

# Technology Department

Q3 FY20



**WIKIMEDIA**  
FOUNDATION

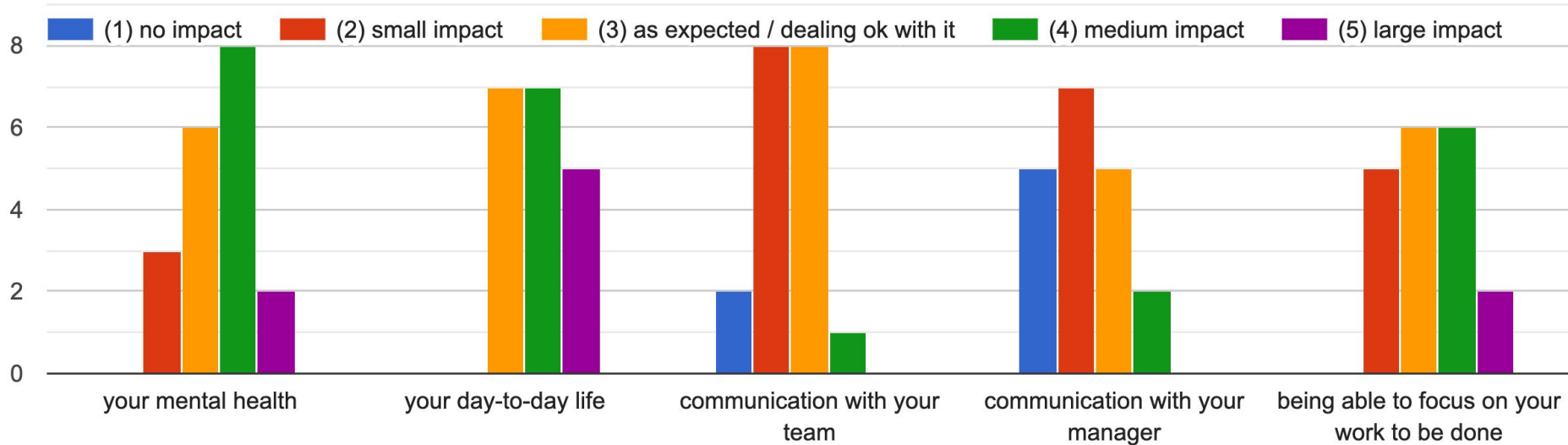
# COVID-19

- **Approximately 10-20% of our dept staff are working reduced hours due to circumstances**
- **Actions taken to reduce risk and reduce stress:**
  - **De-risking releases**
  - **Data Center Operations guidelines**
  - **Documentation**
  - **Broader WMF guidelines**
- **We are still struggling with how best to lighten the load while making sure site runs, but teams are adjusting**



# But, how do you feel?

On a scale 1-5, do you feel the coronavirus is having a serious impact on:



\*n=19 mgrs in tech

# Platform Evolution

We need to have a modernized, instrumented, and efficient platform to enable next generation engagement across the globe. As we engage, we need to incorporate next generation approaches around artificial intelligence to secure and enhance trustworthy content, while ensuring the safety for all our curators and readers.

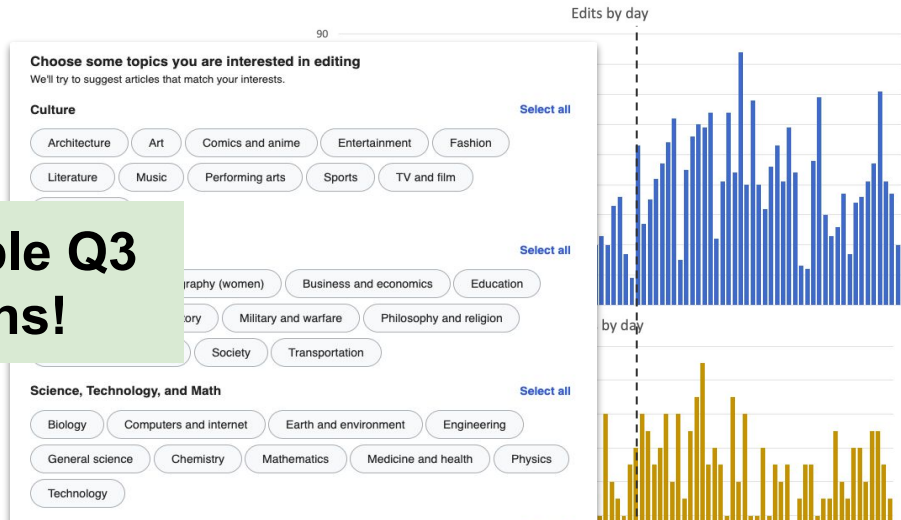


Internet shut down in Iran due to protests.

