THE STATE OF THE **Software Testing Profession 2016–2017**

Results from the Second Annual Survey

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Executive Summary

In 2016, we heard less buzz about agile methods and more about DevOps and "continuous everything," including continuous delivery, continuous integration, continuous deployment, and continuous testing. The 2015 State of the Software Testing Profession survey showed that DevOps and test automation were at the forefront of many respondents' minds. In the 2016–2017 report, we confirm that this continues to be true.

While our inaugural survey established benchmarks for attitudes, predictions, and the current state of the software testing profession, the results of TechWell's second annual survey show the role of tester continues to evolve and adapt thanks to the increasing influence of automation, DevOps, and agile. Responsibilities and skill sets are still expanding to include more technical skills and domain knowledge. And, most importantly, the role of tester seems to be holding strong for the foreseeable future.

About the Survey

TechWell conducted an online survey for six weeks in May and June 2016 and at the STAR*EAST* testing conference in May 2016. Data was collected from 1,096 software professionals, including testers, managers, developers, analysts, and consultants representing more than thirty industries.

See Appendix 1 and 2 for respondents' detailed demographic and organizational information.

Key **Findings**

Top Three Takeaways

- 1. Testing (still) Isn't Dead
- 2. It's an Automated World; We Just Get to Live in It
- 3. Agile and DevOps: Keeping It Continuous

1. Testing (still) Isn't Dead

Our survey showed once again that the testing profession remains pretty healthy. In fact, 80% of respondents disagree with the notion that testing as a profession is dying, and 82% are pushing for "tester" to remain a distinct role. Respondents almost unanimously agree that as long as humans create software, we will need humans to test it. (Fig. 1)

Hiring managers are still on the hunt for software testers. Almost 80% of respondents say their organization maintained or added to the number of testers it employs within the past year, while only one-fifth of respondents say their organization reduced the number of testers. These numbers are essentially unchanged from the previous year's results. (Fig. 2)

Looking ahead, 90% of respondents are confident their organization will continue to employ individuals specifically for testing, i.e., those with "test" in their job titles. (Fig. 3)

"I became a tester by accident. After a career break, I applied for a development job and was offered a temp role in testing while they assessed whether I was good enough to do development. I discovered that I preferred testing." —Software tester

Do you agree or disagree with the following statements?



2. It's an Automated World; We Just Get to Live in It

One of the most cited causes of change to the tester role is the increased call for testers to become more technical. These technical skills are especially in demand as automation becomes a must-have rather than a "nice-to-have."

More than half of respondents focus their personal testing efforts on automation (Appendix 1), and 59% report that they are doing more system-level automation work. (Fig. 4) More than a third say their job responsibilities have changed recently due to the need for more automation (Fig. 5), and almost half expect to take on more technical work in the coming year. (Fig. 6) In fact, more than half of respondents have been specifically tasked by management to increase their knowledge of automation in the near term. (Fig. 7)



How has your testing role changed in the past 12 months?

What drove the changes in testing tasks? (Respondents could select more than one answer)



Fig. 5



How do you expect your job responsibilities to change in the next 12 months? (Respondents could select more than one answer)

What new knowledge does your supervisor expect you to acquire in the next 12 months? (Respondents could select more than one answer)



We found little change in the number of unit and integration tests being automated since last year, but the percentage of respondents who automate at least half of their system testing has almost doubled since the 2015 survey. There has also been a significant increase in automated acceptance testing. In 2015, 65% of organizations did not automate acceptance testing. In 2016, that number dropped to 39%. (Fig. 8)

For each test stage, w	hat percentage of	f your team's test	ing efforts are automated?

