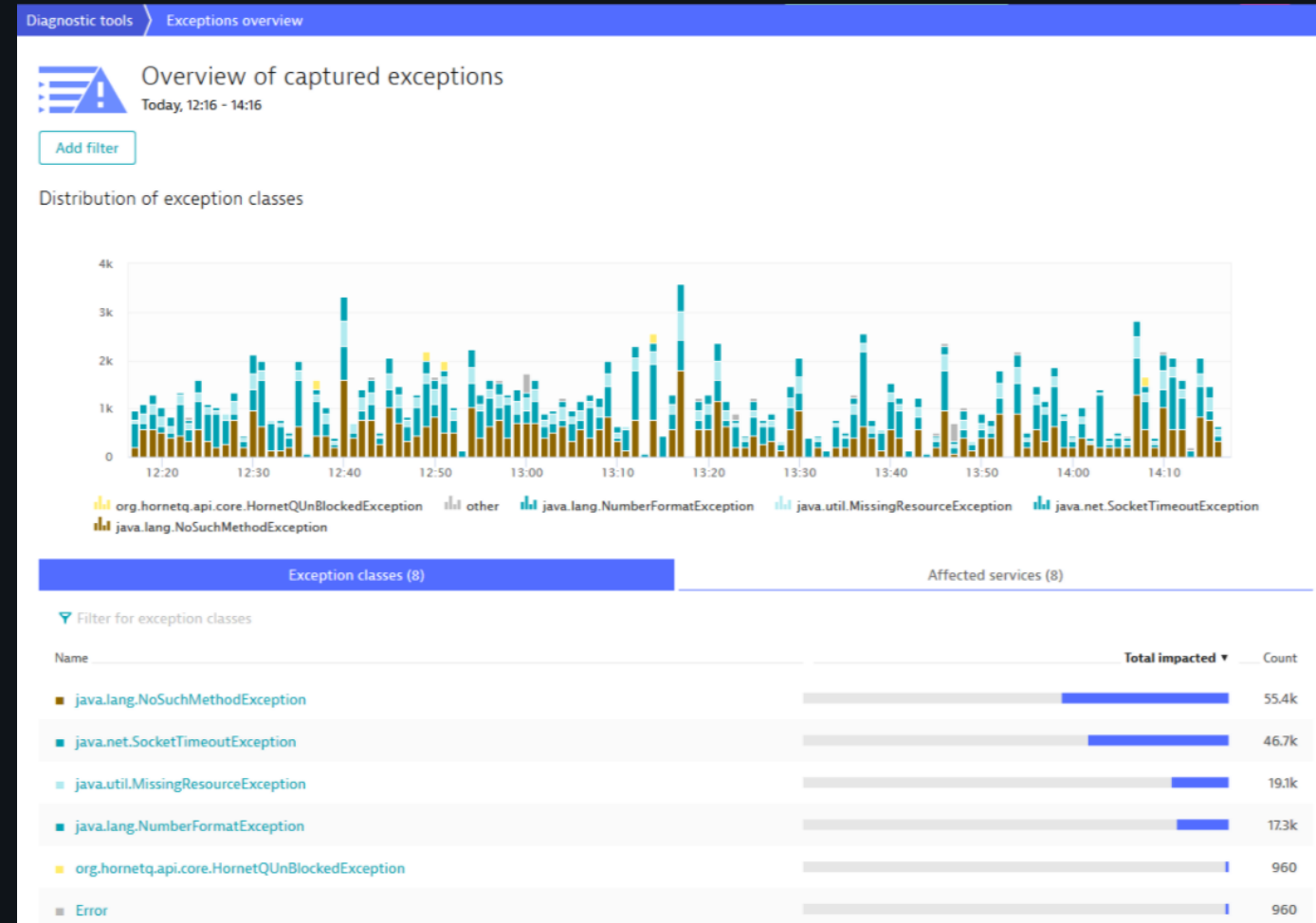
Response Time Hotspots

Failure Analysis

Exception Analysis ◀

PurePaths

Exception Analysis



Analyze Transactions

View Web Requests

Response Time
Distribution

Response Time
Hotspots

Failure Analysis

Exception Analysis ◀

PurePaths

Exception Analysis

- What is it?
 - View the details of exceptions that are happening in your application and how it changes over time
- When would I use it?
 - Identify the most commonly triggered exception
 - Filter down to the services that contain exceptions
 - Drilldown into the stacktrace of a particular exception