Not Wikipedia-specific

Automated detection of outages and censorship events

Sample Q3 wins!



Growth Team now using ORES topic models in Newcomer homepage

# Drill Down: Platform Evolution

## The situation

Last quarter, we committed to having an updated set of recommendations around our MTP metrics and the Annual Plan “reduce complexity” task for Q3.

The Product & Technology Departments have made good progress on establishing our ability to measure metrics automatically, and are bringing forward a new recommendation on artificial intelligence use and the impact on our projects.

We do not yet have full working definitions for updated MTP metrics on structured data and non-text, but we do have baseline counts from which metrics can be defined! Likewise for engineering productivity metrics.

We have also made progress on performance issues with Wikidata Query Service (WDQS), but we are not out of the woods yet.

## The impact

For the first time ever, we now have measurements of the usage of Wikidata and Commons data in other projects! However, there is a small knowledge gap on how we *assess the impact* of this type of data.

As stated in our Q2 tuning session, Wikidata and the Wikidata Query Service are reaching the limits of their current architecture.

We are starting to have a deeper understanding of how we operate together as a complete team and what we can track, but we still have a ways to go.

# MTP Priority slides



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# Platform Evolution



## Overview

- Introducing more structured data and leveraging machine learning is unlocking new capabilities in our products to support our communities.
- Increasing use of media in our content increases the richness of our knowledge and reaches more people.
- Improving our code quality, automation, and developer tooling increases our capacity to innovate, experiment, learn and deliver.

## Progress and Challenges

- We have made good progress on improving our MTP metrics to demonstrate impact. However, some metrics still need more research in order to set targets and refinement to better measure true impact.
- Our annual February survey showed a slight decline in developer satisfaction.
- Community metrics have been split out into *Established* and *Emerging* communities.

## Key Deliverables

Content Integrity	Yellow
Machine Learning (ML) Infrastructure	Yellow
Technology and Product Partnerships	Green
Improve developer productivity and efficiency to accelerate innovation	Red

## Actions

- Introduce new metrics with baselines
- Update code quality metric
- Working on new metrics around ML
  - Our original metric was achieved in Q1 and will be removed from reporting



# Platform Evolution Metrics



## MTP Outcomes

We will build tooling for internal and external development and reuse of code and content

## MTP Metrics

An X% increase in structured data used (uptake) across wikis.  
**Baseline:** 24.9% (238.9M/959.4M) of pages across Wikimedia projects use Wikidata or Structured Data on Commons in April 2020.

(Note: Commons Data currently cannot be used in other Wikimedia Projects)

An X% increase in non-text (e.g. Commons) content used across wikis.  
**Baseline:** 52.9% (31.2M/60M) of Commons is used across WMF projects in April 2020.

Y1 Goal	Q1 Status	Q2 Status	Q3 Status
X% (TBD)		Changed (see appendix)	<b>24.9%</b> (238.9M)
X% (TBD)		Changed (see appendix)	<b>52.9%</b> (31.2M)

**Fun fact:** 13.6% (8.1M/59.7M) of pages on Commons have structured data as of April 2020



Department:  
Technology



# Drill Down: Platform Evolution



## The situation

We need to develop a new Machine Learning (ML) metric that is measurable and demonstrates long term impact.

We have baselines, but we need targets for both our data and media usage.

## The impact

We don't have a long term goal to guide focus our ML efforts, although we do have short term metrics.

We don't know yet what is *achievable and meaningful* for either data or media usage metrics, therefore we cannot, as of yet, measure progress.

## Recommendations

Work with the Product Department to define metrics that will truly be impactful for users.

Hire a VP of Data Science and Engineering.

Research and finalize targets for next FY, now that we have established baselines.

