

Powering Innovation and Speed with Amazon's Two-Pizza Teams



How to scale innovation, not complexity

Today's business leaders want to empower their organizations with an ability to constantly innovate new offerings to get to market, drive continuous operational improvement, and speed growth across the entire breadth of their enterprises.

In [AWS 2022 C-Suite Report: Cloud Enabled Growth](#), a comprehensive survey of 1,500 executives across 15 markets and 10 industries, it was found that more than half of today's executives report prioritizing business growth in their corporate strategy. This includes rapidly innovating across their existing business as well as creating new customer value, revenue streams, and growth opportunities.

Ensuring agility and speed across teams is crucial for successful growth and digital transformation, but is often difficult to realize. Legacy organizational structures typically don't lend themselves to a pace designed to accelerate innovation. Enterprises that are initially agile can also strain as the size and scope of their business grows, becoming bogged down in process and decision-making as the business expands and becomes more complex.

Amazon and AWS are not immune to these dynamics. As the number of business units expanded, and as our global workforce became more geographically dispersed, we needed to transform the way our teams were organized in order to maintain fast-paced innovation. Here's how we did it, and how you can too.





The challenges of organizational scale

Amazon, like many companies that started during the Dot-com era, was organized for rapid agility and delivering constant value to customers. In his very first [Letter to Shareholders in 1997](#), Jeff Bezos discussed the importance of obsessing over customers and delivering continuous long-term value on their behalf, even at the expense of short term corporate profit.

This relentless obsession over customers relied on hiring and maintaining an organizational structure of empowered builders who were excited to wake up every day to solve customers' thorniest problems, and invent on their behalf.

This was easier to accomplish in those early days when the business was focused on e-commerce, and teams — and the technical architecture they relied upon to deliver rapid innovation — were more centralized and tightly coupled.

Over time, as Amazon expanded the number of businesses and new innovations to meet our customers' needs, we began to experience strain in the speed and agility with which we could execute. The desire to remain an "invention machine," as Jeff outlined in his [2015 Letter to Shareholders](#) — a company that can "combine the extraordinary customer-serving capabilities that are enabled by size with the speed of movement, nimbleness, and risk acceptance mentality normally associated with entrepreneurial start-ups" – began to be impacted. Our tightly coupled architecture and organization were simply not helping us move as fast as we wanted, or needed, to be.

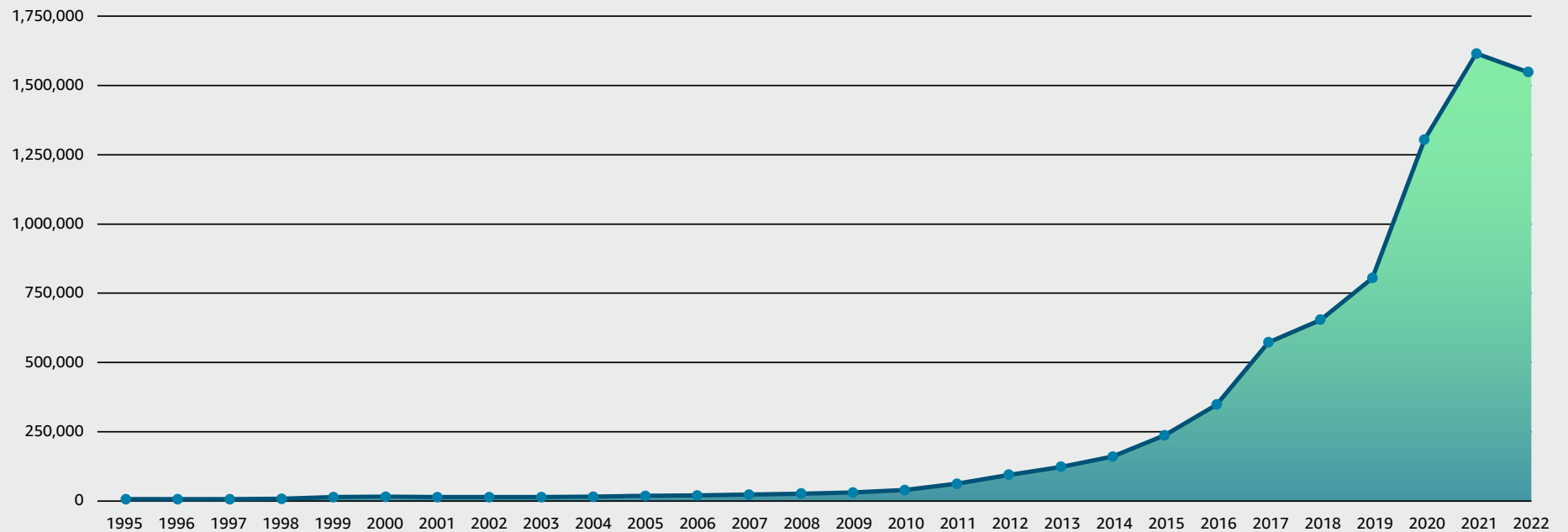
To address growing sluggishness and inefficiency, we fundamentally changed our technical architecture to what became known as a microservices architecture. We decoupled our monolithic architecture into a vast network of single, standalone services. By doing so, we were better able to rapidly launch new innovations and offerings, quickly iterate existing services based on customer's ever-changing needs, and constantly experiment with new ideas to invent on customers' behalf.



