

Testing in Production

How we fixed New Boards Hub performance in Azure DevOps

Dave Paquette Principal Software Engineer - Microsoft











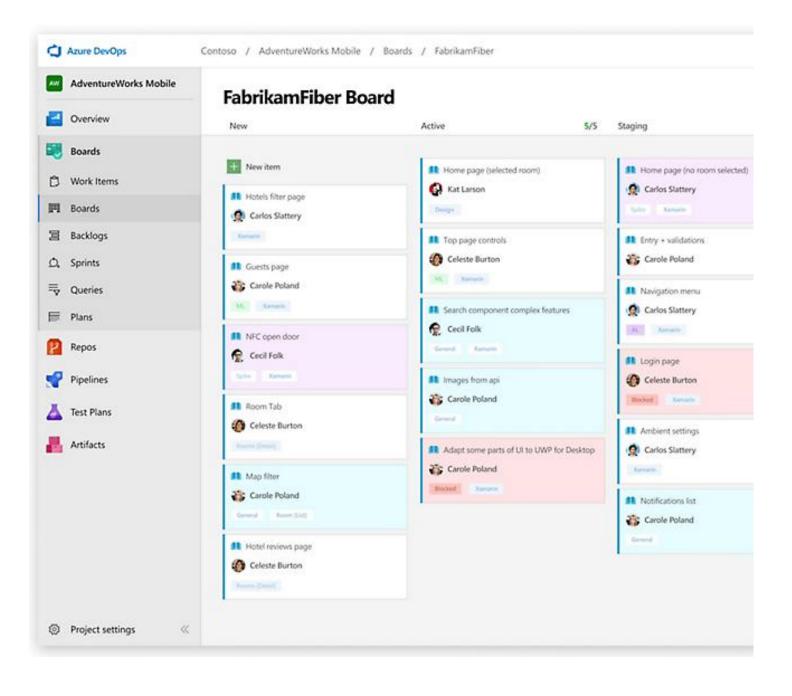








What is Boards?



Why did New Boards need fixing?

Try the New Azure Boards

X

Turn on the new Azure Boards Hub for improved performance, accessibility, and a set of new features.

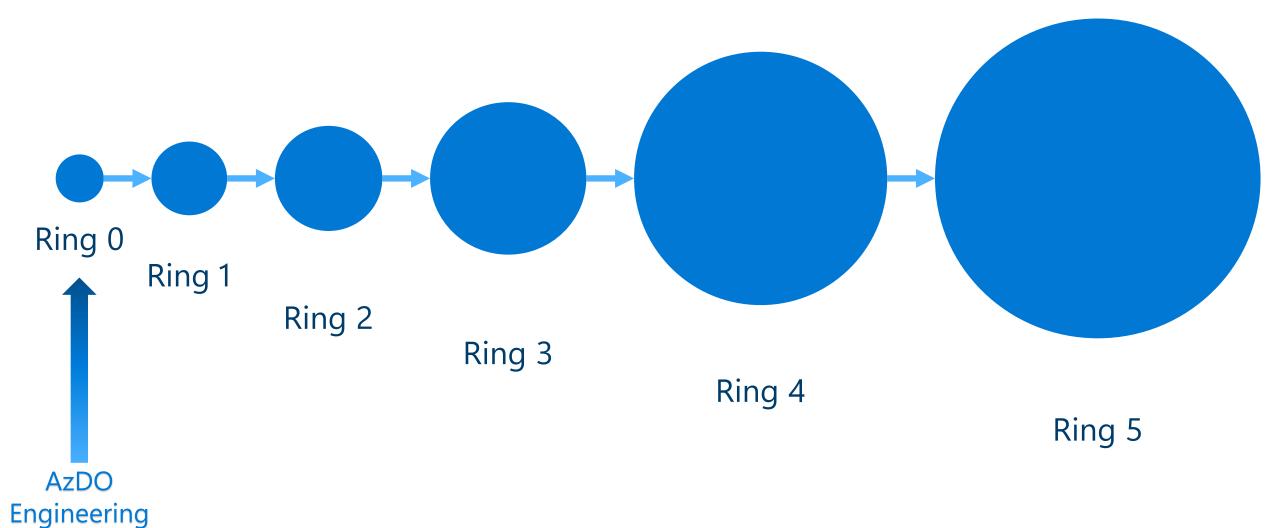
Try it!

Safe Deployment Practices

- Safe Deployment through rings
- Feature Flags
- User Opt-In
- Care about Quality Signals
- Deploy Often (and during work hours)

