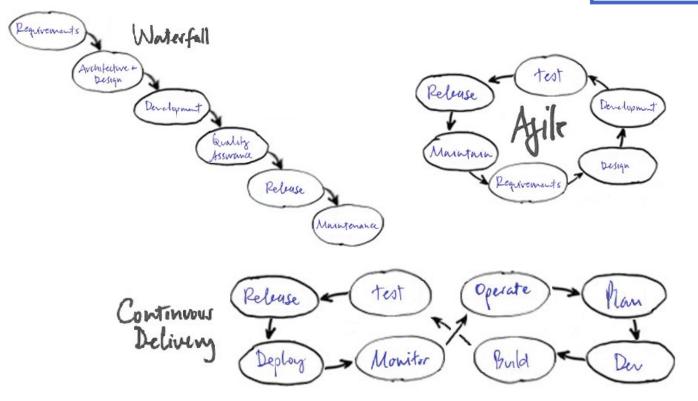
Shea & Company



DevOps & Software Development Tools

v3.3 – September 2022

DevOps & Software Development Tools Market Trends & Landscape The DevOps Market Continues To Gain Traction

Enterprise digital transformation is driving a total refresh in the tools, processes and people developing software applications

- Back in 2011, Marc Andreessen somewhat famously wrote "software is eating the world," putting
 forward the belief that software-defined companies are poised to dominate large swathes of the
 economy. Over the intervening eight years, an increasing number of enterprises are expanding their inhouse software development teams, creating a greater demand for tools that provide more effective
 development, testing, and launch processes and increasing the number of users for development tools.
 With examples like Amazon displacing traditional retailers or a proprietary application for player
 evaluation named "Carmine" helping to lead the Boston Red Sox to four titles in the past 20 years, the
 power of software cannot be understated.
- Software is not only changing business models that have been in place for centuries (or 86 years of baseball futility), but also it is enabling incumbent vendors across disparate industries to improve product offerings, drive deeper engagement with customers and optimize selling and marketing efforts. Most industries (financial services, retail, entertainment, healthcare) and large organizations now derive a great deal of their competitive differentiation from software.
- But as software has brought benefits, it has also brought increasing demands for business agility and the software industry itself has been changed. The rapid pace of innovation has required software developers to scrap old methods (waterfall) in favor of DevOps and other continuous delivery methods, ushering in a new set of tools. The explosion of BYOD within the enterprise has changed software development from desktop-focused to mobile. With increased influence within the enterprise, practitioners are now driving and making purchase decisions on tooling. Widespread adoption of the cloud and SaaS delivery has brought automation, microservices and integrated security to the forefront.
- These trends, and others, have given rise to both a new class of emerging leaders and a wave of acquisition activity by incumbent vendors. In this report, we examine some of these trends, as well as the emerging companies at the forefront of innovation in the burgeoning DevOps and Software Development Tools ecosystem.





"I run a software company inside of FedEx."

David Zanca, SVP of IT

"What we have witnessed over the past year is the dawn of a second wave of digital transformation sweeping every company and every industry" – Satya Nadella, Microsoft CEO

> "The interface you put in front of that customer is the perception of your product and of your value as a company" – Jeff Lawson, Twilio Founder, CEO

DevOps & Software Development Tools Market Trends & Landscape Macro Trends Impacting DevOps & DevTools

[1] Cloud & SaaS Delivery	 A fundamental change to the way software is built, sold, delivered and integrated The cloud will increasingly be built on open source – with the notable exception of Microsoft Azure, the major cloud platform vendors are running open source stacks
[2] Continuous Everything	 As much a cultural shift as a process and tooling change, iterative development methods necessitate continuous everything: development, quality, code integration, releases, performance management solutions targeted at waterfall development cannot keep up Achieving true CI/CD/DevOps requires continual resolution of bottlenecks in the SDLC
[3] Services & Containers	 Breaking development projects into reusable components has yielded significant improvement in development efficiency, speed and reliability Developers can modify, test and deploy smaller services faster than pushing modifications to an application monolith
[4] Open Source	 90% of IT leaders surveyed are using enterprise open source today, and they're using it for IT infrastructure modernization (64%), application development (54%), and digital transformation (53%) ^[a] The pace of feature/function expansion in many projects has been notably faster than commercial offerings – and enterprises have long cited the "technical superiority" of open source offerings ^[b]
[5] End Users Have Purchasing Power	 As enterprises become more digital, IT practitioners are exerting growing influence on software and tooling decisions, shifting the buying center from top-down, center of excellence buying to a land-and-expand, velocity GTM targeting practitioners Technical purchasers are hard to sell to, but can be reached via user communities, e.g. those attached to OSS projects



DevOps & Software Development Tools Market Trends & Landscape [1] Cloud & SaaS Delivery

New delivery methods act as a major catalyst for changes in tooling and enable the continued shift to true DevOps methodology

- > The shift of workloads from on-premises, IT-managed resources to cloud infrastructure represents perhaps the most fundamental change to the way software is built, sold, delivered and integrated since the migration of models from mainframe to client/server
- > The cloud brought a new set of challenges for application owners and developers (particularly around the deployment and monitoring of applications which reside in the cloud), but also enabled a wave of efficiencies, allowing for exponential increases in automation, collaboration. efficiency and quality
- As firms implement cloud-based applications, hybrid workload environments become increasingly complex and customer preference for the secure, scalable, and seamless features within cloud deployment continues to drive growth



200+%

Organizations are already running applications on a total of 4.9

Explosive Growth in Cloud Spend and Usage Drive a Need for Modern DevOps Tools

- cloud environments (3.4 public and private, 1.5 more) 5x \geq
 - 84% of enterprises have a multi-cloud strategy with significant enterprise spend growth (+24% in 2019)



- 13% of enterprises spend more than \$12 million a year on public \geq cloud, while 50% spend more than \$1.2 million annually; public cloud spend is growing 3x faster than private cloud
- SMBs generally have fewer workloads overall and therefore smaller cloud bills, but 11% of SMBs still exceed \$1.2 million in annual spend



- Organizations overall today run 38% of workloads in public cloud and 41% in private cloud
- Enterprises run 33% of workloads in public cloud, 46% in private
- SMBs run 43% of workloads in public cloud, 35% in private



- Optimizing existing cloud use for cost savings continued to be the \geq top IT initiative in 2019 for the third year in a row (64% of respondents)
- The challenge of managing cloud spend grows as use increases -76% of "advanced cloud users" cited spend optimization as their top IT priority



DevOps & Software Development Tools Market Trends & Landscape [2] Continuous Everything

Development Modernization Requires a Cultural, Process and Tooling Evolution

- > Agile development and DevOps has brought about a fundamental change to software development at every step from code, build, test and release
- > With release cycles shortening from months to days (and in some cases, hourly) manual processes break down, and the need for efficiency and constant feedback becomes critical as a result, disciplines like test, release and code integration must become automated
- > The rapid pace of iteration means quality can no longer be "assurance" after the fact; instead code quality is checked at every step of the development process, and testing, once the purview of a dedicated QA department, is now conducted by stakeholders at all stages from developer-led (or test-driven development) to synthetic testing done in production notably, enterprises have found bugs caught later in the SDLC (particularly in prod) become exponentially more expensive

