Windows Journey to DevOps

Catherine Kamerling
Windows Engineering Systems

Sam Guckenheimer
Azure DevOps

Microsoft in 2007

Microsoft in 2007

In 2007, my job was to tell country managers that they wouldn’t get their bonuses

Microsoft in 2007

Worldwide Vista Deployment Predictions

8% to 10%

Windows Vista™

Microsoft in 2007

Worldwide Vista Deployment ~~Predictions~~

1%

Windows Vista™

Three Big Challenges

Telemetry

Data siloed

3rd Party Data

Customer Connection

Great At Reaching Out

Less support for inbound

Speed

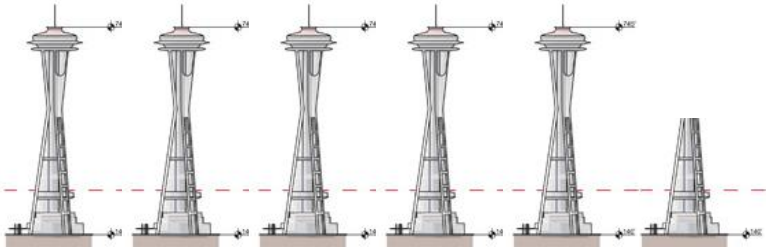
3 Year Waterfall Cadence Was Slow

12,000 ENGINEERS CREATE A LOT OF STUFF…

11M

Work Items

If every one were a sheet of paper, it would be as tall as



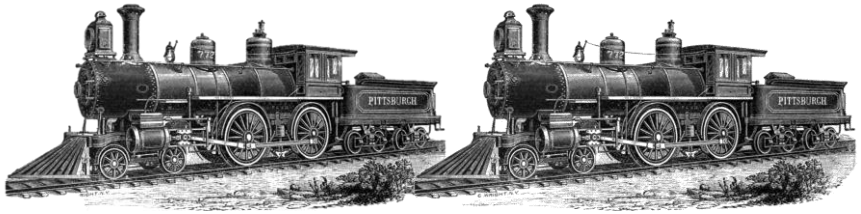
5.5

Space Needles

350M

Revisions

If every one were a feather, it would weigh as much as



2

Steam Engines

2.54M

Queries &
Updates /day

If every one were performed by a human, it would be the population of

Chicago

Illinois

Scale can be like a learning disability

Scale can be like a learning disability

It’s often invisible and you need your own terms

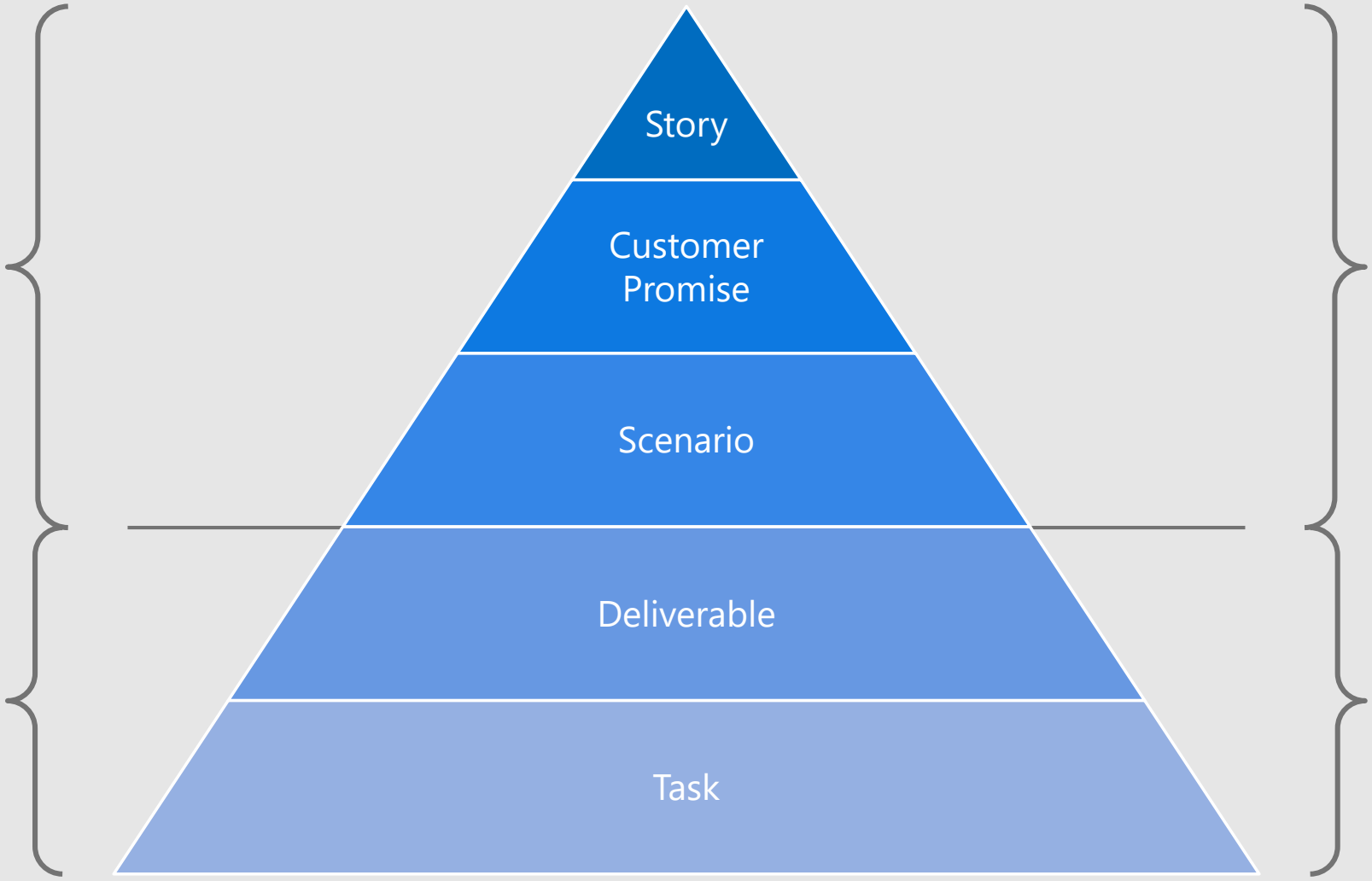
Today's Scale—Fall Creator Update

11,985	Software Engineers in WDG that need to work together
7,305	Developers bringing in code to WDG repos
3,974,374	Commits in development timeframe
497,903	Pull Requests
68,646	Official Lab builds
1,159	Machine years of build resources for Lab builds
4,201,457	Developer desktop builds
949	Machine years for test resources
3,188,972,675	Test cases executed

Today's Frequency—Fall Creator Update

Multiple Daily	Windows Defender signature updates Store and Services updates
Weekly	Windows Servicing updates
Daily - Biweekly	Windows Store Apps updates
Monthly	Xbox updates
Semiannually	Windows feature updates
18-24mos	Device releases