https://learn.microsoft.com/en-us/devops/operate/safe-deployment-practices

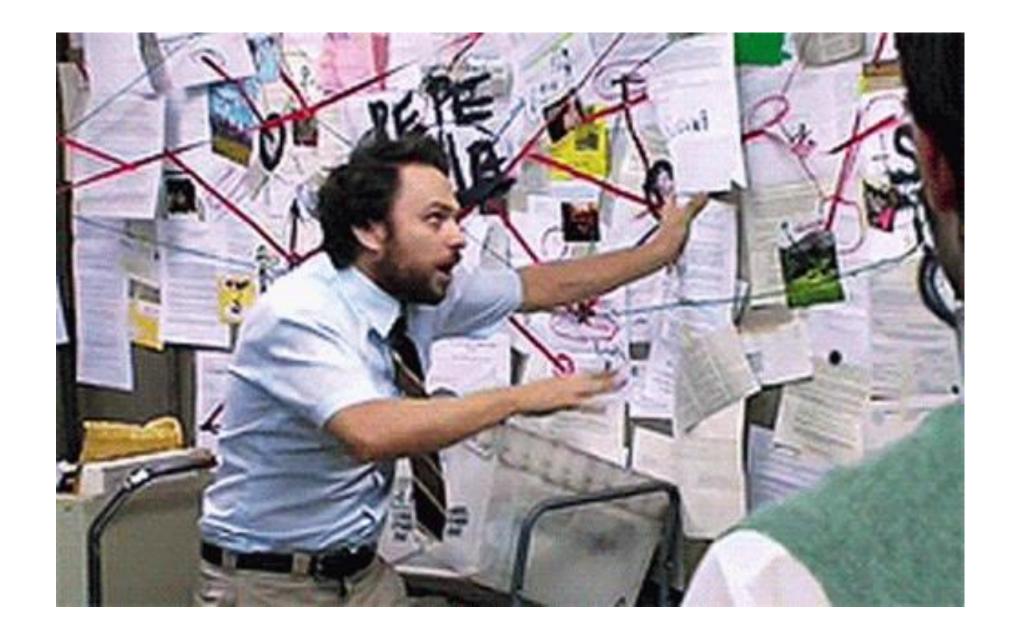
Azure DevOps Deployment Rings



Safe Deployment Practices

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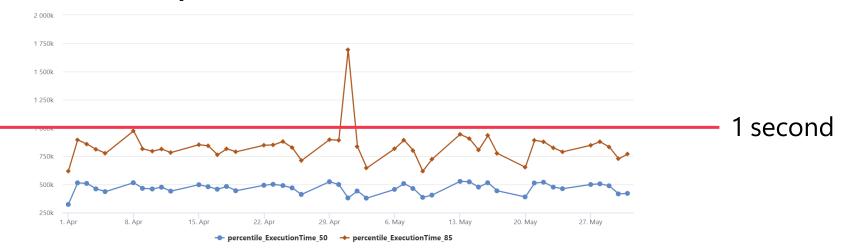
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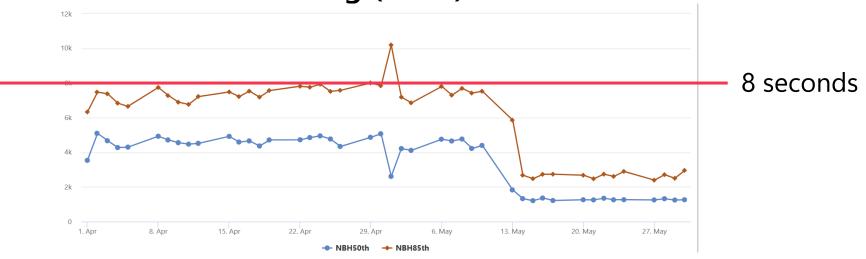
How do we measure performance?



Server Response Time



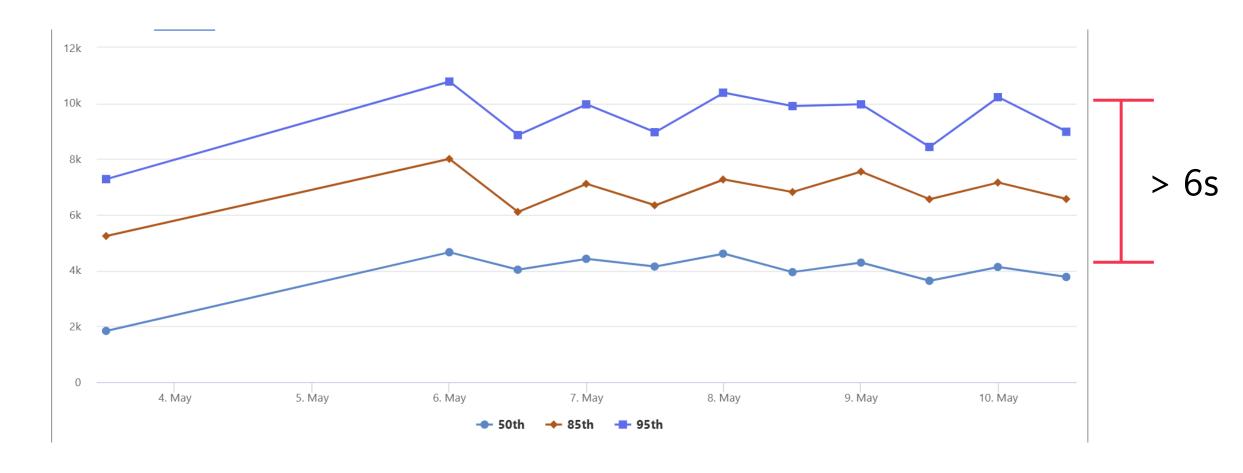
Real User Monitoring (RUM)



Time to Interactive



But TTI can vary



Apdex

3 Buckets

- · Satisfied < 1s
- · © Tolerating 1s 4s
- Frustrated >4s

$$Apdex = rac{TotalSamples}{TotalSamples}$$

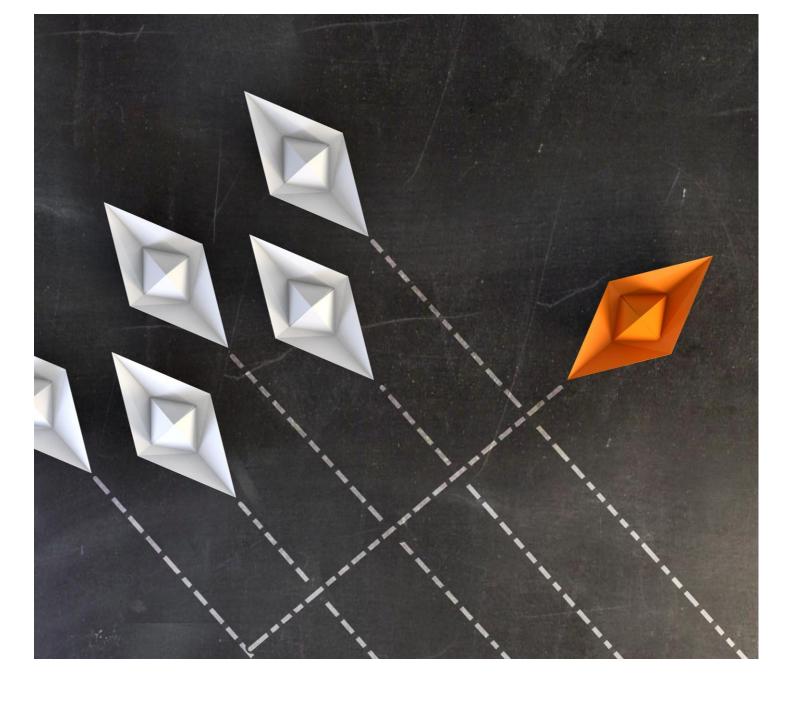
What Happened with New Boards?