Analyze Transactions

View Web Requests

Response Time Distribution

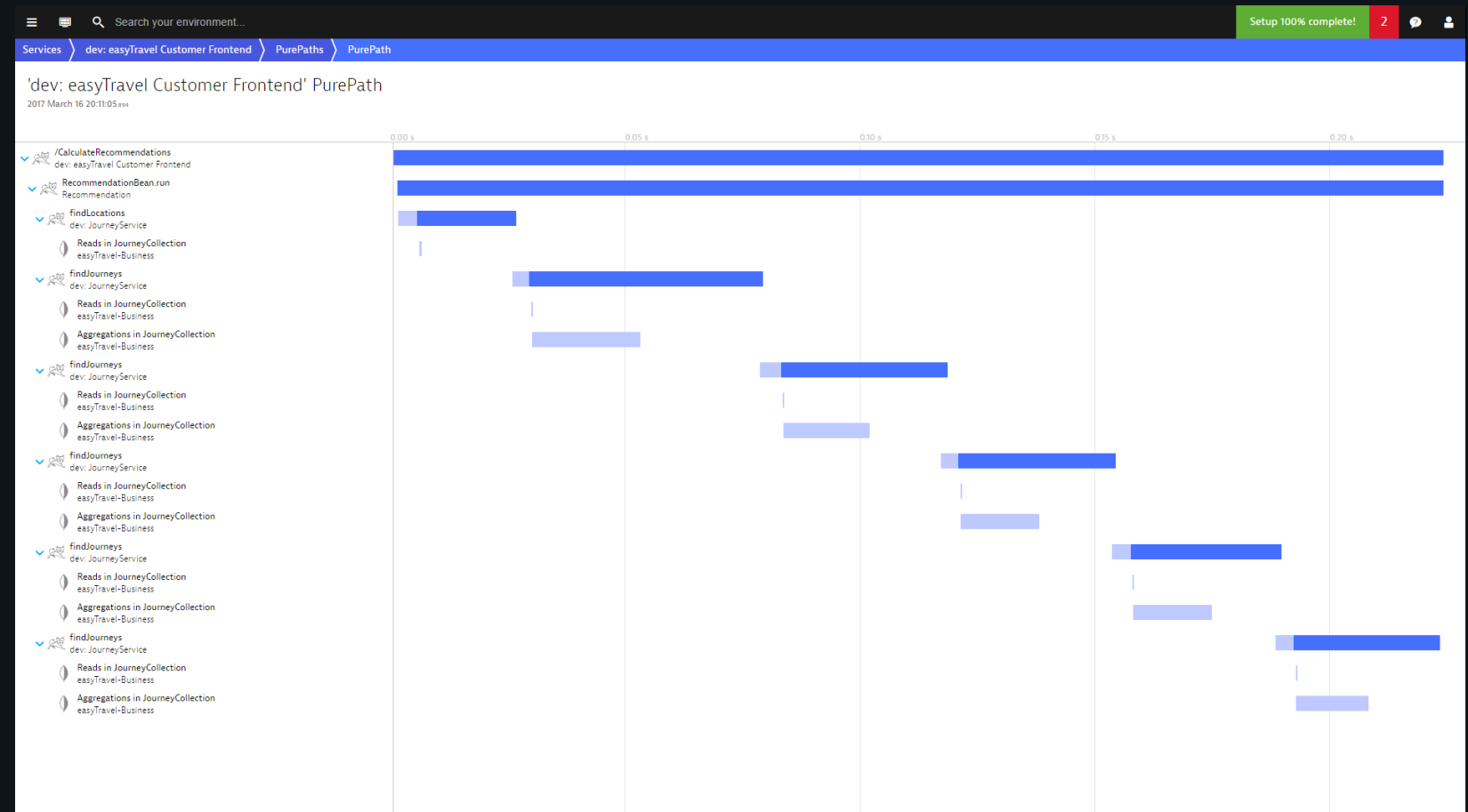
Response Time Hotspots

Failure Analysis

Exception Analysis

PurePaths ◀

PurePaths



Analyze Transactions

View Web Requests

Response Time
Distribution

Response Time
Hotspots

Failure Analysis

Exception Analysis

PurePaths ◀

PurePaths

- What is it?
 - Deep dive breakdown of a single transaction.
 - Waterfall breakdown of where time is spent

Service Analysis during a Problem

Service Analysis – Normal vs Abnormal

- To know what is 'abnormal', we must first understand what is 'normal'
- A few of the previous views dynamically change based on detected abnormalities
 - Service Details
 - Response Time Hotspots
 - Failure Analysis



2 services: Response time degradation

Problem 193 since 14:04 for 3 hours 51 minutes.

Problem summary

Timeframe filtered automatically on selected problem duration

Response time degradation (2 events)

Response time degradation

The current response time (221 ms) exceeds **your custom threshold (100 ms)** by 121 %

Affected requests	Service method
7 /min	All methods affected



dev-CF: Recommendation

Seen recently

Properties and tags

