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Want to Turbocharge your Developer Pipeline?

Viktor Adam
Software Engineer | Atlassian | @rycus86

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ATLASSIAN



Jira



Confluence



Bitbucket



Trello

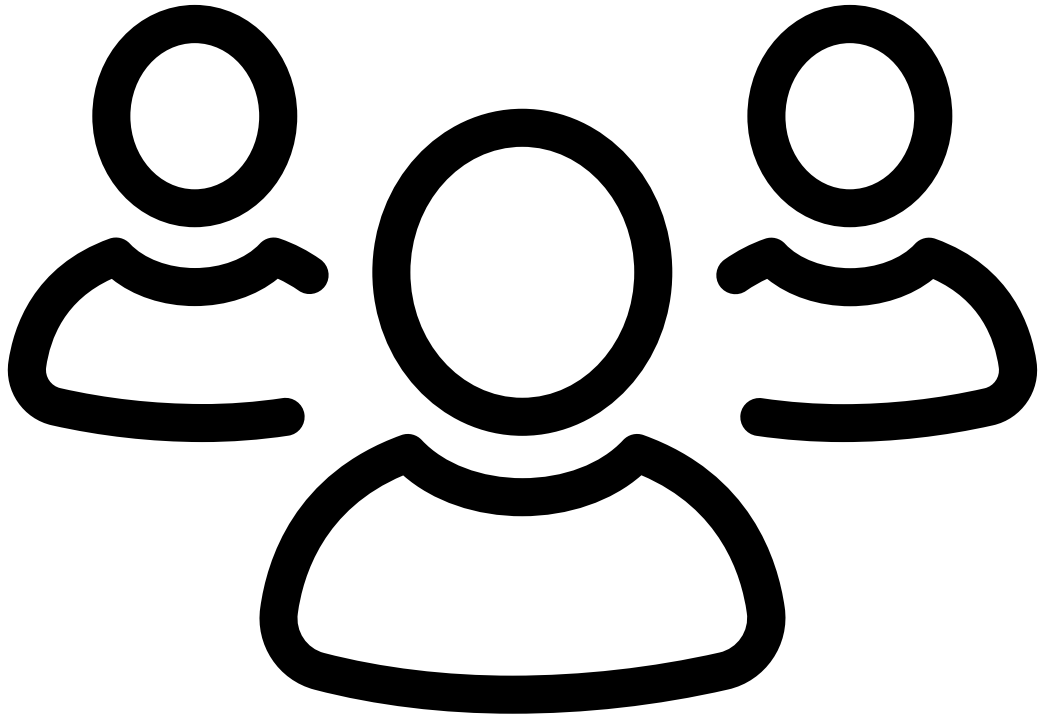
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“We believe behind every great human achievement, there is a **team**. Our mission is to unleash the potential in every team.”

Atlassian’s mission

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Developer Experience Advocates Team

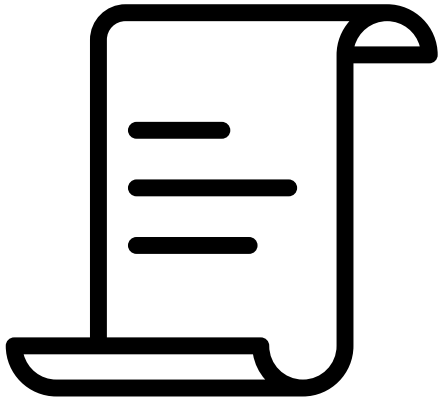


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Agenda

1. Scaling up and its challenges
2. Splunk to the rescue
3. Evolution of dashboards
4. Achievements & failures
5. Takeaways



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Scaling up

and its challenges

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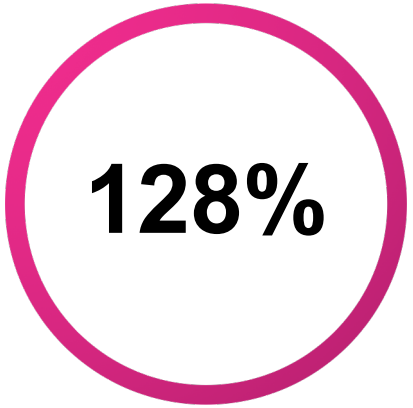
Growing Teams