- Misleading telemetry
- Huge variance depending on data shape
 - · Larger customers with biggest perf problems were in later rings
- Works on my machine
- · Client-side memory usage was not an area we were considering

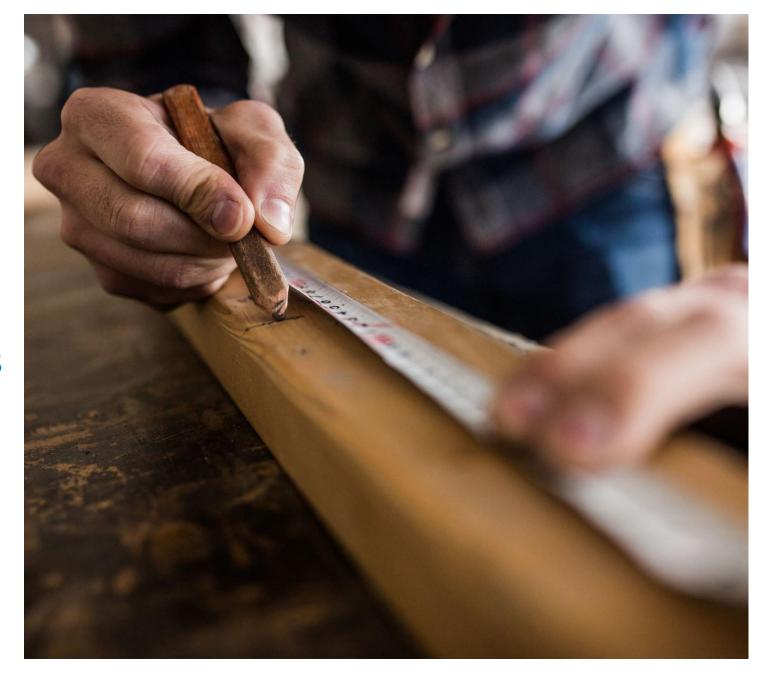
How can we fix this?