# Platform Evolution Metrics



## MTP Outcomes

A secure and sustainable platform that empowers a thriving developer community with the ease of software -as-a-service tooling

## MTP Metrics

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
X% increase of independent developers who submit patches to production code <b>Baseline:</b> 146 independent devs in Q1	X% (TBD)			<b>Determining growth rate</b>
10% decrease in code review time <b>Baseline:</b> 19 days in June 2019	2% (18 days)	Setting baseline	-10% (21 days)	<b>10%</b> (17 days) <b>Monitoring</b>
30% <a href="#">increase of tool maintainers</a> <b>Baseline:</b> 1880 maintainers in Q2	5% (1974)		Setting baseline	<b>2%</b> (1919)
10% (4.2 / 5) increase in developer satisfaction <b>Baseline:</b> 2019 developer satisfaction: 3.8 / 5	4% (3.9)	Awaiting launch of survey	Survey after All Hands	<b>-8%</b> (3.4)
20% decrease in outstanding code reviews <b>Baseline:</b> 1134 code reviews in June 2019	X% (TBD)	61% (442)	47% (601)	<b>-1.4%</b> (1151)
25% increase in code quality <b>Baseline:</b> 0% in June 2019	5%	<1%	4.76%	11.9% <b>Revisit &amp; Recommend</b>



# Drill Down: Platform Evolution



## The situation

Contributions to “production code” by independent developers has been flat.

The definition of “production code” doesn’t currently include community tools in our Cloud VPS.

Code quality metrics aren’t helpful to guide team development efforts.

## The impact

We don’t know the full story about why growth is stagnant, or if this is having a negative impact on our software.

We don’t give the same attention to the tools and services that live in labs that we do to other “production” code (even though these tools account for a large number of edits).

While we can report on them, they aren’t used by teams in an impactful way.

## Recommendation

We need to do research and explicitly commit to efforts to move this number.

We can count contributions to tools as “production code” to better measure the impact of code contributions by our community.

We will develop a plan for growing and sustaining our tech community and revisit code quality metrics to make them more useful.



# Content Integrity



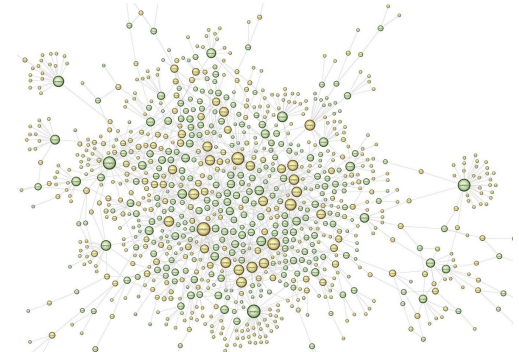
## Objective:

**Secure and protect the platform and our communities in the free knowledge movement against the spread of disinformation and bad-actor risk**

We build the infrastructure to assure the security of content as well as content contributors and consumers.

We build the technologies that empower the editor and patroller communities enforce content policies such as *verifiability* and *neutral point of view* more effectively.

**Target quarter for completion:** Q4 FY19/20



The OrangeMoody network of socks (ongoing)



# Content Integrity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Create 2 security <i>governance</i> services: risk management and security awareness	4	1	3	3
Create 2 security <i>engineering</i> services: application security and privacy engineering <b>Baseline: 0</b>				
Develop a means to limit and disable the API access of bad actors without interrupting the access of other contributors, integrate it into our platform, and measure the effect <b>Baseline: 0%</b>	100%	20%	33%	50%



# Drill Down: Content Integrity



## The situation

The prioritization of the *Enterprise Risk Management program* resulted in deprioritization of work to build the *Security Awareness training*.

We are doing additional work to reduce the risk of deploying the *API limiting* ([covid deployment guidelines](#))

## The impact

We do not expect to be able to finish the Security Awareness training by the end of Q4.

The implementation timing of the *API limiting* is uncertain due to the additional work and reduced capacity.

## The recommendation

Push updating security awareness training to FY21.

Follow deployment guidelines and determine a new ship date.



# Content Integrity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Build 2 sets of Formal Collaborations to expand our capacity for working on prioritized disinformation projects (by the end of Q3) <b>Baseline: 0</b>	2	n/a	In progress	1
Build a test model to address a specific type of disinformation (by the end of Q4) <b>Baseline: 0</b>	1	n/a	In progress	In progress