	None	1% to 24%	25% to 49%	50% to 74%	75% or more
Unit testing	32%	34%	9%	9%	16%
Integration testing	29%	41%	12%	10%	8%
System testing	22%	40%	17%	13%	8%
Acceptance testing	39%	34%	11%	8%	8%

3. Agile and DevOps: Keeping It Continuous

Agile lifecycle models continue to grow in popularity. More than half of respondents report that the amount of work they did as part of an agile team has increased (Fig. 4). More than a third are expected to become proficient in agile methods over the next year, which is an increase of 25% from 2015. (Fig. 7)

In 2016, we saw more teams using Scrum, kanban, and other agile models, and a decrease in both waterfall and agile-waterfall hybrids. (Fig. 9) In fact, 40% of respondents reported changes to their testing role as a direct result of their team moving to agile (Fig. 5), and nearly a third anticipate changes in the coming year. (Fig. 6)

	2015	2016
Agile—Scrum	36%	44%
Agile/Waterfall Hybrid	24%	22%
Waterfall	15%	11%
Agile—Other	5%	8%
Other	13%	7%
Kanban	2%	5%
V-model	5%	3%

What primary lifecycle model does your team use?

Fig. 9

Between organizations of every size embracing agile methodologies and increased DevOps adoption, continuous everything is the name of the game. This year's survey shows growth in implementation of continuous integration, continuous delivery, and continuous testing. (Fig. 10)



Which of these DevOps practices do you currently implement or plan to implement in the next 12 months?

(Respondents could select more than one answer)

Current Trends and **Future Outlook**

How did we get here?

Testing continues to be a labor of love. Almost a third of respondents were led to testing as a profession simply because they are passionate about the craft. Other popular paths to testing include the opportunity to use business knowledge (17%) and being "volun-told" to test by management (16%). (Fig. 11)



Why did you first become a tester or test manager?



Prior to becoming testers, a quarter of respondents worked as developers or programmers, while 16% claim "tester" as their first job. These results suggest that testing continues to be a great gateway to a software development career. They also illustrate the applicability of technical skills to testing, which this survey shows are fast becoming a requirement for the tester role. (Appendix 1) While a college degree is basically a must to get a good job these days, college courses remain the least cited source of testing knowledge. Half of respondents say they developed their testing skills the old-fashioned way—through trial and error and by reading books. Almost three-quarters learned on the job, and about a quarter got their knowledge from either instructor-led, web-based, or virtual training. (Appendix 1)

Do you want to continue your testing career?

Yes: "What happens when I do this?" is in my very DNA! I believe in continuous training as well as continuous testing." —Test analyst No: "I have evolved beyond testing as a career and am now looking at Quality as a whole. Specifically, my passion is in designing ways to create quality software (creating the right product and creating the product right)." —Project manager Undecided: "The current trend believes that there is not an individual skill set required to test, only a tool set, and I do not agree with that philosophy. I believe it requires both." —Lead system analyst

Where do we go from here?

Respondents overwhelmingly want to continue their testing careers. Three-quarters plan to stay within testing, while 6% want to get out and 18% aren't sure yet. (Fig. 12)

While this commitment to the craft indicates the testing profession is not dying, there is no doubt that it is changing. Ninety percent of respondents agree that the role of tester must adapt to the modern software development environment. (Fig. 1) As noted in the Key Findings section, today's testing environment is increasingly influenced by automation and agile. And according to this year's survey, this trend toward increased technical skills and agile methods is expected to continue, at least for the next few years. (Fig. 13)





What do you see as the biggest trend for the testing profession in the next five years?



Fig. 13

In 2016, the number of global mobile devices and connections grew to 8 billion, up from 7.6 billion in 2015. [1] So, it's pretty safe to say that, sooner or later, a lot of testers will find themselves working on some sort of mobile device or application. But how prepared are today's testers for the onslaught of mobile? About one-third of respondents say they are very ready, having both the skills and the tools needed for mobile testing. This is up from a quarter of respondents the previous year. (Fig. 14)

However, 31% say they have the skills but not the tools they need to test. And more than one-fourth of respondents are completely unprepared for the

deluge of mobile devices, reporting that they lack both the skills and the tools to test mobile. On the bright side, in 2015, almost 40% of respondents lacked the knowledge and the tools for mobile testing, so we are seeing improvement as the need for skilled mobile testers increases.

The demand for and lack of these skilled testers ranks high on the list of mobile testing challenges. The most common roadblocks to mobile testing include not enough emulators, representative devices, and other tools; not enough people on the team with mobile-specific knowledge; and not being able to automate mobile tests. (Fig. 15)



Are you equipped with the skills, knowledge, and tools necessary for mobile testing?

What is your biggest mobile testing challenge?





