




# Emerging trends in software development: The next generation of storage

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Technology  
adoption  
is increasingly  
bottom-up



Wikipedia: G dallorto

# App-dev workloads are **quickly** moving to the cloud

On-Premises, Non-Cloud

Off-Premises, Non-Cloud

On-premises Private Cloud

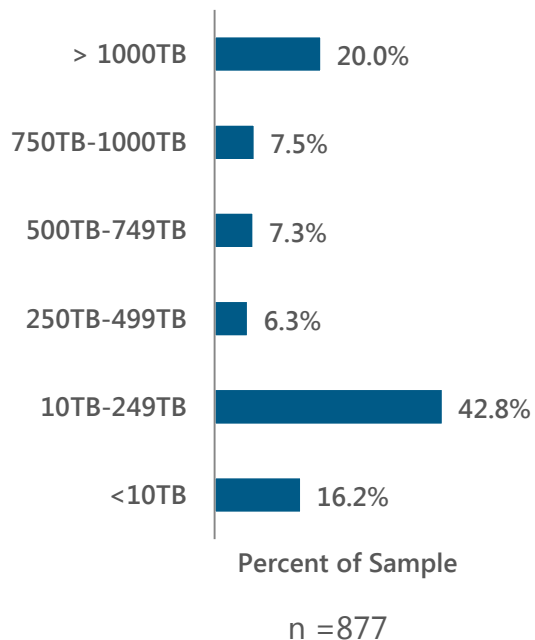
Hosted Private Cloud

Infrastructure-as-a-Service  
(IaaS)/Public Cloud

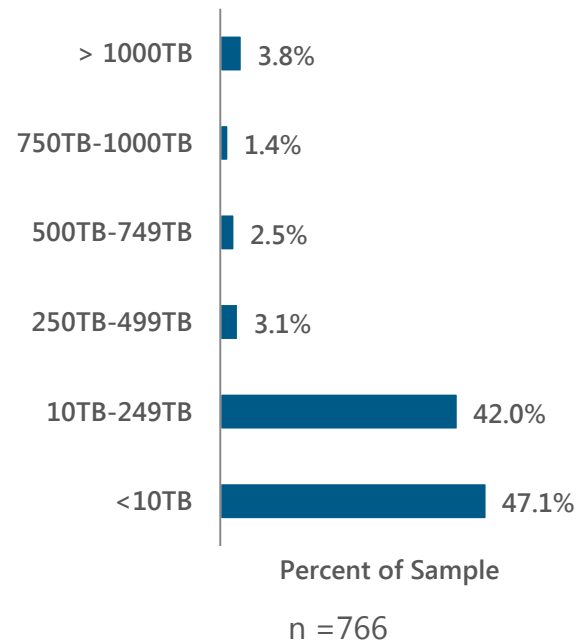
Software-as-a-Service (SaaS)



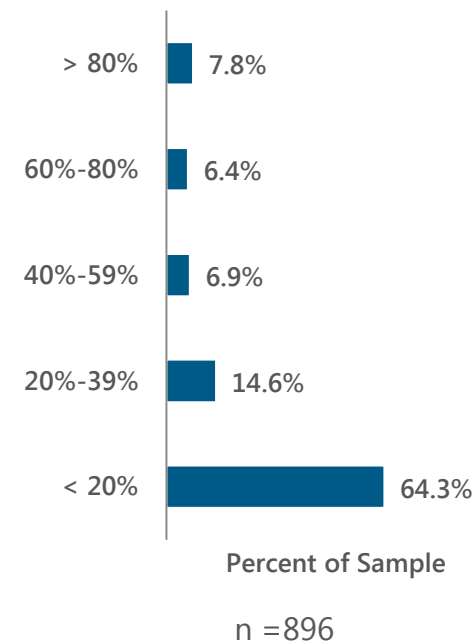
Total Data at Organization



Terabytes of Data Stored in Off-Premises Cloud \*



Percent of Organization's Data Stored in Off-Premises Cloud



Q. Estimate the percentage of your organization's data currently stored in off premises cloud environments? Q. How many terabytes of data does your company currently have under management across all environments?

\*Terabytes of Data Stored in Off-Premises Cloud" is calculated from an organization's total data and the percent they store in off-premises cloud environments.

Source: 451 Research, Voice of the Enterprise: Cloud Computing Q1 2015



Research®

Voice of the  
Enterprise



# The new stack?

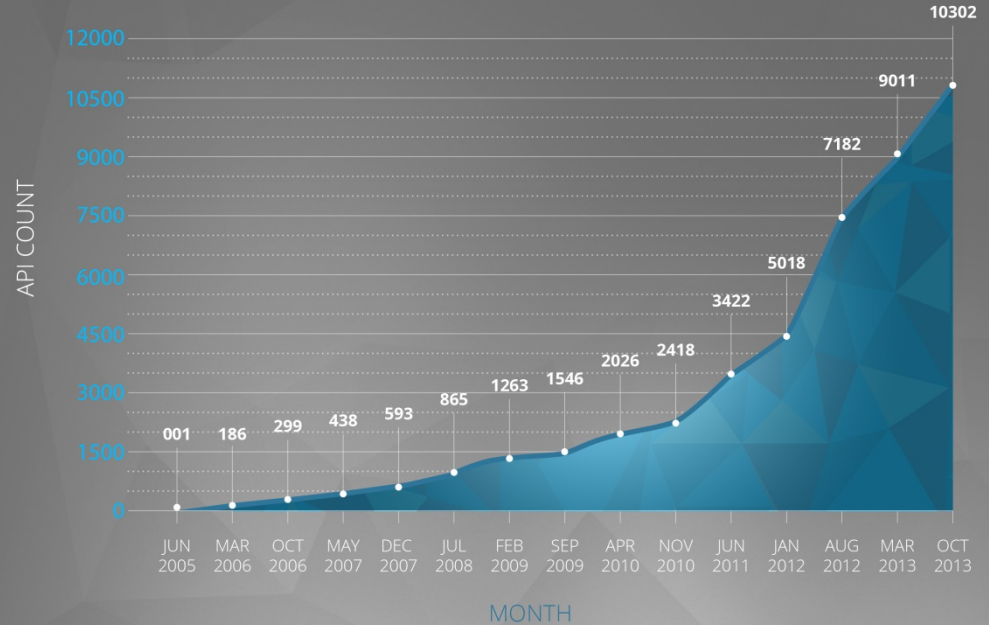
An **infinite** array of possible stacks.