Kristof Wolfgang aaakaro2 wolfgangMainte...

Impacted metric will be red if problem is ongoing, green if the is problem resolved

Requests

Response time



189 ms

Failure rate



0 %

CPU



10.6 ms/req

Throughput



49 /min

Requests contributing to this problem



Slow response time 221 ms
[RecommendationBean.run](#)

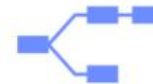
Multi-dimensional analysis

This section will list your bookmarks

Hotspot frame is now showing summary of requests and failures that contribute to the selected problem

Understand dependencies

Today, 13:49 - 17:55



Understand all dependencies and response time contributions

[View service flow](#)



Understand which user actions and related services are dependent on this service

[Analyze backtrace](#)

RESTProcedureControl

Request: status X

Affected metric highlighted

Response time

Failure rate

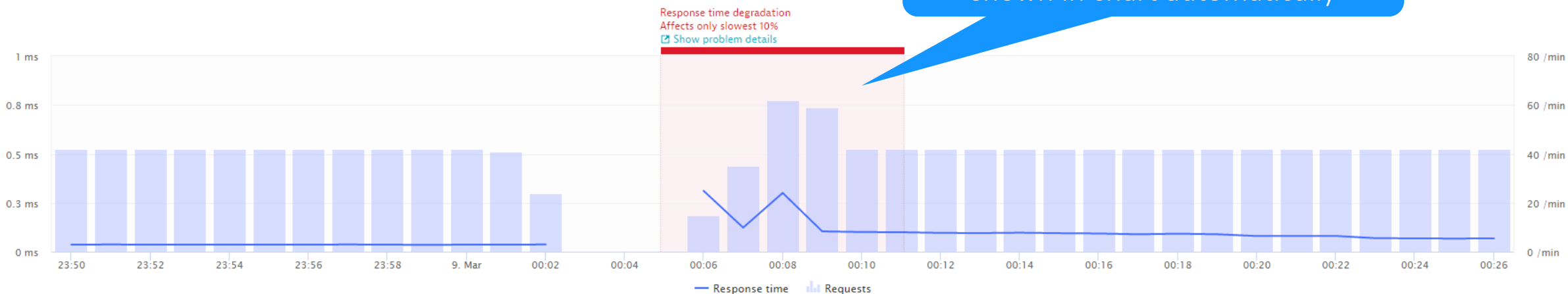
CPU

Throughput

View Median Slowest 10 % Slowest 5 %

Server response time

Problem duration and information shown in chart automatically



Analyze all requests during this event's time frame. Mar 09 2017, 00:05 - 00:11



Analyze code level, database calls, and outgoing requests.