	(~ ` ,)	(<u>~</u> ⇒)		
	Waterfall	Iterative	Continuous Integration	DevOps
Process	Traditional sequential design model (release few times a year)	Initial adoption of Agile (release every few months)	Significant adoption of Agile (release few times a month)	Fully automated development process (release daily/weekly)
Tools	Legacy tooling frameworks, limited automation in QA/test, deployment scripts	Importance of automation increases, bulk of spend remains in manual	Automated testing dominates; manual test for coverage of CI; use of tools covering Dev & Ops	Automation in all phases of SDLC is core to delivery (ARA, test, deploy, provision)
People	Product Management, Dev, QA, Ops completely separate (silos)	Dev & QA start to communicate, Ops remains siloed	Dev and QA collaborate closely; DevTest is a reality; coordination between Dev & Ops	In the most modern organizations, true DevOps Engineer role emerges
Market Share	→ √ 30% 10%	↓ → ♪ 40% ≥0%		10% 30%

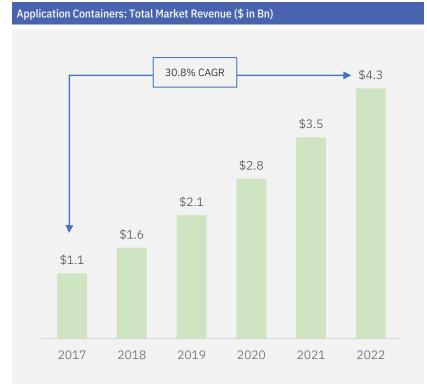
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2017

DevOps & Software Development Tools Market Trends & Landscape [3] Services & Container / API Based Architecture

New take on an old concept that embraces DevOps and automation

- Application development teams have extended functionality by adopting microservices over monolithic architectures. Instead of building new applications from scratch, developers can break an application into smaller, reusable microservices bringing significant improvement in development efficiency, speed and reliability
- The reuse of discrete application services first arose under the banner of Service Oriented Architecture (SOA) in the mid-2000s and despite a wave of consolidation by IBM, Oracle, Software AG and TIBCO, the service-oriented approach largely failed as many of the required building blocks were not yet in place, notably connectivity and compute infrastructure
- In a microservices architecture, managing the connectivity between services and eliminating performance bottlenecks is critical, and has given rise to an important class of infrastructure software covering API development (SmartBear, Postman) and API management (CA/Layer 7, Intel/Mashery, MuleSoft) and containers (CoreOS, Docker, Kubernetes, Rancher Labs)



APIs and Containers Enable Speed and Agility

"Growth in the containers market and ecosystem is being driven by increasing enterprise interest to help application developers move faster, manage infrastructure more efficiently and meet digital transformation goals."



"Delivering software and services through APIs has fundamentally changed the economics of software, by opening new delivery channels with new pricing options"

Gartner

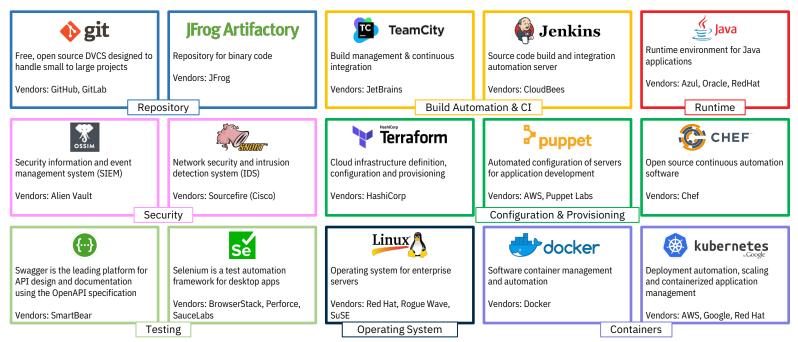
Source: 451 Research

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DevOps & Software Development Tools Market Trends & Landscape [4] Open Source

- 90% of IT leaders surveyed are using enterprise open source today, and they're using it for IT infrastructure modernization (64%), application development (54%), and digital transformation (53%) [a]
- 84% of IT leaders say that enterprise open source is a key part of their organization's security strategy [a]
- **95%** of enterprises use OS within mission-critical segments of their IT portfolios [b]

- > Open Source has in many ways become the preferred licensing and delivery model across infrastructure software, and particularly in the modern developer tooling market
- As developers increasingly make/influence tooling decisions, they have gravitated to OS solutions which allow users to download, experiment and modify apps and components with little friction, then as needed purchase a commercial solution for enterprise production deployments
- The pace of feature/function expansion in many projects has been notably faster than commercial offerings and enterprises have long cited the technical superiority of open-source offerings
- The "open core" model, wrapping proprietary functionality around an open-source core, has driven a plurality of the recent Dev & Ops success stories: Chef, Elastic, GitHub, GitLab, HashiCorp, JFrog, MongoDB, Mulesoft, Pivotal, Sauce Labs, SmartBear...



Notes:

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For additional context, see Shea & Company's Open Source in the Enterprise market map

[a] Red Hat State of Enterprise Open Source, 2021

[b] Gartner, 2019

DevOps & Software Development Tools Market Trends & Landscape [5] Developers Have Purchasing Power

A paradigm shift away from the traditional Center of Excellence-led purchasing model

- > As enterprises become more digital, IT practitioners are exerting growing influence on software and tooling decisions, shifting the buying center from top-down, center of excellence buying to a land-and-expand, high velocity Go To Market targeting practitioners
- Initial entry point is often a single offering cheap enough to be purchased by a development team member via credit card, often at the time of need (the "land"); from there, word of mouth and additional product needs help drive additional upsells throughout the organization (the "expand")
- > In 2020, DevOps initiatives exist in more than 50% of organizations employing 22 million developers; these technical purchasers are hard to sell to, but can be reached via targeted digital marketing and user communities, e.g. SolarWinds THWACK or those attached to OSS projects

Firms employing a Go-To-Market selling motion with "easy to try, easy to buy" products aimed at developers rather than the C-suite often showcase greater sales efficiency and/or lower sales & marketing spend. Two exemplifiers of this methodology are Atlassian and SolarWinds:

Revenue Growth	FY2019A \$ 1,210.1 33%	solarwinds FY2019A \$ 932.5 12%	LTM Q3 2018 \$ 4,009.0	FY2019A \$ 9,613.0 10%	When researching new tools 77% 68% and Of developers start a free trial Ask develope they know / work with	
Sales & Marketing % of revenue Total Operating Expenses % of revenue EBITDA EBITDA Margin	268.4 22% 1,063.2 88% \$ (63.4) (5%)	264.2 28% 472.1 51% \$ 380.9 41%	1,058.0 26% 2,038.0 51% \$ 1,378.0 34%	3,230.0 34% 6,249.0 65% \$ 1,812.0 19%	 Investing only 22% of it's revenus shown incredible growth and sall been able to invest significantly SolarWinds has taken a slightly of focusing on driving profitability a digit growth through its low-touc sales model 	es efficiency and has in R&D lifferent approach, nd consistent double-
Sales Efficiency Forward EV/ Revenue Forward EV/ EBITDA	1.13x 23.0x nm	0.37x 7.8x 16.8x	nm 4.3x 11.3x	0.28x 5.3x 14.9x	 In contrast, legacy vendors with such as CA or VMware are burde costs or inefficient dollar spend 	

DevOps & Software Development Tools Market Trends & Landscape Market Trends and Implications: Notable Beneficiaries

Market dynamics have notably benefitted vendors providing solutions which help enterprises automate, collaborate and secure software development, and which bring efficiency, transparency and optimization to the development and release process