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Codebase Growth

in 2.5 years

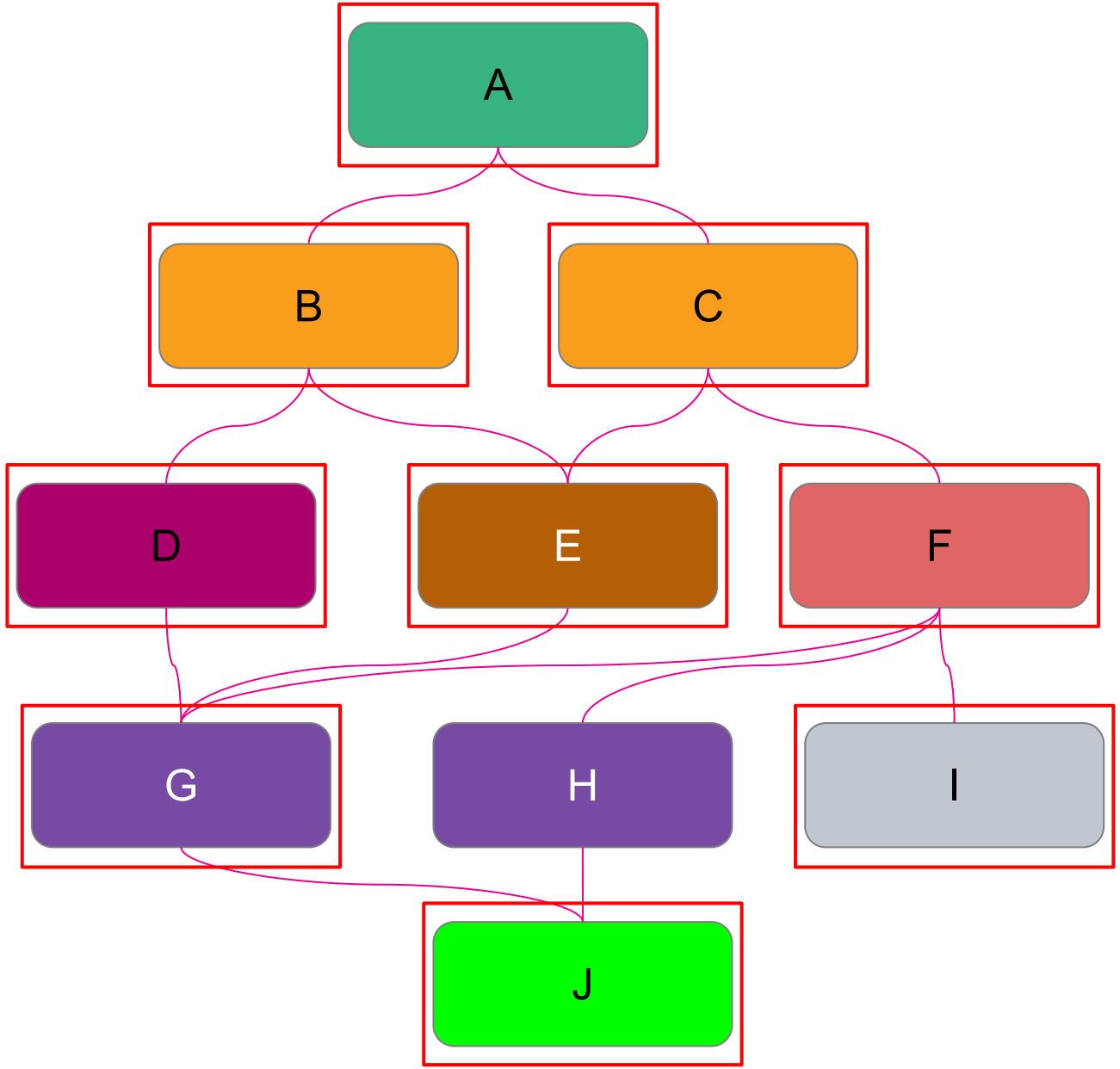


more lines of
Java code

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Maven™

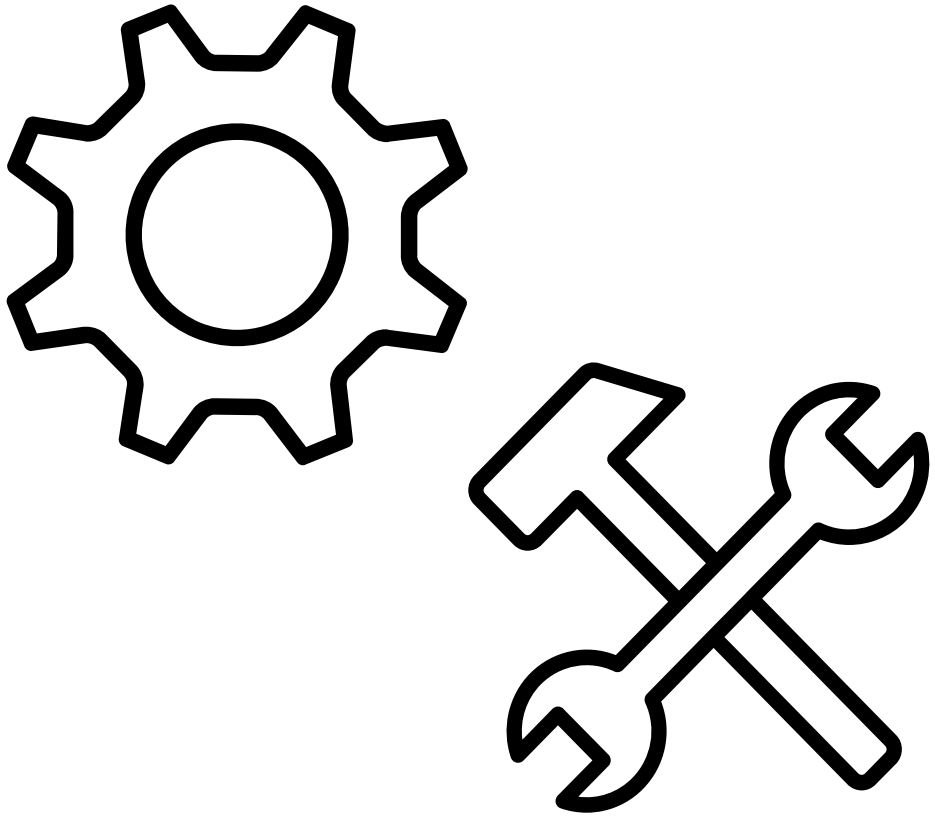
Directed Acyclic Graph



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Framework Agnostic

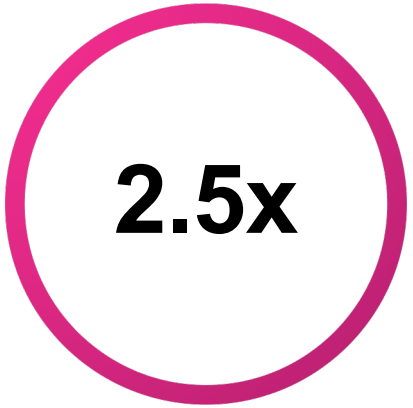
Can be applied to optimization problems



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Codebase Growth

in 2.5 years

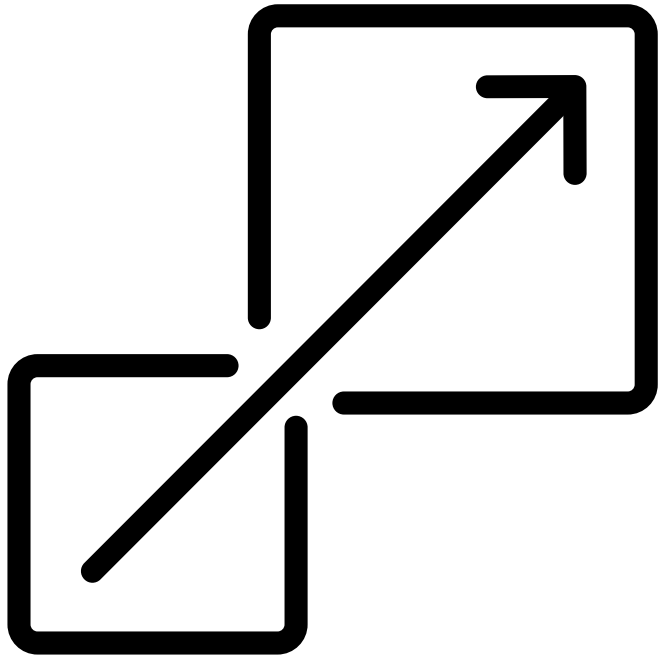


more Maven modules

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Challenges with Growth

- Increased complexity
- Inefficient builds
- Long build times

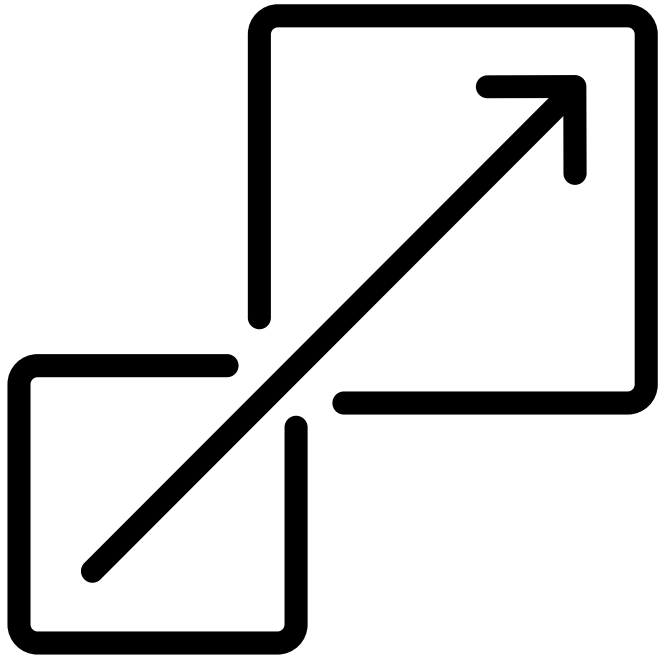


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Challenges with Growth

- Increased complexity
  - Jmake, a wrapper tool around Maven invocations
- Inefficient builds
  - Maven incremental build extension
- Long build times

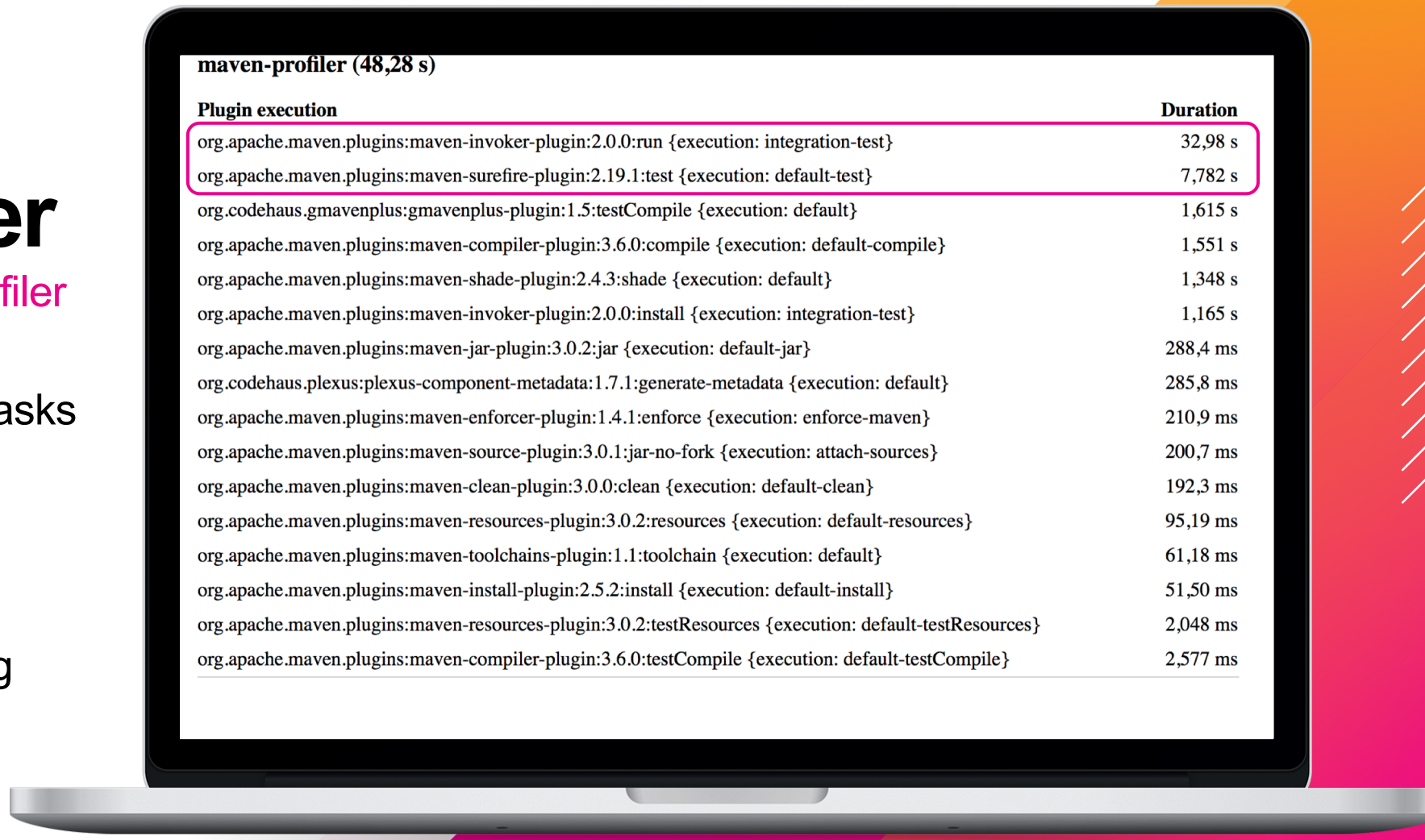




Maven Profiler

github.com/jcgay/maven-profiler

- Highlights individual slow tasks
- HTML or JSON report
- Doesn’t help understanding the problem as a whole