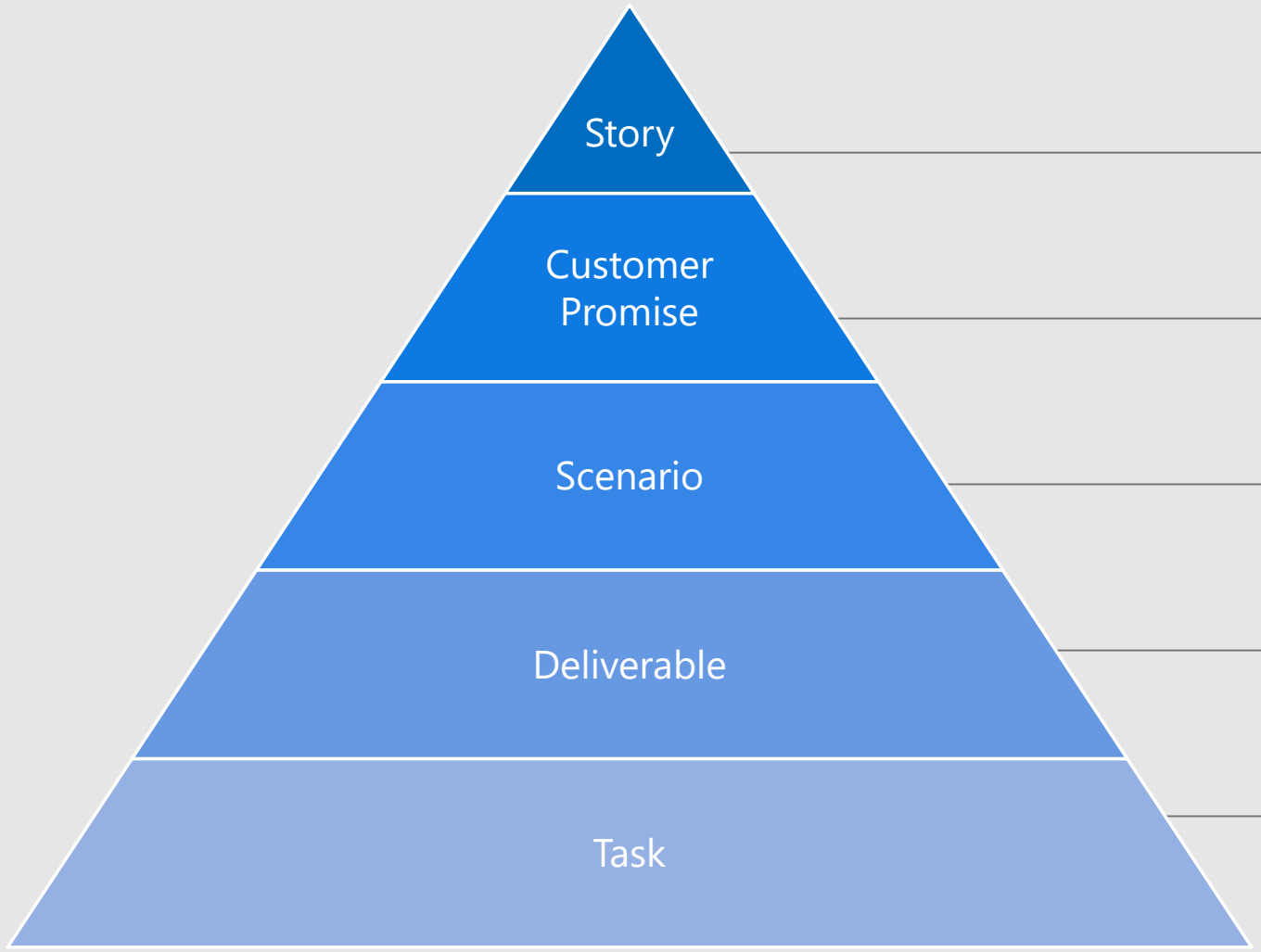
Taxonomy Enables Alignment and Autonomy



Defines the Product we're building

Describes the work required to build it

TAXONOMY BY THE NUMBERS IN 2017



43 Stories

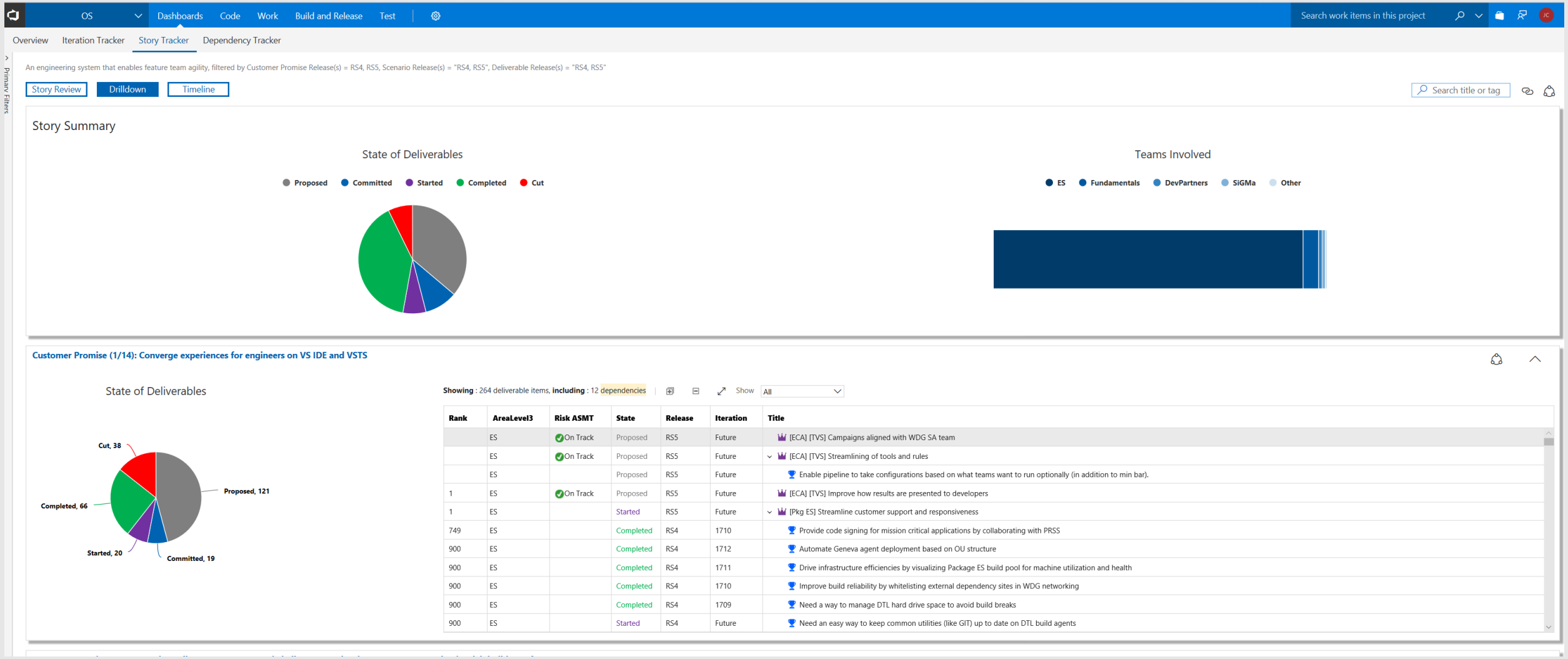
206 Customer Promises

3,342 Scenarios

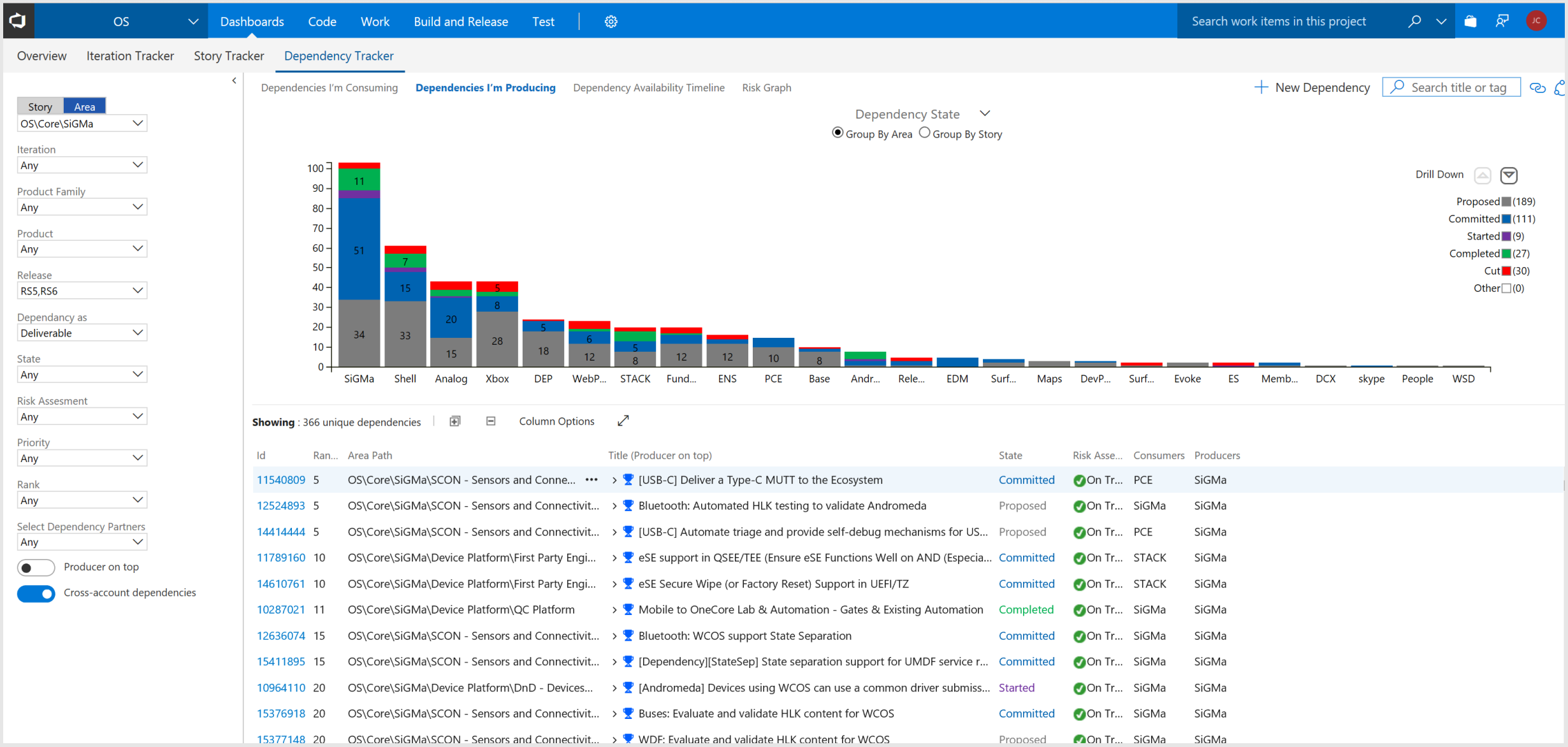
38,864 Deliverables

143,408 Tasks

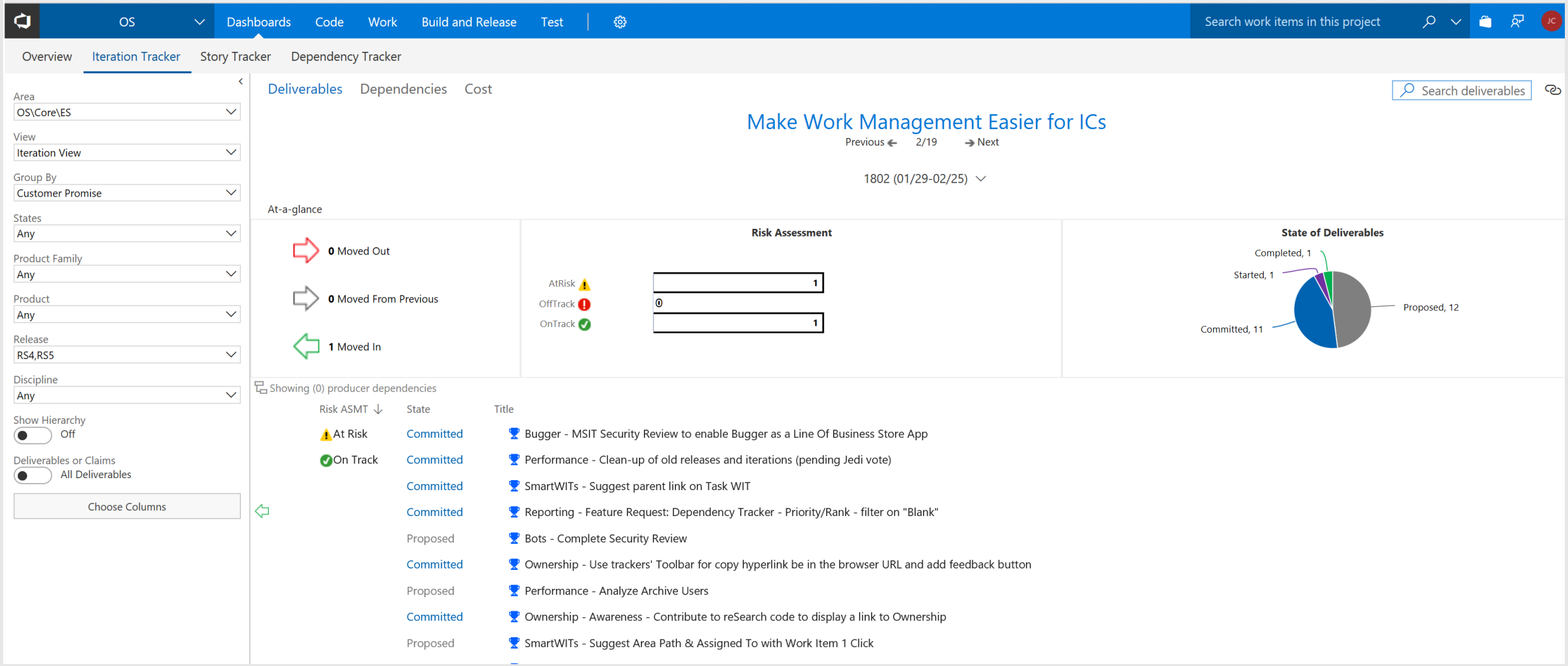