We want to be a large company that's also an invention machine. We want to combine the extraordinary customer-serving capabilities that are enabled by size with the speed of movement, nimbleness, and risk acceptance mentality normally associated with entrepreneurial start-ups."

Jeff Bezos
2015 Shareholder Letter

Amazon organization size over time



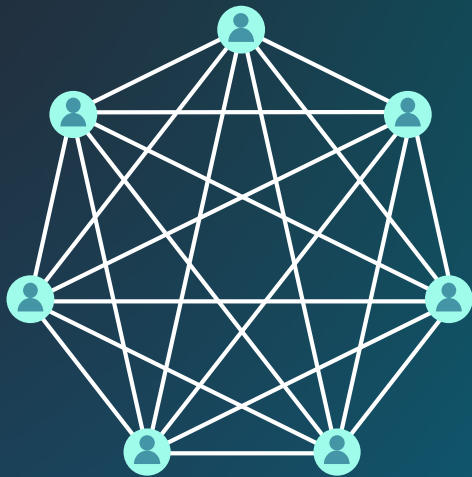
While it was important to overhaul the technology our builders used to drive innovation, more critically we needed to restructure the way teams were organized. Doing so would maximize their ability to stay close to customers and their needs, rapidly launch innovative products and services on their behalf, and best take advantage of the agility and speed a microservices architecture could provide.

This organizational structure became known as Amazon's "two-pizza teams."

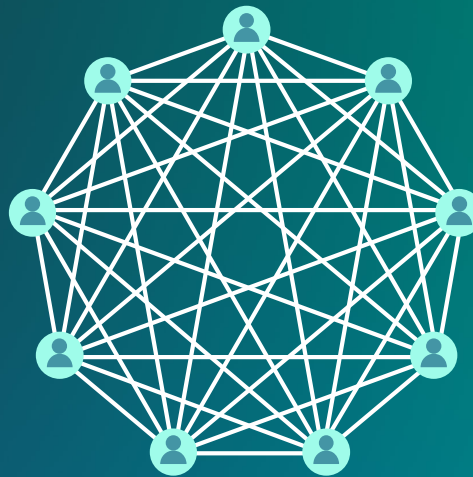
Empower innovation by limiting the size of teams

The concept of Amazon's two-pizza teams is straightforward: no team should be big enough that it would take more than two pizzas to feed them. Ideally, this is a team of less than 10 people: smaller teams minimize lines of communication and decrease overhead of bureaucracy and decision-making. This allows two-pizza teams to spend more time focusing on their customers, and constantly experimenting and innovating on their behalf — the biggest priority of high-performing teams at Amazon.

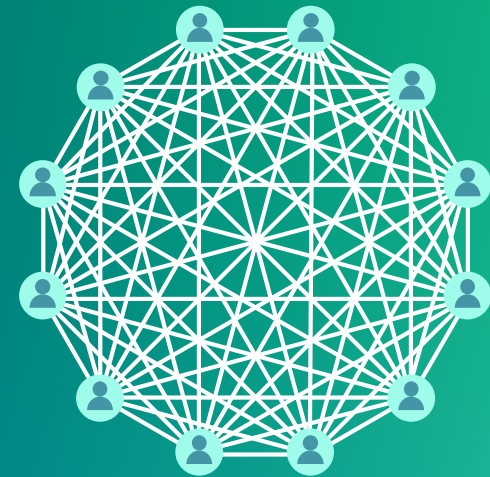
Smaller teams also increase ownership and empowerment. This can mitigate the Ringelmann Effect: a tendency for individual productivity to decrease in larger groups. As team resources swell, there is less focus on individual effort as people lean more on others to shoulder the load. The magnitude of individual contribution decreases as team size grows. Inversely, individual effort increases as the team size decreases.