# The API economy

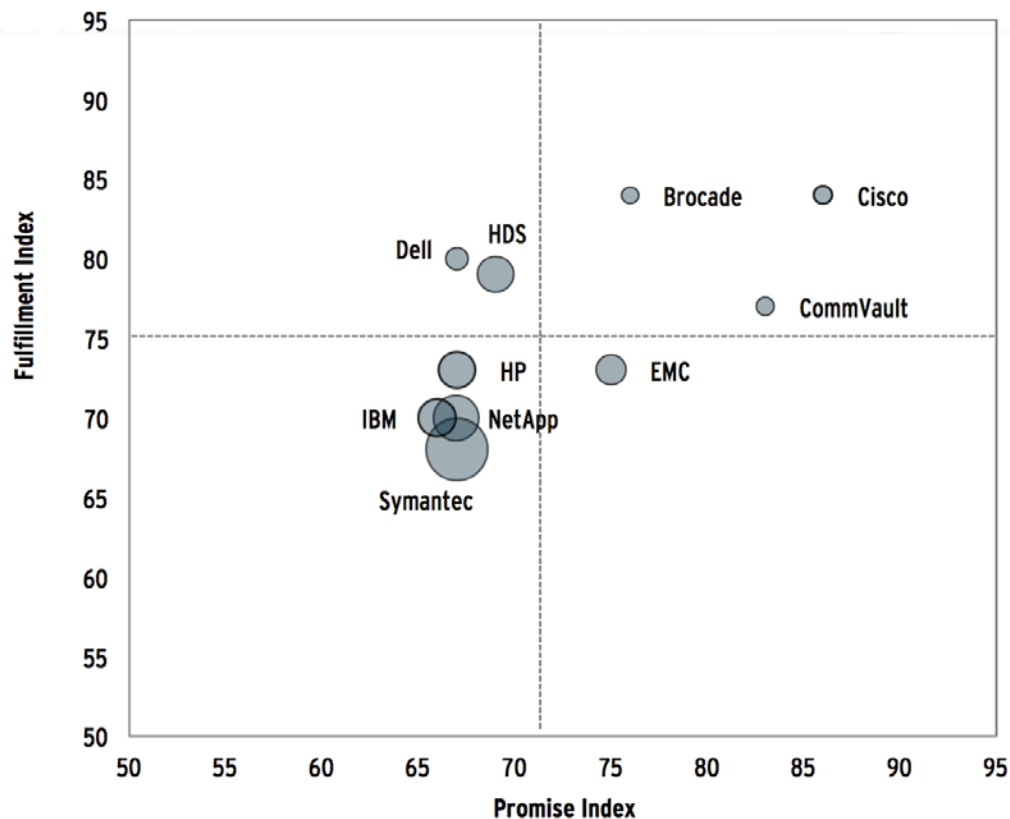
The new mode for access and transfer of data has become APIs.



## Growth In Web APIs Since 2005



# What do enterprises think of storage vendors?



Vendor	Promise Score	Fulfillment Score
Average	71	75
Brocade	76	84
Cisco	86	84
CommVault	83	77
Dell	67	80
EMC	75	73
HDS	69	79
HP	67	73
IBM	66	70
NetApp	67	70
Symantec	67	68

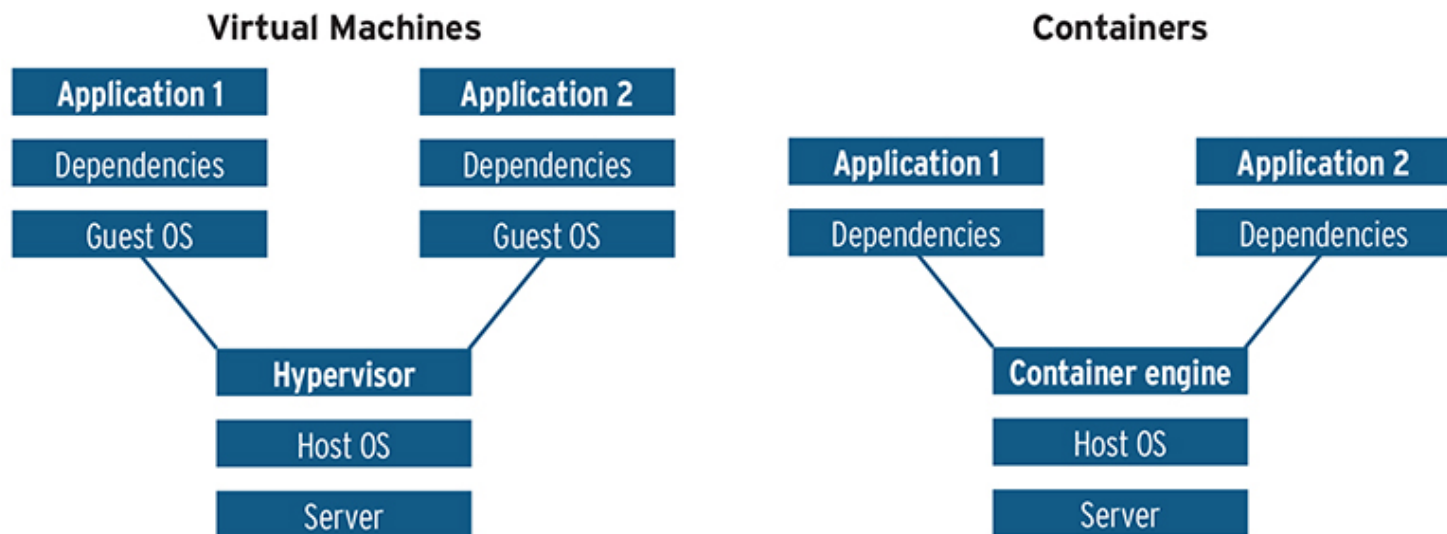
The logo for 451 Research, featuring the number '451' in a white circle on a blue background, followed by the word 'Research' in white text.