TRACKING STORIES



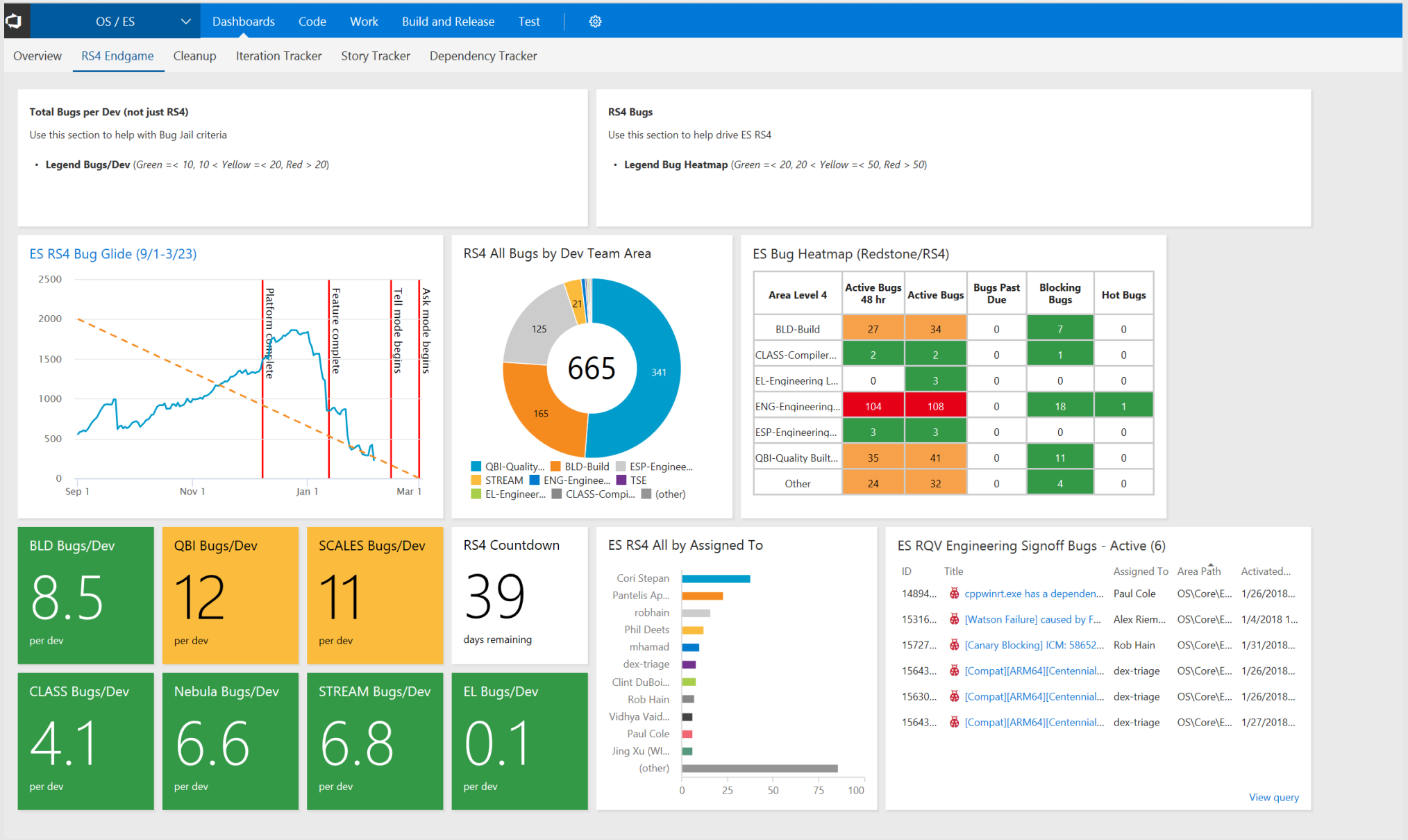
UNDERSTANDING DEPENDENCIES – BY TEAMS AND BY STATE



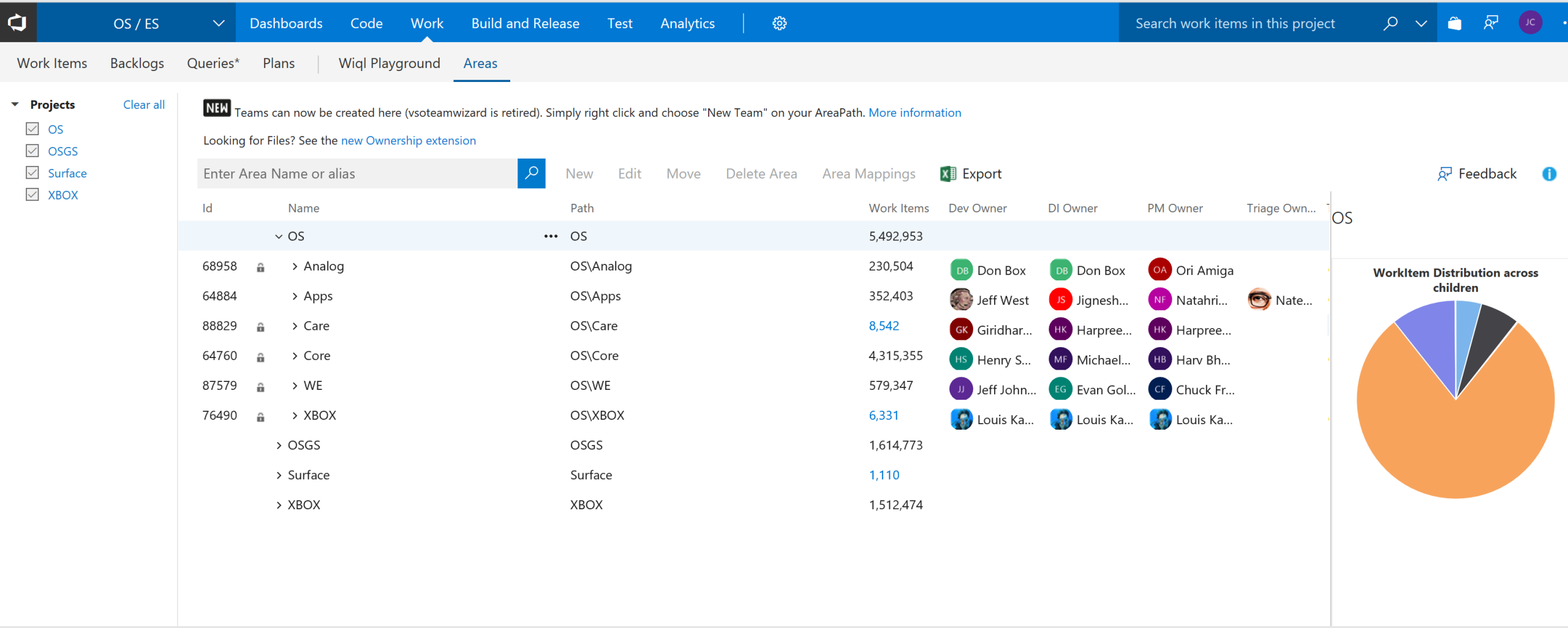
TRACKING WORK ACROSS MONTHLY ITERATIONS



AT A GLANCE - CUSTOMIZED WIDGETS FOR DASHBOARDS



NAVIGATING AREAS AND TEAMS



FINDING FILES AND OWNERS

OS | Dashboards | Code | Work | Build and Release | Test | Analytics | Search code in this project

os | Files | Commits | Pushes | Branches | Tags | Pull Requests | CodeHub | Gitbit | Ownership | Clone

Projects
- OS

Repositories
- OS

Enter file name, file path or alias | Change Owners | Add Files | Show Servicing Area | Exclusions | Export | Feedback

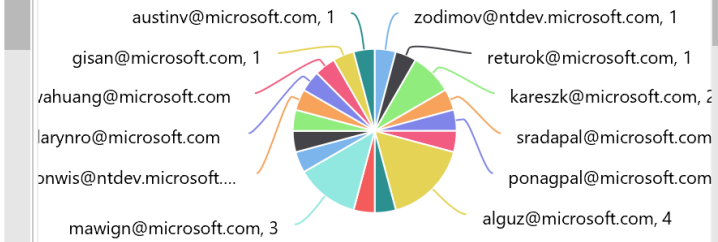
3,109,762 Files | Shipping (25,434) | Non Shipping (81,658) | Checked In (3,002,670)