[View response time hotspots](#)

See how response times vary across requests during the selected period.

[Analyze outliers](#)

Looking for more? More analyses and drill-

Further analysis will be done on the problem timeframe (if selected in chart)

No client calls or calling services not monitored.

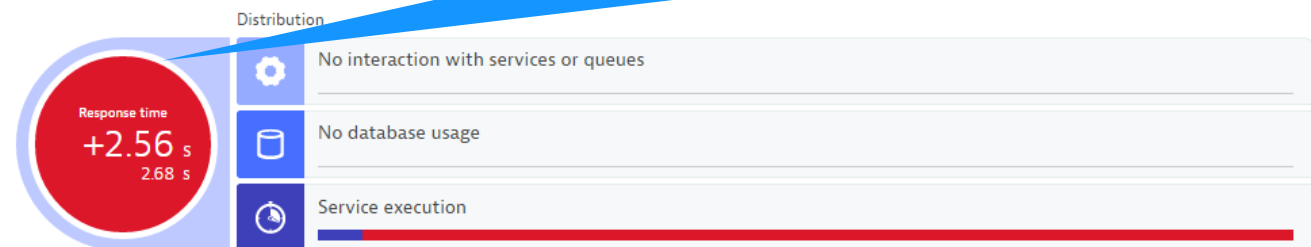
Average response time of CheckDestination

02:58 - 03:28 compared to Mar 15 22:30 - Mar 15 23:00

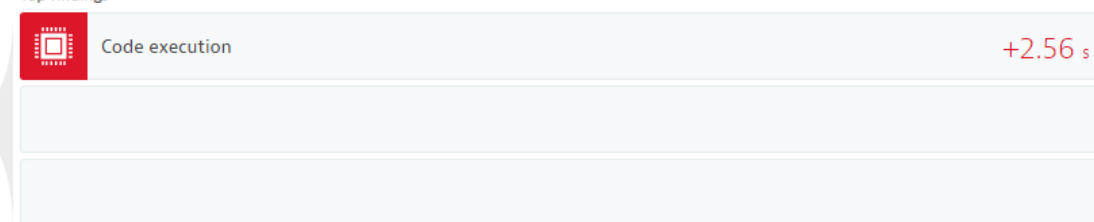
[Need help?](#)

[Add filter](#)

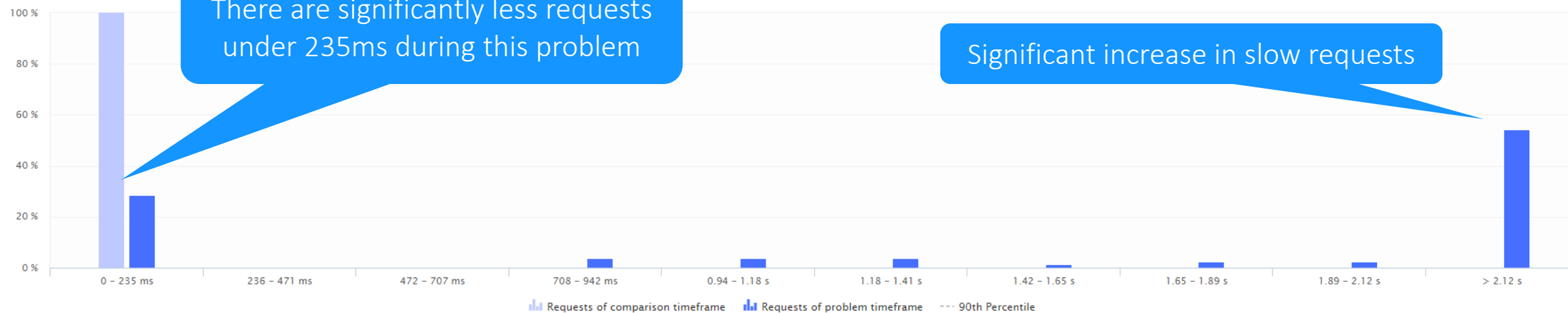
Distribution icon signals response time abnormality