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# Development trends that will transform storage **use**

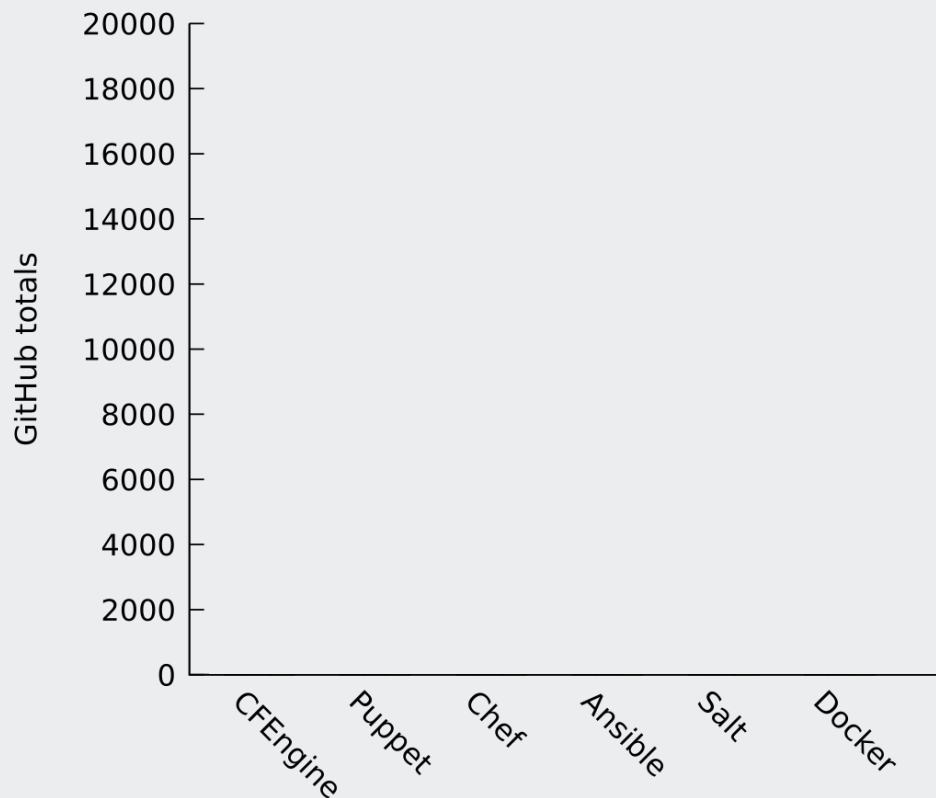


# Docker Docker Docker

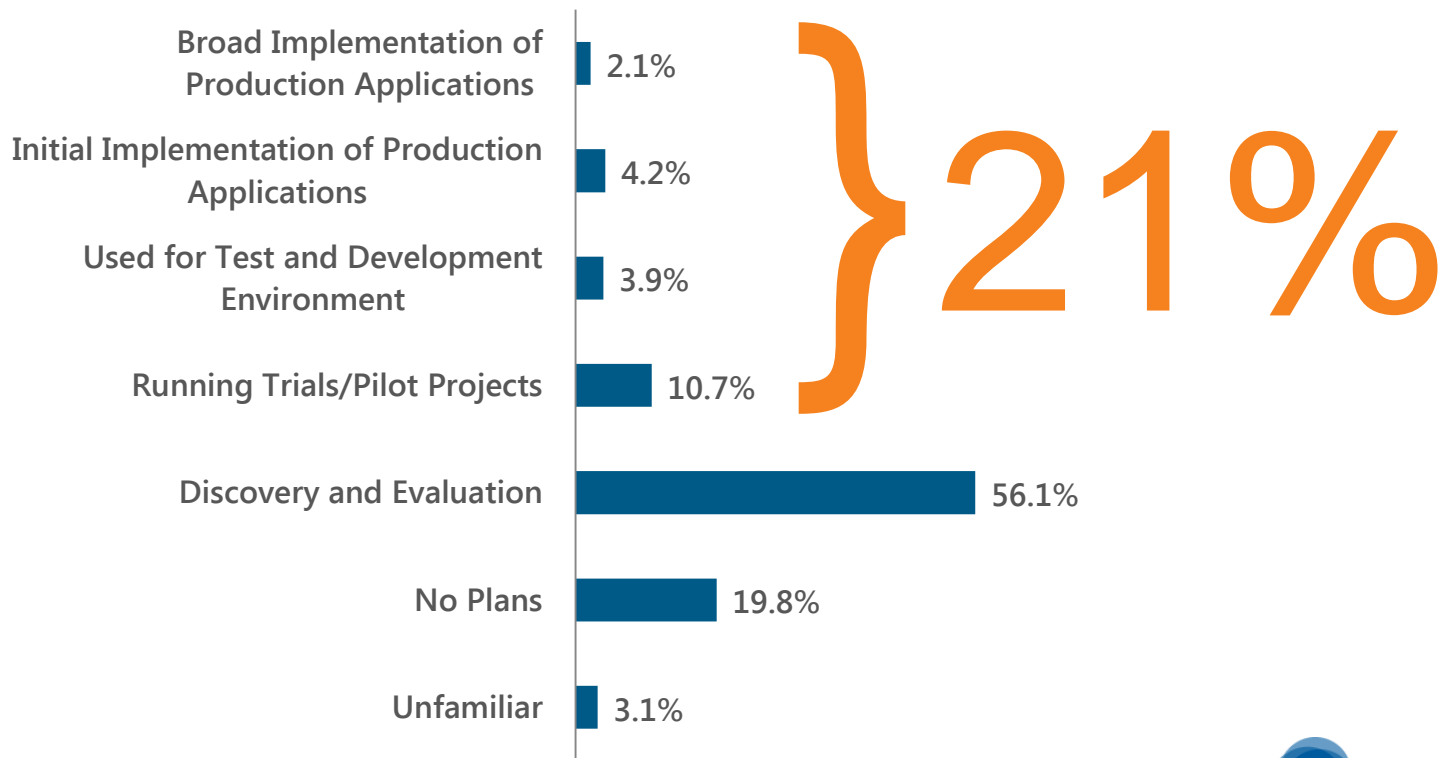


Developers  
love  
Docker

## Config mgmt GitHub totals



## But it's **not** just a toy



# Docker to **microservices**





## Loosely coupled **teams**

*“ One of the biggest changes is that we no longer have an official ‘architecture’ team. Instead, we have made ‘architecture’ an ‘ingredient’ on each of our teams. ”*