[1] Cloud & SaaS Delivery

[2] Continuous Everything

[3] Services + API-Based Architectures

[4] Open Source

[5] End Users Have Purchasing Power

> Application Performance Management AppDynamics (acquired by Cisco) Datadog (IPO) Dynatrace (IPO) New Relic > CI/CD & Release Orchestration Automic (acquired by CA) CircleCI CloudBees LaunchDarkly Octopus Deploy Split.io XebiaLabs (acquired by TPG) > DevSecOps BlackDuck (acquired by Synopsys) Contrast SonarSource Snvk

Veracode (acquired by Thoma Bravo)

> Infrastructure Automation

- HashiCorp
- Kong

> Issue Tracking & Collaboration

- Asana
- Atlassian (IPO)
- Trello (acquired by Atlassian)

Source Access & Control

- Perforce
- GitHub (acquired by Microsoft)
- GitLab
- Jfrog (IPO)

> Test Automation

- Eggplant (acquired by Keysight)
- Sauce Labs
- SmartBear
- Tricentis



\$7.5 billion

GitHub

acquired by

DevOps & Software Development Tools Market Trends & Landscape Market Landscape: Notable Market Leaders

Requirements	IT PPM	-	EMP -	- Application	Lifecycle						
AtlassianIBM	 Adobe Asana 	 Planview Salesforce 	 CloudBees Code Climate 	Value Stream	Management				API Lifecycle M	anagement	
Inflectra Jama Micro Focus Microsoft PTC	 Citrix KeyedIn Microsoft One2Team Planisware 	SmartSheetUplandZoho	 Jama Jellyfish LinearB Planview Pluralsight 	Apptio Aqua Atlassian Decision Lens Digital.ai	 Digité GitKraken GitLab Inflectra Jama 	 LiquidPlanner Micro Focus Microsoft One2Team Parasoft 	 Perforce Planisware Planview Plutora PTC 	 Sopheon Tasktop ZenHub 	 Axway Dell DreamFactory Google Kong 	 Microsoft Perforce Postman Red Hat Salesforce 	 SmartBear Software AG Tyk WSO2

Development Platforms

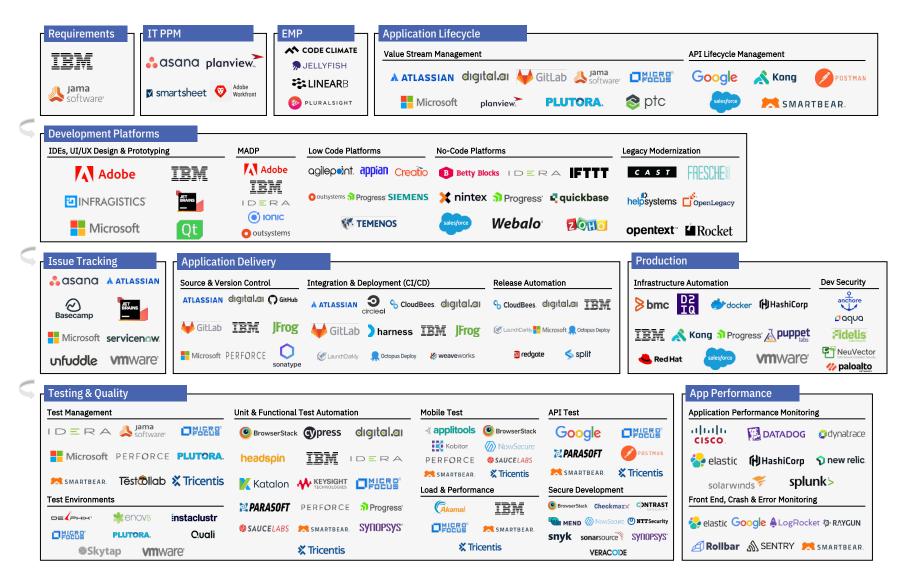
IDEs, UI/UX [esign & Prototyp	ing	MADP	Low Code Plat	forms	No-Code Platf	orms		Legacy Modern	nization
 Adobe Axure Balsamiq Bootstrap Genuitec GrapeCity IBM Idera 	 Infragistics InVision iRise Jetbrains Marvel Microsoft Nevron Oracle 	 Progress Qt Syncfusion UXPin Vaadin Voiceflow XB Software 	 Adobe IBM Idera Ionic Microsoft NativeScript OutSystems 	 AgilePoint Appian Clear Creatio GeneXus Microsoft Netcall OutSystems 	 Pegasystems Progress Salesforce ServiceNow Siemens Skuid Temenos VMware 	 Alpha Betty Blocks Caspio Databasify Hexagon Idera IFTTT Kintone MIOsoft 	 Nintex Oracle OrangeScape Progress QuickBase Red Hat Salesforce SAP ServiceNow 	 Snappii Software AG TrackVia Webalo WebRatio Wizehive Zoho 	 Arcad BMC CAST Fresche HelpSystems IBM Idera 	 Mobilize.net OpenLegacy OpenText Profound Logic Rocket

Issue Track	king –	Applicatio	n Delivery						Production			
AsanaAtlassian	 MicroFocus Microsoft 	Source & Vers	ion Control	Integration &	Deployment (CI/C	D)	Release Automa	ation	Infrastructure /	Automation		Dev Security
 Basecamp Bugzilla Civica DevFactory Idera Freshworks IssueTrak Jetbrains 	 Nulab Redmine ReQtest ServiceNow Unfuddle VMWare WebIssues Zoho 	 Atlassian Dynatrace Digital.ai GitHub GitKraken GitLab IBM JFrog 	 Mercurial Micro Focus Microsoft Perforce PTC Sonatype Unity 	 Atlassian Buildbot Buildkite CircleCI CloudBees Codemagic Digital.ai GE Digital 	 GitLab GoCD Google Harness Idera IBM JFrog LaunchDarkly 	 Microsoft Octopus Pulumi Semaphore Weaveworks 	 BMC CloudBees DBMaestro Digital.ai IBM LaunchDarkly Liquibase Microsoft 	 Micro Focus Octopus Plutora Redgate Split.io VMware Weaveworks 	 BMC Cisco D2iQ DeployHub Digital Ocean Docker Gradle 	 HashiCorp IBM Kong Kubernetes Netlify New Relic Progress 	 Puppet Labs Red Hat Salesforce Suse VMWare Weaveworks 	 Anchore Aqua Security Fidelis Security NeuVector Palo Alto Networks Sysdig Tenable

