



HOW SPINNAKER ENABLES CONTINUOUS DELIVERY

AN EXECUTIVE OVERVIEW

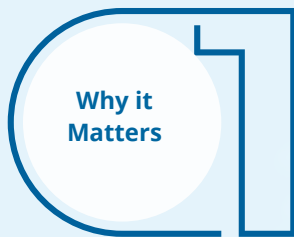


Introduction

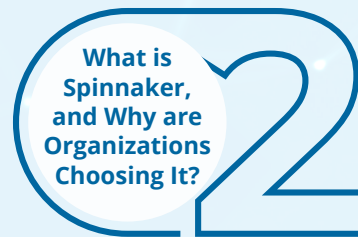
From traditional manufacturers to space exploration startups, companies increasingly recognize that in order to succeed, software must become a core competency and key competitive differentiator. At the same time, development organizations are undergoing a tectonic shift as they embrace open source technologies and move workloads into public, private, and hybrid cloud environments. In the context of this change, it is ever more critical to deliver software quickly and reliably, while maintaining a rapid pace of innovation. This is leading many companies to adopt a continuous integration/continuous delivery (CI/CD) model. The CI/CD approach enables organizations to standardize a set of best practices and to secure rapid, reliable, repeatable, and high-velocity software delivery.

Spinnaker is quickly becoming the CD platform of choice for organizations moving to CI/CD. [Spinnaker](#) is an open source, multicloud continuous delivery platform for releasing software changes with high velocity and confidence. Companies that have successfully moved to Spinnaker have experienced measurable benefits, including 40x increase in deployment cadences with up to 50% reduction in associated costs.

This executive overview will help you understand:



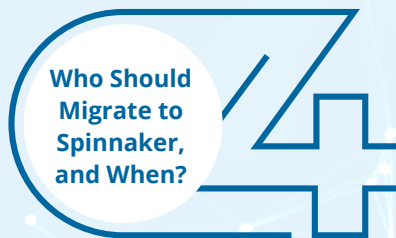
What are the advantages of efficient software delivery, and what challenges make it difficult to achieve continuous delivery?



What is Spinnaker, and how can it help you get closer to your goal of being a competitive, software-centric organization?



Why did Netflix develop Spinnaker, and what lessons can be learned from the thought leadership on CI/CD from Netflix, Google, Microsoft, and others?



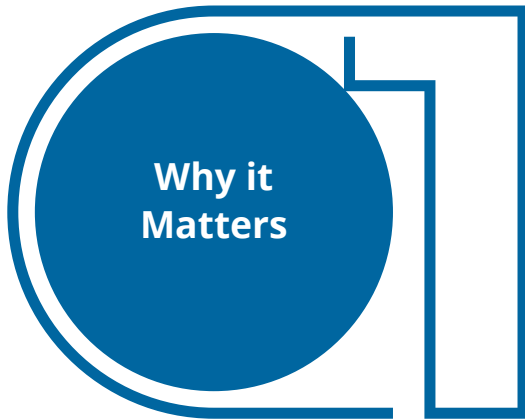
What kind of organizations should consider a Spinnaker migration, and when are you ready to migrate software delivery to Spinnaker?



How do you begin the move to CI/CD with Spinnaker, and how can Armory help?



Compelling stories from successful implementations at organizations just like yours



What are the advantages of efficient software delivery, and what challenges make it difficult to achieve continuous delivery?

In today's competitive environment, you know that it has never been more important to:

- Deliver new features and products to customers quickly and reliably.
- Align software delivery with your cloud strategy for maximum efficiency.
- Keep operational costs as low as possible.
- Be secure and compliant.

It is likely that your development or operations teams face some or all of the following software delivery challenges:

- Complex deployment environments with multiple deployment targets. This is especially true as you deploy to hybrid and cloud environments. This is a key challenge for 94% of organizations surveyed in [Armory's State of Software Delivery 2019 report](#).
- Manual or resource-intensive software delivery processes that lead to inefficiencies and errors.
- Manual processes that aren't conducive to being automated.
- DevOps teams that grapple with complex tooling and/or multiple tools: 85% of organizations surveyed use four or more tools. This introduces complexities, and teams spend too much time on processes instead of on delivery and innovation.