– Lauri Apple, Gilt Groupe, 14 Nov 2014

# The **foundation** of microservices

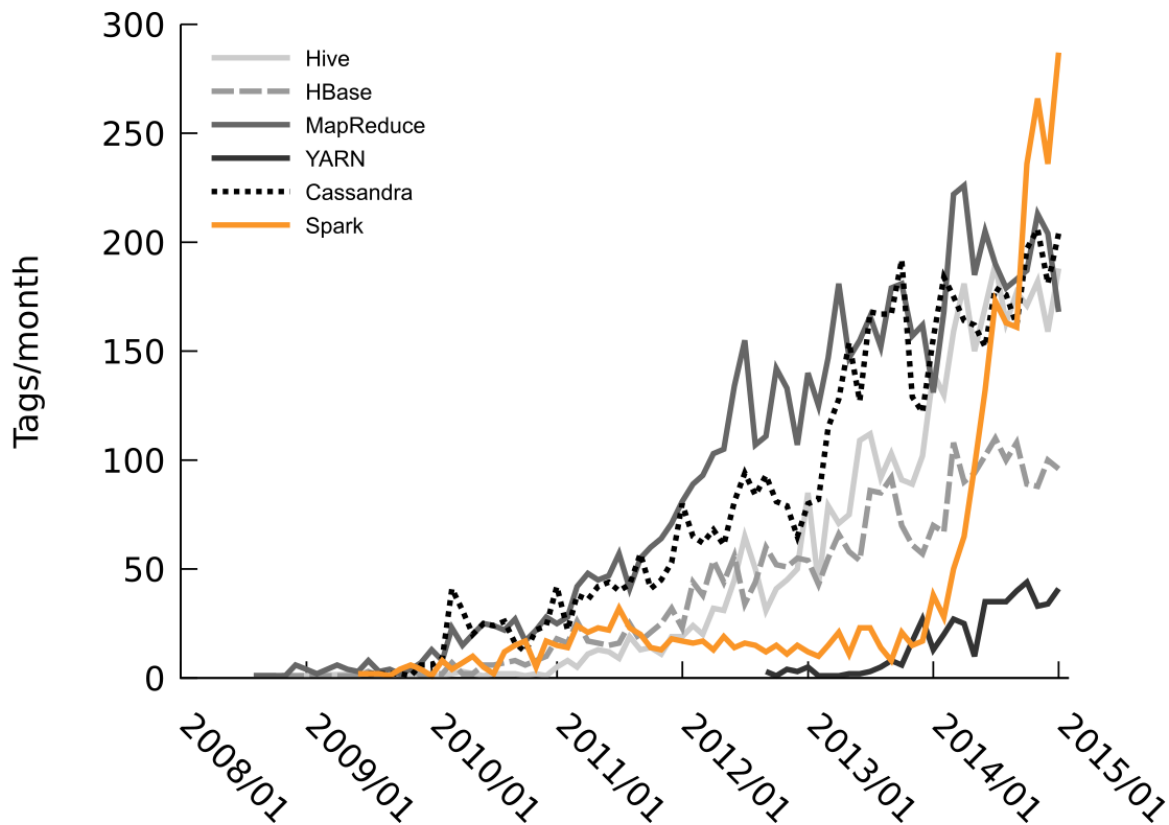


Amazon EC2 Container Service

# Disruption in **data** processing

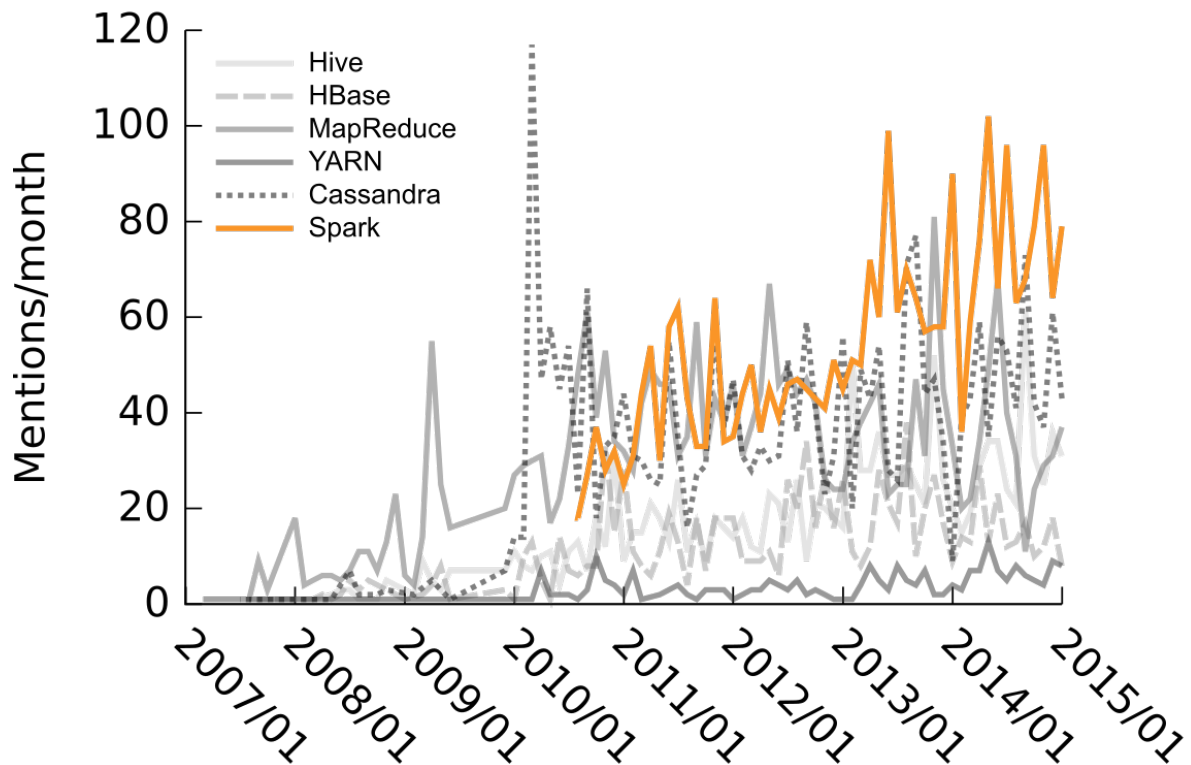


# Spark came out of nowhere

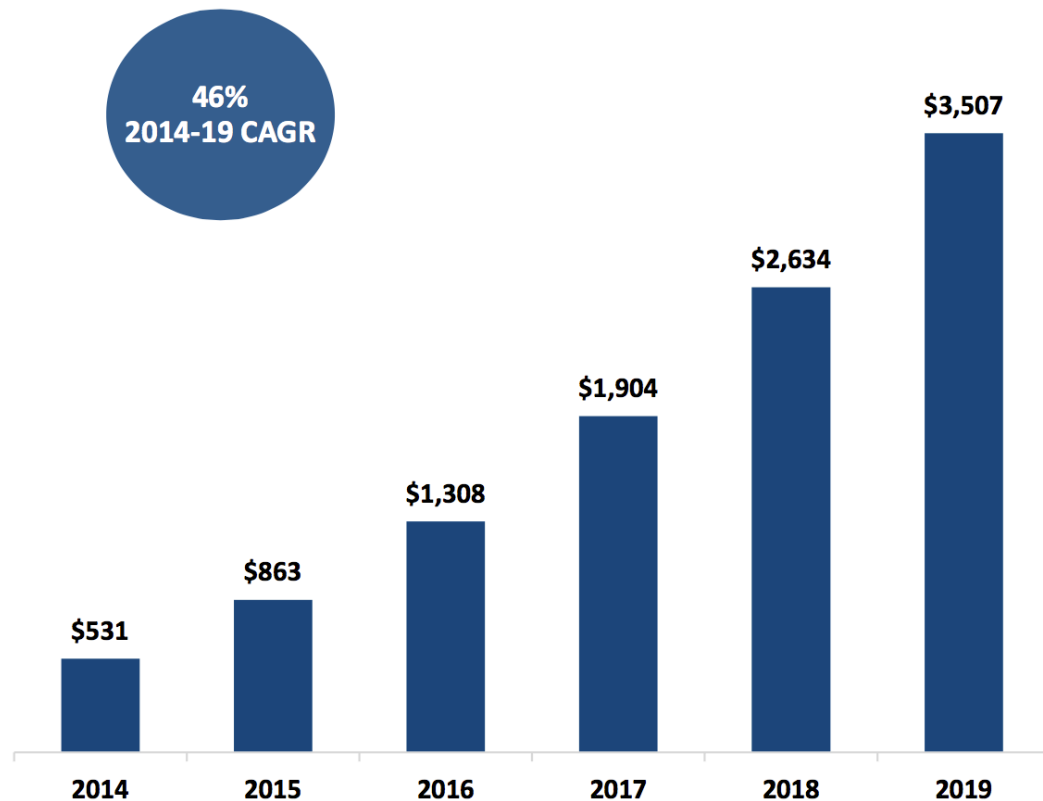




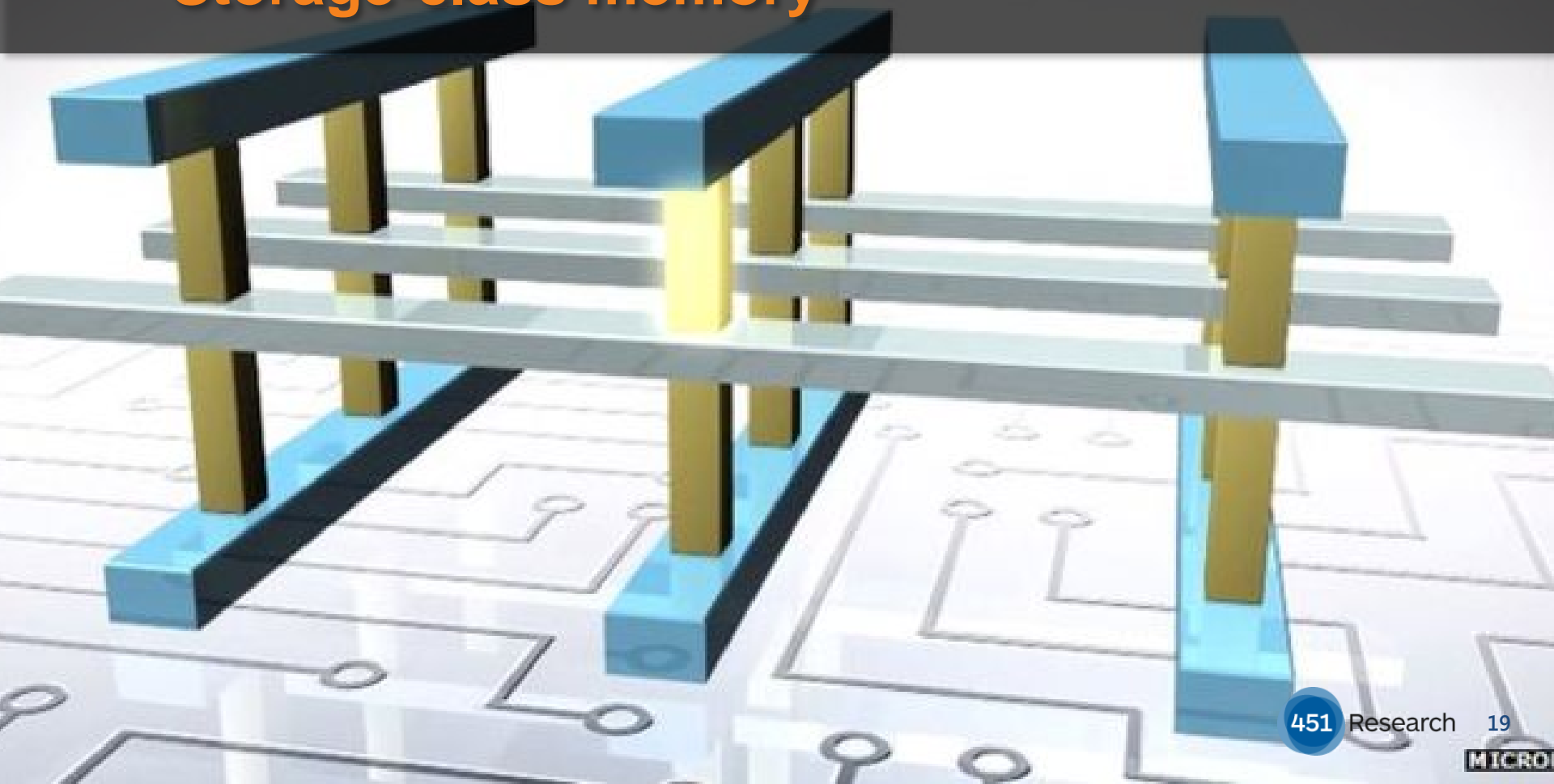
# On Hacker News, too



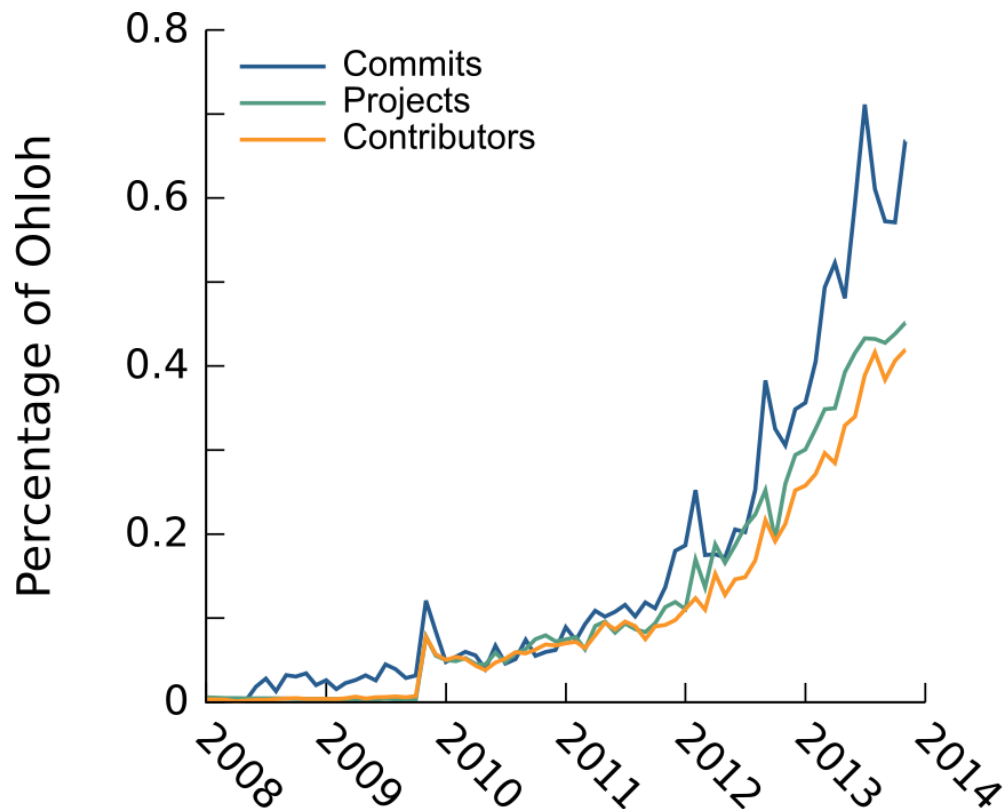
# The market is **coming**



# Storage-class memory



# Concurrency for **developers**



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# Development trends that will transform storage **vendors**





# What in the world is **DevOps**, anyhow?



# Agile, truly tip to tail



# Business to customer

# 3 pillars of DevOps

***Culture***

***Automation***

***Measurement***

A black and white photograph of a person with dark hair, seen from the side, holding a spiral-bound notebook. The notebook has the words "FREE HUGS" written in large, bold, black capital letters. The person is wearing a dark jacket and has their arms extended forward. The background is slightly blurred, showing what appears to be an outdoor setting with trees and possibly other people.