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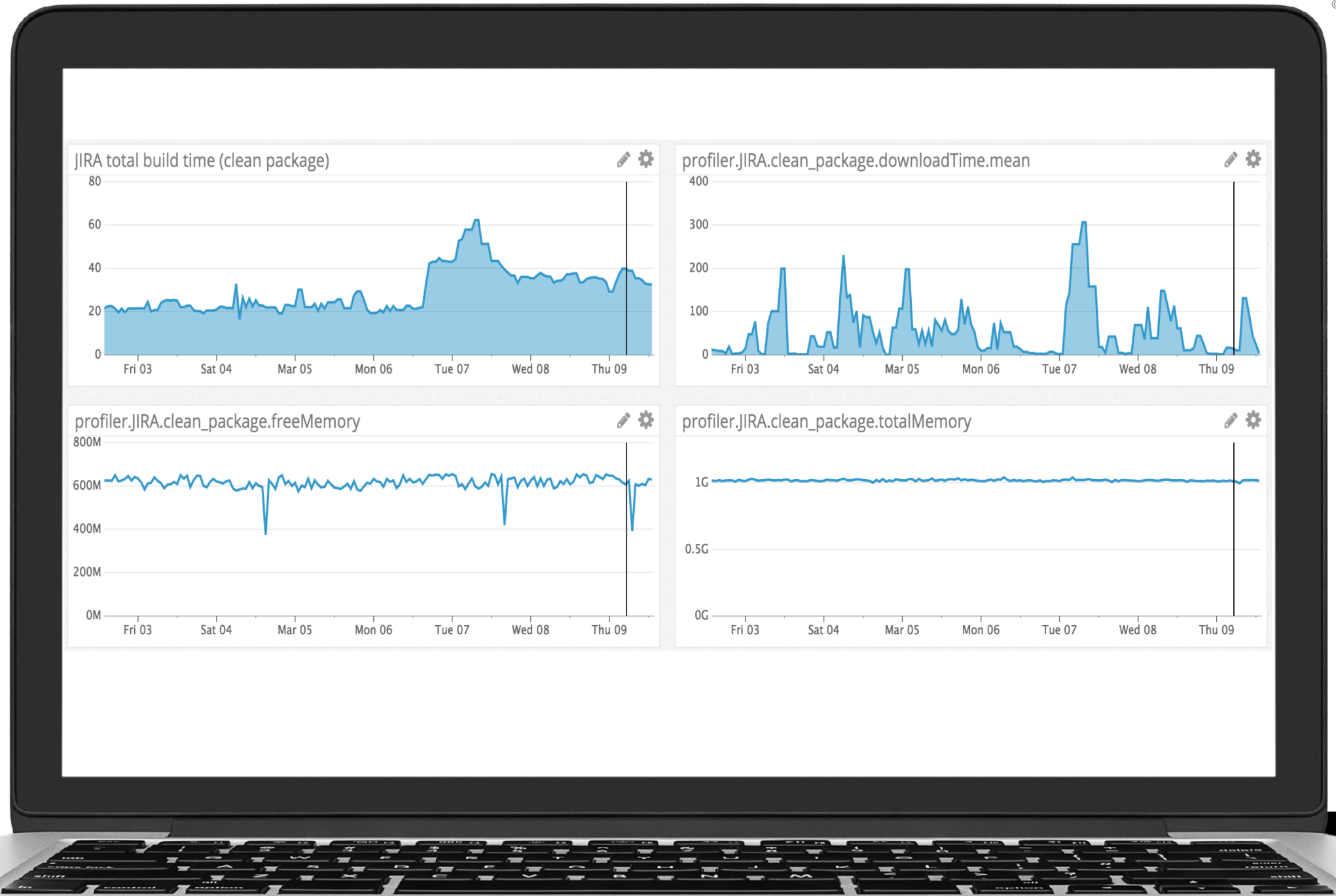
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Splunk

to the rescue

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Collecting Metrics

into Splunk

- Record metrics with maven-profiler on the laptop
- Collect them in memory
- Sending batches as JSON over HTTP
- Validate messages and write to log output
- Ship the logs (containing the metrics) into Splunk

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Structured Events

- Not aggregated
  - Can aggregate however you want
  - Plus it supports ad-hoc queries
- High cardinality
  - No need to worry about reporting on values with a big range


```
{ [-]
  devspeed_metric: { [-]
    metatags: null
    name: devmetrics.jira.mavenprofiler.details.buildTime
    tags: { [-]
      dm_devmode: false
      dm_environment: LOCAL
      dm_java_version: 1.8.0_212
      dm_profiler-cores: 12
      dm_profiler-os: MacOS
      dm_sessionid: 28ceeca2-d646-4478-b5d8-466dc41822ad
      profiler-artifact-id: ..module-artifact-id..
      profiler-cores: 12
      profiler-environment: LOCAL_DEV
      profiler-goals: package
      profiler-host-id: bf5f1c65-fa53-4f9f-b45e-698283637ddb
      profiler-module: .. module title ..
      profiler-mojo: maven-resources-plugin
      profiler-mojo-goal: resources
      profiler-mojo-id: default-resources
      profiler-mojo-phase: process-resources
      profiler-mojo-start: 1559534079465
      profiler-os: MacOS
      profiler-request-id: 150852c1-a3e3-4cca-a205-36256a0a75bc
      profiler-thread: BuilderThread 5 #103
    }
    type: TIME
    value: 16
  }
  ec2: { [+]
  }
  env: prod-apse2
  level: INFO
```

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Structured Events

- Initial dashboard
  - Lots of data, very busy
  - Aggregated in different ways
- Central overview
  - Single place for all events
  - Easy to explore

Profiler stats by module

module	timeTaken	mojos	numPhases
[redacted]	179,059 ms	artifactory-staging-maven-plugin, atlassian-spring-scanner-maven-plugin, frontend-maven-plugin, jacoco-maven-plugin, maven-bundle-plugin, maven-compiler-plugin, maven-resources-plugin, maven-surefire-plugin, soy-packager-maven-plugin	12
[redacted]	71,370 ms	artifactory-staging-maven-plugin, frontend-maven-plugin, jacoco-maven-plugin, maven-compiler-plugin, maven-jar-plugin, maven-resources-plugin, maven-source-plugin, maven-surefire-plugin	12
[redacted]	62,417 ms	artifactory-staging-maven-plugin, frontend-maven-plugin, jacoco-maven-plugin, maven-antrun-plugin, maven-resources-plugin	6
[redacted]	50,542 ms	antlr3-maven-plugin, artifactory-staging-maven-plugin, docsversion-maven-plugin, frontend-maven-plugin, jacoco-maven-plugin, maven-compiler-plugin, maven-jar-plugin, maven-resources-plugin, maven-source-plugin, maven-surefire-plugin, protoc-jar-maven-plugin	14
[redacted]	44,131 ms	artifactory-staging-maven-plugin, atlassian-swagger-maven-plugin, jacoco-maven-plugin, maven-compiler-plugin, maven-dependency-plugin, maven-jar-plugin, maven-resources-plugin, maven-source-plugin, maven-surefire-plugin	13

« prev 1 2 3 4 5 6 7 8 9 10 next »

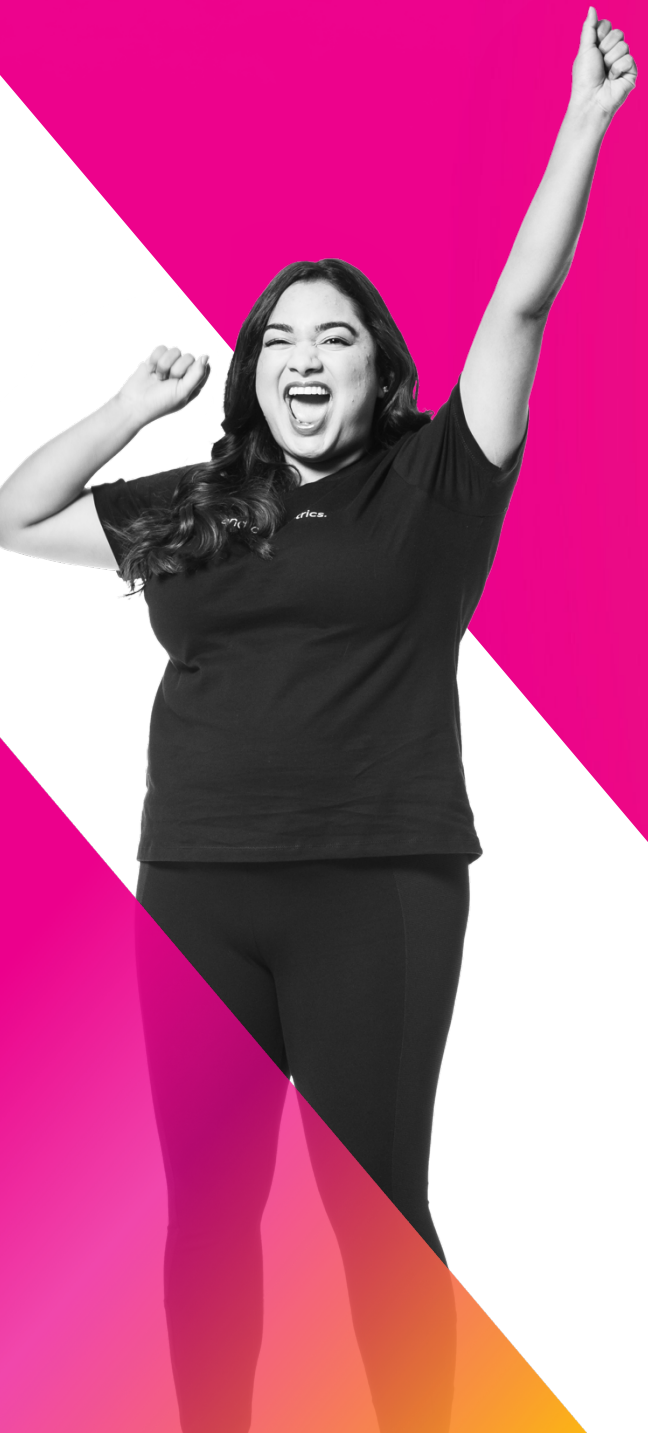
38m ago

Profiler stats by mojo

dmtags.profiler-mojo	timeTaken	modules	numPhases
frontend-maven-plugin	773,081 ms	... list of Maven modules ...	65
maven-compiler-plugin	524,368 ms	... list of Maven modules ...	490
maven-bundle-plugin	313,135 ms	... list of Maven modules ...	86
atlassian-swagger-maven-plugin	203,012 ms	... list of Maven modules ...	18
maven-resources-plugin	85,669 ms	... list of Maven modules ...	809