Ironically, if you put velocity pressure on an environment with these challenges in order to accelerate software delivery time-to-market, you may find yourself further from your goals. The pressure can lead to more errors, increased outage frequency, and/or reduced software delivery speed and innovation.

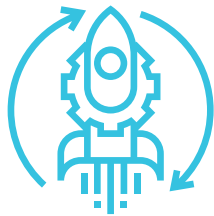
Instead of trying to accelerate delivery in inefficient environments, it is important to address your software delivery challenges head-on. There are both quantitative benefits to solving the challenges, and real risks in ignoring them.



In Armory's recent industry survey,
91% of organizations
agree that software development and
delivery is critical to success.



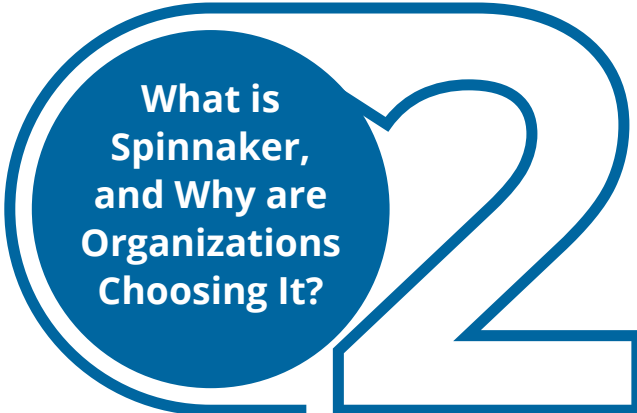
High-functioning DevOps teams can
accelerate time-to-market by
**83%, reduce cycle time
by 90%, and improve
productivity by 48%,**
according to [McKinsey](#).



From a delivery perspective,
high-performing companies
**deploy 200x more often
than low performers,
with a 2,500x+**
[shorter lead time](#).

The results of a recent [Gartner report](#) show that reliability is critical to both reputation and the bottom line: One hour of downtime costs 98% of organizations more than \$100,000; it costs 81% of organizations more than \$300,000; and for 33% of those organizations it costs between \$1 million and \$5 million.

You can't afford to ignore approaches to software delivery that increase reliability or secure a time-to-market advantage for your organization. That's why as more organizations adopt CI/CD, many are choosing Spinnaker.



What is Spinnaker, and Why are Organizations Choosing It?

What is Spinnaker, and how can it help you get closer to your goal of being a competitive, software-centric organization?

[Spinnaker](#) is an open source, multicloud continuous delivery platform for releasing software changes with high velocity and confidence. It [enables organizations](#) to automate release pipelines with maximum efficiency across diverse platforms and teams.

As it becomes the CD platform of choice for organizations, the advantages of migrating software delivery to Spinnaker are clear.

Advantages of migrating to Spinnaker:

- Automate software delivery.
- Remove manual, error-prone, and time-consuming deployment processes.
- Enable speed, iterability, safety, repeatability, and a focus on innovation and software quality, instead of just on software delivery.
- Introduce economic efficiencies and better regulatory compliance.

Spinnaker delivers these advantages by providing:

- An internal platform for release, delivery, and deployment standardization.
- Easy management across hybrid cloud platforms, with deployment to all providers in the same “golden” pipeline.
- A common delivery mechanism.
- Simple, repeatable deployments.
- Automated cloud scaling.
- Single-pane-of-glass views.
- An extensible architecture that hooks into external tools and platforms (e.g., events, notification, pipeline orchestrators, authentication, and authorization).
- Zero application downtime during deployments.
- Safe and easy rollbacks.
- Automated testing and canary analysis, enabling you to move fast without breaking things.
- Guard rails: A way to empower developers to move quickly and innovate, while simultaneously ensuring that the controls and restrictions that protect organizational best practices are followed.

As an open source platform, Spinnaker benefits from the innovations of a passionate, active, and contributing user community. Being open source also makes public cloud, private cloud, or multitarget deployments smooth and easy. For example, Spinnaker complements Kubernetes with easy deployment APIs that allow for multiple deployment pipelines.