# Content Integrity



## Objective:

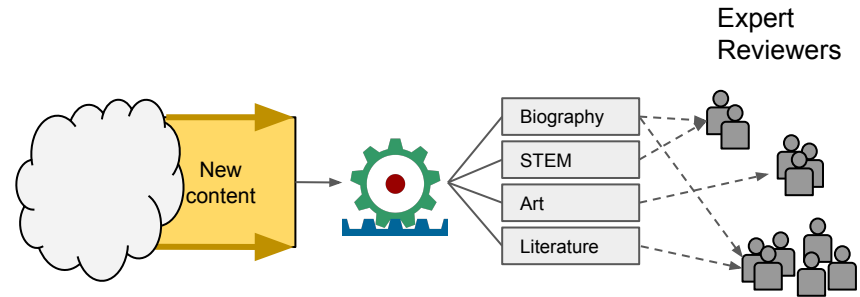
**Expand quality control Artificial Intelligence (AI) tooling to underserved communities, to make fundamental services available for consumption by those tools that support the growth of high quality content and the maintenance of quality standards**

We expanded our topic models to 5 languages.

New page reviewers are using these models to route new article reviews to those with subject matter expertise.

Users are reporting 2x efficiency gains.

**Target quarter for completion:** Q4 FY19/20



# Content Integrity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Deploy 8 new quality control AI tools to Wikimedia Projects, increasing availability of AIs for tooling <b>Baseline: 0</b>	8	4	6	11
Recruit 4 new campaign coordinators to advertise the availability of the new AI tools, increasing rate of consumption of those tools <b>Baseline: 0</b>	4	0	Blocked on coordinating resources to engage community	2 new campaign coordinators recruited (Simple and Swedish Wikipedia)
Improve 3 AI tools in a statistically significant way based on community feedback, ensuring utility of AIs for quality control work <b>Baseline: ongoing</b>	3	4	7	9



# Drill Down: Content Integrity



## The situation

We are still in need of 2 more campaign coordinators for advocating the AI tools built. This has been further delayed due to reduced availability of resources, as a result of covid-19.

## The impact

The adoption rate is slower than expected.

## The recommendation

We start with the smaller group of 2 coordinators that we currently have – we learn from them and then assess for FY21 what the updated target should be.



# Machine Learning Infrastructure



## Objective:

**Consolidate and simplify workflows — building, training, and deploying models to enable machine learning aided product augmentation and research.**

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Primary GPU work was concluded in Q1.

Ongoing maintenance of GPU access continues.

Feature store work is being deprioritized.

**Target quarter for completion:** Q4 FY19/20

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# Machine Learning Infrastructure



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Deploy a fully open sourced solution for GPU-enhanced computation infrastructure, improving training times of algorithmic image analysis models by 50% <b>Baseline: 0</b>	100%	Completed	-	-
Speed up model training by providing models with easier access to feature data through a feature store. Baseline: 0	100%	-	-	Postponed



# Drill Down: ML Infrastructure



## The situation

ML infrastructure is a project that was not resourced.

The value of GPU support is much more clear; for instance – image classification and Structured Data on Commons (SDC).

It's less clear what ML work would benefit from a feature store at this time.

## The impact

We've focused on low level infrastructure improvements mostly centered around providing GPU support in the analytics environment, statistics machines and Hadoop cluster.

We've deprioritized work on a feature store.

## The recommendation

Drop the feature store related key result.

Continue maintaining GPU support and increasing library support as core work.

# Machine Learning Infrastructure



## Objective:

**Enable our communities to more easily detect the hidden algorithmic biases in current Machine Learning (ML) solutions**

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We have made substantial progress on building out Jade functionality.

We are slowed by the complexity of building front-end components in MediaWiki (*shout out to FAWG!*)

We have recruited collaborators from 2 wikis for our pilot deployment.

COVID deployment restrictions for production code will slow down our pilot.

**Target quarter for completion:** Q4 FY19/20

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# Machine Learning Infrastructure



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Build, deploy, and establish baseline metrics for infrastructure that enables Wikipedians to correct the algorithmic predictions around quality of content to 4 wikis <b>Baseline:</b> 0%	4	33%	50% of the MVP complete	90% of the MVP complete
Increase the rate of community-based false-positive reporting in damage detection models by 100 times <b>Baseline:</b> 1 report per day	100%	0%	0 Blocked on deployment of the MVP	0 Blocked on deployment of the MVP





# Drill Down: ML Infrastructure



## The situation

Front-end engineering in MediaWiki was a bigger hurdle than we expected.

Also, our pilot deployment will be delayed due to production code deployment restrictions, due to covid-19.

## The impact

We were not able to deploy the pilot by the end of Q3.

## The recommendation

Continue work and push back our estimated pilot deployment date to Q4.