« prev 1 2 3 4 5 6 7 next »

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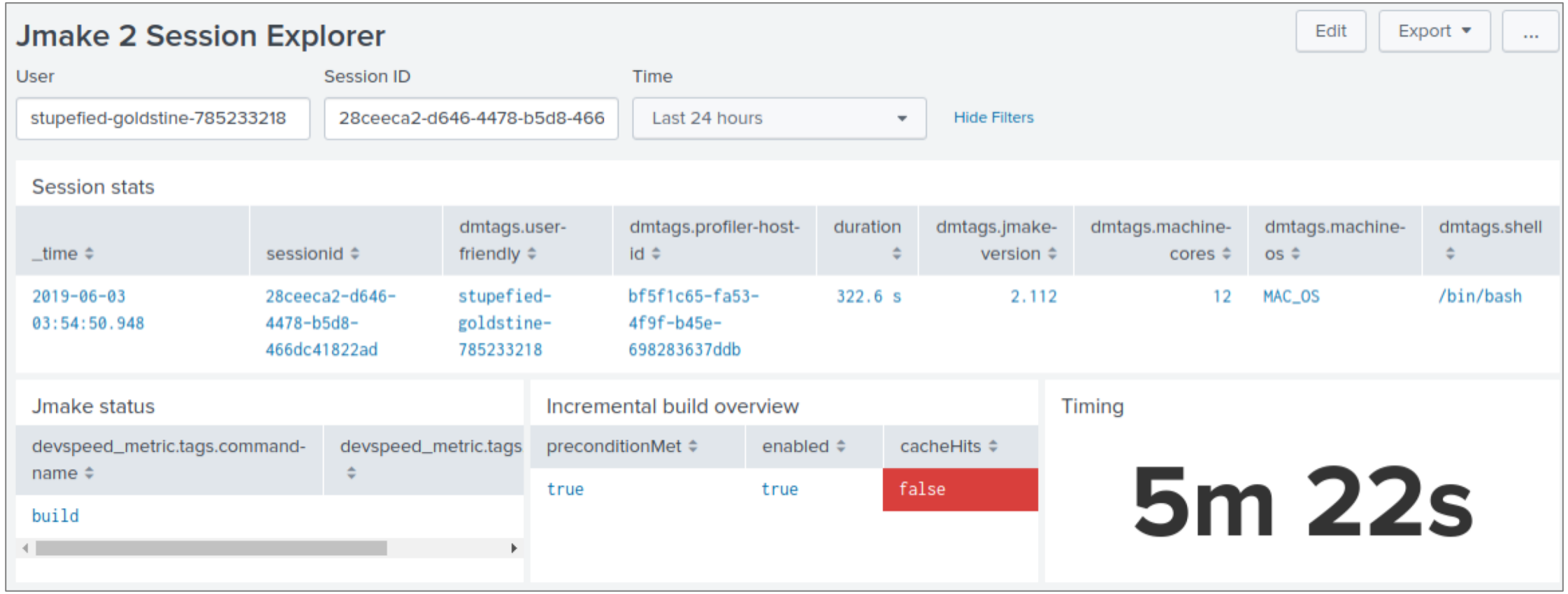
Evolution

of dashboards

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Session Explorer

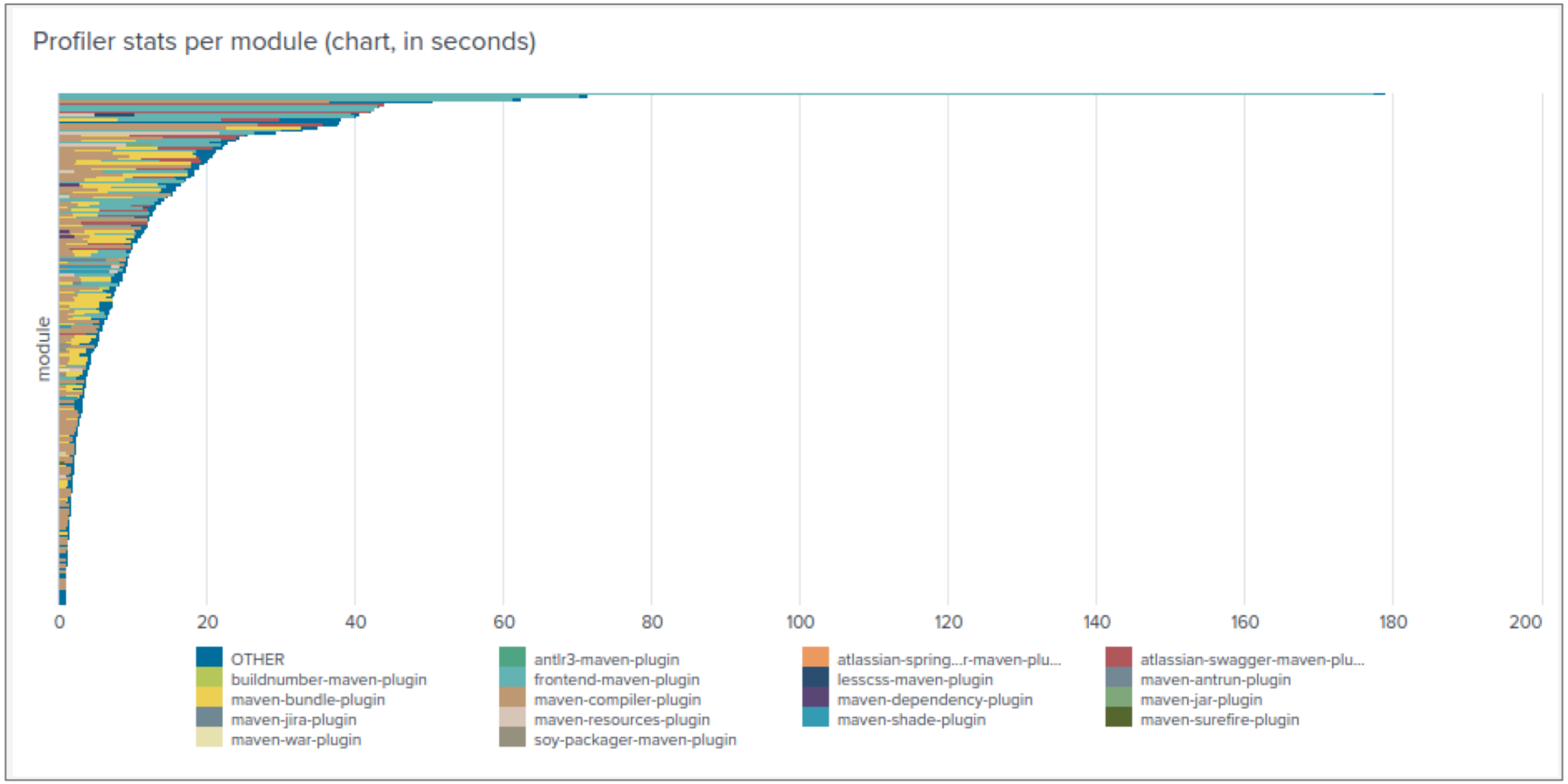
main dashboard



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Session Explorer

continued



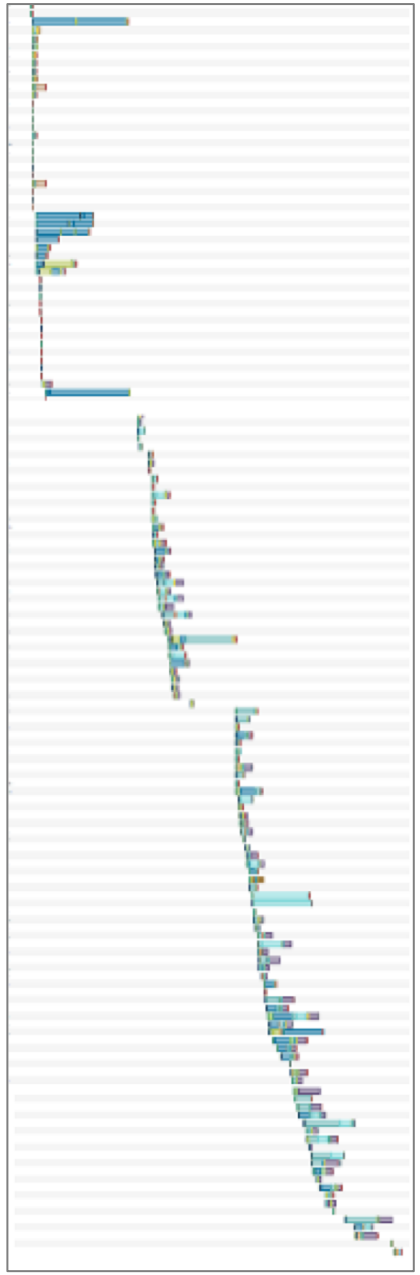
splunk> .conf19

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Timeline

(initially)

- Complete view
  - Has all the information we need
  - Start & finish times of each module
- Hard to understand
  - The actual view is too long, scrolls
  - Does not help to draw conclusions



