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CONTINUOUS AUTOMATION

FOR THE CONTINUOUS ENTERPRISE

EXECUTIVE SUMMARY

Businesses that embrace apps and digital business as the new customer interface will be the leaders in the coming years and will outperform their peers, industries, and markets.

To become a disruptor and not be one of the disrupted, businesses must deliver software at speed, with efficiency and low risk.

In the midst of this need for speed, then there are other disruptive changes:

- **The shift to cloud-native, modern applications** that are designed for scale while still managing a portfolio of legacy applications.
- **The shift toward container-based runtimes** for applications composed of multiple microservices while still managing monolithic stateful applications.
- **The shift to vertically integrated development teams.** Starting with Agile, Lean and DevOps (ALDO) techniques some silos are being broken by modern application teams already. But more is needed to better integrate all stakeholders: from the business to compliance.

Delivering software at speed in the midst of these shifts requires a platform that can deliver optimized ALDO processes, and consistent infrastructure, application, and compliance automation regardless of the IT environment.

Chef Automate is the leading platform for this 'Continuous Automation' approach. Chef Automate can support any environment, from applications that run on bare metal in the data center to containerbased microservices in the cloud.

THE DISRUPTION OF DIGITAL TRANSFORMATION

Every industry is being disrupted by the demands of the digital marketplace. Traditional approaches to business no longer work as they don't meet the expectations of the market and are ripe for disruption by more nimble competitors. Leaders in digital transformation are accepting that digital (or the 'app') is the new customer interface and are focused on delivering experiences to that interface. Which means more apps, doing more things, faster.

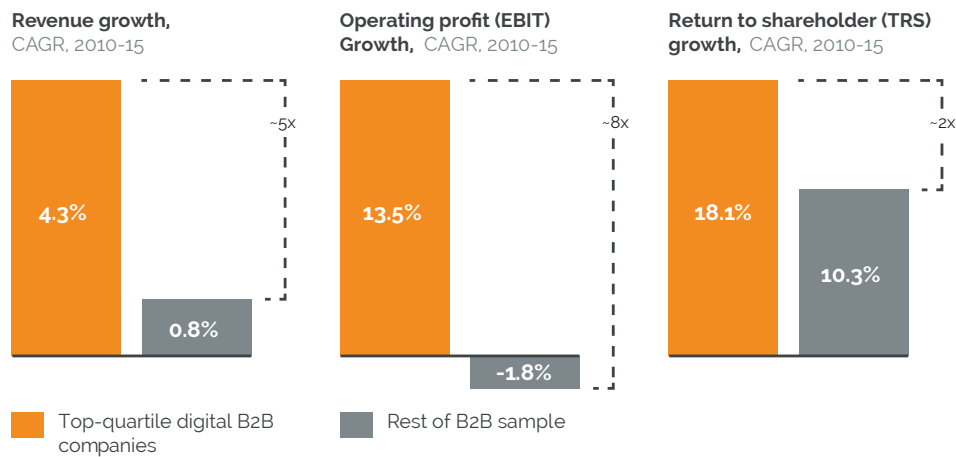


Fig 1. B2B companies who lead digital transformation outperformed peers by 5x in Revenue CAGR from 2010-2015.ⁱ

“Our research is clear: by investing in a targeted set of digital capabilities and approaches, B2B companies can improve their financial performance—and not just by a percentage point or two. Rather, the B2B companies that master these areas are generating eight percent more shareholder returns and a revenue compound annual growth rate (CAGR) that is five times greater than the rest of the field.”

- McKinsey & Company

ⁱ <http://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/how-b2bdigital-leaders-drive-five-times-more-revenue-growth-than-their-peers>

Those who lead digital transformation have pioneered significant technical and cultural shifts that let them deploy applications quickly, efficiently, and with minimum risk.

So what are these leaders in digital transformation doing?

NAVIGATING COMPLEX TECHNOLOGY CHANGE

For any reasonably sized business, then modern applications are being designed for web-scale applications and consumer-level experiences. These requirements mean a design point that involves multiple technology shifts:

- **SHIFT TO CLOUD-NATIVE.** Modern applications are cloud-native or at least use one facet of the cloud such as storage or cloud bursting, where workloads run in the cloud when the demand for computing capacity spikes.
- **SHIFT TO MICROSERVICES.** Modern applications are distributed, not monolithic. They are composed of collections of API calls, multiple data sources and microservices.
- **SHIFT TO CONTAINERS.** Containers are becoming increasingly popular as advances in the technology have made them easier to use. They are well suited to modern design techniques such as microservices.