Take this time to address technical debt and run additional rounds of user testing.



# Platform Evolution



## Objective:

**Build a reliable, scalable, and comprehensive platform for building services, tools and user facing features that produce and consume event data.**

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We often have use cases that depend on the same 'event' happening. For example, a cache purge needs to know that a page was edited.

With a comprehensive event-based architecture, all consumers — analytics or otherwise — can share streams of events and take action as it pertains.

We are building a robust solution that allows us to create services that can both consume and produce standardised data in a predictable fashion.

**Target quarter for completion:** Q4 FY19/20

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# Platform Evolution



Sometimes as high as 1 error per user pageview



# Platform Evolution



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
5% of analytics events and 100% of production events migrated to the new event platform. <i>The percentage of production and analytics events will increase every quarter until older systems can be fully deprecated.</i> Baseline:0	5%	100% of production events and 5% of analytics events migrated	100% of production events and 5% of analytics events migrated	Done
Client Error Logging is deployed to 1 wiki and error stats are displayed on our operation dashboards. <b>Baseline: 0</b>	1			Done
By June 2020, all production and consumption of <b>new event data</b> originated in our websites is flowing through this new event platform. <b>Baseline: 0%</b>	100%	0%	0%	Slightly delayed but still on track



# Drill Down: Platform Evolution

## The situation

We are pivoting to deliver a new metric this quarter:

[SessionLength](#)

This work will happen in conjunction with the Product Department

## The impact

Migration of existing instrumentation to Modern Event Platform will be delayed to emphasize the migration of new instrumentation

## The recommendation

Keep calm and carry on

# Improve Developer Productivity



## Objective:

**Maintain and evolve developer tooling, testing infrastructure, validation environments, deployment infrastructure, and supporting processes.**

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Exploring and shepherding changes in how we build and maintain our deployment pipeline and supporting infrastructure takes time.

The addition of many new tests slowed down our Continuous Integration (CI) pipeline during Q3, so the natural next step is to work on making it more performant again.

We are winding down discussions around in-house vs. third-party solutions for CI.

**Target quarter for completion:** Q4 FY19/20

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# Improve Developer Productivity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Release Engineering and SRE teams create a plan to implement a Deployment Pipeline compliant CI system. <b>Baseline:</b> 0%	100%	10%	60%	70%
Maintain and improve the Continuous Integration and Testing services. <b>Baseline:</b> Standard deviation: 12 minutes	<13.2 mins	On track	4.62 mins	9.31 mins
Developers have a consistent and dependable deployment service. <b>Baseline:</b> 1 issue per quarter	Address new reports within 1 month	On track	0 incidents this past quarter	4 incidents
Reduce infrastructure gaps in the areas of backups, disaster preparedness, observability, infrastructure automation and team structure & support. <b>Baseline:</b> TBD	TBD	TBD	85%	92%



# Improve Developer Productivity



## Objective:

**We will improve developer efficiency for all developers: new and experienced, internal and external.**

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The Developer Satisfaction Survey ran in Q3 showed an 8% decline in developer satisfaction among the 60 staff members and 11 volunteers who replied.

- The main takeaway is that local development environments still need improvement; and for volunteers, code review is the sticky point.

Cycle time in Q3 was impacted by All Hands, when the train stops for two weeks — catching up takes some time.

In Q3, we started to [centralize resources](#) for technical skill building to serve small wiki communities. As COVID-19 led to the cancelation of in-person events, we are now exploring virtual workshops to test and refine formats for building technical capacity in smaller wikis.

**Target quarter for completion:** Q4 FY19/20

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# Improve Developer Productivity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Determine a baseline set of metrics to assess internal developer efficiency, including time to first merge (new devs), time to first review (new devs), average time to merge (fully ramped devs), and average time to review (fully ramped devs), by end of Q2. <b>Baseline: 0</b>	4 baselines	0	Completed	Completed
Improve all baseline developer efficiency metrics by 10% by the end of the year. <b>Baseline: 3.8/5 or 76%</b>	4.18/10% increase	No change	No change, update in Feb 2020	3.4 (-8%)
Improve Cycle Time by 10% year over year. <b>Baseline: 11.6 days</b>	10% decrease	No change	11% decrease (10.3 days)	36% increase (14 days)



# Drill Down: Improve Dev Productivity

## The situation

There was an overall decline in developer satisfaction expressed in Q3.