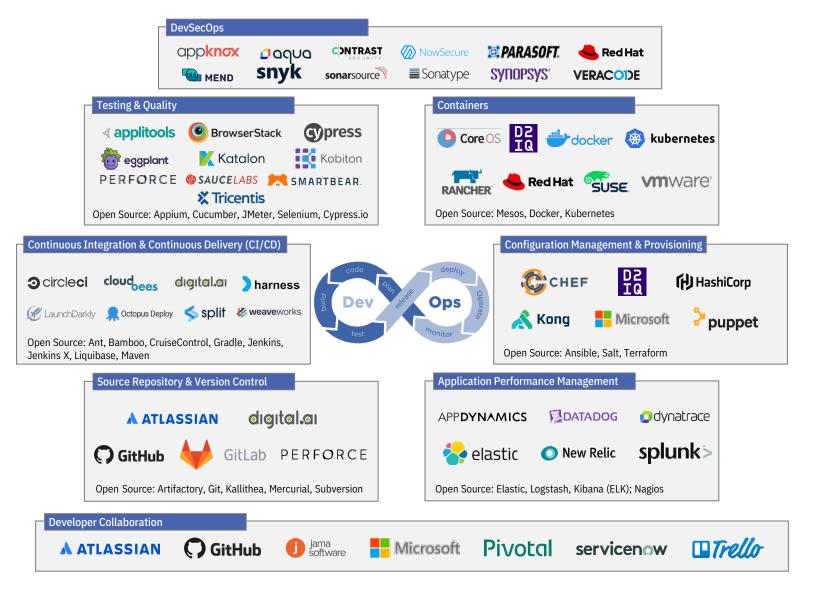
Test Managen	nent		Unit & Function	nal Test Automa	tion	Mobile Test		API Test	
 Andagon HP IBM Idera Inflectra Jama Kualitee 	 Micro Focus Microsoft Perforce Plutora PractiTest PTC OMetry 	 ReQtest SeaLights SmartBear Test Collab TestLodge Tricentis 	 AccelQ Applitools Appvance BrowserStack Conformiq Cypress Diffblue 	 Infosys Katalon Keysight Kobiton Leapwork LDRA Mabl 	Perforce Progress Provar QMetry Qt Runscope SauceLabs	 Applitools BrowserStack Digital.ai Headspin Kobiton 	 NowSecure Perforce SauceLabs SmartBear Tricentis 	 API Metrics Assertible Google Katalon Micro Focus Oracle 	 Parasoft Postman SauceLabs SmartBear Tricentis
Test Environm	. ,		 Digital.ai Functionize 	 Mesmer Micro Focus 	 SmartBear 	Load & Perform	ance • Mobileum	Secure Develop	
 Apwide CloudShare Delphix Enov8 	 Humanitec Instaclustr Micro Focus Plutora 	 Quali Skytap TEMS VMWare 	 Functionize Headspin IBM Idera Inflectra 	 Micro Focus Microsoft Oracle Original Parasoft 	 Synopsys Test.ai Testim Tricentis Worksoft 	 Akamai IBM Inflectra Keysight Micro Focus 	 Mobileum RadView SmartBear Tricentis 	 BrowserStack Checkmarx Contrast Mend Now Secure 	 Parasoft Snyk SonarSource Synopsys Veracode

App Performance Application Performance Monitoring BMC Micro Focus Solarwinds Cisco Microsoft Splunk Datadog Netreo Sumo Logic Dynatrace New Relic Zenoss Elastic Oracle Zoho HashiCorp Quest IBM Riverbed Front End, Crash & Error Monitoring Apptentive LogicMonitor Rollbar Elastic LogRocket SauceLabs FullStory Microsoft Sentry Google Progress SmartBear Instabug Raygun

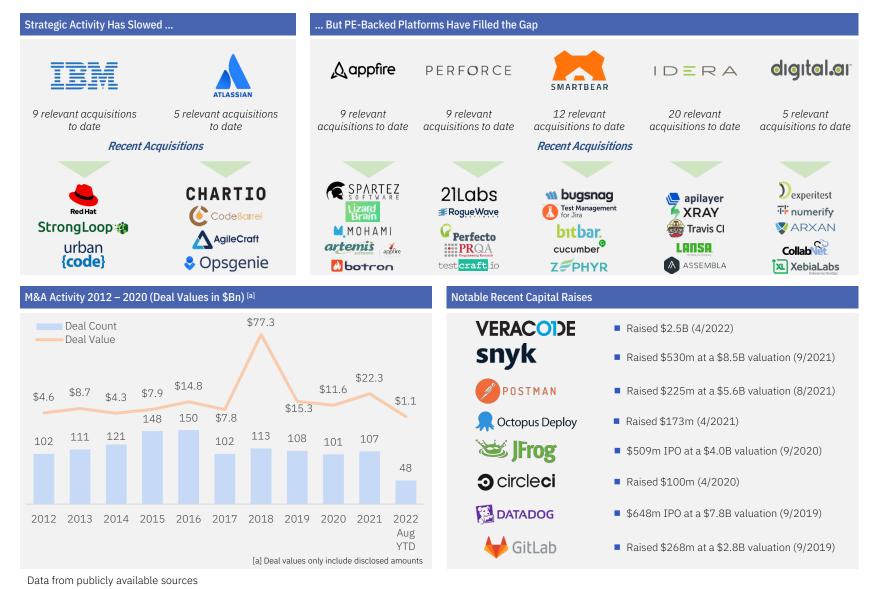
DevOps & Software Development Tools Market Trends & Landscape Market Landscape: Notable Market Leaders



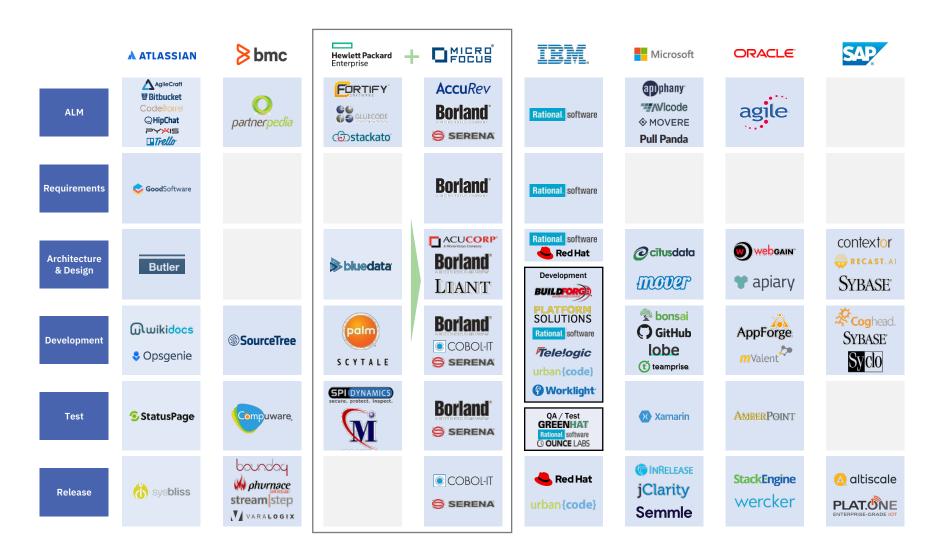
DevOps & Software Development Tools Market Trends & Landscape Market Landscape: Leaders in the DevOps Stack



DevOps & Software Development Tools Market Trends & Landscape **DevOps is an Incredibly Vibrant Market, With Considerable Investor Attention**



DevOps & Software Development Tools Market Trends & Landscape Notable Acquisitions by Large Cap Vendors



DevOps & Software Development Tools Market Trends & Landscape ALM: Agility & Collaboration are Driving Growth

Market Trends & Key Drivers

ALM Market Growth (\$ billion)

Accelerating Demand for Business Agility

- Software is now a key competitive differentiator across industries, including hardware/devices, financial services, manufacturing, healthcare and defense – to some extent, all companies are software companies today
- With that backdrop, the demand for business agility and response-time to changing market trends and demands has only accelerated, particularly in the fast-evolving context of cloud, mobile and social environments – the traditional 18-24 month development cycles no longer work
- According to Gartner, by 2023 60% of large enterprises will adopt design thinking as part of agile product delivery to drive better business outcomes. And by 2023 organizations that embrace continuous quality will beat out competitors in delivering successful digital products

Industry Recognition that Waterfall Methods Alone Don't Work

- Traditional "Waterfall" based software development methods (including Rational's Unified Process), focused on a top-down, stepmethod approach with explicit handoffs from strategy to planning to execution have often wasted time and money
- The Standish Group found that only 14% of Waterfall-method projects were "successful" versus 42% for Agile projects, and with iteration times measured in weeks instead of years