Top findings



Response time distribution



Average response time of CheckDestination

02:58 - 03:28 compared to Mar 15 22:30 - Mar 15 22:00

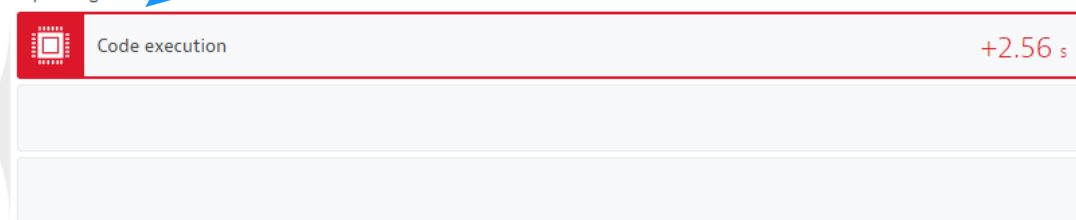
Add filter

Distribution view shows us significant increase in internal execution time

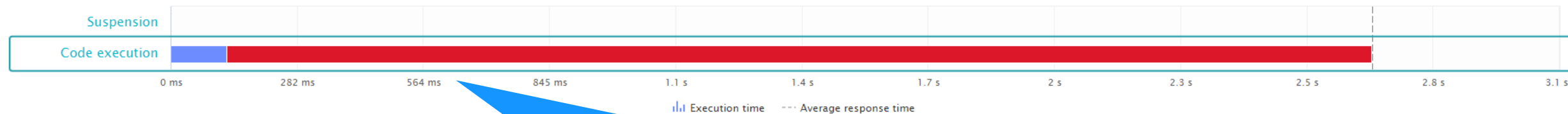


Top findings shows us an exact category where that time is spent

Top findings



Breakdown of service execution time



We are able to visualize the difference in time spent within code execution

Method hotspots contributing to code execution

Search



Module

java.lang.Thread.run

Sample count

Contribution

3.92k 100 %

java.util.concurrent.ThreadPoolExecutor\$Worker.run [+]

3.92k 100 %

org.apache.tomcat.util.net.JIoEndpoint\$SocketProcessor.run [+]

3.92k 100 %

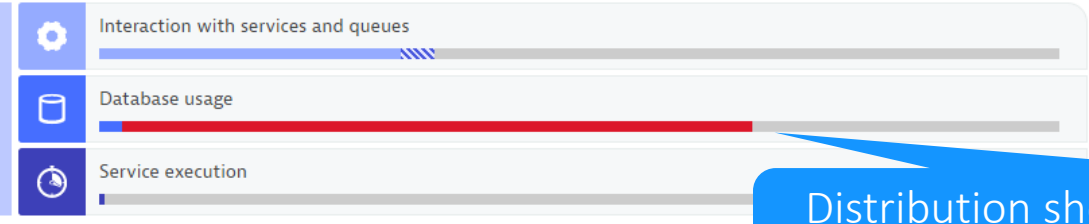
org.springframework.web.filter.OncePerRequestFilter.doFilter [+]