However, while the end states and strategies might be easy enough to identify: from cloud-first to container-first, the transition strategies are harder to define.

Leaders are embracing repeatable, scale automation across the whole portfolio for software production and development as a key component in every shift.

ACCEPTING HYBRID AS THE NEW REALITY

The reality is that few companies have a portfolio that consists solely of modern applications and equally the legacy portfolio must continue to perform and integrate with the modern portfolio.

"Most enterprises are going to operate in hybrid mode for many years to come"

—Andy Jassy, CEO, Amazon Web Services (re:Invent 2016)

Most companies have a hybrid environment that includes a variety of applications whose designs reflect the practices of their time. 'Hybrid' may be across any or all of multiple dimensions.

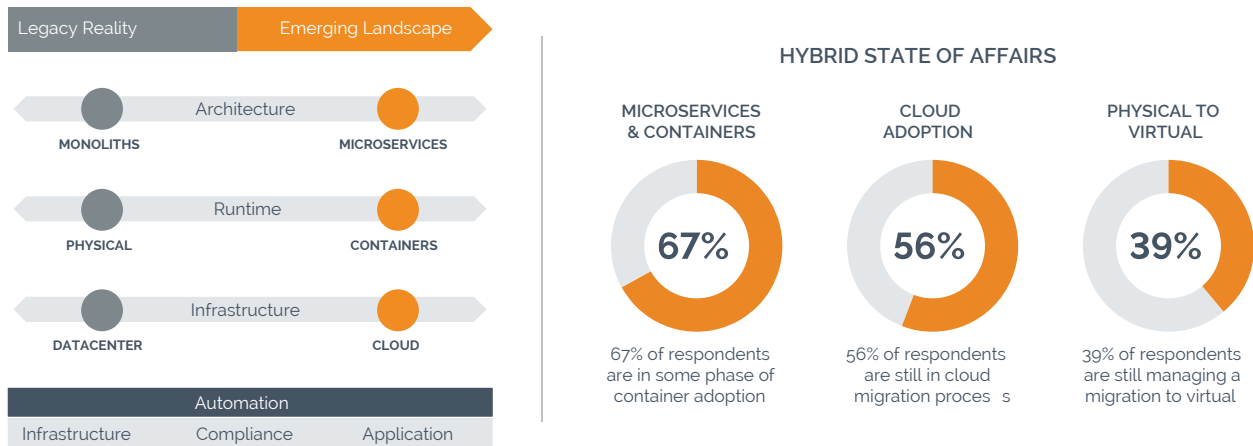


Fig 2. From Chef Survey 2017 we can see most enterprises are in some hybrid state of change for new tech adoption.

Leaders are finding ways to manage their infrastructure, application, and compliance concerns with consistency.

EMBRACING AGILE, LEAN, AND DEVOPS (ALDO) TECHNIQUES

Applications cannot get to customers quickly without cooperation between all the stakeholders in a company in a way that delivers quality at speed. The collective set of ALDO techniques are representative of a cultural and process shift away from siloed organizations toward integrated teams.

Leaders are driving internal change to maximize the value they return to the business by way of delivering software at speed.



JUMPSTART YOUR MOVE TO THE DEVOPS LIFESTYLE

Learn how Lean principles, a diverse workforce, and a good roadmap help to build better products with greater speed.

[Download the Ebook at pages.chef.io/embrace-devops-ebook](https://pages.chef.io/embrace-devops-ebook)

BUILDING VERTICALLY INTEGRATED MODERN APP TEAMS

Silos are difficult to break down. A longstanding point of friction for software development is that operations teams see risk reduction and stability as their goals while development teams feel they must innovate and deliver new features quickly. The business typically wants results fast, and so consequently, developers have become the new "kingmakers." They take control by circumventing their IT departments and creating their own instances in the cloud.

Governance and testing comes after the fact, which slows down production releases, or if not managed correctly could lead to real risk in the future.

From the recent Chef Survey 2017ⁱⁱ:

CROSS-FUNCTIONAL TEAMS ARE:



17% more likely than application teams to release changes to production on an on-demand basis



23% more likely than infrastructure teams to do so



24% more likely than security teams to do so

Fig 3. Cross-functional teams are most likely to reduce the time it takes from initial software commit to running that software commit.

Leaders are fully integrating development, operations, security and business teams into closed loops for maximum effect, and offering services which enable and encourage innovation.