**7 people,
21 connections**



**9 people,
36 connections**



**12 people,
66 connections**

Significantly, smaller teams also increase employee satisfaction — a key concern as today's organizations strive to attract and retain the best talent. A notable study by [Hackman and Vidmar](#) shows that individual satisfaction decreases as team size grows. Oftentimes in large teams, individual contributions are less recognizable, and individual ownership over specific areas becomes more diffuse.

The benefits of two-pizza teams



Speeds innovation

Small teams have minimized bureaucracy and maximized time to focus on innovating for customers, which in turn raises employee satisfaction



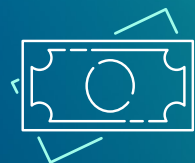
Maintains productivity

This approach mitigates the Ringelmann Effect: the tendency for individual productivity to decrease in larger groups



Encourages experimentation

It allows teams to run fast, experiment early and frequently, and apply learnings rapidly to constantly drive value to their customers



Lowers the cost of failure

A team's learnings come quicker and at lower stakes than they may have otherwise faced at later stages of development or in a larger organizational structure

Give two-pizza teams single-threaded ownership

Amazon's two-pizza teams aren't just about size. A key factor in enabling constant innovation and speed in a two-pizza team structure is empowering them with a single-threaded focus.

At Amazon and AWS, two-pizza teams have single-threaded ownership over a specific product or service. Rather than maintaining complex systems or solving problems spanning multiple services, lines of business, or customer segments, two-pizza teams are focused on just one service or offering, and just the customers who use it. This single-threaded focus promotes efficiency and scalability. Two-pizza teams' roadmap — including the tradeoffs and prioritizations they need to make — are singularly focused on innovating on behalf of just their service and the customer segment that uses that service.

The two-pizza structure also promotes team accountability. Two-pizza teams do not hand over something they've launched to another team to run. This single-threaded ownership extends across the full customer experience and the entire lifecycle of a two-pizza team's product or service.

As such, two-pizza teams need to stay on top of every part of their service, with a clear charter and a tightly defined mission. They need to remain close to their customers, and create the right tracking mechanisms, metrics, and KPIs to ensure their service is constantly delivering value to customers.

This also requires that a two-pizza team has the right resources embedded within them — engineering, testing, product and program management, operations, etc. — to help them own and run their service end-to-end.



The two-pizza team isn't as much about size as it is about fostering and pushing ownership and independence down to the team level."



As team demands grow, divide teams to preserve speed and agility

As demands for a product or service grow, rather than expanding the team to many more members, we look for ways to split teams into separate two-pizza teams working on single-threaded sub-area of the service. This mitosis maintains a flatter organizational structure that preserves agility, autonomy, and single-threaded ownership.

In the end, a two-pizza team isn't solely about size as much as it is about fostering and pushing ownership and independence down to the team level – from ideation to execution, from ongoing operational improvement to constant product iteration and innovation. It allows teams to run fast, experiment early and frequently, and apply learnings rapidly to constantly drive value to their customers. Faster innovation and experimentation also helps lower the costs of failure — your learnings come quicker and at lower stakes than you may have otherwise faced at later stages of development.

Empower single-threaded leaders

Today's executive leaders realize the enormous benefit of being able to rapidly deliver innovation and digital transformation. The ability to quickly go to market with new products and services is not only crucial in delivering constant value to customers, it can also become a differentiating competitive advantage for your enterprise. But as scale and scope of the business increases, executives need to ensure they are creating the right structure and leadership to ensure teams are empowered to run fast.

The governance and management of teams must provide "guardrails" – mechanisms that allow teams to run fast and make high-quality, high-velocity decisions – rather than "tollgates" that impede speed by swelling lines of approval or coordination before allowing teams to progress with innovative experiments.