ALM Market: A Period of Redefinition and Innovation

 Constant innovation in methodologies (DevOps, Kanban), use cases (mobile, social, SaaS), delivery (on-premise, hybrid, cloud) and development organization complexity (larger projects, distributed teams) has shifted competitive advantage to more nimble, upstart vendors; the easy deployment of these tools has driven an "up through the floorboards" land-and-expand displacement of incumbents



Notable Market Activity

<u>Date</u>	<u>Acquirer</u>	<u>Target</u>	EV
05/18/22	planview	TASKTOP	n/a
04/20/22	📚 ptc	INTLAND SOFTWARE	\$280m
12/08/21	ICONİQ	附 miro	\$400m Capital Raise
04/08/21	S E P SUMERU EQUITY PARTNERS	TASKTOP	\$100m
12/11/20		planview	\$1,600m
09/04/19	TPG		\$225m ^[a]
03/18/19	A TLASSIAN	AgileCraft	\$166m

[a] Source: The 451 Group Data from publicly available sources

DevOps & Software Development Tools Market Trends & Landscape **Release Automation: New Leaders Emerging**

Market Trends & Key Drivers

Emergence of Application Release Automation

- Software is the engine that powers all industries; however, creating and delivering software doesn't seem to be enough anymore
- The ARA market has emerged as a formal set of solutions to address the specific requirements of enterprises for deploying Agile-based or web-based apps; ARA is being driven by companies' need to: i) push releases quickly and easily across all phases of the app lifecycle; ii) replace manual scripting with automation; and iii) establish and encourage collaboration between developers and admins
- Feature flagging and feature management have emerged as ways for vendors to further break down releases and gradually roll out features to end users

Market Maturity Driving M&A and New Entrants

 While new vendors continue to emerge, the market has reached a level of maturity where large vendors are recognizing the strategic nature and value of ARA tools; heritage vendors are beginning to add functionality in ARA either organically or through acquisitions

Continued Solution Integration and Feature Development

- While many ARA tools are currently used in a targeted fashion to address the app release process with a distinct set of actions, integration into an organization's larger DevOps, IT support and other CI/CD tools such as feature flagging and release analytics has begun in this space and is expected to be the next evolution of the sector
- ARA developers continue to broaden their view of continuous delivery and desire to move faster with greater control and security will extend across all environments, including databases, middleware and app servers

Release Automation as an Anchor for DevOps

 Gartner estimates that 50% of global enterprises have implemented at least one ARA solution today, up from 10% just a few years ago.
 Demand for higher-quality and higher-velocity app releases continues to drive the adoption of ARA, as it becomes increasingly integral to enterprises' growth and execution strategy

Shea -



Application Release Orchestration Market Growth (\$ millions)

Notable Market Activity

<u>Date</u>	Acquirer	<u>Target</u>	<u>EV</u>
05/05/22	iqt IN-Q-TEL.	weaveworks	n/a Capital Raise
04/26/22	NORWEST	Output the second se	\$230m Capital Raise
12/09/21	Goldman Sachs	cloud	\$245m Capital Raise
10/15/21	INEXT PLAY SUBPLE	LaunchDarkly ᢣ	n/a Capital Raise
08/17/21	OWL ROCK	< split	\$50m Capital Raise
08/10/21		LaunchDarkly ᢣ	\$3,000m
12/01/20	INSIGHT Partners	💂 Octopus Deploy	\$173m Capital Raise
01/21/20	digital.ar		n/a

DevOps & Software Development Tools Market Trends & Landscape **Testing is** *the* **Critical Bottleneck in DevOps Adoption**

Market Trends & Key Drivers

Large and Growing Market

 Test Management & Automation market growth driven by increased application complexity and strategic factors like corporate image and security; according to Gartner at \$2.7 billion, growing at 9% CAGR

Overreliance on Manual Testers

- Manual testing is still the largest portion of time spent on a typical development project
 - 80% of testing is manual (Gartner) and \$22 billion is spent annually on QA/test services at the global SI firms (IDC/Nelson Hall)
 - A recent Forrester survey found 46% of respondents "always" tested manually
- The shift to iterative development methods has strained software development processes heavily dependent on manual testing – much of this work is redundant, with repeat testing and other inefficiencies – and simply cannot keep up in a CI/CD context
- Manual testing remains important for the long tail of test cases, but automation brings faster cycle times and an increase in coverage; as a result the "mix" will shift

Continuous Delivery Requires Continuous Quality

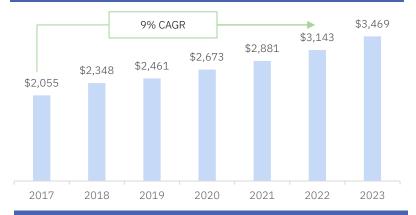
- Testing is no longer a point-in-time event managed by dedicated QA resources; quality is now embedded in all stages of development
- Automation allows scaling of testing to fit disparate needs, but without the lead time and cost of increase testing infrastructure

Challenges to Adoption

- Adoption of test management and automation will frequently serve as the first step toward the adoption of more advanced automation tools
- However, the central challenge of most test solutions is the expertise required to create and maintain scripts – "loss of expertise" (i.e. a champion leaves the company) is the leading cause of churn at many enterprise test automation vendors

Other data from Gartner, Forrester, IDC/Nelson Hall, Pitchbook

Testing & Quality Engineering Market Growth (\$ millions)



Notable Market Activity

<u>Date</u>	Acquirer	Target	<u>EV</u>
06/07/22	TPG	SAUCELABS	n/a Capital Raise
02/09/22	X Tricentis	testim	\$150m
11/01/21	PERFORCE	≡ BlazeMeter	n/a
10/19/21	elephant	K Katalon	\$27m Capital Raise
09/15/21		Kobiton	\$6m Capital Raise
06/15/21	BOND	BrowserStack	\$4,000m
05/05/21	THOMABRAVO	∢ applitools	n/a
12/17/20	OPENVIEW	Cypress.io	n/a
10/21/20	VISTA EQUITY PARTNERS	SMARTBEAR .	n/a



DevOps & Software Development Tools Market Trends & Landscape Low and No-Code: Solutions for Resource-Constrained Enterprises

Market Trends & Key Drivers

Market Growth (\$ millions)

Bifurcating the Market

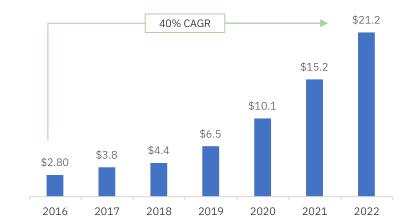
- No-Code "high productivity" platforms supporting workflow-based apps via a captive, proprietary runtime environment which IT generally does not control where development is led by "citizen developers" (notable vendors: Appian, Force.com, QuickBase)
- Low-Code "high control" vendors supporting development of sophisticated enterprise applications within the control environment of IT, and generally targeting developer audiences looking to augment or accelerate customer development efforts (notable vendors: Mendix, OutSystems, Uniface)

Demand for Agility and Responsiveness Push the Market

- Digital transformation, along with overly-strapped IT organizations, has provided the underpinnings for technologies which help developers quickly create applications, and platforms which allow business analysts and other non-developers to develop apps on their own
- Rapid application development (RAD) as a discipline has existed for quite some time, but as a market-ready technology had not taken off until recently, under the new banner of "low-code"
- Non-technical users are building and managing applications that run from general purpose to sophisticated and scalable, using "drag-anddrop" composition for quick UI creation across mobile, web and cloud
- Gartner predicts that by 2024, 75% of large enterprises will be using at least four low-code development tools for IT application development as well as citizen development initiatives