Spinnaker is also a member of the Continuous Delivery Foundation (CDF), part of the Linux Foundation. Jim Zemlin, executive director of the Linux Foundation, [says that the goal of the CDF](#) is to provide a “neutral environment to enhance the tools and best practices needed to speed and ease software development and delivery. Every industry and company relies on software to compete, which is why open source and CI/CD are preferred and pervasive across collaborative, real-time software development teams.”



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Jim Zemlin, Executive Director of the Linux Foundation



Where Did Spinnaker Originate and Why Was it Developed?

Why did Netflix develop Spinnaker, and what lessons can be learned from the thought leadership on CI/CD from Netflix, Google, Microsoft, and others?

With a market capitalization of nearly [\\$165 billion](#), and almost [149 million](#) streaming subscribers, Netflix is undoubtedly a behemoth in the marketplace. The company embraced CI/CD early on as a philosophical approach to software delivery, and developed Spinnaker to ensure that customer satisfaction, innovation, and growth could continue reliably and without interruption. Since its development at Netflix, many other large companies and the open source community have contributed to the platform and continue to do so regularly.

WHY DID NETFLIX DEVELOP SPINNAKER?



If you've ever binge-watched a series on Netflix, you know the importance of a completely seamless streaming experience. It is absolutely non-negotiable at Netflix: [software updates](#) cannot impact the user viewing experience. "Netflix developers constantly release updates and new software, and they don't want your 'Stranger Things' streaming to be interrupted by the fact that an engineer, maybe, pushed out an errant deployment or made a change to a property that they shouldn't have and the whole system goes down," [says Dianne Marsh, Netflix's director of engineering tools](#). To address this critical customer requirement and remain a leader in the streaming content space, Netflix decided to make developers responsible for their own code, end-to-end. [There are no DevOps teams at Netflix](#): developers push out code and when the application dies, the developer fixes the problem. This is the nirvana of CI/CD, where software delivery is completely automated end-to-end. (See Section 4)

Spinnaker's Origins and Growth

Netflix developed a precursor platform, Asgard, to simplify [software delivery to AWS](#). To improve the software delivery process at Netflix, and to make the mandate of uninterrupted streaming experience a reality, Spinnaker grew out of Asgard as a more holistic CD platform. Netflix development teams worked with Google, Microsoft, Amazon, Pivotal, and Oracle, among other companies, to broaden Spinnaker. This enabled many companies to use Spinnaker in their environments (eliminating the requirement to fork), and embodying the open source [win-win model](#). Spinnaker was released to the open source community in 2015, and in 2018 [Netflix announced](#) it had adopted a "formalized project governance plan with Google." Amazon, Microsoft, Google, Oracle, and Pivotal, among others, remain major backers of and contributors to the platform, and Spinnaker today is supported by 40+ full-time employees at

multiple companies. Additionally, as the industry consolidates around Spinnaker, [Netflix has donated it to the Continuous Delivery Foundation](#). This enables a broad, robust, and growing community of contributors to continue growing and improving the platform and the open continuous delivery ecosystem.

Spinnaker, According to Google



“Out-of-the-box, Spinnaker supports sophisticated deployment strategies like release canaries, multiple staging environments, red/black (aka blue/green) deployments, traffic splitting, and easy rollbacks. This is enabled in part by Spinnaker’s use of immutable infrastructure in the cloud, where changes to your application trigger a redeployment of your entire server fleet. Compare this to the traditional approach of configuring updates to running machines, which results in slower, riskier rollouts and hard-to-debug configuration-drift issues.”


Christopher Sanson, Google Product Manager

Why It Works: Insights on CI/CD From Netflix

Netflix has an incredible release cadence — it releases code more than 4,000 times per day — and that cadence [more than doubled](#) after building and implementing Spinnaker. Netflix Engineering Manager Andrew Glover has some key insights into why Spinnaker works not just for Netflix, but also for any organization considering CI/CD:

- “You can take small changes, move them into environments, experiment, and back out of problems, quickly.”
- “Spinnaker is a paved road where best practices are codified in a single platform.”
- “Moving fast leads to competitive advantage. Netflix believes strongly in moving faster, because if we don’t move fast enough, our competitors will.”