DELIVERING THE CONTINUOUS ENTERPRISE

Companies can deliver on all of these challenges through Continuous Automation (CA). Businesses that embrace CA across infrastructure, applications, and compliance outperform their competitors. They deliver their software faster, manage risk better, and are more assured of the software's security and stability.

ⁱⁱ <https://pages.chef.io/chef-survey-2017>

Automation is vital to software at speed, as workloads are increasing faster than headcount in development and operations teams. Those teams also continue to struggle with process issues that need to be consistent and repeatable.

THE RISE IN DEMAND IS OUTPACING THE RISE IN HEADCOUNT

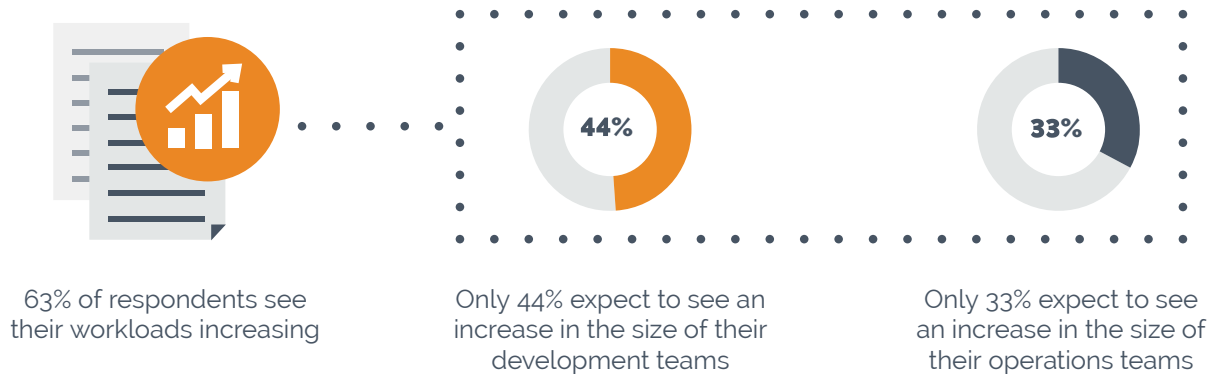


Fig 4. The rise in app delivery demands is outpacing the rise in headcount.

“Continuous configuration automation tools are foundational to DevOps initiatives and can improve IT operational configuration management.”

- Gartnerⁱⁱⁱ

REDEFINING OPERATIONS AS DEVELOPER SERVICES

Companies that adopt continuous automation tooling and ALDO processes break down silos and create teams that are vertically integrated. With vertical integration, everyone works together toward the business objective. Operational teams evolve into developer services teams that create the tools developers need to deliver innovative features quickly.

For instance, a developer services team can create a self-service portal that grants developers the independence to quickly spin up their own pre-configured instances that are verified to comply with all company information security policies. Such portals make development faster, while at the same time decrease risk, because the instances are known quantities that are in sync with operational standards, as shown by executable tests.

iii December, 2016 report Market Guide for Continuous Configuration Automation Tools.

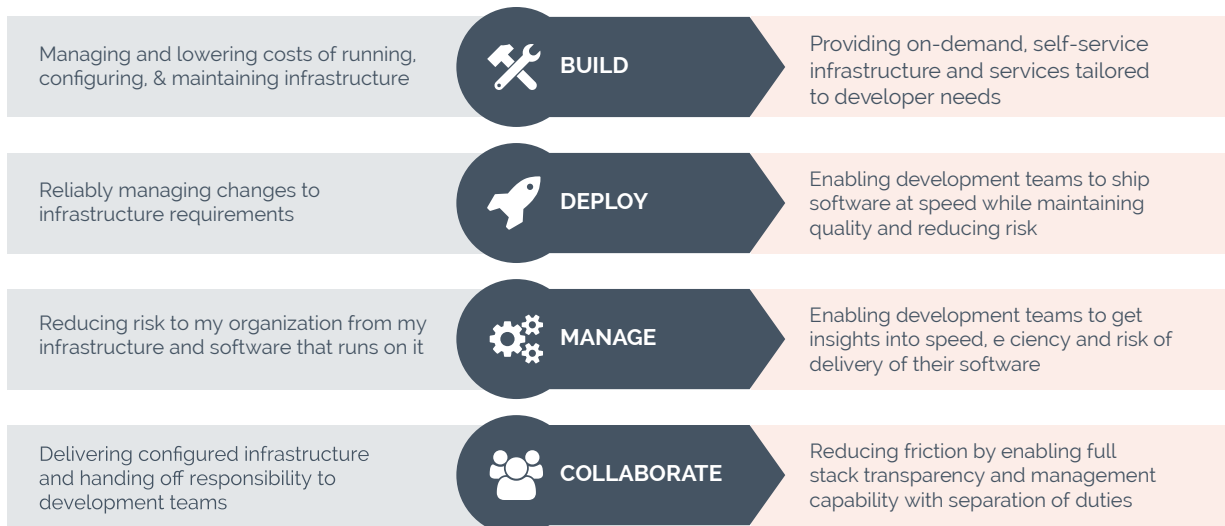


Fig 5. Reinventing operations teams as developer services teams.