Name	Total Files	Area Path	Dev Owner	DI Owner	PM Owner
[Manually Added Files]	11,803				
admin	201,844				
amcore	10,062				
analog	182,640				
avcore	86,165				
base	211,418				
build	568				
com	46,450				
data	1,907				
drivers	79,245				
ds	140,137				
enduser	38,367				
gamecore	31	XBOX\XboxOne\Platform\AppPlat	Matt Dissi...	Darryl Russi	Jeremy C
hub	741				
inbox	5,078				
inetcore	17,311				
inetsrv	39,760				
iot	7,613				

Source Path : admin

Pull Requests with linked Work Items

Pull Requests by Contributor



Primary Contributor : Alex Guzman

ZD Zoran Dimov OS\Core\Fundamentals\WaaS Flighting 5/2/2018
Phase 2: Generate INC files with direct file operations -- use the new tool
1763063 official/rs_fun_flight 16335851

RT Rebecca Tu... OS\Core\ES\STREAM\SCM\Git 5/30/2017
Updated placeholder.txt Updated placeholder.txt
507590 official/rs_play 11283943

Karesz Kec... OS\Core\ES\SCALES - Speedy 5/10/2017

What about all that (err...legacy) code?

What About Code Velocity?

ON AVERAGE, EACH MONTH

7.3K	Developers making code changes
11K	Topic branches
367K	10 commits per minute
33K	1,100 pull requests per day
9.7K	Branch Integrations

OUR BRANCH MERGE LOOKS LIKE THIS

china.org.cn

Err…Jez and Nicole said yesterday …

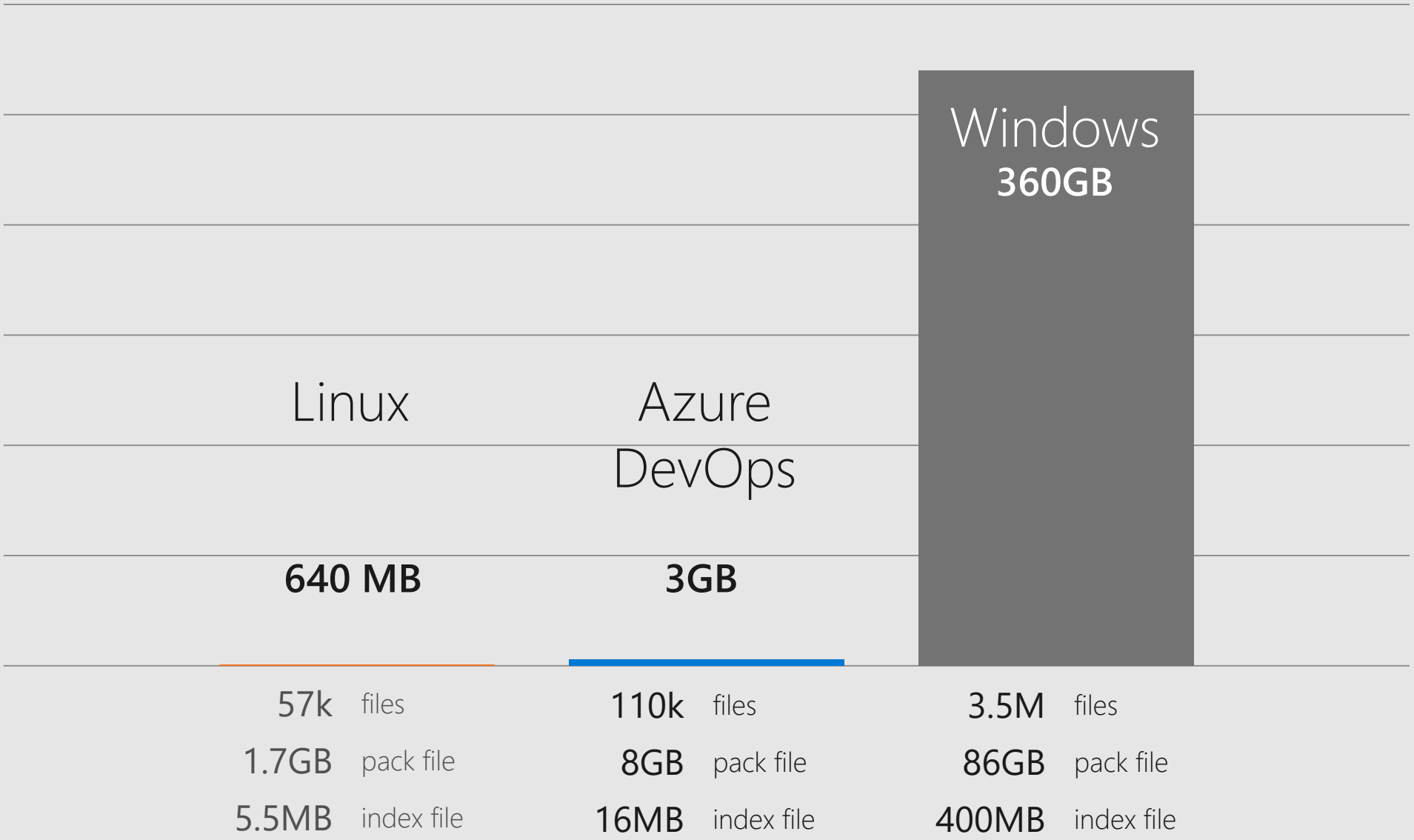
Some of my other favorite data findings!

- Change advisory boards are **useless***
- Industry **doesn't matter**
- Integration times and branch lifetimes **lasting hours are better than days**

Why Did We Pick Git as a Starting Point

- Evaluated Git against Source Depot
- Found Git was the only solution that could meet all our needs
- But only if, we could get the scale

No.	Requirement	SD	Perforce	Git w/VSO
1	Large Scale	✓	✓	×
2	High Availability (HA/DR)	✓	✓	×
3	Support a "Monolithic" Code Base	✓	✓	×
4	Fast Performance	×	✓	✓
5	Monitoring and KPI Support	✓	✓	×
6	Code Review	✓	✓	✓
7	Strong Merge Conflict Support	×	✓	✓
8	Payload Tracking	×	✓	✓
9	Branch Maintenance	×	✓	✓
10	High Code Velocity	×	✓	✓
11	Collaborative Development	×	✓	✓
12	Enable Experimentation	×	✓	✓
13	Easy Code Sharing	×	✓	✓
14	Easy Code Movement	×	✓	✓
15	Fast Learning Curve	×	×	✓
16	Open Source Tooling Innovations	×	×	✓
17	Distributed Development	×	✓	✓
18	Single Source Store	×	×	×
19	Social Profiles	×	✓	✓
20	Integrated Support for DevDiv Tools	×	×	✓


Windows
360GB
Linux
640 MB
57k files
1.7GB pack file
5.5MB index file
Azure DevOps
3GB
110k files
8GB pack file
16MB index file
3.5M files
86GB pack file
400MB index file