3.92k 100 %

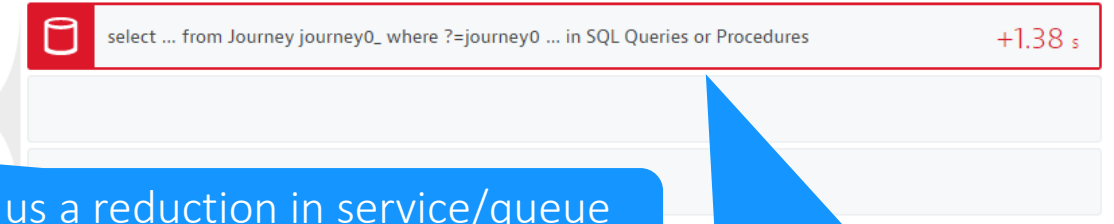
javax.servlet.http.HttpServlet.service [+]

3.92k 100 %

Distribution



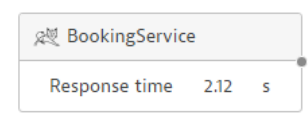
Top findings



Distribution show us a reduction in service/queue time and a massive increase in Database usage

Top findings give us a link to an exact SQL/service call where that additional time is spent

select ... from Journey journey0_ where ?=journey0 ... in SQL Queries or Procedures



28%
1.98 x

select ... from Journey journey0_ where ?=journey0 ...			
Response time	2.48 s		+2.48 s
x Percentage of calls	28 %	N	-10.4 %
x Invocations per call	1.98 x		+0.98 x
= Response time contribution	1.39 s		+1.38 s

28% of the requests call select ... from Journey journey0_ where ?=journey0 ... (averaging 1.98 calls per request).

We see the changes in that query's performance – including number of invocations during the problem timeframe

Database statements of select ... from Journey journey0_ where ?=journey0 ...

```
select journey0_id as id1_1, journey0_amount as amount2_1, journey0_description as description3_1, journey0_destination_name as destination_name8_1, journey0_fromDate as fromDate4_1, journey0_name as name5_1, journey0_content as content6_1, journey0_start_name as start_name9_1, journey0_tenant_name as tenant_name10_1, journey0_toDate as toDate7_1 from Journey journey0_ where ?=journey0_id and (normalize_location('*****', ?) is not null)
```

change in contribution

+1.38 s


Average execution time	2.48 s		+2.48 s
x Percentage of calls	28 %	N	-10.4 %
x Invocations	1.98 x		+0.98 x
= Response time contribution	1.39 s		+1.38 s

Rows returned per execution 0.01

We see the changes in that query's performance – including number of invocations during the problem timeframe

Failed requests of Images in
easyTravel Customer Frontend from Mar 13 21:11 to Mar 13 21:41

Request: Images ✕ Add filter

 **4.3k** (+4.3k)
Failed requests

Quantifiable increase in total failed requests

View PurePaths Service backtrace

Reasons for failed requests
Following are the reasons for failed requests. Click a specific reason to view the exception message and code-level details.



Percentage and absolute increase per failure

Requests that failed with HTTP 500



Absolute failure increase in individual requests

Root causes for requests to Images that failed with HTTP 500

100 % (+100 %) were caused by failed service calls to CouchDB_ET on port 5984 with java.net.ConnectException

Details

These specific requests of CouchDB_ET on port 5984 failed with "java.net.ConnectException":

Images

Breakdown for the root cause failure increase

Specific exceptions

Connection refused (Connection refused)