FREE  
HUGS

*Culture:*  
Tear down all the silos





# Automation: Pets vs Cattle



## *Automation:* Infrastructure as code

CFEngine



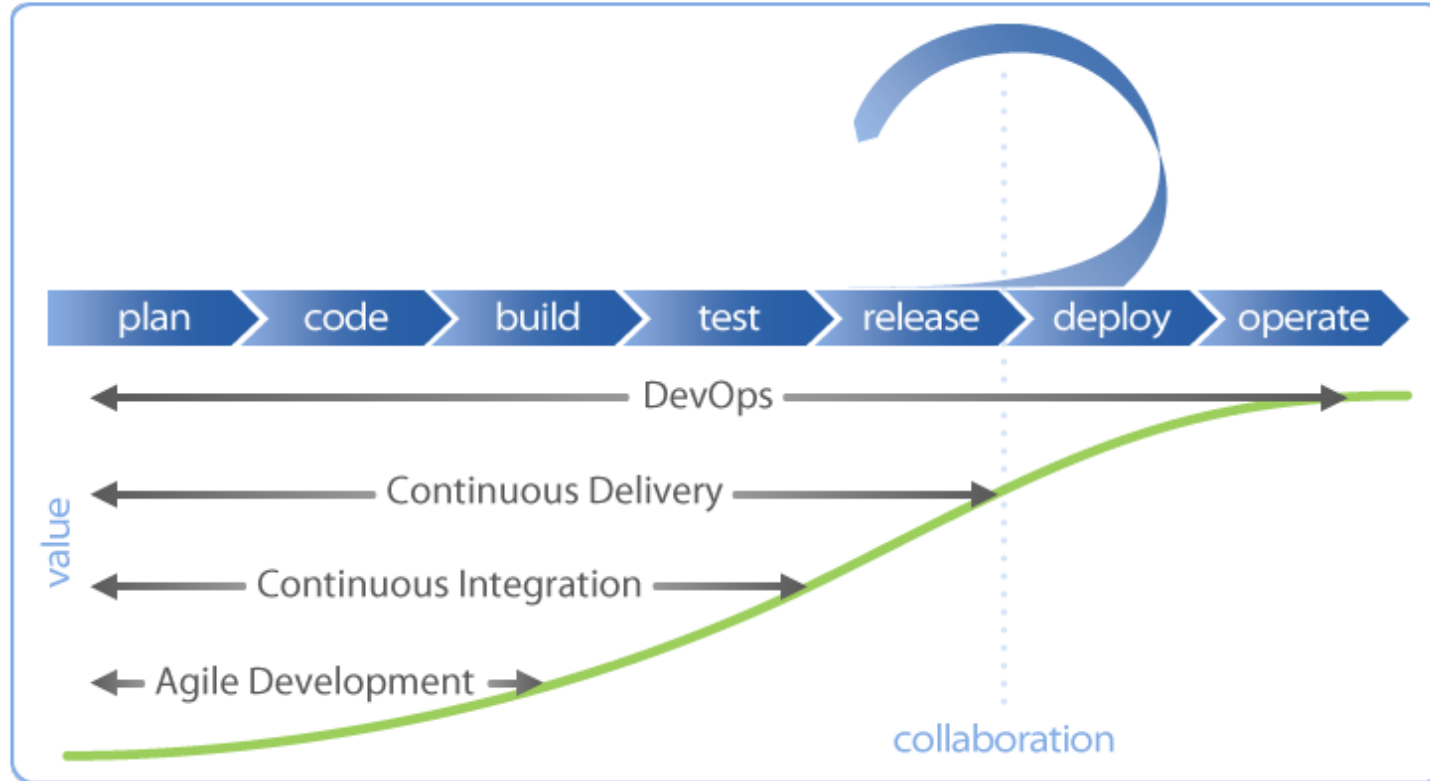


# Knight Capital and the \$460 million bug

Release management – quarterly to daily  
Gary Gruber, HP

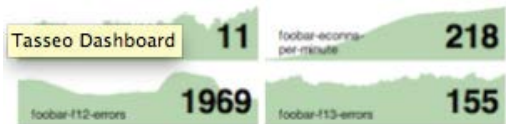


# Automation: Continuous delivery



# Measurement. #monitoringsucks/monitoringlove

**Nagios**<sup>®</sup>  
*graphite*



{ GRAYLOG2

splunk>



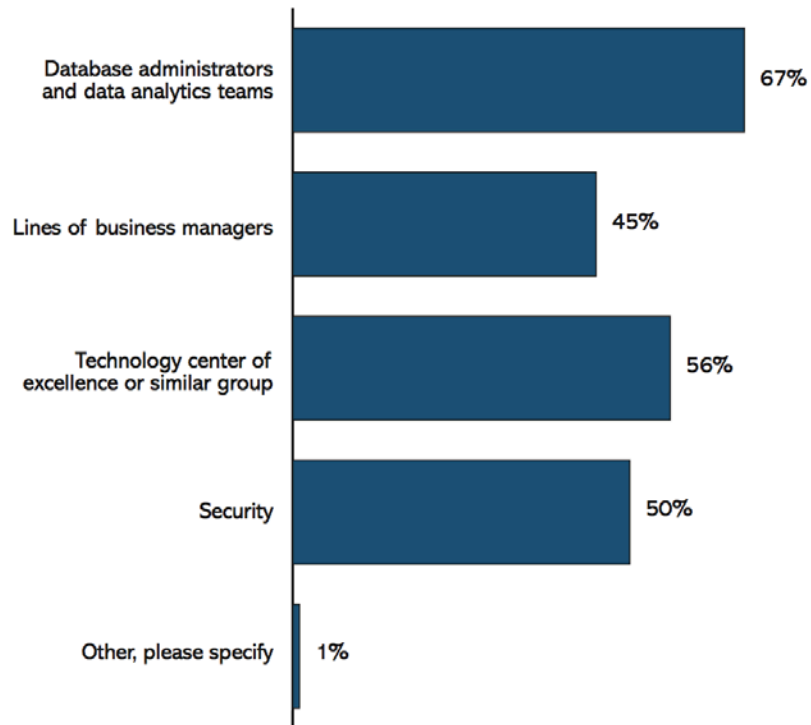
**Kibana**  
Make sense of a mountain of logs Now in Ruby!



# DevOps is reaching DBAs

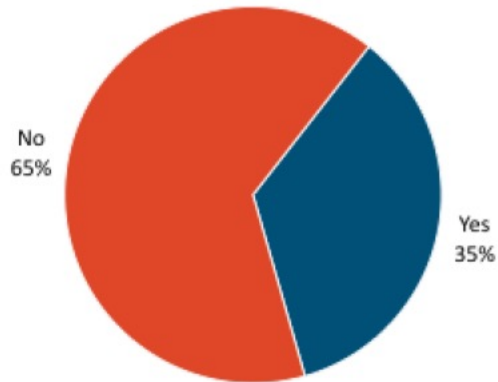
**FIGURE 13: OTHER DEVOPS STAKEHOLDERS**

QM6 - Beyond IT operations and developers, what stakeholders are involved in your modern IT management or DevOps initiatives and strategies?