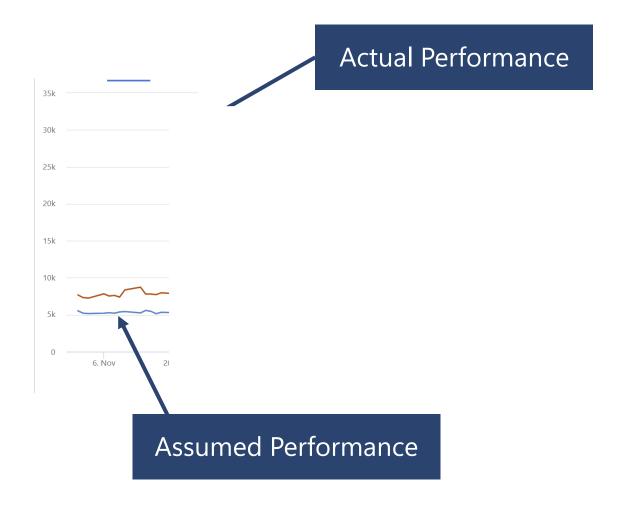
Our Strategy

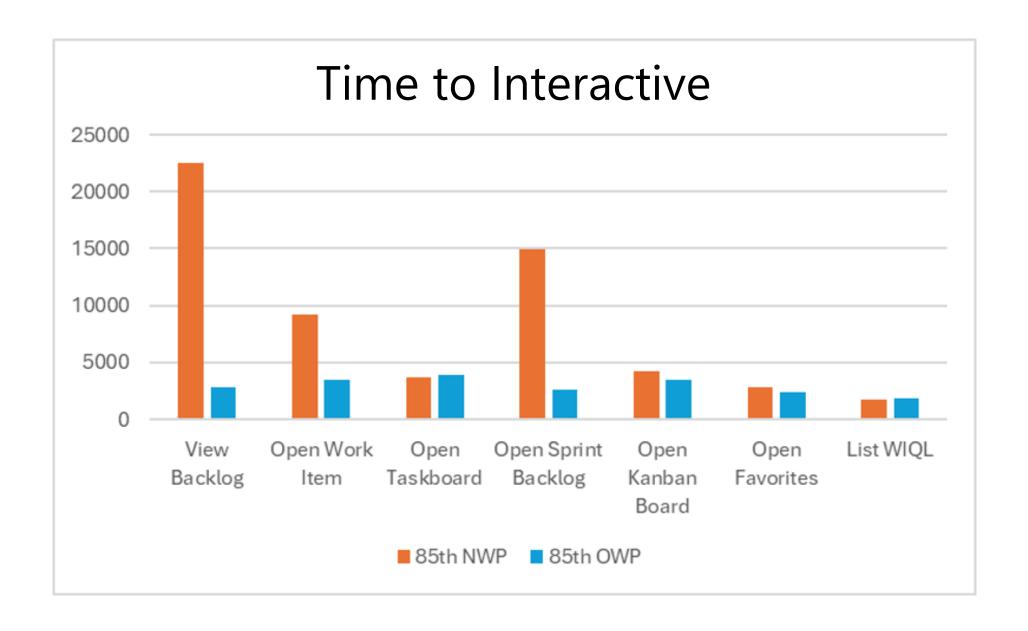


Step 1 – Fix Telemetry and Build Dashboards

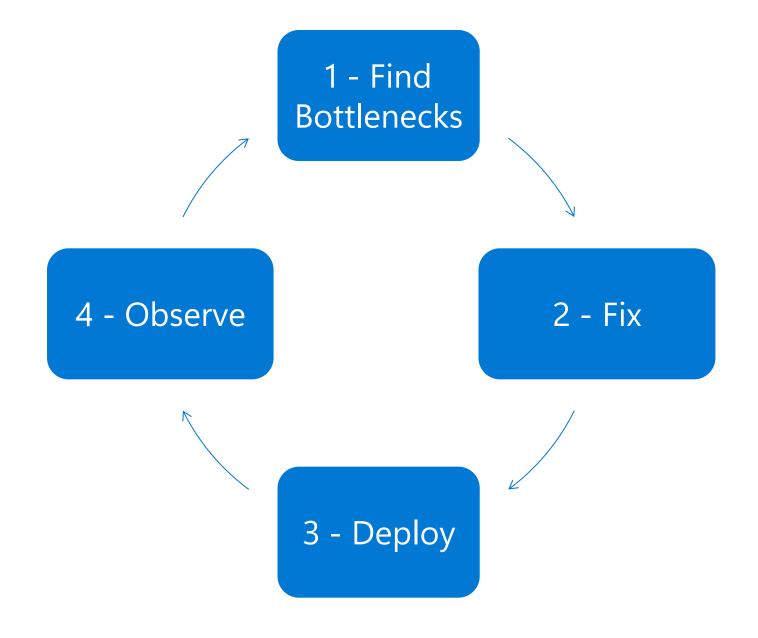


Reviewing TTI markers





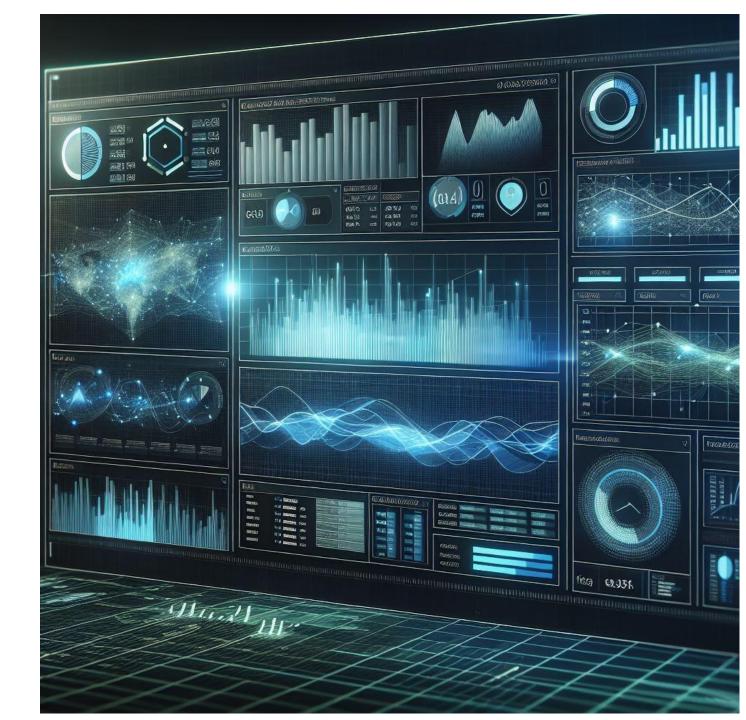
Step 2
Iterative Data Driven
Improvements



Finding Bottlenecks

- · Telemetry
- · Performance Bar
- Browser Dev Tools
 - Network Tools
 - Memory Profiler
 - · Performance Profiler

Telemetry



Performance Bar

Resources Scripts 154 (4941 KB) CSS 75 (1064 KB) Ajax 7 Data Providers 27 (445 KB) | Performance TTI 3102ms 😀 SQL 27 REST 5 Total Remote 41

DevTools - dev.azure.com/mseng/AzureDevOps/_backlogs/backlog/PoP%20for%20Classic%20RM/Stories □ □ □ \(\text{\text{\$\exititt{\$\text{\$\exititt{\$\text{\$\text{\$\text{\$\text{\$\}\$\}}}\$}\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\}}}}\$}\text{ ... ? £ □ Invert □ Hide data URLs □ Hide extension URLs All | Fetch/XHR | Doc | CSS | JS | Font | Img | Media | Manifest | WS | Wasm | Other □ Blocked response cookies □ Blocked requests □ 3rd-party requests Domain Size Fulfilled by Waterfall Name Status Type Initiator Time (;) HierarchyQuen 200 fetch 7.3 kB 80 ms dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min (;) Panel 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 352 B 83 ms ⟨ BacklogsHub 200 fetch dev.azure.com 458 B 81 ms ms.vss-web.platform-content.es6.fiUhlJ.min (;) FavoriteProviders 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 1.5 kB 394 ms dev.azure.com (3) BacklogId 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 320 B 81 ms (3) HierarchyQuery 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 1.4 kB dev.azure.com 81 ms 🗅 me 204 fetch 190 B 80 ms dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min ⟨) backlogs 200 fetch 1.6 kB 417 ms dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min () HierarchyQuery 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 6.1 kB 437 ms () HierarchyQuery 200 fetch 2.0 kB 151 ms dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min (;) HierarchyQuery 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 1.9 kB 160 ms ↔ HierarchyQuery 200 fetch 2.0 kB dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min 157 ms (;) HierarchyQuery 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 2.0 kB 168 ms (;) HierarchyQuery 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 2.1 kB 159 ms dev.azure.com (;) HierarchyQuery 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 2.0 kB 266 ms dev.azure.com ⟨ CommonSettings ms.vss-web.platform-content.es6.fiUhlJ.min 200 dev.azure.com 587 B G Favorites?artifactType=Microsoft.TeamFoun... 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 757 B dev.azure.com 116 ms ⟨₃⟩ BacklogsHub 200 fetch ms.vss-web.platform-content.es6.fiUhlJ.min 374 B 82 ms dev.azure.com 🗅 me 204 fetch 488 B dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min 99 ms 🗅 me 204 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 189 B 98 ms () HierarchyQuery 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 7.1 kB 87 ms (3) DynamicBundles?scripts=VSS%2FContributi... 200 xhr 638 B 75 ms dev.azure.com Content?bundle=vss-bundle-basejs-vx38JY □ Events 204 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 291 B 82 ms (;) HierarchyQuery 200 dev.azure.com fetch ms.vss-web.platform-content.es6.fiUhlJ.min 8.8 kB 87 ms (;) HierarchyQuery 200 fetch dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min 8.2 kB 85 ms (;) HierarchyQuery 200 fetch 4.3 kB 87 ms dev.azure.com ms.vss-web.platform-content.es6.fiUhlJ.min (;) HierarchyQuery 200 ms.vss-web.platform-content.es6.fiUhlJ.min 2.1 kB 163 ms dev.azure.com {i} query 200 dev.azure.com xhr Content?bundle=vss-bundle-basejs-vx38JY 620 B 94 ms ⟨⟩ query 200 Content?bundle=vss-bundle-basejs-vx38JY 541 B 94 ms dev.azure.com 29 / 324 requests 66.2 kB / 3.8 MB transferred 217 kB / 12.2 MB resources Finish: 3.88 s DOMContentLoaded: 971 ms Load: 1.87 s Console Issues + ¢ä 🖈