The [Paved Road](#) is an internal philosophy at Netflix that translates operationally into a well-integrated, supported machinery enabling engineers to focus on delivering their core business value. It provides a set of applications and tools that make it easy to launch a new application using well-established patterns, such as the guard rails that Spinnaker provides. As its origins and successes at Netflix show, Spinnaker enables a smooth migration to CI/CD and highlights a path for other organizations keen to deliver core value rapidly and reliably.



Who Should Migrate to Spinnaker, and When?

What kind of organizations should consider a Spinnaker migration, and when are you ready to migrate software delivery to Spinnaker?

You are ready to migrate to Spinnaker when:

- Software is critical to your business.
- You embrace cloud and hybrid strategies and deploy to one or both.
- You have identified that your tooling is inadequate or is too complex.
- You have a critical mass of deployments per week or month.
- You embrace open source technologies.
- You know that your DevOps and Ops resources could be better directed toward innovation.
- You are instrumenting (or can instrument) your pain points and can benchmark the value Spinnaker can bring.

The move to CI/CD can be viewed within the context of the Stages of Software Delivery Evolution. Armory developed this framework to visualize the progress from traditional deployments that are manual and error-prone, through the maturity model to complete CI/CD. Completely automated CI/CD is aspirational: it's a nirvana, or ideal state, that few companies have actually achieved. Netflix, of course, is at the final stage of the evolution. Its thousands of daily deployments are smooth and completely automated end-to-end, and are largely a non-event for engineering teams.

 DATA CENTER DEPLOYMENTS	 HYBRID CLOUD ADOPTION	 MULTICLOUD GOLDEN PATH TO PROD	 CONTINUOUS DELIVERY ADOPTION	 SOFTWARE DELIVERY AUTOMATION
<ul style="list-style-type: none"> Bare Metal or VMs Mutable Deployments SSH into Prod Deployments = Events Manual & Error Prone Dev vs. Ops 	<ul style="list-style-type: none"> Data Centers + Lift & Shift No Standard Path to Prod No Global Compliance Complicated Rollbacks No Service Ownership Inconsistent Deploys SLA Failures 	<ul style="list-style-type: none"> Kubernetes in Data Centers Pipelines as Code Global Compliance Policies Dedicated DevOps Immutable Deploys Confident Rollbacks Manual Judgments Strong Integration Test Coverage 	<ul style="list-style-type: none"> Deploy Continuously in Background Full Embrace of DevOps Culture Monolith Apps into Microservices App Teams Fully Self-Service All Teams Deploy with Same Platform Manual Canaries 	<ul style="list-style-type: none"> Automated Canaries Automated Rollbacks Machine Learning Powered Anomaly Detection SLA Transparency on Per-App Basis Chaos Engineering Automated Dependency Analysis Feature Flagging Value Stream Map Developer Analytics
<ul style="list-style-type: none"> Frequent Outages 20+ Manual Steps Weeks/Months to Deploy 1-2 Deployments/Month 	<ul style="list-style-type: none"> Some Outages 10+ Manual Steps Days/Weeks to Deploy 2-10 Deployments/Month 	<ul style="list-style-type: none"> Few Outages 1 to 3 Manual Steps Hours to Deploy 10-20 Deployments/Month 	<ul style="list-style-type: none"> Minimal Outages 0 Manual Steps Minutes to Deploy 100+ Deployments/Month 	<ul style="list-style-type: none"> Rare Outages 0 Manual Steps Minutes to Deploy 1000+ Deployments/Month
Late Majority	Early Majority	Early Adopters	Early Adopters	Innovators

If your organization is looking to accelerate software release volume and cadence with reliability and repeatability, you are in good company. Armory found that 36% of companies it surveyed are early adopters of CD, while 24% have already begun CD deployments. It may be time to prepare for a migration to Spinnaker.

How Do You Move to Spinnaker?

How do you begin the move to CI/CD with Spinnaker, and how can Armory help?

Armory provides an enterprise-scale software delivery platform powered by Spinnaker. Spinnaker has been battle-tested in production by hundreds of teams over millions of deployments. Armory is also a founding member of the Continuous Delivery Foundation and a noted thought leader in CI/CD. Armory has built key features on top of Spinnaker (for example, a recently released [Terraform integration](#)); has deep experience operating and extending Spinnaker services; provides dedicated training and support; and guarantees uptime SLAs. It also ensures high-availability configuration and flexibility with third-party custom integrations. With Armory, developers get actionable insights with deep analytics to enhance developer productivity. Spinnaker with Armory is secure and compliant, with end-to-end auditability.