Git on Windows repository

12 hrs	clone
3 hrs	checkout
8 mins	status
30 mins	commit

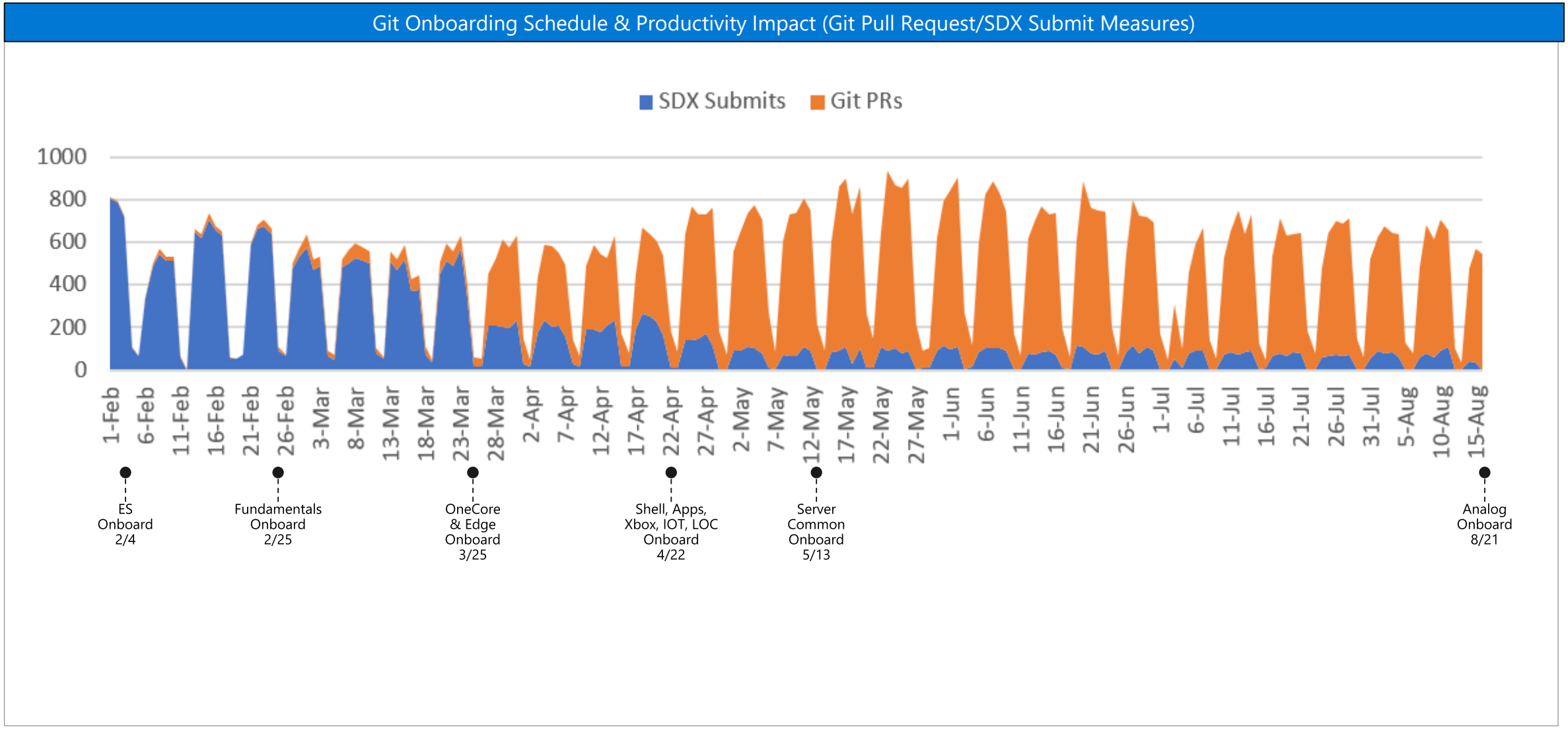
To make Git work for Windows, we made Git 300x faster

(It took three attempts.)

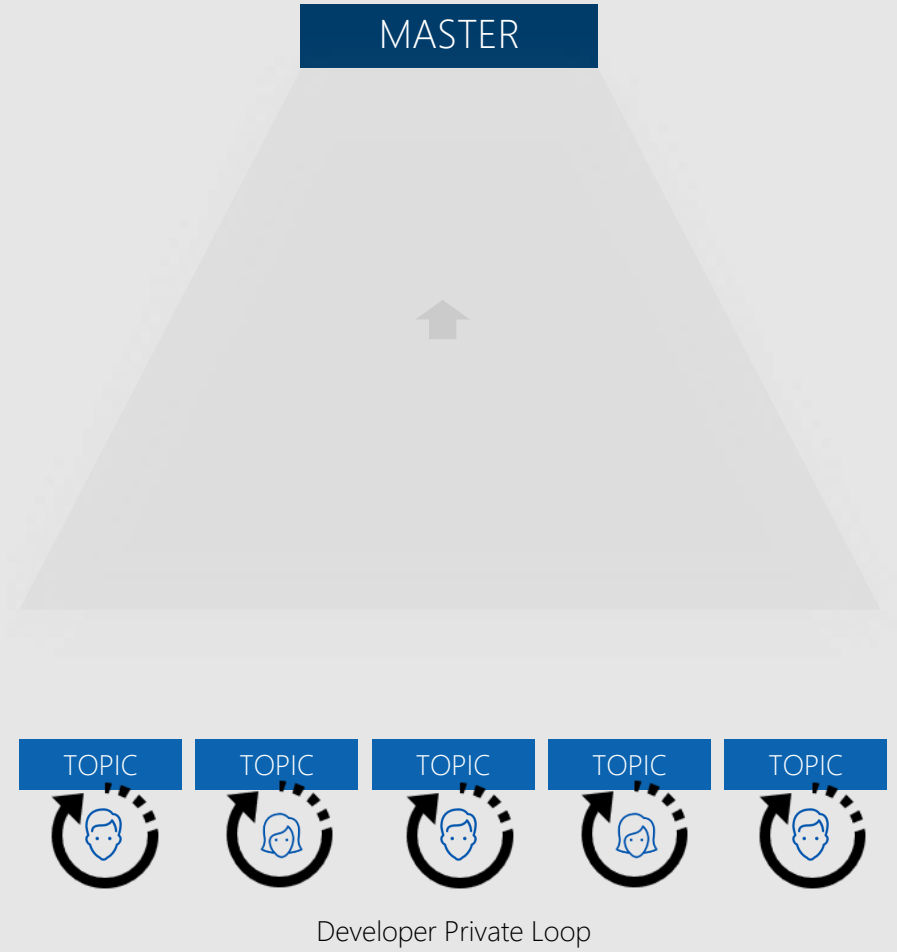
Git + GVFS on Windows repository

~~12 hrs~~	5 mins	clone
~~3 hrs~~	30 secs	checkout
~~8 mins~~	8 secs	status
~~30 mins~~	6 secs	commit