Fragmented Market, Ripe for Investment and Consolidation

- The low-code, no-code market is highly fragmented, with a broad group of vendors generally segmented along productivity / control lines
- This market has seen considerable uptake from enterprise customers, and supported several notable liquidity events, including public exits (Appian), strategic M&A (Kony) and LBOs (QuickBase) as well as notable funding events at OutSystems



Notable Market Activity

<u>Date</u>	Acquirer	Target	EV
12/13/21	X	F Airtable	\$735m Capital Raise
08/01/21	🕖 Smartfin	B Betty Blocks	\$33m Capital Raise
02/22/21	VOLITION Horizon Capital	Creatio	\$68m Capital Raise
02/17/21		outsystems	\$150m Capital Raise
02/03/21	Rocket	UNIFACE	n/a
10/01/20	💢 nintex	K2 [°]	n/a
08/28/19		🌟 kony	\$580m

[a] Source: The 451 Group Other data from publicly available sources



DevOps & Software Development Tools Market Trends & Landscape **DevSecOps: As the Perimeter Evaporates, Applications Must be Secure by Design**

Market Growth (\$ billions)

Market Trends & Key Drivers

Integration of IT Security into DevOps

- As applications, data and users are increasingly outside the confines of the datacenter's firewall, the "perimeter" first spread to the individual and device level (e.g. IAM/IdM) then further fragmented into security maintained at the application and service level – the threat surface is continually growing
- As with functional/performance bugs, catching security vulnerabilities earlier in the development lifecycle is order of magnitude less expensive than production
- According to a 2018 Forrester survey, direct web application attacks and *exploitation of software vulnerabilities* were the top two methods of external attacks
- DevSecOps, a development approach which embeds security practices and tools into each phase of the DevOps pipeline (mirroring the "shift left" in testing), embeds automated security controls, checks, tests, etc., embedding built-in security that is adaptable while still maintaining robust functionality

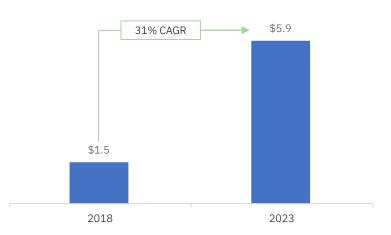
Secure by Design

- Rising cyber security concerns necessitate DevOps tools that provide built-in security rather than being implemented from the outside
- In addition to creating more secure applications, security built into the DevOps toolchain enables problems to be detected earlier and remedied prior to deployment
- DevSecOps implementation helps address the sometimes-competing priorities of development, IT operations and security teams

The Challenge is Adoption

- Security remains very much a top-down selling and adoption path;
 CSOs have tremendous budget and ability to dictate tooling decisions this is directly at odds with the adoption path in DevOps
- Budget for DevSecOps pulls from either Test or Security wallets both
 of which are deep at most enterprises the challenge remains how to
 insert DevSecOps into the practitioner-led adoption motion common
 within Dev and Test teams

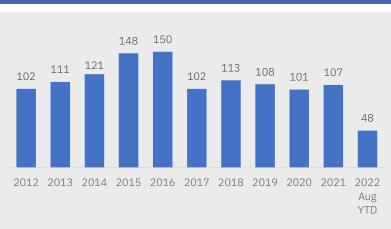
[a] Source: The 451 Group Other data from publicly available sources



Notable Mark	et Activity		
<u>Date</u>	Acquirer	Target	EV
04/27/22	Synopsys [®]	O NTT Security	\$330m
04/29/22	TAASSOCIATES	VERACODE	\$2,500m Capital Raise
04/12/22	CAPITAL MANAGEMENT, LIC	<i>§</i>) sonar	\$412m Capital Raise
10/05/21	LIBERTY		\$150m Capital Raise
09/09/21	TIGERGLOBAL	snyk	\$530m Capital Raise
04/07/21			\$75m Capital Raise
03/10/21		Dopo	\$1,000m



DevOps & Software Development Tools Market Trends & Landscape Recent M&A Activity



M&A Volume By Year

Source: Shea & Company and 451 Research

- As business agility demands pressure software developers to deliver custom, high-quality products in shorter periods of time, IT organizations will continue to migrate to Agile and DevOps methodologies which will drive a wave of consolidation
- Consolidation within Release Automation (a DevOps prerequisite) is already well underway which we expect to continue as the market evolves and DevOps becomes even more mainstream; additionally, we expect the larger IT management software vendors to make strategic acquisitions in other Agile/DevOps driven market segments, including ALM, APM and Automated Testing, among others
- Driven by cloud and mobile initiatives, API Management should also see continued consolidation

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[a] Source: The 451 Group
Other data from publicly available sources
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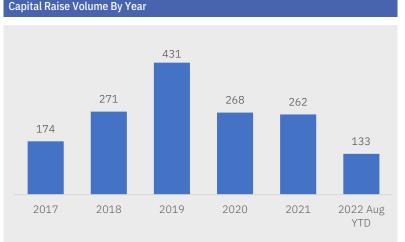
Select Transactions (\$ million)

Date	<u>Acquirer</u>	<u>Target</u>	EV	
05/18/22	planview	TASKTOP	n/a	
04/09/22	PERFORCE	puppet	\$300	m ^[a]
05/05/21	THOMABRAVO	∢ applitools	n/a	
02/11/21	DATADOG	🕅 sqreen	\$195	m ^[a]
02/03/21	Rocket	UNIFACE	n/a	Shea &Company
09/08/20	Progress [*]	🏀 CHEF	\$220	Im
08/08/20	SUSE	RANCHER	\$600	Im ^[a]
06/16/20	digital.ar	() experitest	n/a	Shea &Company
05/27/20	KEYSIGHT TECHNOLOGIES	eggplant	\$330	Im
03/04/20			n/a	Shea &Company
01/21/20	digital.ar		n/a	Shea &Company
12/30/19	vm ware [*]	Pivotal	\$2,700m	
04/30/19	FRANCISCO PARTNERS	PERFORCE	n/a	Shea &Company
01/22/19	PERFORCE	≇Rogue ₩ave	n/a	Shea &Company
12/05/18	THOMABRAVO	VERACODE	\$950	Im ^[a]
10/08/18	PERFORCE	Perfecto	n/a	Shea &Company

Note: Shaded deals represent Shea & Company advised transactions For updated transactions, valuations and multiples, please see the <u>Shea &</u> <u>Company quarterly report</u>



DevOps & Software Development Tools Market Trends & Landscape Recent Capital Raise Activity



Source: Shea & Company and 451 Research

- DevOps funding continues at a record pace as the proliferation of new tools and use cases drives growth across all subsectors
- Driven by the numerous market trends outlined previously, and in particular the purchasing power now wielded by developers, new dev-focused subsectors have emerged from what was previously Ops domain (Release Automation/Orchestration, CI/CD, Application Performance Monitoring, etc.) or QA/CoE domain (Testing & Test Management)
- Automation is another key driver of funding spanning subsegments

 as the talent shortage continues to grow and companies become ever more software-reliant and software-centric, opportunities to automate across the DevOps lifecycle enable customers to see increased efficiency and productivity, and therefore gain a competitive edge