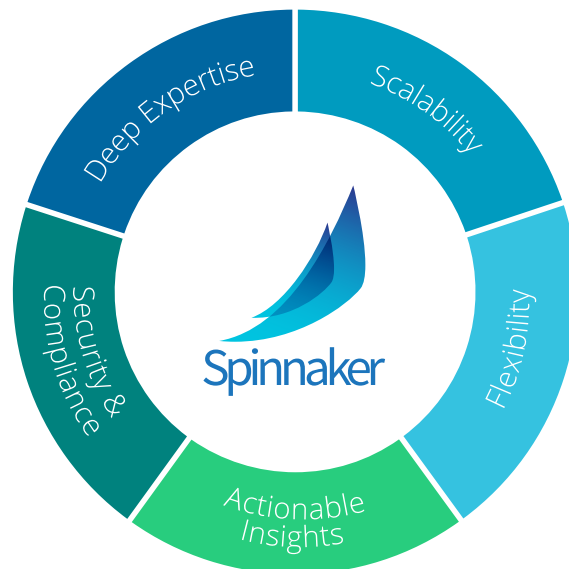
Armory has a simple, high-level [overview](#) of what to consider and the steps you can take to begin migrating some or all of your software delivery to CI/CD with Spinnaker.

DEEP EXPERTISE

- Operating and Extending Spinnaker
- Services, Training and Support
- Guaranteed Uptime SLA

SECURITY & COMPLIANCE

- End-to-End Auditability
- Air-Gapped Environments
- SLA Management
- FedRAMP & ISO



ACTIONABLE INSIGHTS

- Development Analytics
- Developer Productivity

SCALABILITY

- Manage Spinnaker Pipelines via SourceCode
- 1-Click Service Bootstrap
- High-Availability Configuration

FLEXIBILITY

- 3rd Party & Custom Integrations

◆ Jira Software






Compelling stories from successful implementations at organizations just like yours.

Armory has seen great success with customers who have migrated their software delivery to Spinnaker. From the highest levels of the organization to the DevOps teams on the ground, customers have reported measurable results.

- Record-setting productivity and feature velocity:
 - [40x increase](#) in weekly deployments.
- Increased cost efficiencies, developer productivity, and security of services:
 - [50% reduction](#) in cost by managing Google Cloud Platform/K8 through Spinnaker.
 - [4x reduction](#) in number of required software delivery tools reduces complexity, costs, and chances of error.
- Close partnership with Armory, benefiting from the company's thought leadership & expertise.

Metric	Explanation	Results with Spinnaker (avg)
Number of steps to deploy service into productions	The number of manual steps, including manual validation, in all staging environments through production. (Each manual step introduces the potential for human error, which was responsible for many deployment failures and service outages.)	25x reduction
Engineering TTD	The amount of time for an engineer to deploy from staging through to production	60x reduction
Automation TTD	The average amount of time it takes to deploy regardless of engineer or service	2x reduction
Onboarding time	The time it takes for new engineers to be comfortable deploying code to production	144x reduction
Engineering time to patch	Time to patch	100% reduction (automated patching)



“Engineering’s velocity for developing and delivering new services and features is off the charts.”
Customer CEO

Contact Armory today for a complimentary assessment of your software delivery practices and learn more about how your organization can benefit from fast software delivery.

[CONTACT US TO LEARN MORE](#)

Armory Is Spinnaker at Enterprise Scale

Armory helps software teams ship better software, faster. Our platform is powered by Spinnaker, the defacto standard in cloud-native continuous software delivery developed and open-sourced by Netflix and Google. Armory brings the power of Spinnaker to your business, coupled with enterprise-grade availability, powerful feature extensions, and 24x7 expert support and services.

Armory is headquartered in San Mateo, CA, and is backed by leading investors including Insight Partners, Crosslink Capital, Bain Capital Ventures, YCombinator, and others.



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