## The impact

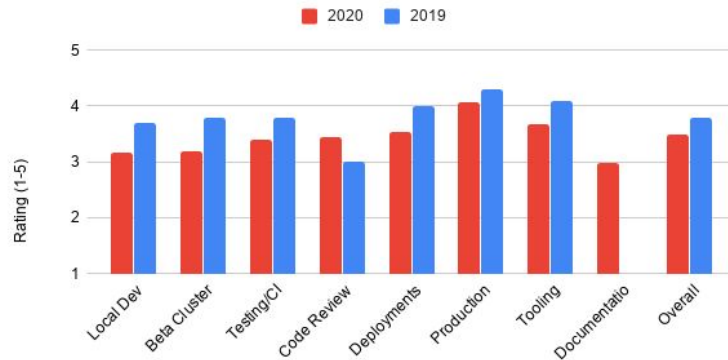
Staff are impacted by constraints in local development environments, volunteers by code review delays.

## The recommendation

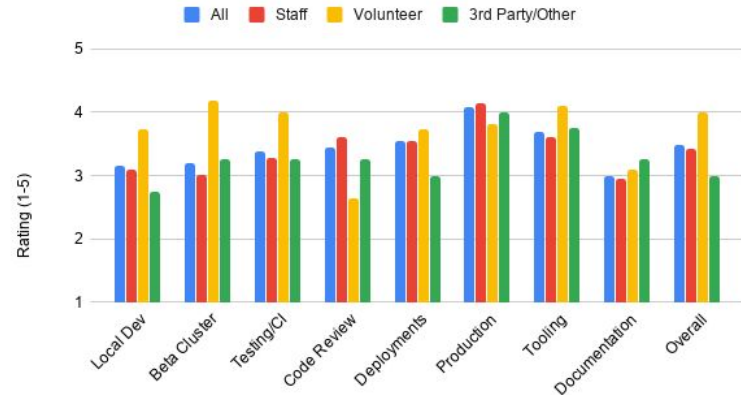
Continue to develop and rollout Mediawiki Docker container.

### Satisfaction

Category averages



### Satisfaction by role



# Improve Developer Productivity



## Key Results

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
Successfully run Wikimedia's technical internship and outreach programs — <a href="#">Google Summer of Code</a> (GSOC), <a href="#">Google Season of Docs</a> (GSOD), <a href="#">Outreachy</a> and <a href="#">Google Code-In</a> (GCI) — that are measured by number of completed projects in GSOC, GSOD, Outreachy and the number of completed task instances in GCI.	20 projects completed, 700 tasks completed, 14 projects promoted for the 2020 rounds	n/a	15 projects completed in <a href="#">GSOC</a> , <a href="#">GSOD</a> , <a href="#">Outreachy</a> . <a href="#">600 task instances completed</a> in GCI	<b>21</b> projects completed in GSOC, GSOD, Outreachy round 19 and 20, <a href="#">715 tasks instances completed in GCI</a> , <b>17</b> projects promoted for the 2020 rounds
Develop, test and evaluate different formats for building technical capacity in emerging communities.	At least 3 formats are developed and tested, year 1 evaluation	n/a	2 formats developed, ongoing testing	Started to work on format 3; improved related documentation and drafted a <a href="#">landing page</a> on Meta