Network Tools

Memory Profiler

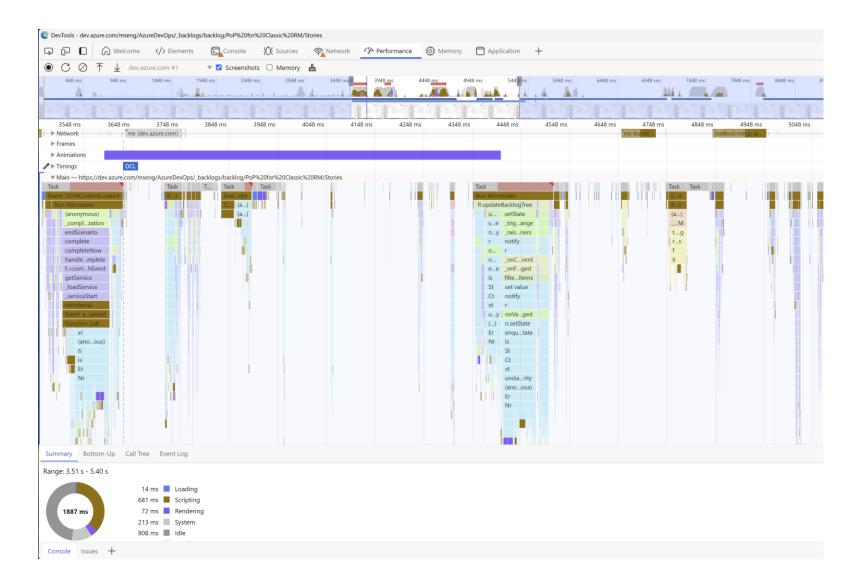
Select JavaScript VM instance

18.1 MB 11.0 kB/s dev.azure.com: Main

 ms-devlabs.gallerycdn.vsassets.io: featuretir

ms-devlabs.gallerycdn.vsassets.io: EpicRoad

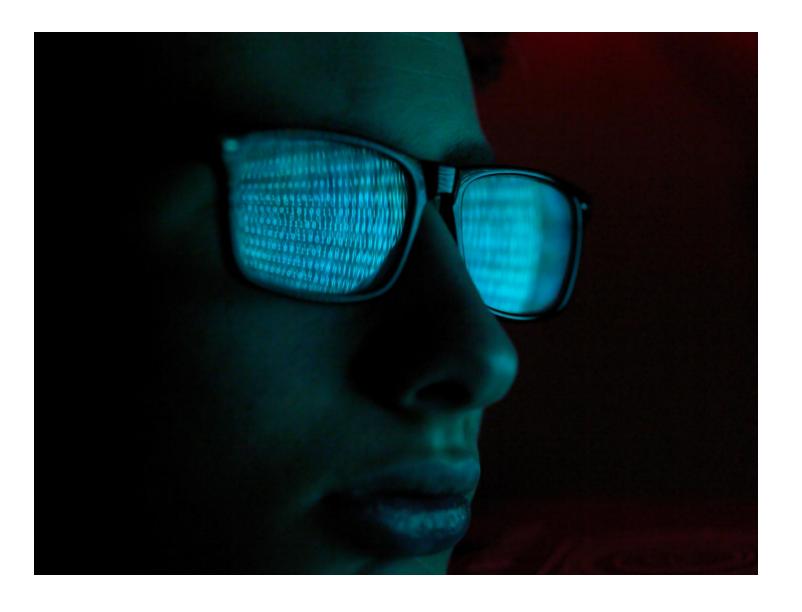
Performance Profiler



Types of Bottlenecks

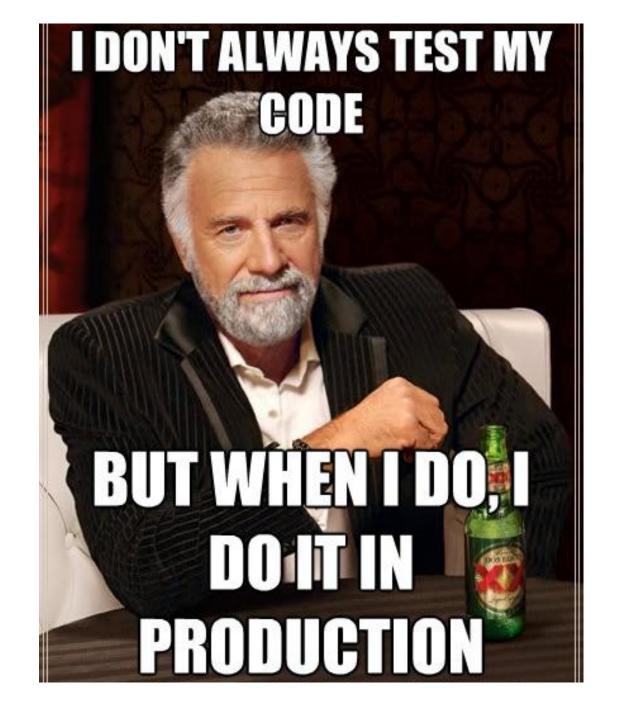
- · Inefficient client-side code
- · Inefficient server-side code
- Loading too much data
- Loading data too early
- Loading data too often