[a] Source: Pitchbook

Shea -

& Company

Other data from publicly available sources

Amount Date Company Investor Raised VERACODE 04/29/22 \$2.500m TAASSOCIATES Sharness NORWEST 04/26/22 \$230m X 12/13/21 Airtable \$735m cloud 12/09/21 \$245m miro 🕷 ICONIQ 12/08/21 \$400m snyk **TIGER**GLOBAL 09/09/21 \$530m INSIGHT bubble 07/27/21 \$100m BOND 06/15/21 BrowserStack \$200m **INSIGHT** 04/20/21 Octopus Deploy \$173m^{Shea} Company 04/07/21 Ppitango SUSQUEHANNA \$75m ουρο ION 03/10/21 \$135m snyk Accel TIGER 03/10/21 \$300m VOLITION Creatio \$68m Shea 02/22/21 Horizon Capital INSIGHT 📀 COPADO 02/17/21 \$96m **SIVP** Quali 01/19/21 \$54m VISTA Shea & Company 10/21/20 📩 SMARTBEAR. n/a

Select Capital Raises (\$ million)

Note: Shaded deals represent Shea & Company advised transactions For updated transactions, valuations and multiples, please see the <u>Shea &</u> <u>Company quarterly report</u>

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A ATLASSIAN

Theme: Collaboration & Issue Tracking

Atlassian provides software development and collaboration tools to help teams conceive, plan and launch products. The company's Jira product is a project management and issue tracking tool that helps product teams manage issues, bugs, tasks and deadlines. Confluence is a content collaboration tool enabling teams to create, share and discuss documents and media. In 2015, the company raised \$462 million via IPO.

Employees: 13,089

Key Executives: Mike Cannon-Brookes (Co-CEO), Scott Farquhar (Co-CEO), Anu Bharadwaj (COO)

Investors: Currently publicly traded with \$48.6b Market Capitalization



Theme: Infrastructure Automation

Chef provides cloud infrastructure automation solutions. Its open source systems integration framework aims to help software developers and engineers manage both on-premises and cloud server provisioning by writing code. Compared with its competitors, it uses a developer-oriented language to build the code or rules.

Employees: 168

Key Executives: Yogesh Gupta (CEO), Anthony Folger (CFO) Investors: Acquired by Progress

⊙ circleci

Theme: CI/CD

CircleCi is a developer of a continuous delivery automation platform designed to offer automated testing and continuous integration tools. The company's continuous integration platform helps developers to rapidly code, for web and mobile applications by automating the build, test and deployment process quickly, safely and at scale, enabling businesses to detect and fix bugs before they even reach customers.

Employees: 665

Key Executives: Jim Rose (CEO), Chitra Balasubramanian (CFO)

Investors: Base10 Partners, Eleven Prime, NP Capital, IVP, Lars Kamp, Sapphire Ventures

cloud

Theme: Application Release Orchestration

Cloudbees offers a cloud-based platform designed to provide software delivery of businesses. The company's platform provides a wide range of continuous delivery services, enabling businesses to meet the unique security, scalability and manageability needs. The end-to-end automated software delivery system allows companies to balance governance and developer freedom.

Employees: 486

Key Executives: Sacha Labourey (CEO & Founder), Audrey Zhao (CFO)

Investors: Bridgepoint Capital, Eight Roads, Goldman Sachs, Morgan Stanley, HSBC Ventures, Ascent Ventures, Delta-v Capital, Unusual Ventures, Verizon Ventures, Lightspeed Venture Partners, Matrix Partners

DATADOG

Theme: Application Performance Monitoring

Datadog Inc is a monitoring and analytics platform for developers, IT operations teams and business users. Its platform integrates and automates infrastructure monitoring, application performance monitoring and log management. The solutions offered by the company include Financial Services, Manufacturing & Logistics, Media & Entertainment and Gaming among others.

Employees: 4,288

Key Executives: Olivier Pomel (CEO), Alexis Lê-Quôc (CTO & Co-Founder)

Investors: Currently publicly traded with \$29.3b Market Capitalization

Theme: End-to-End DevOps Platform

CollabNet VersionOne's upstream Agile planning and enterprise version control functionality is united with XebiaLabs' downstream release orchestration and deployment automation capabilities and Arxan's application security suite to create an end-to-end platform for enterprise DevOps, now known as Digital.ai. The company provides end-to-end intelligent value stream management, software delivery, and application security in a unified platform.

Employees: 762

Key Executives: Stephen Elop (CEO), Prasenjit Dasgupta (CFO) Investors: TPG Capital

GitHub

Theme: Source Code Repository & Management

GitHub provides a social network platform for programmers to share code with friends, co-workers and complete strangers, making it easier for individuals and teams to write better code, faster. The solution is built for software development projects using the Git revision control system and offers paid plans for private repositories and free accounts for open source projects.

Employees: 4,597

Key Executives: Thomas Dohmke (CEO), Erica Anderson (CRO), Chris Hidalgo (CFO)

Investors: Acquired by Microsoft

HashiCorp

Theme: Infrastructure Automation

Developer of cloud infrastructure automation platform designed to solve development, operations and security challenges in infrastructure. The company's platform provides consistent workflows to provision, secure, connect and run infrastructure for any application so as to help enterprises address the realities of multi-cloud, enabling organizations to adopt workflows to provision, secure, connect, and run any infrastructure for any application. In 2021, the company raised \$1.2 billion via IPO.

Employees: 2,273

Key Executives: Mitchell Hashimoto (Co-Founder), Armon Dadgar (CTO & Co-Founder), Dave McJannet (CEO)

Investors: Currently publicly traded with \$5.9b Market Capitalization



Theme: UI/UX Design

Infragistics provides tools and solutions to accelerate application design and development, insights and collaboration for any organization. Infragistics' UX and UI toolkits help rapidly prototype and build high-performing applications for the cloud, web, Windows, iOS, and Android devices. Infragistics Business Tools solutions, ReportPlus and SharePlus, give business users the latest advancements in selfservice business intelligence and collaboration software.

Employees: 190

Key Executives: Dean Guida (CEO & Founder), Chris Rogers (CFO) Investors: n/a



Theme: Requirements and Test Management

Jama provides a product delivery platform that helps companies bring complex products to market. The company's collaborative solution integrates requirements and test management. Distributed teams can join real-time discussions, propose edits, flag issues and electronically sign-off on requirements. All documents reside in one centralized place and documents and product details can be reused on future products.

Employees: 241

Key Executives: Marc Osofsky (CEO) Investors: Insight Partners



Theme: End-to-End DevOps Platform

Provider of end-to-end DevOps platform for accelerating and optimizing enterprise software delivery. The company's platform spans centralized artifact repository management for all types of binaries and container images; security vulnerability and licenses compliance scanning enabling DevSecOps; CI/CD pipeline automation; and private, secured CDN for distribution of applications from any source to any deployment target. Offered as a self-hosted or cloud SaaS solution. In 2020, the company raised \$509 million via IPO.

Employees: 1,224

Key Executives: Shlomi Ben Haim (CEO & Co-Founder), Yoav Landman (CTO & Co-Founder)

Investors: Currently publicly traded with \$2.2b Market Capitalization

outsystems

Theme: Low-code Platform

OutSystems provides low-code development with advanced mobile capabilities, enabling visual development of entire application portfolios that easily integrate with existing systems. Comprehensive metadata models enable configuration of application layers like business processes, integration workflows, UIs, business logic, data models, web services and APIs. Applications are developed using native desktop tools and deployed on-premises, or in a private or public cloud, and are usable with Web and mobile devices.