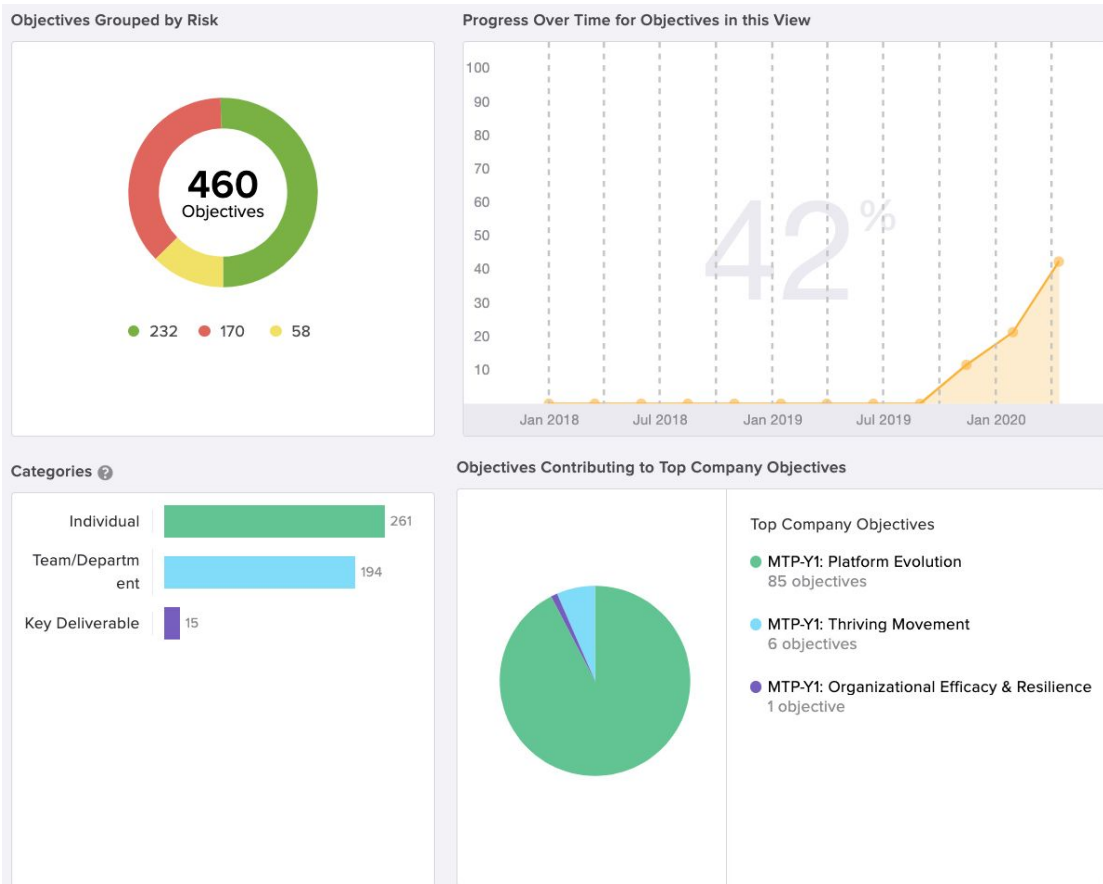


# OKRs and supporting work



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# Department OKR Status



# Supporting wins: Q3

## Collaboration and Communication

*New:*

- hyperlink recommendation model was validated in collaboration with the Growth team
- prototype of a Flink-based streaming updater for WDQS was created

Experimented with cross training in FR-Tech: everyone got a chance to collaborate on recurring donation features.

Good progress in aligning Quality and Test processes and practices: created and discussed testing strategies for three projects while collecting and analyzing existing testing tools and process.

## Better Infrastructure

Formation of the Security Fusion Center to better channel and manage incoming work and to provide a training resource for the Foundation.

COVID-19 related slowing of onsite data center visits for the final 3 weeks of the quarter: we still reduced the number of open tasks by 46%.

Completed replacement of legacy Kubernetes cluster in Toolforge with a more modern deployment without significant interruptions in service.

## Growth and Improved Capabilities

[\[\[WM:Techblog\]\]](#) was officially launched in March 2020, providing a central location to share information about the technical work that folks do, such as *'how to run a top ten website that is all open source'* and *'how do new tools and bots help run Wikimedia projects'*





# FOSDEM 2020



***The Performance track  
had a packed house!***

# Challenges: Q3

## COVID-19 related:

The current suspension of deploying risky changes is blocking a number of tasks, as teams often work on sensitive code

Contract negotiations are moving slowly with some data center vendors

Work on the data center switchover and Deployment Pipeline infrastructure has been postponed

Rack space/10G network port constraints in eqiad have stalled CEPH cluster build out plans





# Supporting themes: Q4

Researching the impact of the 2020 sunsetting of Python v2 for community developed tools and bots

Deploy Jade with labeled data and a machine learning auditing system to pilot wikis and iterate on feedback

Evaluate and finalize k8s provider for a new Continuous Integration (CI) framework