Fix



Deploy

- Feature Flag EVERYTHING
- Aggressively back-ported
 - · FF Off by default





David Paquette commented May 1

@Egor Bryzgalov @Dan Hellem

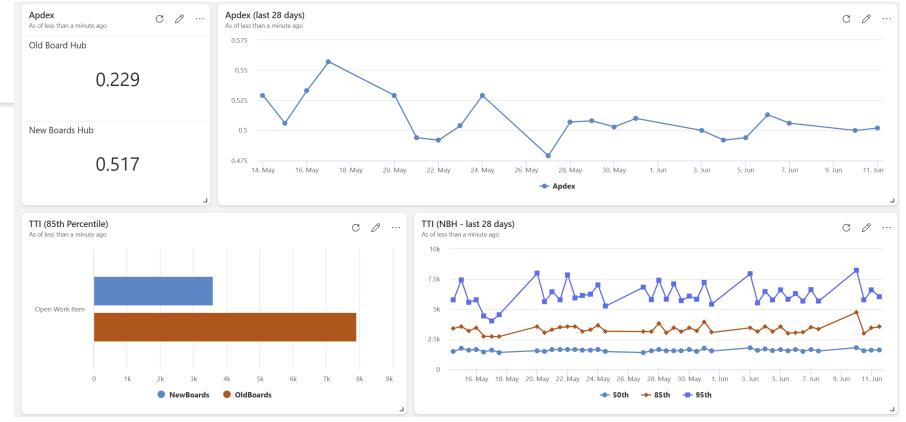
Enabled on Ring 2

https://dev.azure.com/mseng/AzureDevOps/ releaseProgress?releaseId=20808325& a=release-pipeline-progress

Tested Dynamics CRM (https://dev.azure.com/dynamicscrm/CRM/ workitems/edit/3567508/) on desktop

FF Off: Open Work Item 700-900ms

Observe



Ring 1: SQL

Ring 2: Dynamics

Secret Weapon - Internal Orgs

Ring 3: Office or Onedrive

Ring 4: Azure

Ring 5: Microsoft

Example 1: Memory Improvements in Backlog View

Categories

- · Inefficient client-side code
- Loading too much data

Fix

- Optimize client-side code
- Deferred the too much data part to later

Results (Azure)

- Memory usage down from 1.3GB to 100MB
- Page load down from ~25s to ~12s



Example 2: Classification Nodes Meta Data Cache

Categories

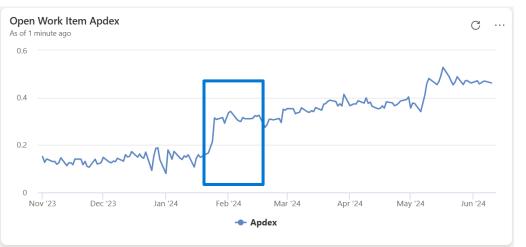
- · Load data too often
- · Loading too much data

Fix

- · Leverage Meta Data Cache
- Deferred loading too much data

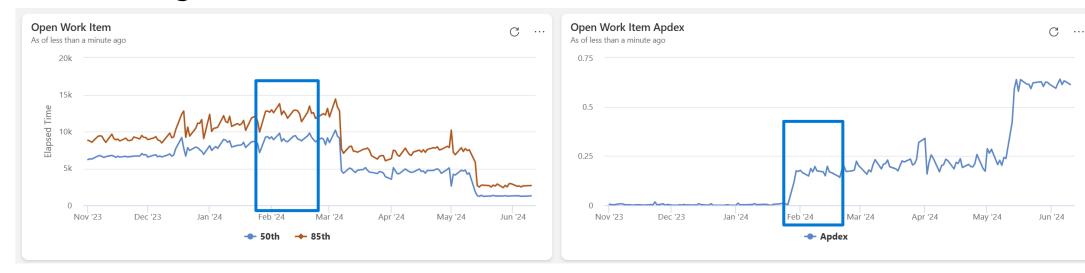
Results (Azure)



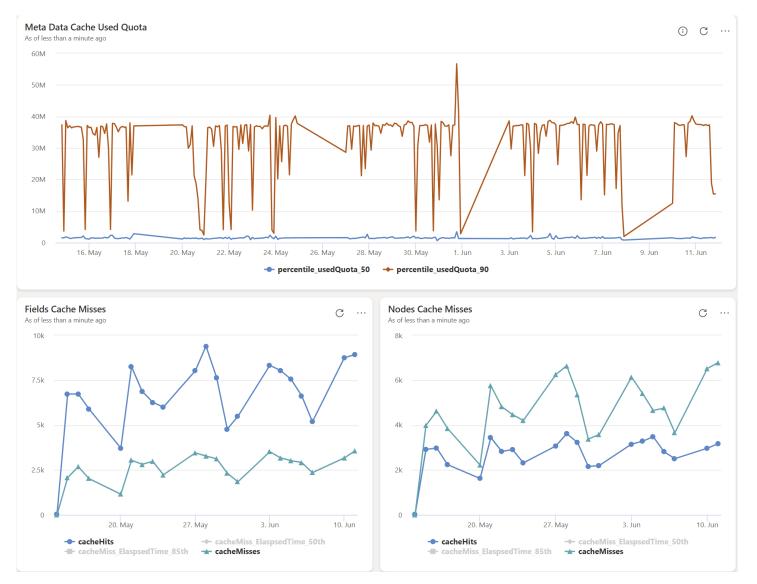


Example 2: Classification Nodes Meta Data Cache

Results (BigBankCo)