Git Crossover – Getting Faster Without Pausing

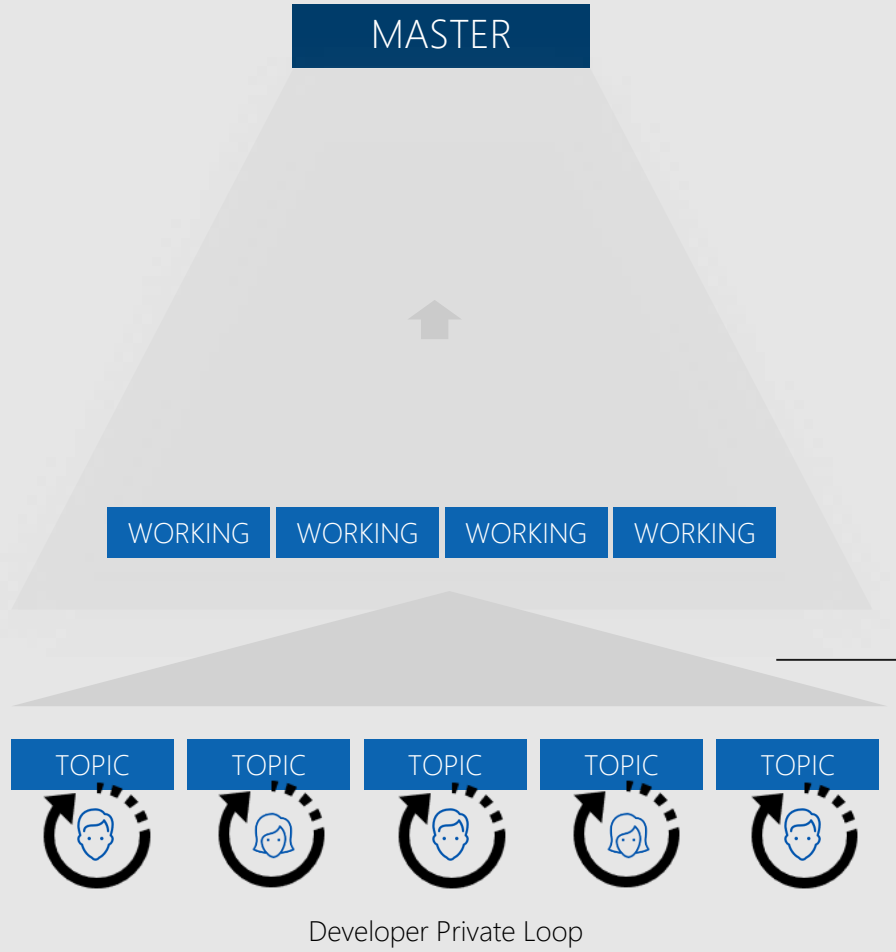


How Do We Flow All That Code?