Employees: 2,052

Key Executives: Paulo Rosado (CEO), Tim MacCarrick (CFO) Investors: KKR, Goldman Sachs

PERFORCE

Theme: End-to-End DevOps Platform

Perforce provides a versatile software development platform for implementing fast and scalable continuous delivery. The Perforce product is applicable in a variety of industries and allow for hybrid version control for both distributed and centralized workflows, collaboration for both technical and non-technical staff, change history tracking and enterprise Git management for more complete Git management and social code review.

Employees: 788

Key Executives: Mark Ties (CEO & President), Mike Goergen (CFO) Investors: Antares Capital, Clearlake Capital, Francisco Partners

puppet

Theme: Infrastructure Automation

Puppet Labs provides IT automation software. The company's products, Puppet and Puppet Enterprise, allow companies to automate configuration management and infrastructure, cut costs and help organizations better handle infrastructure management at scale. Its solutions use a simple declarative language that system administrators find easy to use.

Employees: 494

Key Executives: Luke Kanies (CEO), Paul Heywood (CRO)

Investors: Acquired by Perforce

POSTMAN

Theme: API Lifecycle Management

Provider of a collaboration platform designed to offer application program interface. The company's platform creates and sends HTTP requests, creates collections and folders to group requests logically, save requests, switches contexts and customize with scripts to simplifying collaboration across your teams and organizations, enabling developers to build application programming interface and improve developer productivity.

Employees: 1,258

Key Executives: Abhinav Asthana (CEO & Co-Founder), Ankit Sobti (CTO & Co-Founder)

Investors: Battery Ventures, Bond Capital, Coatue Management, Insight Partners

📭 quickbase

Theme: No-Code Platform

QuickBase provides a low-code development platform enabling businesses to create, customize and deploy business applications of all sizes, without compromising IT governance and controls. QuickBase is based on a public cloud-only, multi-tenant, sharedresource, cloud-native architecture. QuickBase also offers access to hundreds of prebuilt apps, which businesses can use either off-theshelf or as a design-pattern for their own custom applications.

Employees: 738

Key Executives: Ed Jennings (CEO), Steve Webber (CFO) Investors: Vista Equity Partners



SAUCELABS

Theme: Test Automation

Sauce Labs provides a cloud-based mobile and web-testing platform, based on popular open-source testing tools for the web (Selenium), JavaScript (Jasmine, QUnit, YUI Test, Mocha) and mobile (Appium). The company's automated testing platform lets users run functional and unit tests on their native mobile applications, mobile web applications and desktop applications across multiple browsers in parallel without setting up or maintaining test infrastructure.

Employees: 480

Key Executives: Aled Miles (CEO), Abel Matthew (CTO)

Investors: Adams Street, Centerview Capital, IVP, Riverwood Capital, TPG

SMARTBEAR.

Theme: Test Automation & Management

SmartBear provides a suite of tools for developers, testers, and operations professionals for all stages of software development, from software development, to QA & testing, to web & app monitoring. The firm provides code review, automated testing, performance/load testing, API testing, performance profiling and development management tools. SmartBear's tools are highly flexible, and can be used for desktop, mobile, Web and cloud-based applications.

Employees: 832

Key Executives: Frank Roe (CEO), Bryce Chicoyne (CFO & COO), Dann Faulkner (CPO)

Investors: Francisco Partners, Vista Equity Partners

X Tricentis

Theme: Test Automation & Management

Tricentis provides software testing products that enable enterprises to achieve unprecedented automation rates while minimizing businessrelated risks. The solutions empower organizations to systematically align software testing with business needs, so they can harness technology change while optimizing cost and efficiency. The company's testing solution encompasses risk-based testing, test data management and provisioning, service virtualization and quality assurance services.

Employees: 1,345

Key Executives: Kevin Thompson (CEO), Dave Hafner (CFO)

Investors: Insight Partners, Fulcrum Equity Partners



Theme: DevSecOps

WhiteSource is a developer of an open-source security platform designed to provide security by combating associated vulnerabilities. The company's platform fully automates the entire process of open source components management, including real-time security alerts on vulnerable components, enabling clients to ensure the continuity and integrity of open source management and reduce respective risks.

Employees: 337

Key Executives: Rami Sass (CEO & Co-Founder), Ron Rymon (Executive Chairman & Co-Founder) Investors: Pitango Ventures, Susquehanna Growth Equity, M12

DevOps & Software Development Tools Market Trends & Landscape The Leading Advisor in DevOps and Application Development

DevOps & DevTools are core competencies for our firm; we have been among the most active advisors (if not the most active), completing multiple market-defining transactions with leading companies spanning the software development lifecycle

Thought Leader in the DevOps Market

- We have completed transactions across the market, working on both buy-side and sell-side engagements, and interacting regularly with all of the relevant players in these sectors to deliver superior outcomes and support market developments
- Established recurring dialogue with the leading private equity investors, strategic acquirers, and market leading companies in the DevOps ecosystem
- Multiple active mandates spanning the DevOps lifecycle provide holistic industry knowledge and connections to achieve a desired outcome
- Comprehensive DevOps industry insight developed using the latest data gathered from industry practitioners

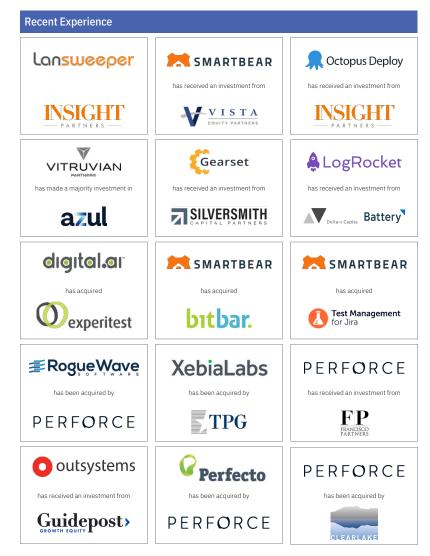
Dedicated Shea & Company DevOps Team

Chris Pingpank Managing Director cpingpank@shea-co.com

William Broughton Vice President wbroughton@shea-co.com

Henry Foster Analyst hfoster@shea-co.com

Glen Oh Analyst goh@shea-co.com



Shea & Company Overview **About Our Firm**

2 \$40Bn+ 40% 1 33 Professionals focused on the Firm focused exclusively on Offices in Boston and San Advised aggregated enterprise software Francisco software industry transaction value Border Component

Transactions with a Cross-

Transactions completed representing billions of dollars in value

125 +

Mergers & Acquisitions, Private Placements & Capital Raising

Shea & Company has advised on important transactions representing billions of dollars in value across the strategic acquirer and financial investor landscape with clients in the U.S. as well as Canada, Europe and Israel.

A compare served as the exclusive financial advisor to Octopus Deploy	SMARTBEAR has received an investment from VISTATIVE EQUITY PARTNERS Shea & Company served as financial advisor to SmartBear and Francisco Partners	Lonsweeper has received an investment from INSIGHT PARTNERS PARTNERS	Perfecto has been acquired by PERFORCE Shea & Company served as the exclusive financial advisor to Perfecto	As acquired bitbar . Shea & Company sorved as the exclusive financial advisor to SmartBear	Pingldenttty has received a strategic investment from CAPITAL PARTNERS CAPITAL PARTNERS CAPITAL PARTNERS CAPITAL PARTNERS CAPITAL PARTNERS	o outsystems has received an investment from Guidepost> Shea & Company served as the exclusive placement agent
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