Example 2: Classification Nodes Meta Data Cache





Example 3: Classification Nodes Data Reduction

Categories

· Loading too much data

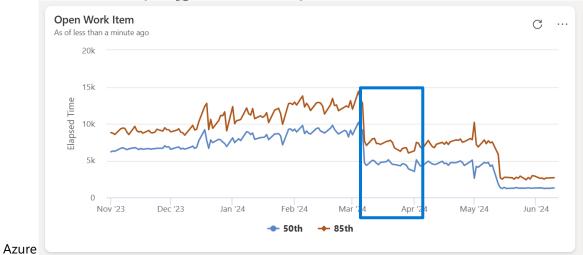
Fix

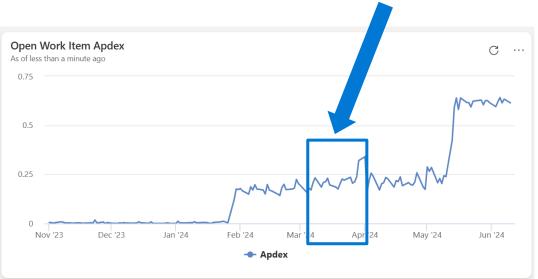
Server was returning properties that were not used

Results (Azure)

- Uncompressed payload size reduced by almost 1/2
- · Reduction in server load

Results (BigBankCo)





Example 4: Work Item Model Refactoring

Categories

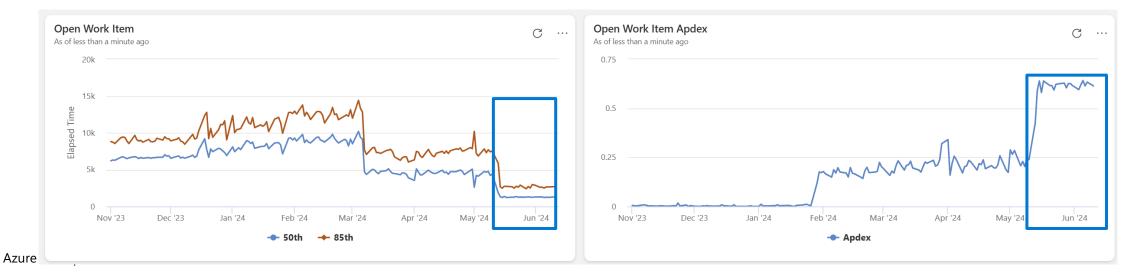
- · Inefficient client-side code
- · Loading data too early

Fix

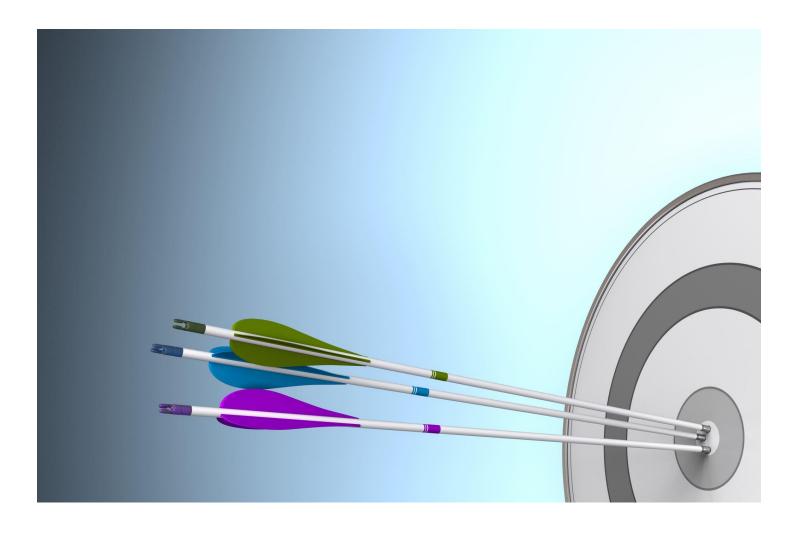
- · Refactor client side WorkItem class
- · Refactor data loading so it doesn't block UI rendering

Results (BigBankCo)

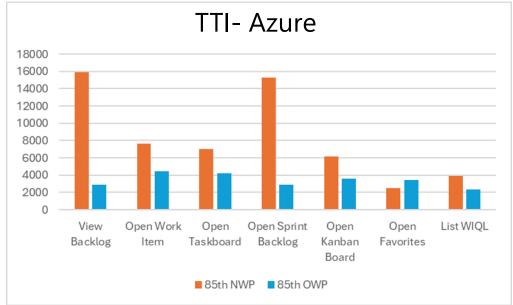
· Finally faster than Old Boards!