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IMPROVING CORE METRICS WITH AUTOMATION: SPEED, EFFICIENCY, AND RISK

Ultimately, continuous automation, and the ALDO processes to support improved software delivery should be measurable. From our discussions with our community and customers, then the outcomes can be broadly defined as:



The metrics to substantiate the delivery of those outcomes are considered below^{iv}.

SPEED: DEPLOYMENT METRICS

	HIGH IT PERFORMERS	MEDIUM IT PERFORMERS	LOW IT PERFORMERS
DEPLOYMENT FREQUENCY	On demand	1 Week - 1 Month	1 Month - 6 Months
TIME FROM COMMIT TO DEPLOY	< 1 hour	1 Week - 1 Month	1 Month - 6 Months

Deployment frequency is how often your company releases to production.

Time from commit to deploy is the average length of time it takes between committing a change to a version control system and deploying that change to production.

EFFICIENCY: CHANGE METRICS

	HIGH IT PERFORMERS	MEDIUM IT PERFORMERS	LOW IT PERFORMERS
CHANGE FAILURE RATE	0 to 15%	31 to 45%	16 to 30%*
MEAN TIME TO RESOLVE	< 1 hour	< 1 day	< 1 day

Change failure rate is the percentage of changes that result in poorer service or require remediation such as a patch or a rollback.

Mean time to resolve is how long it takes to restore service when such a failure occurs.

iv STATE OF DEVOPS REPORT

* Low IT performers have a lower change failure rate than medium IT performers because low IT performers don't ship as often and when they do ship are very conservative about releasing changes. They don't fail as often, but that doesn't matter since software isn't reaching customers.

RISK: COMPLIANCE METRICS

	HIGH IT PERFORMERS	MEDIUM IT PERFORMERS	LOW IT PERFORMERS
COMPLIANCE AUDIT FREQUENCY	On demand	1 Week - 1 Month	1 Month - 12 Months
TIME DEPLOYING REMEDIATION	< 1 hour	1 Week - 1 Month	1 Month - 6 Months

Compliance audit frequency is how often you can assess your state of compliance.

Time deploying remediation is how long it takes to correct failures once a compliance problem is discovered.

CONTINUOUS AUTOMATION WITH CHEF AUTOMATE

In order to support the right processes, and to deliver on the outcomes a business hopes for, then a continuous automation platform must support a series of capabilities:

These capabilities include the ability to build, deploy, manage and collaborate across all aspects of software production: infrastructure, applications, and compliance. Each capability represents a set of collective actions and the resulting artifacts.

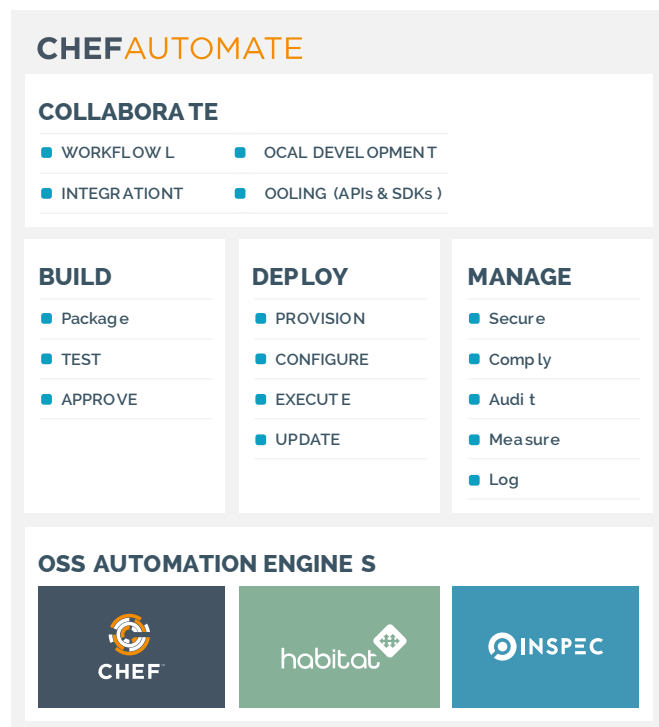


Fig 7. The Chef Automate platform.
[Learn more at chef.io/automate.](https://chef.io/automate)

BUILD

Practicing continuous integration and following proper deployment workflows that methodically test all proposed changes help you build code for production use. Packaging code into a reusable artifact ensures that you are testing, approving, and promoting use of an atomic change that is consistent across multiple environments and prevents configuration drift.