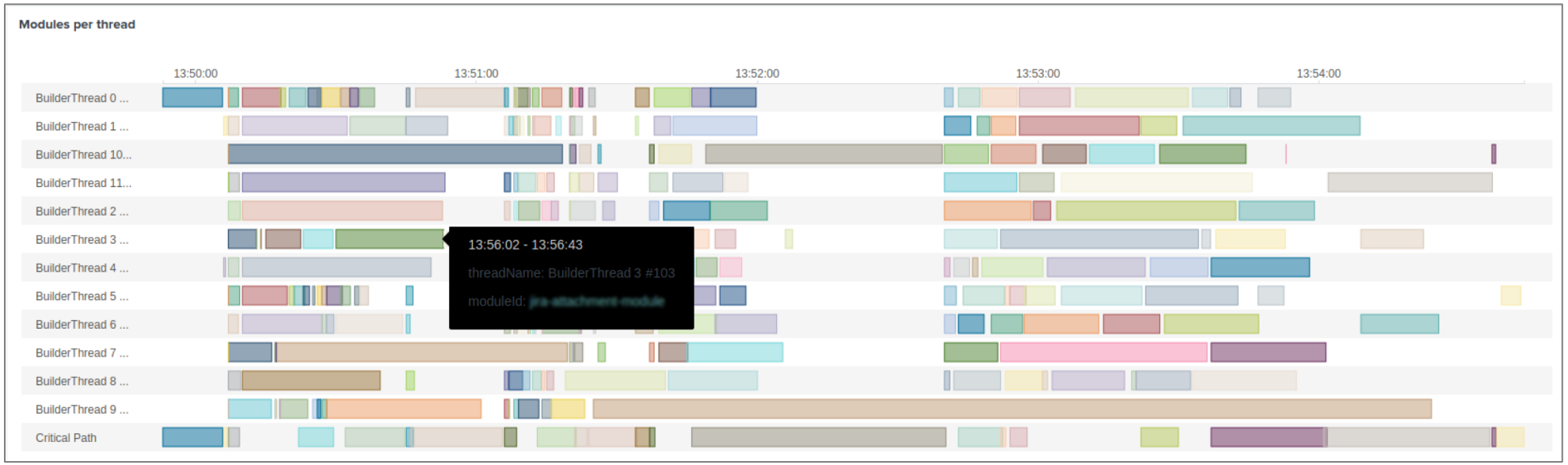
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Timeline

(per thread)

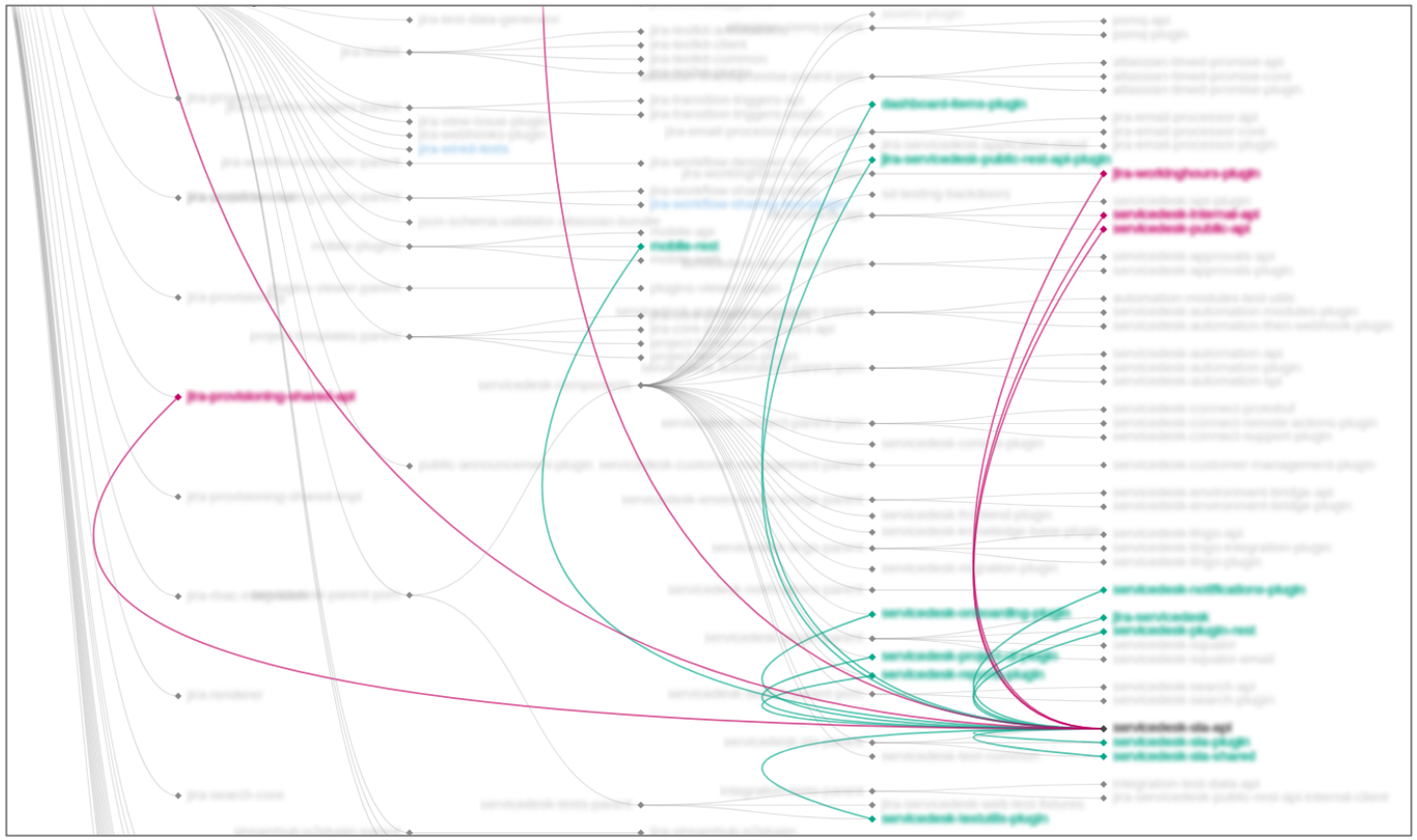
- Complete view
- Reveals connections



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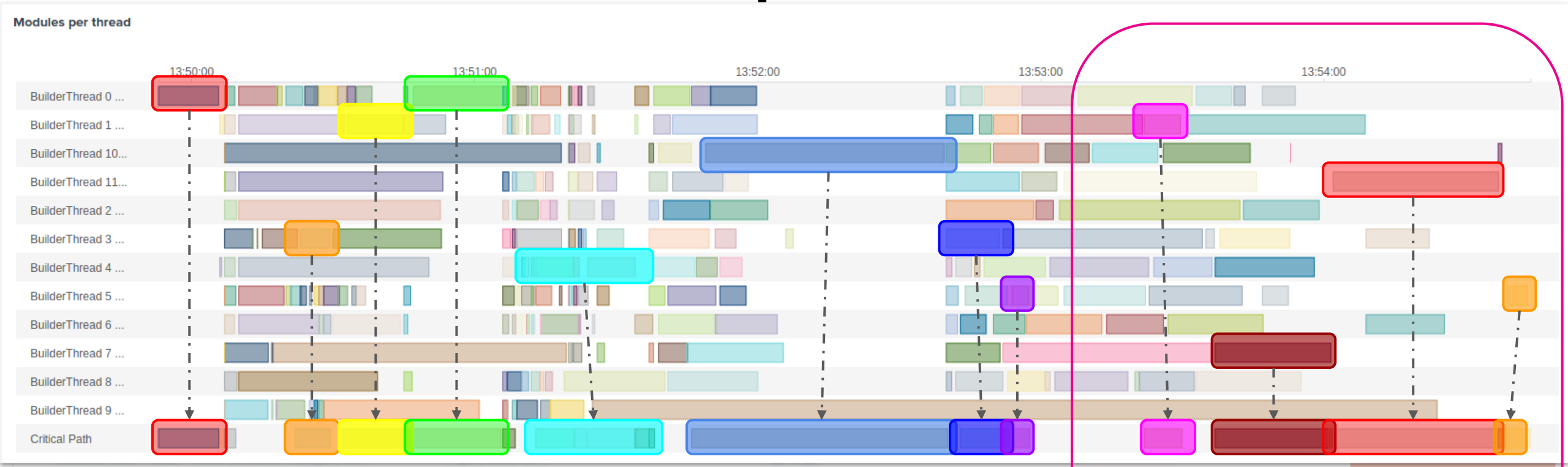
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Internal Dependencies



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Critical Path of Internal Dependencies