Effects on quality

With all these changes afoot in the testing world, it's interesting to look at how quality is being affected.

While 28% of respondents have seen no change in defect occurrences in their products, more than half report a decrease in post-release defects over the past twelve months. (Fig. 16) Of those who reported fewer defects, the most common reasons cited for the improvement are increased automation and regression testing, greater focus on quality within the organization, and the adoption of agile practices.

Similarly, almost one-third of respondents saw no change in the number of features or stories delivered, and more than half of respondents saw an increase. (Fig. 17) Reasons cited for the greater speed of production-ready releases include pressure from customers and upper management, streamlined processes due to agile adoption, and increasing the number of developers on a project. [Interesting side note: 45% of respondents have noticed an increase in the quality of the code they receive from developers. (Fig. 18)]

Where do you see testing in five years?

"People in the test role will have to become more strategic to design testing solutions. They will also have to become more technical to implement automation testing frameworks." —Test architect

"It may split into two roles: One role taking on more of a business orientation and skillset and focusing on test design and planning and the other taking on more technical skills to enable more test automation and integration with the business logic." —Developer/programmer

"Still testing. No automation can replace specific types of testing, and automation is never as simple as click and record, so it can't be easily used by unskilled testers." —Quality assurance supervisor

"I see the tester role more tightly integrated with the developer role as well as the architect role—architecting and developing code that is inherently more testable—and continuing as the technical customer/user advocate on the project." —Test automation engineer

"More closely aligned with developers regarding test automation. From an agile perspective, much more of a system analyst/ engineer involved during all phases of product development." —Test lead





Conclusion

Once again we find that testing is not at death's door. In fact, it remains a valued part of many organizations.

Influenced largely by agile methodologies, DevOps principles, and the push to automate, testers are noticing steady changes to the traditional testing environment, but most are willing to adapt to the new way of working. Testers continue to broaden their skill sets, hone their coding knowledge, and increase their domain expertise in order to stay professionally competitive.

As mobile and embedded technology, the Internet of Things, and AI become more pervasive in our personal and professional lives, who knows what additional challenges and opportunities testers will face over the coming years. TechWell will continue to seek input from the testing community to track the current state of testing and spot upcoming trends so we can provide a comprehensive, databacked resource for tracking the health of the software testing profession.

Take the 2017–2018 State of the Testing Profession survey now. CLICK HERE

About TechWell Corporation

TechWell Corporation focuses on helping software developers, testers, and managers improve development and delivery practices.

Through respected <u>software conferences</u>, expert-led <u>training classes</u>, and in-depth <u>online resources</u>, TechWell offers multiple ways to learn about methods, technologies, and tools software professionals need to design, develop, test, and deliver great software.

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Acknowledgments

Thanks to everyone who took the time to complete the survey. Your input is invaluable to helping us understand the changing role of the tester and to track data trends in the future. Special thanks to the TechWell survey review panel. Your insight, suggestions, and expertise are always welcome.

References

[1] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021 White Paper http://www.cisco.com/c/en/us/solutions/service-provider/visual-networking-index-vni/index.html

Appendix 1 **Demographics**

WHAT IS YOUR PRIMARY JOB FUNCTION?

Test manager 15%
Test lead 14%
Quality assurance manager 12%
Quality assurance engineer 10%
Test analyst 10%
Quality assurance analyst
Test automation engineer
Other
Software manager/director4%
Test architect
Agile coach/ScrumMaster
Developer/programmer
Independent consultant
Project manager
Business analyst

WHAT IS THE FOCUS OF YOUR PERSONAL **TESTING EFFORTS?**

(Respondents could select more than one answer)

Functional system testing	78%
Regression testing	74%
Exploratory testing	61%
Automation	54%
Integration testing	52%
User acceptance testing	52%
Usability testing/user experience	51%
Load/performance testing	32%
Build verification testing	27%
Security testing	23%
Unit testing	18%
Other	.5%
None	.4%

HOW MANY YEARS OF EXPERIENCE DO YOU HAVE IN TESTING?