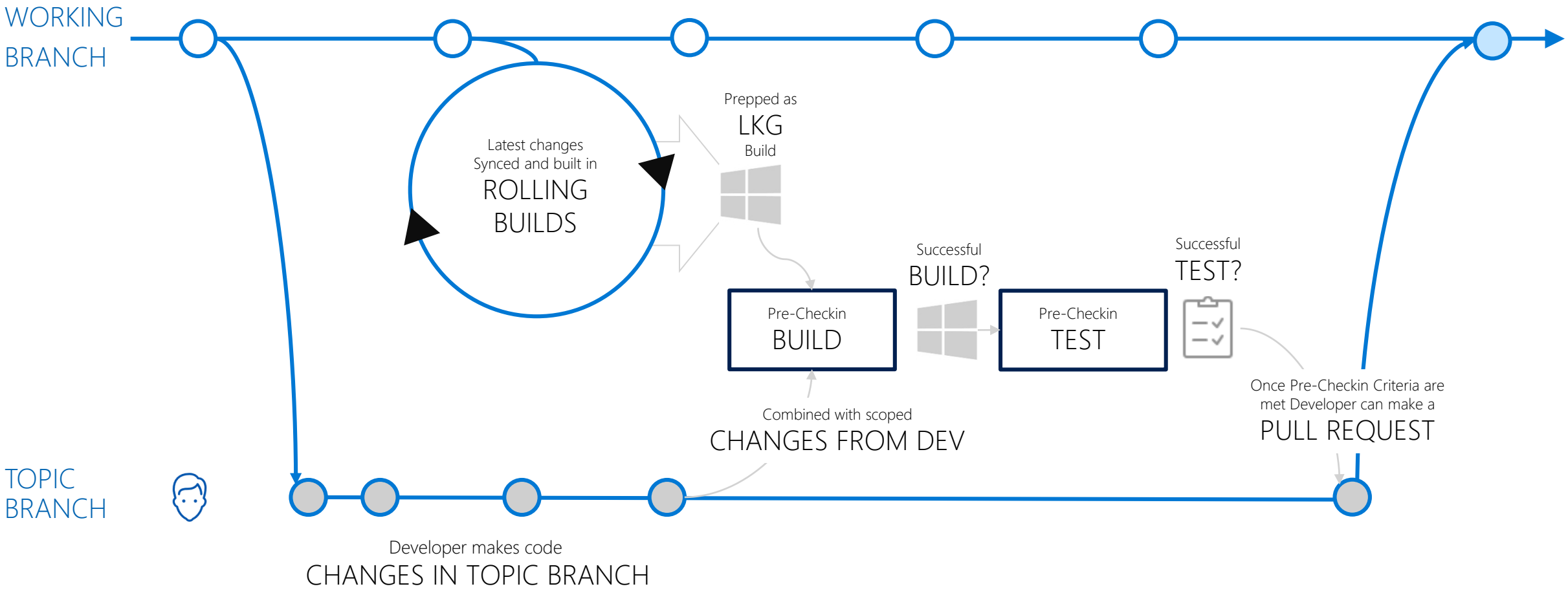
Developer Private Loop

Working with Azure Repos on a Windows-Scale PCV

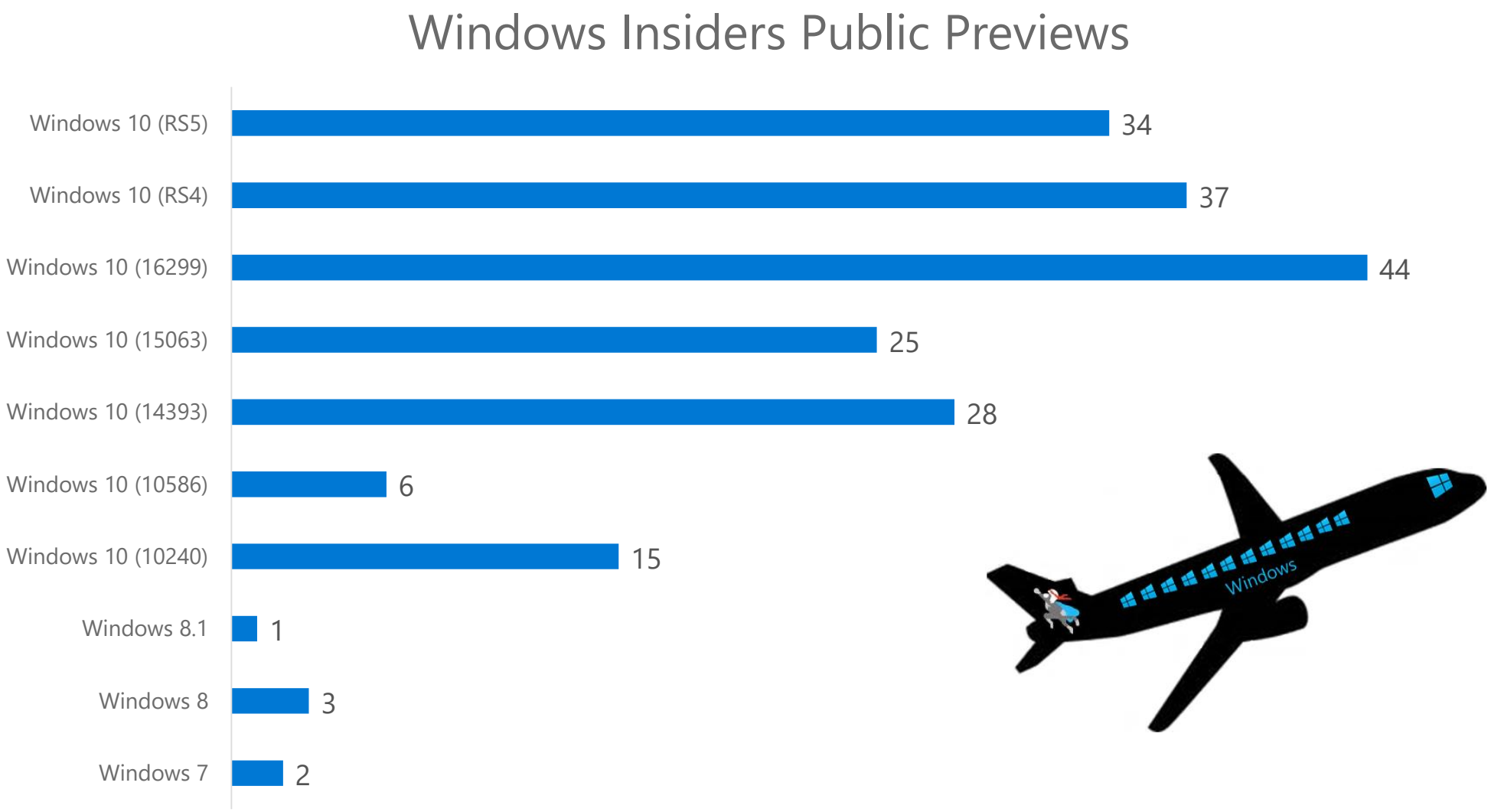


Pre-checkin Validation (PCV)

Pre-Checkin Validation



Windows Insiders—Development In The Open



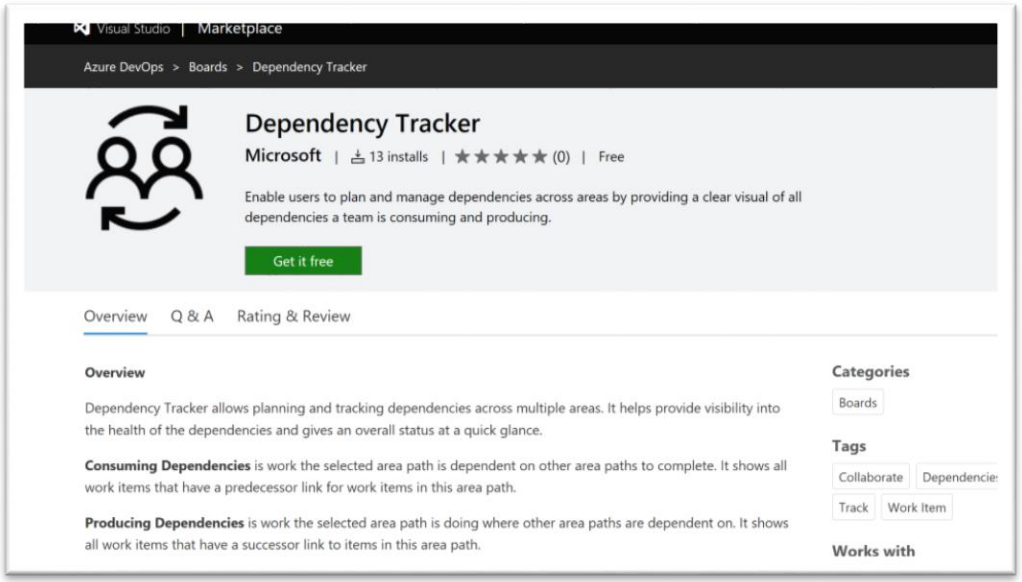
Now Sharing with the World

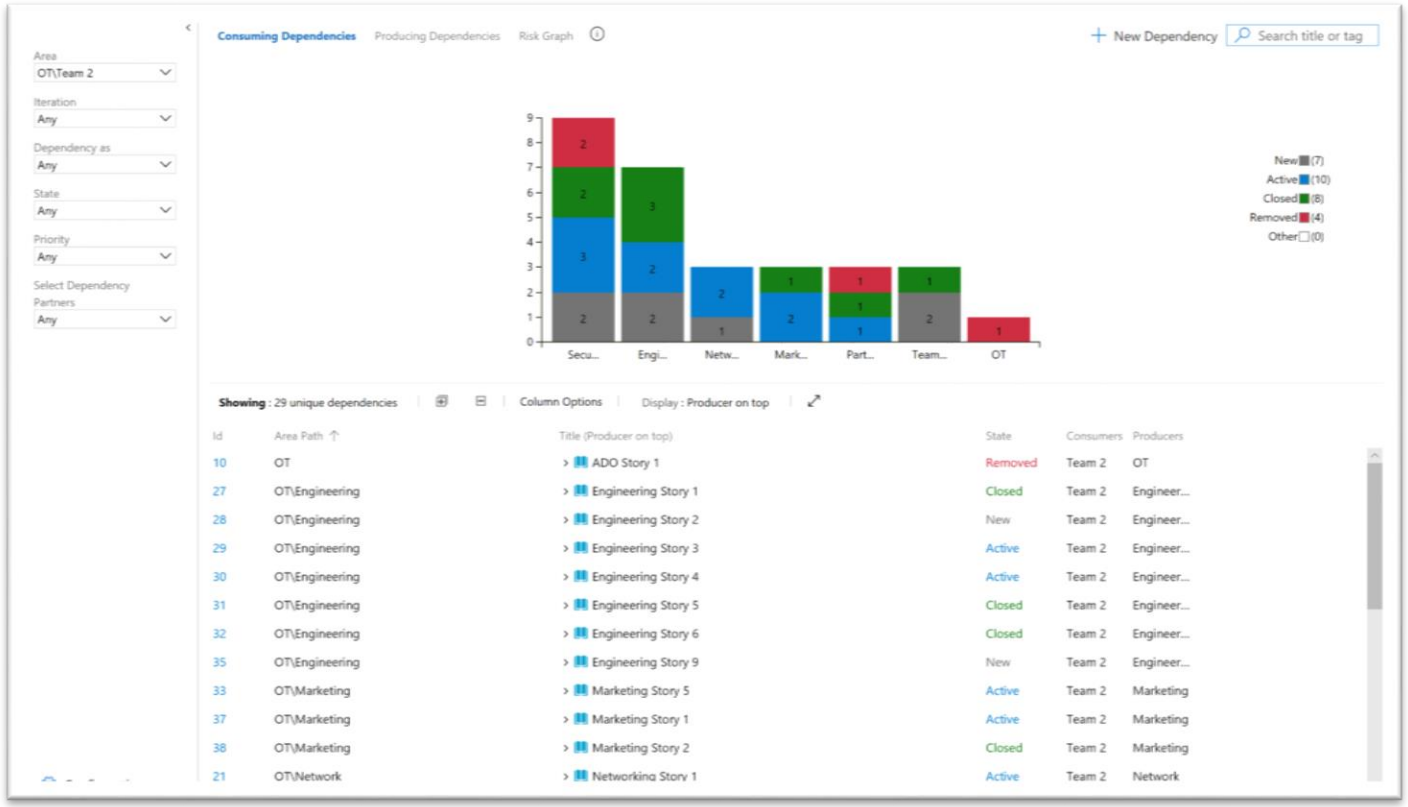
http://Aka.ms/WorkItemOneClick

http://Aka.ms/WiMigrator

DEPENDENCY TRACKER

Dependency Tracker allows planning and tracking dependencies across multiple areas. It helps provide visibility into the health of the dependencies and gives an overall status at a quick glance.





http://Aka.ms/DependencyTracker

GETTING 12,000 SOFTWARE ENGINEERS TO WORK INDEPENDENTLY AND TOGETHER

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http://aka.ms/devops