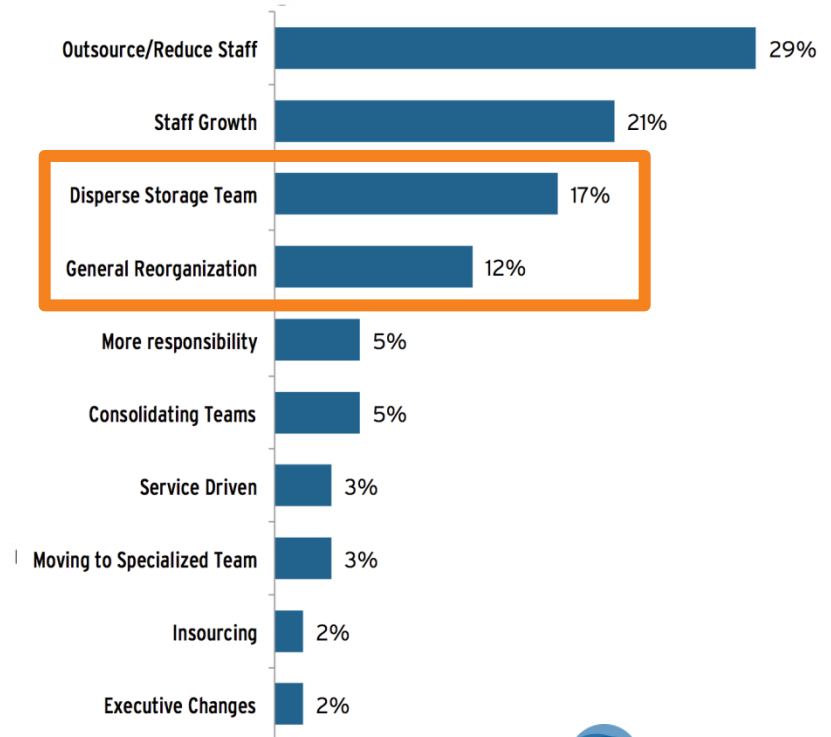


# Recent Storage Team Structure Changes

Change of Storage Team Structure



Description of Storage Team Structure Change



Left Chart: Q. Has the storage team structures changed significantly in the past 12 months? n=237; Right Chart: Q. Please describe. n=58.

## Adopting open-source technologies

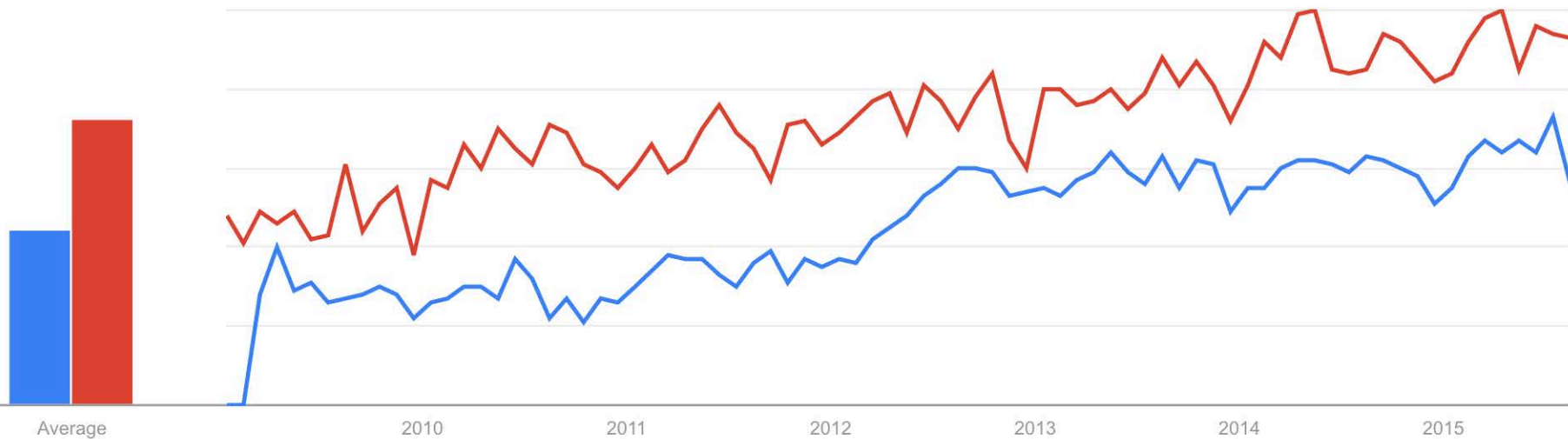
Score	Meaning
P	Meets the grade-level standard by demonstrating proficiency of the content or processes for the Measurement Topic
I	In progress toward meeting the grade-level standard
N	Not yet making progress or making minimal progress toward meeting the grade-level standard
M	Missing data—no grade recorded
NEP	Not English Proficient; may be used for ESOL Level 1 and 2 students for no more than two marking periods

**PROFICIENT**—A score of P means your child is successful in using the content and processes at the grade level.

**NOT YET PROFICIENT**—A score of I or N means your



# The changing role of **standards**



# The changing role of benchmarks

## Torturing Databases for Fun and Profit

Mai Zheng, *The Ohio State University*; Joseph Tucek, *HP Labs*; Dachuan Huang and Feng Qin, *The Ohio State University*; Mark Lillibridge, Elizabeth S. Yang, and Bill W. Zhao, *HP Labs*; Shashank Singh, *The Ohio State University*



### Call me maybe: Carly Rae Jepsen and the perils of network partitions

2013/05/17  
[Software](#) [Network](#) [Distributed Systems](#) [Jepsen](#)

*This article is part of [Jepsen](#), a series on network partitions. We're going to learn about distributed consensus, discuss the CAP theorem's implications, and demonstrate how different databases behave under partition.*

# Wrapping up

- Docker and microservices will exacerbate hypervisor-style use & increase demands on the network
- Spark will drive requirements for memory and memory-like storage
- DevOps & continuous delivery will transform how you deliver storage software
- The interplay between open source, standards and benchmarks continues to tilt toward agility

# Global Digital Infrastructure Alliance — 20,000 strong



**Share your thoughts, get our data**  
**451alliance.com**

# Storage needs to cope with **agility**.

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