At Amazon and AWS, the role of single-threaded leaders is vital in instituting the right level of oversight to retain a team's empowerment to innovate independently on behalf of their customers, while creating consistent mechanisms that allow the right level of inspection and directional vision.

Single-threaded leaders help provide a strategic vision – and then get out of their team's way. Team leaders need to help remove obstacles as opposed to being a barrier through which all decisions need to pass through. Small, agile, autonomous teams who obsess over their customers every day are the foremost subject matter experts on their service and customer segment.



The role of single-threaded leaders is vital in instituting the right level of oversight to retain a team's empowerment to innovate independently on behalf of their customers."



Employ narratives to help guide team decision-making

Single-threaded leaders' involvement in their team's decision-making is most often to help guide the team in situations where, even with the right data instrumentation and highest judgement, the path forward may not be clear.

One mechanism used at Amazon to facilitate a single-threaded leader's oversight at these checkpoints are written narratives. Narratives in these circumstances help outline the customer-facing problem that has surfaced; brings information from deep analysis and data that the team gathered to inform next steps; and articulates the decision the team recommends, along with alternate paths considered and the risks and benefits of each of those paths.



There are many different narratives at Amazon and AWS. Some are focused on launching new products, such as our PR/FAQ document (which stands for Press Release/Frequently Asked Questions) which is the product of our [Working Backwards approach](#). Others are operational business reviews (often on weekly, monthly, and quarterly cadences) that provide inspection and governance on the key metrics, trends, tensions, risks, and opportunities that arise in a team's business.

While taking the time to write a narrative may seem counterintuitive

to maintaining speed and constant execution, the use of narratives across Amazon and AWS has driven extraordinary benefits. One is that these documents are often highly debated and refined by the team, its stakeholders, and subject matter experts of the team's offering and customer segment even before it lands on an executive's desk. This fosters collaboration and diverse perspectives, challenges assumptions, and serves to refine the ideas and recommendations within the document. Ultimately, this often leads to higher quality decisions.

Getting Started

While two-pizza teams may not suit all organizations, executive leaders can help increase agility, speed, and innovation in your business by adopting similar structures and mechanisms where it makes sense. Here's how to get started:

- 1** Seek ways to empower smaller autonomous teams with single-threaded ownership over a rationalized service, offering, or customer segment.
- 2** Head those teams with single-threaded leaders, dedicated to removing roadblocks for their teams to constantly experiment instead of being the decision-making bottlenecks.
- 3** Create consistent, highly distributable mechanisms that give teams guideposts to make autonomous, high-quality and high-velocity decisions.
- 4** Have leaders create the right level of inspection and governance to ensure speed, agility, and customer obsession — and encourage constant experimentation and sharing the lessons from failure.

Together these steps will help businesses become an “invention machine” — providing ongoing avenues of new business growth, and serving as a true differentiator that enables your ability to surprise and delight customers, and invent on their behalf.



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Dan Slater oversees Culture of Innovation as a part of AWS's Digital Innovation team. Dan joined Amazon in 2006 to launch the company's first direct-to-customer digital content offerings. He helped launch the Kindle device and Kindle's global content marketplaces, as well as Amazon's self-publishing service, Kindle Direct Publishing (KDP). After overseeing the digital business of the top 60 trade publishers, Dan led content acquisition, demand generation, and vendor relations for KDP. Prior to Amazon, Dan was a Senior Acquisitions Editor at Simon & Schuster and Penguin, and led sales for a publishing IT firm (Vista, now Ingenta). Born in Toronto, Canada, Dan lives in Seattle with his wife and two children. He earned his MBA from the Fuqua School of Business, Duke University, and completed a dual Bachelor of Arts degree at Cornell University.

About AWS

For over 15 years, Amazon Web Services has been the world's most comprehensive and broadly adopted cloud offering. Today, we serve millions of customers, from the fastest-growing startups to the largest enterprises, across a myriad of industries in practically every corner of the globe. We've had the opportunity to help these customers grow their businesses through digital transformation efforts enabled by the cloud. In doing so, we have worked closely with the C-suite, providing a unique vantage point to see the diverse ways executives approach digital transformation—the distinct thought processes across C-suite roles, their attitudes and priorities, obstacles to progress, and best practices that have resulted in the most success.