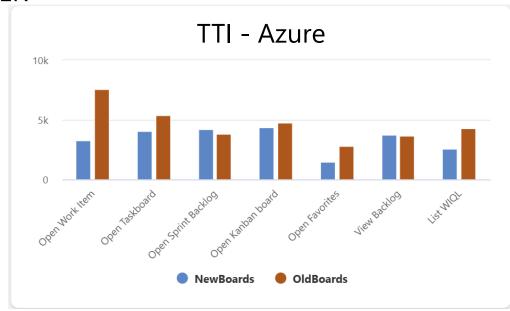
Results



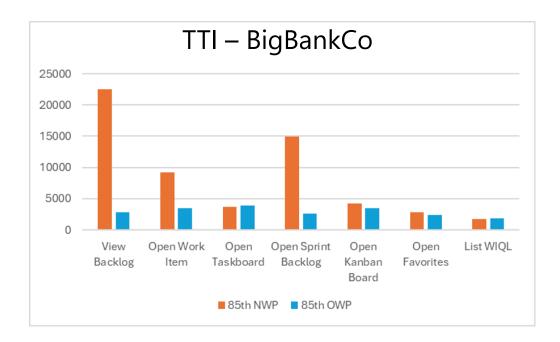
BEFORE

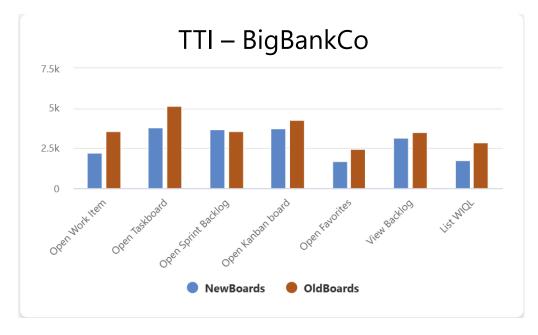


AFTER



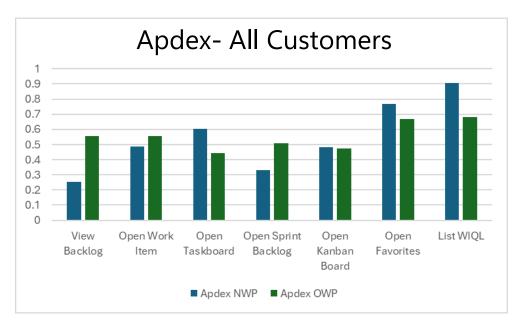
Azure DevOps

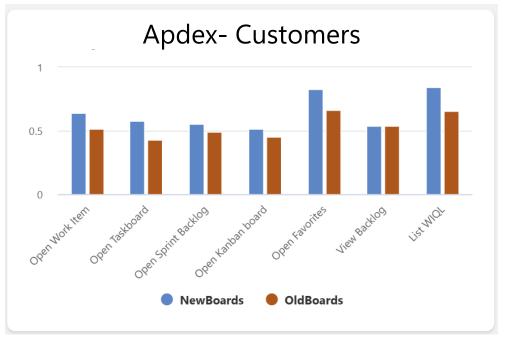




BEFORE

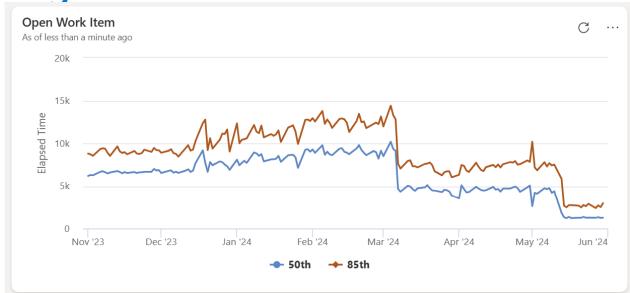
AFTER

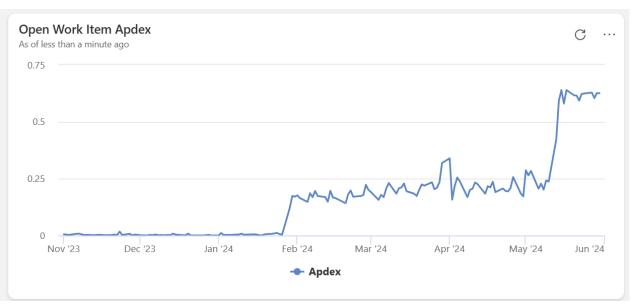




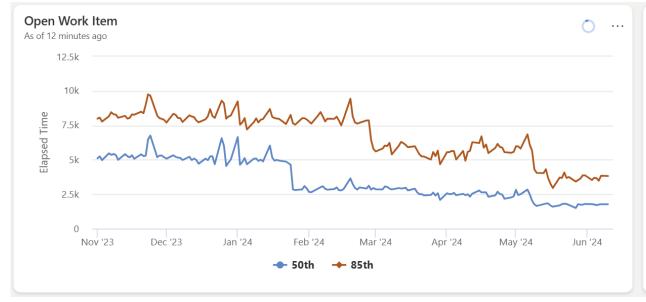


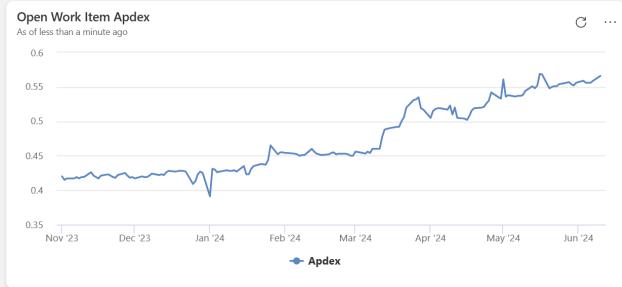
BigBankCo





All Customers





What did we learn?





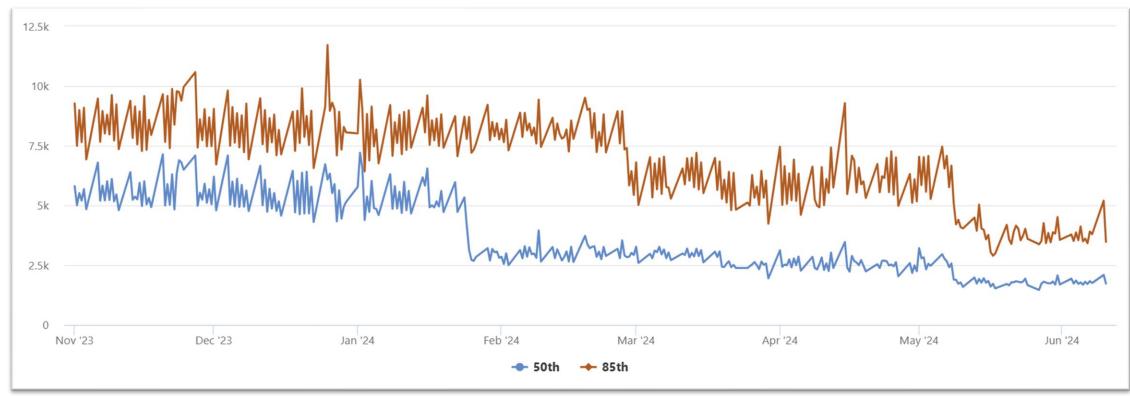
Delay loading large payloads

Check telemetry

Don't rely only on local testing

What to watch for

- · Don't assume network calls are fast
 - Local != Production
 - AzureDevOps != Azure
 - · North America!= India
- --Try binning data by 12h instead of 1d





Thank you

Dave Paquette Principal Software Engineer - Microsoft