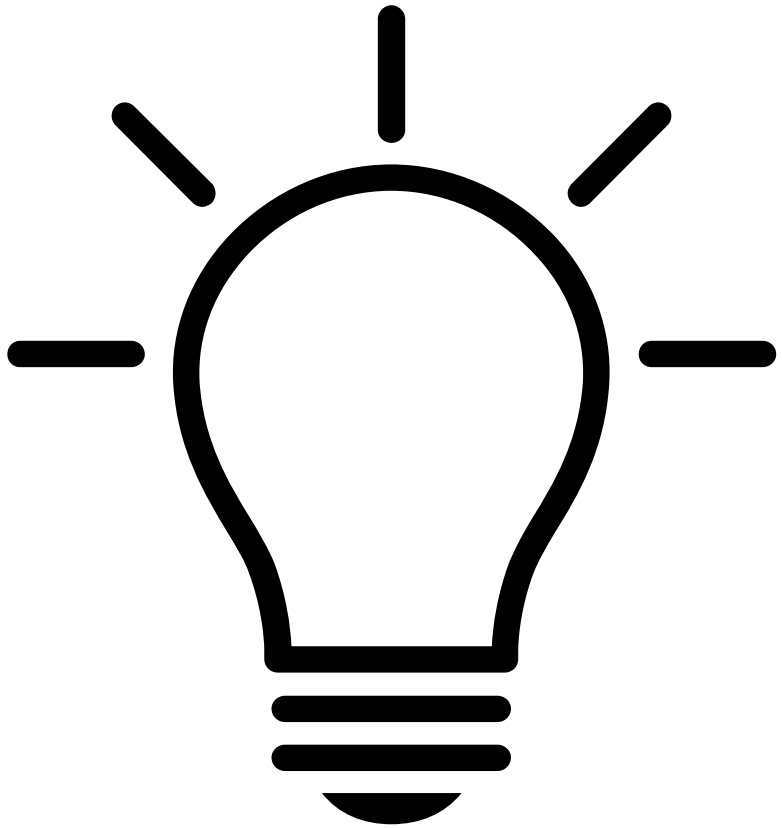
16	[redacted]	[redacted]	[redacted]	19,580 ms	8.56 %	4 ms	23,079 ms	36,695 ms
17	[redacted]	[redacted]	[redacted]	1,538 ms	0.67 %	19 ms	37,537 ms	37,537 ms
18	[redacted]	[redacted]	[redacted]	12,691 ms	5.55 %	2,590 ms	6,193 ms	19,856 ms
19	[redacted]	[redacted]	[redacted]	7,467 ms	3.26 %	12,389 ms	0 ms	0 ms
20	[redacted]	[redacted]	[redacted]	2,363 ms	1.03 %	43 ms	0 ms	0 ms
21	[redacted]	[redacted]	[redacted]	119 ms	0.05 %	9 ms	0 ms	0 ms
22	[redacted]	[redacted]	[redacted]	748 ms	0.33 %	250 ms	0 ms	0 ms
23	[redacted]	[redacted]	[redacted]	12,781 ms	5.59 %	0 ms	0 ms	0 ms

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Our Plan

- Drop unnecessary dependencies
- Eliminate artificial dependencies
- Split code into multiple modules
- Change test dependencies



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Achievements

and failures

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Starting Point

(last December)