Update at least one WDQS test server with a new streaming updaters

Integrate code to help identify and label bots in pageview data

Continue work on the API Portal and OAuth User Flow (API Keys) for API



# New Hires

## ***Platform***

Hugh Nowlan  
Mat Nadrofsky  
Mandy Mooney

## ***Technical Engagement***

Joaquin Oltra Hernandez  
*(internal transfer)*

## ***Performance***

David Pifke

## ***Quality & Test Engineering***

Monte Hurd  
*(internal transfer)*

## ***SRE (started April 1)***

Janis Maybohm  
Wolfgang Kandek

# Anniversaries *(January - March)*

## ***9 years***

Aaron Halfaker

## ***7 years***

Greg Grossmeier

## ***6 years***

Gilles Dubuc

Leila Zia

Chase Pettet

## ***5 years***

Joseph Allemandou

Tyler Cipriani

Eric Evans

Corey Floyd

## ***4 years***

Deb Tankersley

Emanuele Rocca

Luca Toscano

Guillaume Lederrey

## ***3 years***

Jean-René Branaa

Anthony Borba

## ***2 years***

John Bennett

Brooke Storm

Kate Chapman

Valentín Gutierrez

Sam Reed

## ***1 year***

John Bond

David Sharpe

Holger Knust

Brennen Bearnese

Dominic Walden

Birgit Müller

# Questions?



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# Appendix



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# Supporting wins: Q3

Volunteer tool developers picking up ORES' topic models

User:SD0001/AfC sorting

From Wikipedia, the free encyclopedia

< User:SD0001

more from ORES

Pending AfC submissions as of 10

March 2020

*A single page may appear in multiple sections. Pages now in mainspace appear in green. Count of entries in each section is indicated in the section header.*

**Outdated demo. See [User:SDZeroBot/AfC sorting](#) for an updated version.**

[Culture/Biography/\\*](#) (1123)  [[edit](#)]

- [Draft:Syed Mohammed Hashmi Ashraf](#): C-class
- [Draft:Suraj Pal 'Amu'](#): Start-class
- [Draft:Gonçaves de Sousa](#): Stub-class
- [Draft:Jeon Bonggeon](#): C-class
- [Draft:Andrew Salgado \(singer\)](#): C-class
- [Draft:Raymond Huish](#): B-class

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Patrollers reporting a **2x efficiency boost**[1].

Tool developers reporting that ORES topic models are really easy to use.

1. [https://en.wikipedia.org/wiki/User\\_talk:SD0001#consider\\_this\\_a\\_barnstar](https://en.wikipedia.org/wiki/User_talk:SD0001#consider_this_a_barnstar)

# (Old) Platform Evolution Metrics



## MTP Outcomes

We will build tooling for internal and external development and reuse of code and content

## MTP Metrics

Artificial Intelligence (AI) tools and workflows are utilized against 25% of all content  
**Baseline:** All English Wikipedia content uses Artificial Intelligence tooling

25% of content (consumed or created) uses structured data  
**Baseline:** Wikidata: 234 million pageviews with 59 million pages in the month of July

25% increase in rich media content created and consumed across projects  
**Baseline:** Commons: 516 million pageviews; 72 million pages in the month of July

Partnerships (see Advancement deck)

Y1  
Goal

Q1  
Status

Q2  
Status

Q3  
Status

10%

100%  
**DONE**

100%  
**DONE**

**Metric was  
already  
achieved**

X%

207 million  
pageviews, 62  
million pages

158M page views  
in Dec. 72m  
pages

**Was too broad  
to measure and  
not the right  
metric**

X%

560 million  
pageviews; 74  
million pages

784M page  
views, 75.3M  
pages

**Was too broad  
to measure and  
not the right  
metric**



# (Old) Platform Evolution Metrics



## MTP Outcomes

A secure and sustainable platform that empowers a thriving developer community with the ease of software -as-a-service tooling

## MTP Metrics

	Y1 Goal	Q1 Status	Q2 Status	Q3 Status
X% increase of independent developers who submit patches to production code <b>Baseline:</b> 228 (July 1, 2018 - Jan 1, 2019)	Additional time needed to define X	Setting baseline	248 devs submitted patches in Q2	
10% decrease in time from code contribution (patch submission) to codebase commit. <b>Baseline:</b> 19 days	2% (18 days)	Setting baseline	X% (21 days)	
30% <a href="#">increase of tool maintainers</a> <b>Baseline:</b> 1880 maintainers	5%	Setting baseline	X% (1889)	
Increase in developer satisfaction measured and 20% decrease in outstanding code reviews <b>Baseline:</b> Developer satisfaction: 3.8 / 5	4% (3.9)	Setting baseline	Survey after All Hands	<b>Need to split into 2 distinct metrics</b>
25% increase in code quality <b>Baseline:</b> 0%	5%	Setting baseline	<1%	