More than 15	37%
11 to 15	20%
6 to 10	26%
3 to 5	11%
0 to 2	6%

HOW DID YOU FIRST DEVELOP YOUR **TESTING KNOWLEDGE?**

(Respondents could select more than one answer)

On the job from other testers 72%
Trial and error 52%
Books about testing 48%
Articles and blogs about testing 43%
Instructor-led training 29%
Conferences 26%
Web based/virtual training 21%
Tutorial videos (YouTube, etc.)
College courses 15%
Other

WHAT WAS YOUR JOB BEFORE GETTING INTO TESTING?

Developer/programmer 25%
Other 23%
Nothing, testing is my first job 16%
Technical support 14%
Business analyst
Business user
Quality assurance analyst
Project manager
Software manager/director2%
Quality assurance manager1%

DO YOU HAVE A TESTING CERTIFICATION?

Yes	• • •	•				•	•																		•	•	•	•		•		43	3%
No.	•••	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	57	′%

IF YOU ARE CURRENTLY CERTIFIED, DO You plan to obtain additional testing Certifications in the Next 12 Months?

Yes	22%)
No	51%)
Undecided	27%)

IF YOU AREN'T CURRENTLY CERTIFIED, Do you plan to obtain certification in the Next 12 Months?

Yes	21%
No	49%
Undecided	30%

Appendix 2 Testing in the Organization

WHAT PRIMARY LIFECYCLE MODEL DOES YOUR TEAM USE?

Agile—Scrum 44%
Agile/Waterfall Hybrid 22%
Waterfall 11%
Agile—Other
Kanban
V-model
Other
Iterative (e.g., RUP)2%
Scrum-But

WHAT ARE THE PRIMARY TECHNOLOGIES TESTED BY YOUR TEAM OR ORGANIZATION? (Respondents could select more than one answer)

Websites	70%
Web services	63%
Client/server	50%
APIs	46%
Mobile apps (e.g., smartphones, tablets)	46%
Database/big data	37%
Packaged applications	
(e.g., SAP, Oracle, Lawson, etc.)	20%
Mainframe	17%
Embedded systems	14%
Internet of Things/wearables	6%
Other	5%

ON AN AVERAGE PROJECT, WHAT PERCENTAGE IS TESTING OF THE TOTAL EFFORT?

75% to 100%	.7%
50% to 74%	21%
25% to 49%	40%
10% to 24%	28%
1% to 9%	.4%
0%	.0%

WHICH TESTING APPROACHES DO YOU USE REGULARLY? (Respondents could select more than one answer)

Requirements-based testing 85%
Exploratory testing 81%
Risk-based testing 55%
Boundary analysis and equivalence
partitioning 52%
Acceptance test-driven development 44%
Test-driven development 34%
Structural—white box testing 28%
Static analysis 27%
Combinatorial techniques
Context-driven testing 25%
State transitions 22%
Decision tables 20%
Model-based testing 14%

WHAT TOOLS AND SOFTWARE DOES YOUR TEAM USE TO SUPPORT TESTING? (Respondents could select more than one answer)

Defect- or incident-tracking software 58%
Open source functional testing software (e.g., Selenium)
Text documents and spreadsheets
Scripting languages
Commercial functional testing software (test execution)
Programming languages
Web browser developer tools
Continuous integration software
In-house developed functional testing software
Commercial performance testing software (e.g., LoadRunner)
Debugging software
Open source performance testing software (e.g., JMeter)
Static analysis (code scanning) software
Continuous deployment software
Cloud-based testing software (e.g., for virtualization or for mobile testing)
In-house developed performance testing software
Test data generation software
Other

APPROXIMATELY HOW MANY EMPLOYEES ARE IN YOUR ORGANIZATION?

1000 or more	14%
500 to 999	1%
100 to 499	25%
0 to 992	20%

WHAT IS YOUR ORGANIZATION'S PRIMARY INDUSTRY?

Software development / testing services
Financial services / banking / insurance
Computer software / software-as-a-service
Other
Healthcare / pharmaceuticals / biotech
Government
Other business services / consulting / nonprofit
Manufacturing / utilities / communications (non-computer) 4%
Education
Media / marketing / advertising
Retail
Computer manufacturer (hardware, peripherals, etc.)
Travel / hospitality / recreation / entertainment
Transportation / logistics / aerospace
Computer services (web hosting, integrator)1%
Construction / architecture / engineering / real estate