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Test-only Dependencies

Removing integration test dependencies

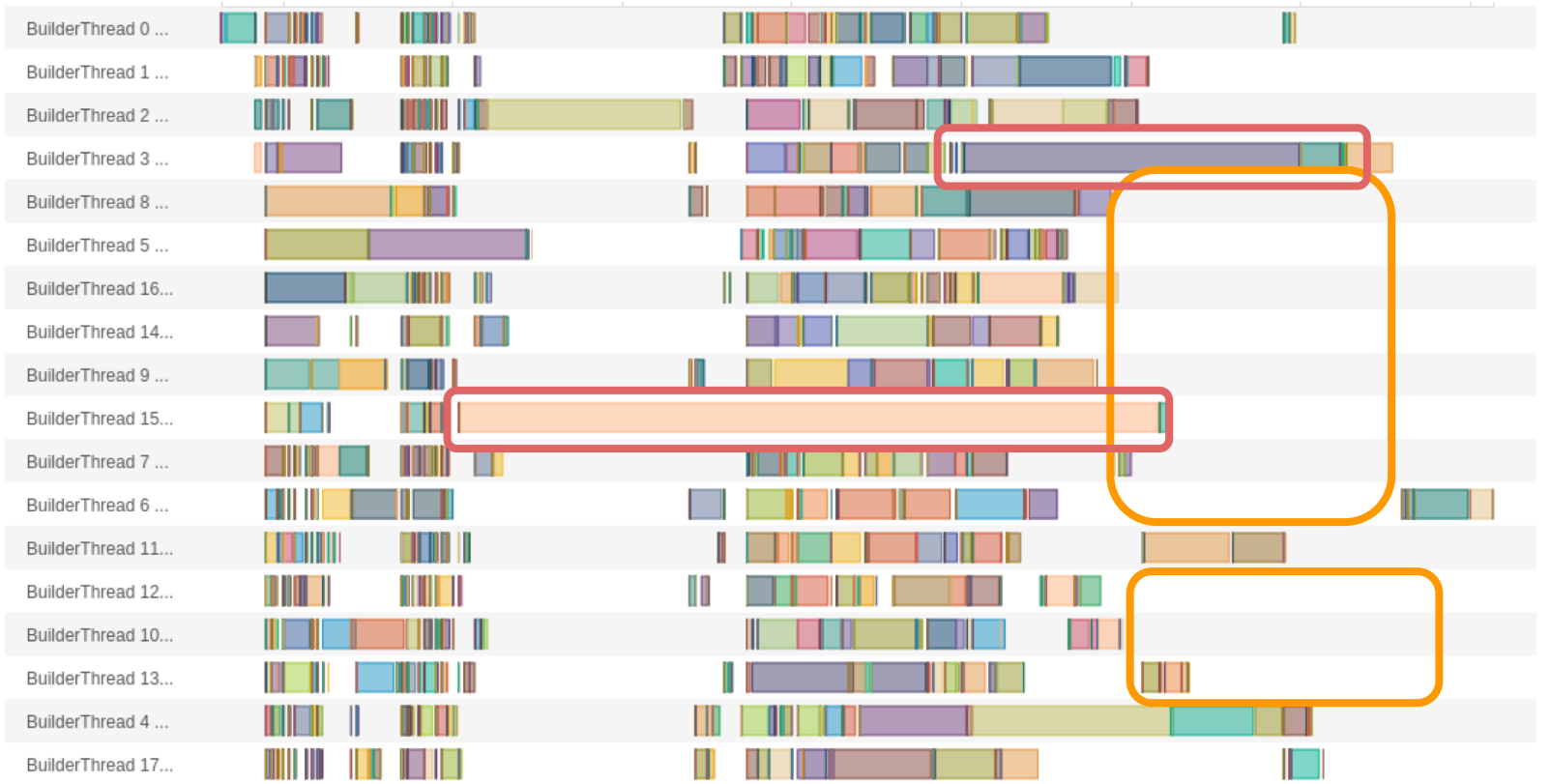


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Cleanup

Unnecessary and artificial dependencies



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Refactoring

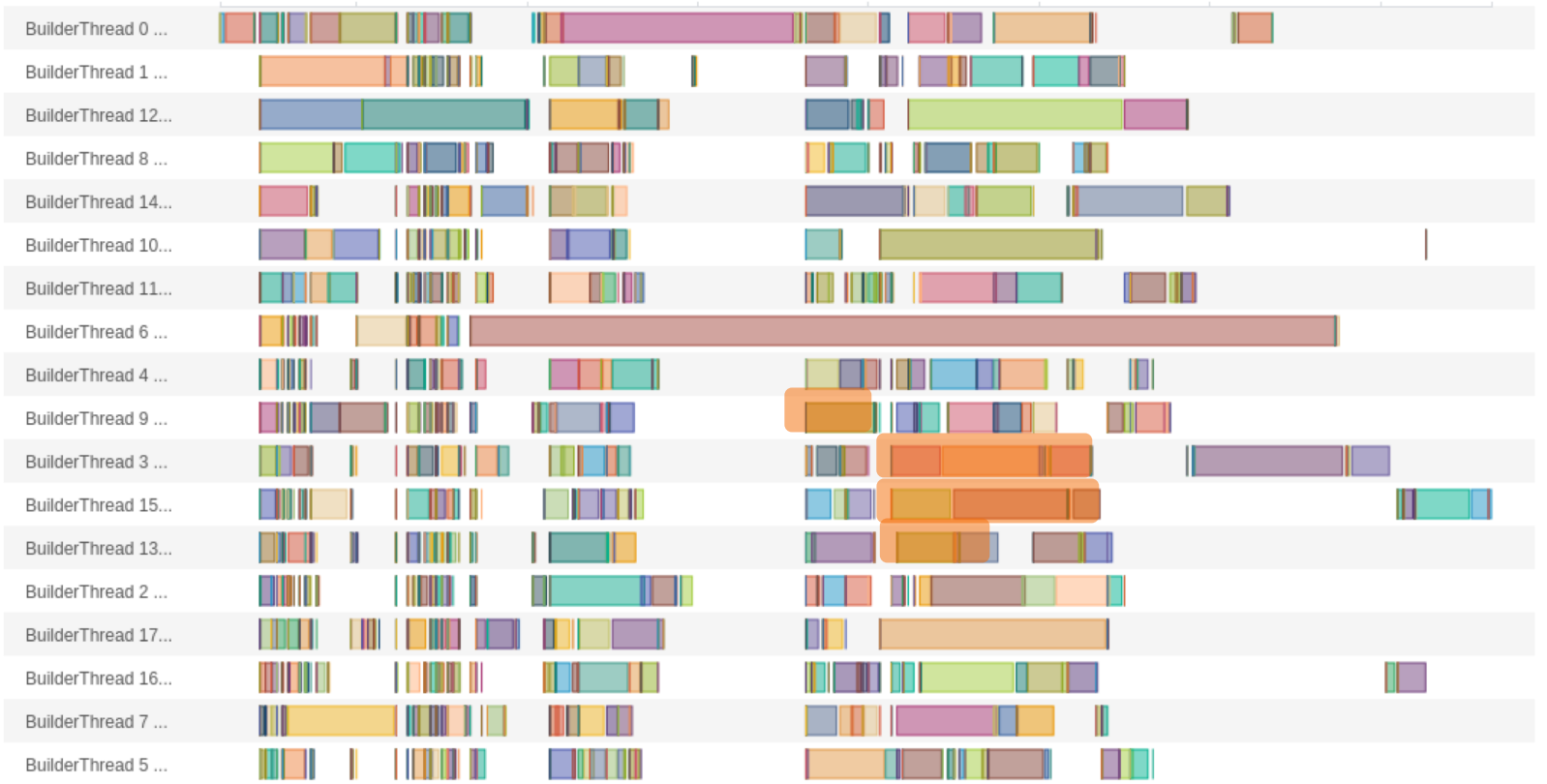
Changing test-only dependencies



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Concurrency

Making tasks more parallel

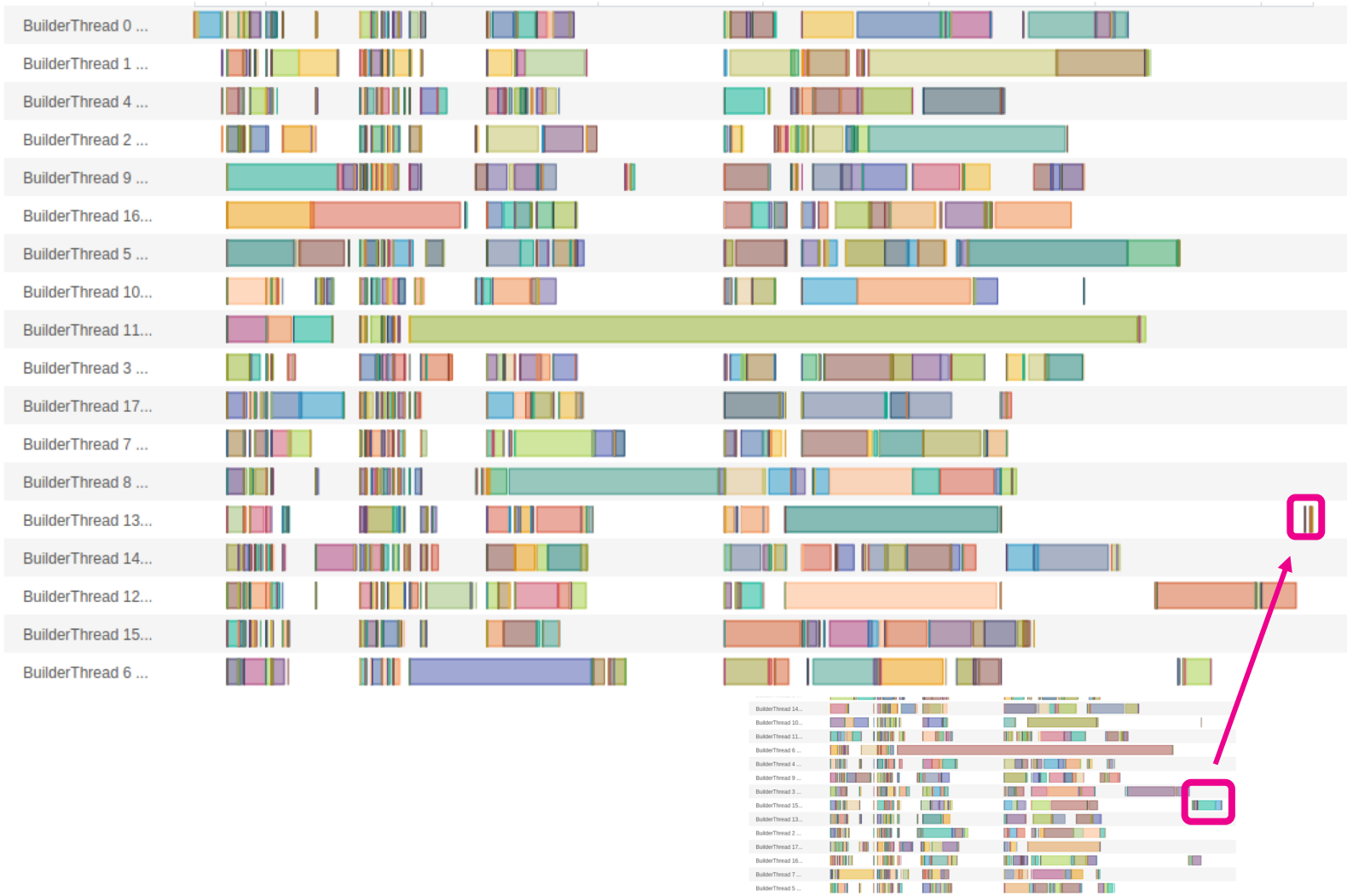


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Module Layout

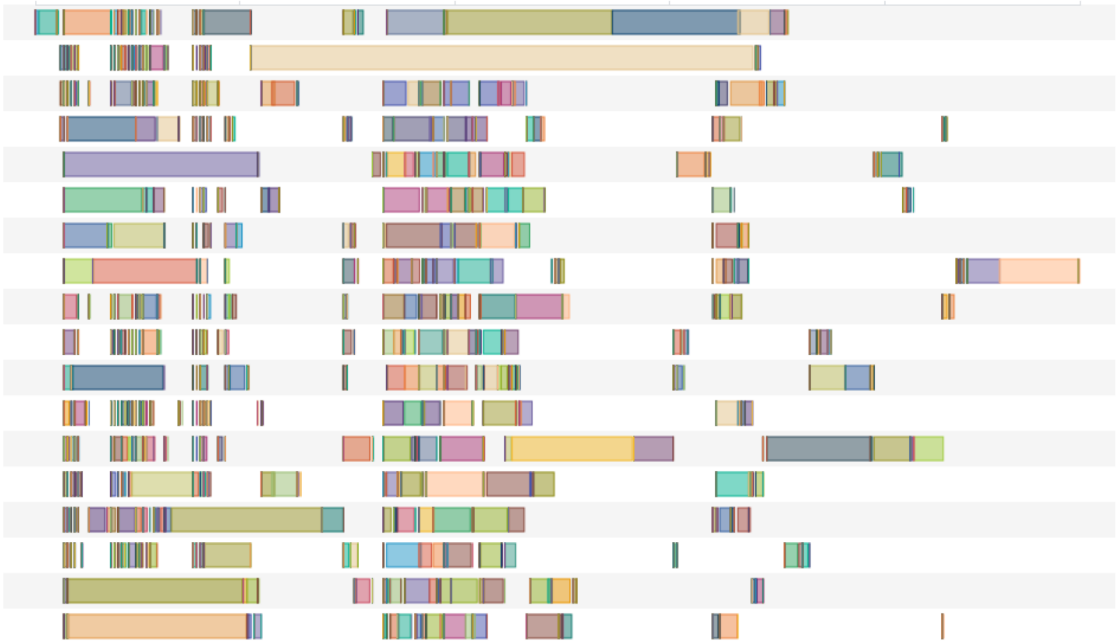
Splitting long tasks



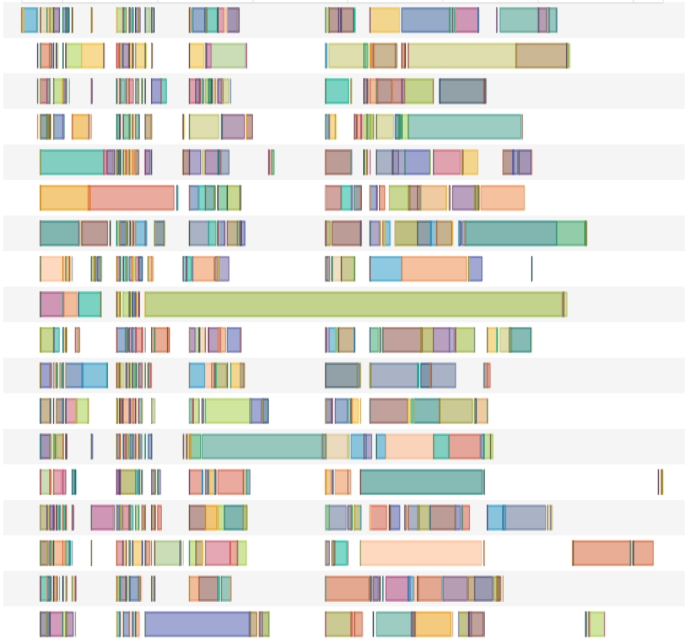
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Before