DEPLOY

Deployment pipelines increase the speed and efficiency of your software deployments by simplifying the number of variables and removing the unpredictable nature of manual steps. Deployment pipelines have a specific beginning, a specific end, and a predictable way of working each time; thereby removing complexity, reducing risk, and improving efficiency. Establishing standard workflows that utilize deployment pipelines give your operations and development teams a common platform.

MANAGE

With increased speed comes an increased demand to understand the current state of your underlying software automation. Organizations cannot ship software quickly, yet poorly, and still manage to outperform their competitors. The ability to visualize fleetwide status and ensure security and compliance requirements act as risk mitigation techniques to resolve errors quickly and easily. Removing manual processes and checklist requirements means that shifting management capabilities becomes a key component of moving to continuous automation.

COLLABORATE

As software deployment speed increases across your organization, the need for fast real-time collaboration becomes critical. Different teams may use different tools to accomplish various tasks. The ability to integrate a variety of third-party products is necessary in support of continuous deployment of infrastructure and applications. Chef Automate provides tools for local development, several integration points including APIs and SDKs, in addition to deployment pipelines that support a common workflow.

CHEF IS POWERED BY OPEN SOURCE ENGINES

Chef Automate is powered by three open source engines: Chef, Habitat and InSpec.

- **CHEF** is the engine for infrastructure automation.
- **HABITAT** automates modern applications such as those that are in containers and composed of microservices.
- **INSPEC** lets you specify compliance and security requirements as executable code

CASE STUDY

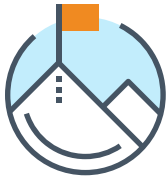
Gannett's traditional deployment workflow was characterized by multiple handoffs and manual tests. Maintaining accurate, repeatable builds was difficult. There were many build failures and tests were often run in the wrong environments. Deployment and provisioning times could range from a few days to several weeks. There were two operations teams, each in its own silo both physically, within different data centers, and organizationally. Neither team had access to the cloud or the development environments.

On the development side, a type of "shadow IT" emerged. Developers would spin up instances on Amazon's EC2-Classic and personal Heroku accounts and tie them to the production DNS. There was no sort of oversight.

To solve the problems, Gannett began using Chef to configure and manage its infrastructure and started to move applications to the cloud. They adopted DevOps practices and created services that allowed developers to spin up their own instances. The improvements were dramatic.

All infrastructure is treated as code, which greatly increases visibility into any changes that occur. Development, operations, security and finance all benefit.

Deployments are quicker and more reliable. All new applications are deployed to the cloud with Chef. Environments are standardized and testing occurs in each environment, so that the deployments are reliable. Application provisioning and deployment, which once could take weeks, now takes minutes.



TRANSFORMATION AT GANNETT

Gannett's DevOps evolution – changing the culture, processes, and tools of a media juggernaut to break down barriers between development and operations.

[Download the Whitepaper at chef.io/customers/gannett](https://chef.io/customers/gannett)

RECOMMENDATIONS

The pursuit of outperformance in digital transformation for a business means:

- Embracing agile, lean and DevOps practices as foundational to cultural transformation
- Accepting a hybrid reality across multiple dimensions: cloud, containers and architecture.
- Redefining IT shared service teams as Developer Services in a vertically integrated system of continuous delivery.
- Quantifying the outcomes of DevOps as improvements in Speed, Efficiency and Risk management.
- Applying Continuous Automation tools and platform to deliver software at speed.

[Learn more about the chef automate platform at chef.io/automate](https://chef.io/automate)

ABOUT CHEF

Chef is the leader in Continuous Automation software, and one of the founders of the DevOps movement. Chef works with more than a thousand of the most innovative companies across the world to deliver their vision of digital transformation, providing the practices and platform to deliver software at speed. Chef Automate is Chef's Continuous Automation Platform which is powered by an awesome community and open-source software engines: Chef for infrastructure, Habitat for applications, and InSpec for compliance.

[For more visit http://www.chef.io.](http://www.chef.io)