Stacktraces of exceptions

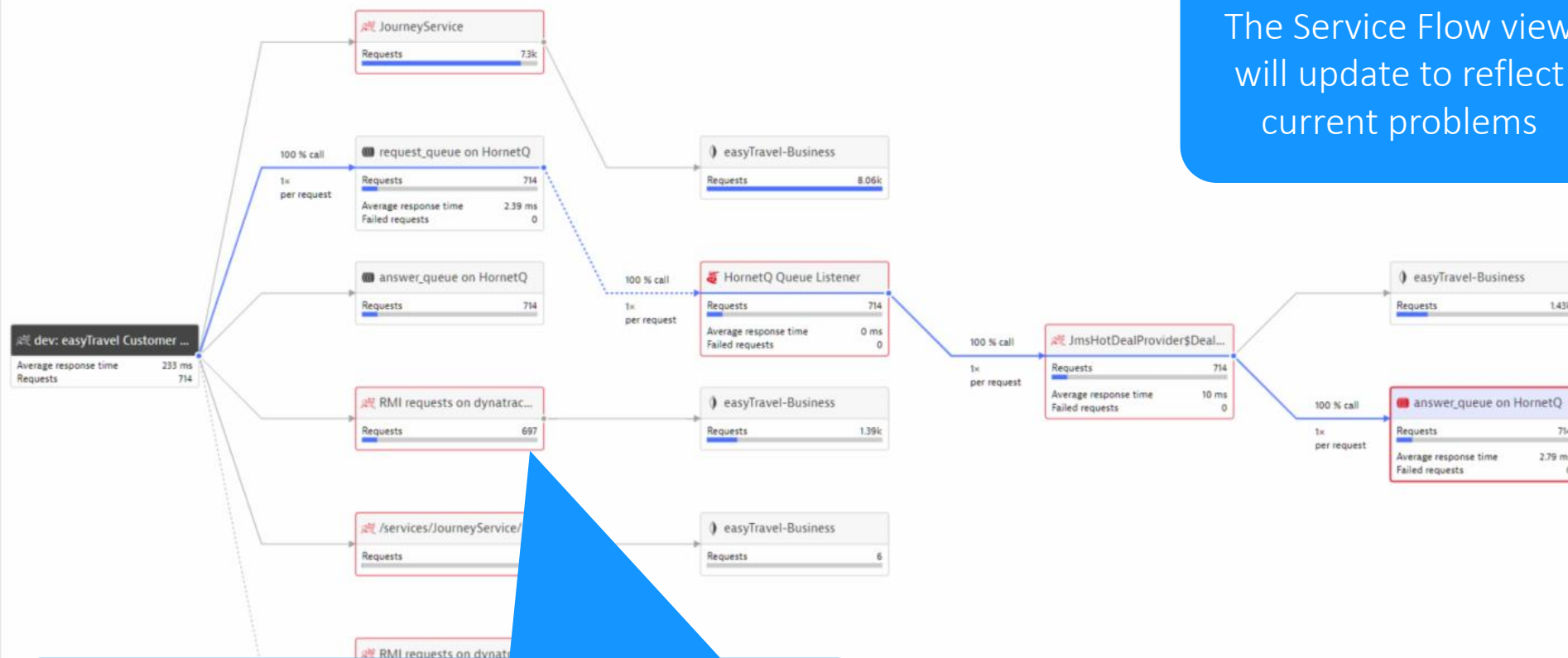
```
java.net.PlainSocketImpl.socketConnect (PlainSocketImpl.java) [+]  
org.apache.http.conn.socket.PlainConnectionSocketFactory.connectSocket (PlainConnectionSocketFactory.java:72) [+]  
org.lightcouch.CouchDbClientBase.executeRequest (CouchDbClientBase.java:417) [+]
```

Showing service flow of requests of 'dev: easyTravel Customer Frontend'

Today, 12:07 - 14:07 (2 Hours) Apply

Show Response time Throughput

dev: easyTr... request_qu... HornetQ Q... JmsHotDe... easyTravel... Remove filter



The Service Flow view will update to reflect current problems

Affected services colored in red or green if viewing within problem analysis mode.

Passing transactions Infrastructure

dev: easyTravel Customer Frontend 2 service instances

dynatrace-dev-CF
Avg. response time 291 ms
Requests 364
Failed requests 0
Running on lr-ws-102v

Apply as filter

dynatrace-dev-CF
Avg. response time 173 ms
Requests 350
Failed requests 0
Running on lr-ub-104v

Apply as filter

3 services 4 service instances

answer_queue on HornetQ 1 service instance

dynatrace-dev-BB
Avg. response time 2.79 ms
Requests 714
Failed requests 0
Running on lr-ws-102v

Apply as filter

Questions?



Simply smarter clouds