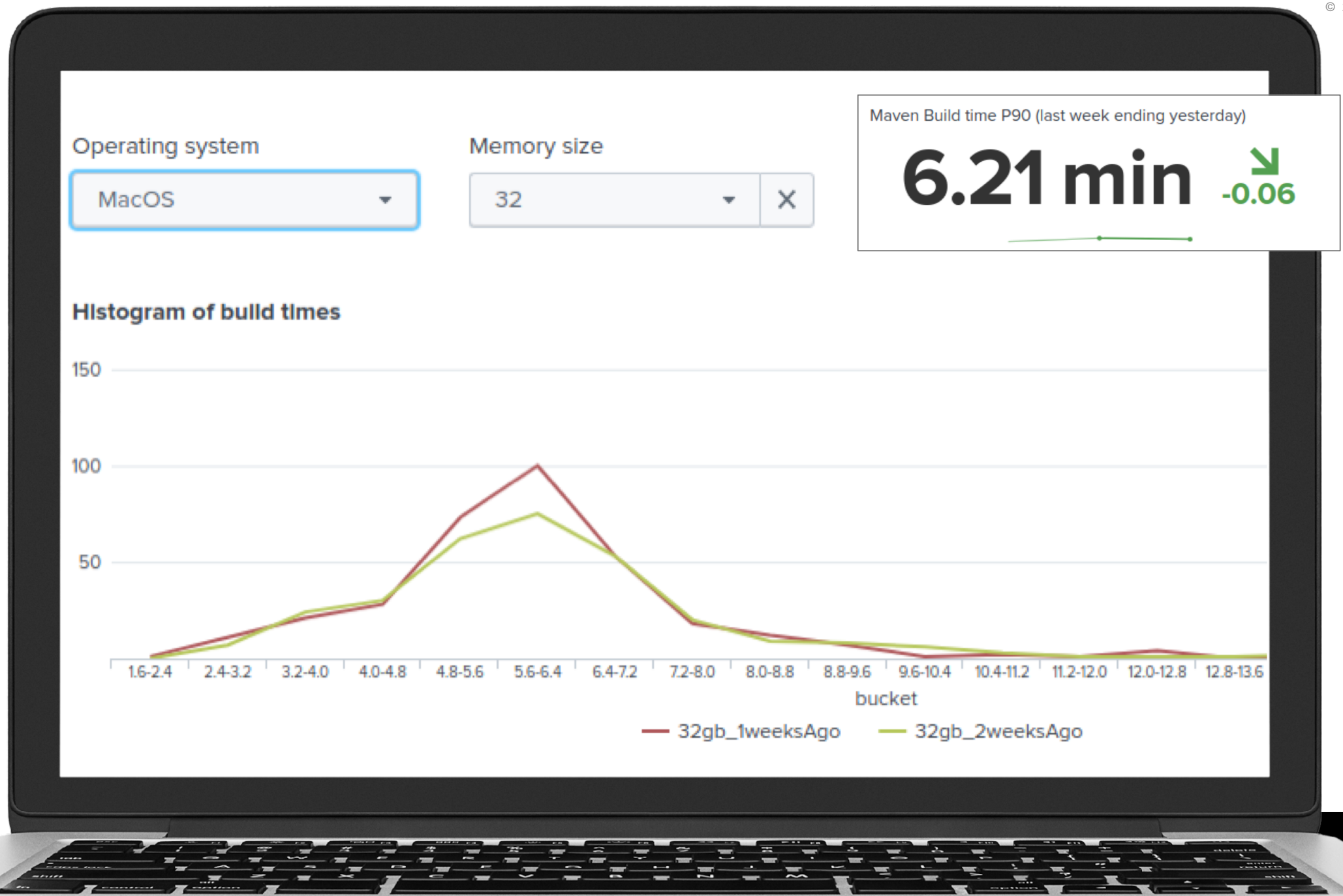
After



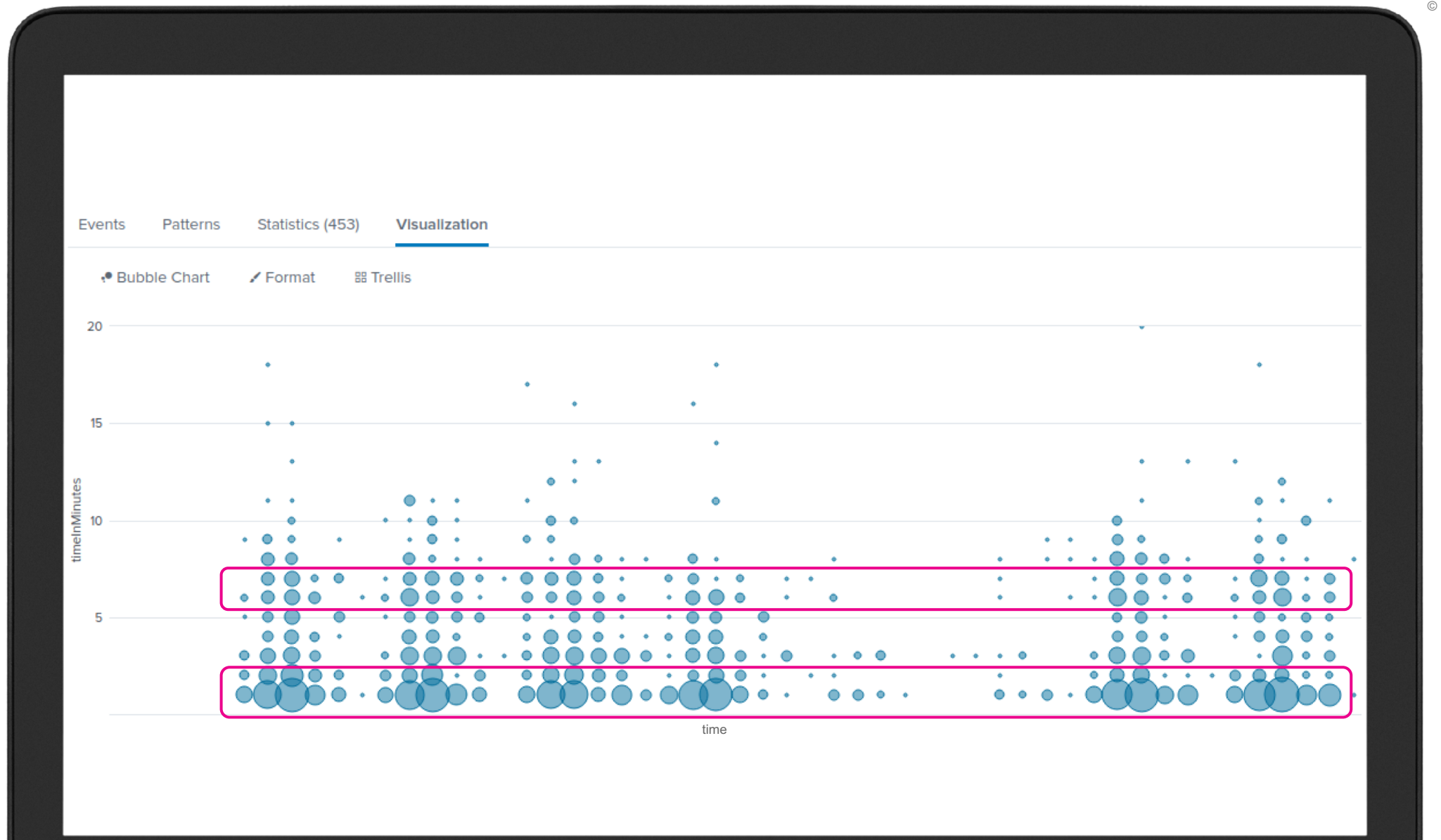
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Overall Build Time Reduced from **10:40** to **6:30**

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Not Everything Worked Well

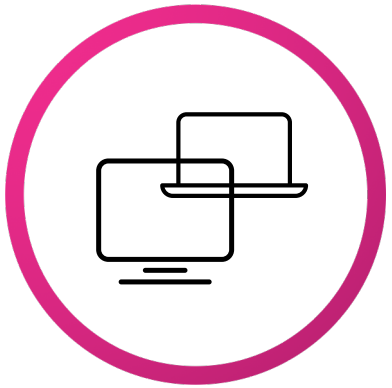


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Complex Problem Space

Difficulties



Different build environments



Different build targets

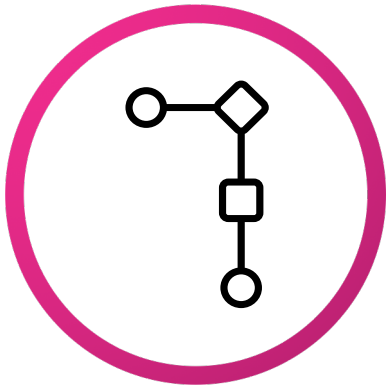


Geographical locations

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Noisy Data

Difficulties



Not enough data points



External factors

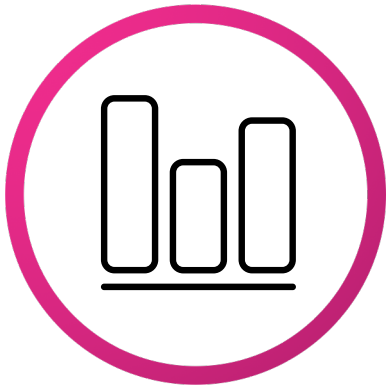


Correlating changes

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Key Metric

Difficulties



N-th percentile



Overall vs. Machine type



Excluding our team

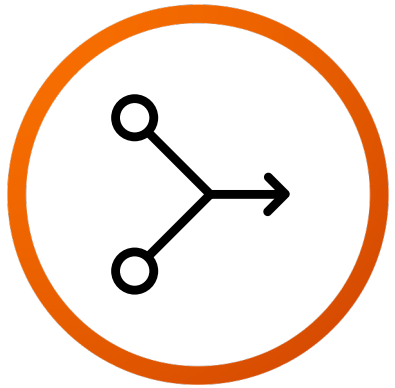
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Changing Behaviour

Difficulties



Wanted more incremental builds



Hoped for less full builds



Failed to change learned behaviours

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Takeaways

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FIND A METRIC YOU CAN COMMIT TO AND **WORRY LESS** ABOUT WHETHER IT'S THE **BEST ONE.**

Progress over perfection

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HAVE TRUST THAT YOU'RE MOVING IN THE RIGHT DIRECTION AND **METRICS WILL FOLLOW**.

Progress over perfection

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COLLECT AS MANY **STRUCTURED EVENTS** AS YOU CAN. YOU CAN **AGGREGATE** THEM LATER IN SPLUNK.

Progress over perfection

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COLLECT AS MANY **PROPERTIES** AS YOU CAN. YOU CAN FIGURE OUT LATER WHICH OF THEM ARE **USEFUL**.

Progress over perfection

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BUT MAKE SURE THAT YOU **DON'T** PUT **ALL THE METRICS** ON A **SINGLE DASHBOARD**.

Build with heart and balance

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USE VISUALIZATIONS THAT ARE **EASY TO UNDERSTAND** WITH THE **HUMAN EYES**.

Build with heart and balance

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