The State of the
Software Testing Profession 2015–2016
Results from the Inaugural Survey

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Summary

In 2011, Alberto Savoia famously declared testing to be dead [1]. Since then, we have seen the further mainstreaming of agile methodologies, the push for increased test automation, a focus on continuous delivery, and the infiltration of "smart" everything into all facets of our lives.

So, where does this leave today's testers—and, perhaps more importantly, where is the testing profession headed?

Executive Summary

The inaugural TechWell State of the Testing Profession survey sets a baseline measurement of attitudes about the testing profession, with an eye toward repeating the survey annually to track trends and changes. The survey not only collected data on the current state of testing, but it also gathered feedback on evolving tester roles and responsibilities, new skills and knowledge requirements, and opinions on the outlook for the testing profession.

The data collected from 529 software professionals, including testers, managers, developers, analysts, and consultants, suggest that the testing profession isn't going away; it's just going to be different. See appendices 1 and 2 for respondents' detailed demographic and organizational information.

Testing is at a crossroads. With widespread agile adoption, the proliferation of mobile and embedded technology, the rising popularity of DevOps, the demand for increased automation and technical skills, and the push for testers to become domain experts, these initial survey results provide an invaluable starting point for tracking the ongoing fitness—or failure—of the testing profession.

Key **Findings**

State of the Testing Profession Survey: Key Findings

1. Testing isn't dead
2. Organizations are employing testers—and will continue to do so
3. Tester roles and responsibilities are evolving
4. Testers want to keep testing
5. DevOps and mobile continue to grow and challenge testers
6. Quality is up; post-release defects are down

1. Testing isn't dead

So, is testing dead? According to 84% of survey respondents, the short answer is no. Additionally, respondents almost universally believe that as long as humans are accountable for software, we will need testers, and more than 75% of participants support "tester" remaining a distinct role within a team. (Fig. 1)

While it's true the tester role doesn't appear headed for extinction (as stated previously, half of respondents said their organizations added testers in the past twelve months, and most think they will continue to employ testers [Figs. 3 & 4]), it does appear to be headed in a different direction. Almost all respondents agree that the role of tester needs to be transformed, with 71% predicting a shift toward more technical testers and 70% noting how the widespread adoption of agile practices is significantly changing how testers work. (Fig. 1)

Where do you see testing in five years? (Fig. 2)

"Testing is a broad discipline. I believe we will see more maturity around automated approaches and perhaps more distinction between manual/automated/performance—all of these should be recognized as specialities in their own right."
—Performance Test Analyst

"Ensuring the end product is accepted and adopted by the user group. Particularly in our environment of inward facing applications, stakeholder/scope management has become a critical part of ensuring the systems are deployed on time and budget."
—Test Manager

"Pretty similar to where it is now. But with agile being the popular trend, testers can't be isolated, but need to be integrated within the development teams. I feel that the testing role will still remain the role that ensures quality prevails."
—QA Analyst

"The boundary between tester and software engineer will have dissolved completely."
—ScrumMaster

"More coordination and support of non-QA doing testing, more poly-skilling, more automation, more analysis and coordination of process improvements."
—QA Manager

"Less pronounced within IT sector, more blended with development roles. 'Tester' will be more well known as a term on the business/UAT side."
—Test Manager

Do you agree or disagree with the following statements?

DISAGREE | **AGREE**

84% | 12%
Testing as a profession is dying. We will not need the full-time tester role within 10 years.

7% | 91%
The role of tester must be transformed to meet the needs of today's software development projects.

16% | 77%
Tester should be a separate role within a team.

49% | 38%
The role of tester in my organization has not changed significantly in the past five years.

6% | 91%
As long as humans are accountable for software creation, we will continue to need the tester role.

20% | 70%
As organizations embrace agile, the role of tester changes significantly.

19% | 71%
The tester role must become more technical (programming skills) to serve the demands of agile teams and evolving technologies such as mobile and embedded.

Fig. 1

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

- Need for testers to become more technical
- Move from traditional to agile approaches
- Increasing importance of mobile and embedded systems
- Need for testers to become domain experts
- Move to cloud computing
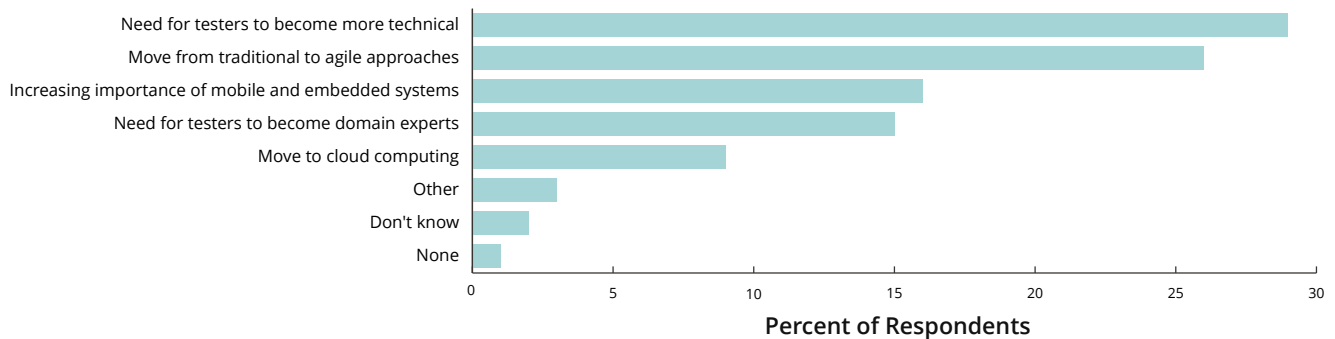- Other
- Don't know
- None

Percent of Respondents

Fig. 2

5

2. Organizations are employing testers—and will continue to do so

Survey results indicate that job prospects look good for testers. In the twelve months preceding the survey, many organizations increased the number of testers they employ. Almost half of respondents report their organizations added testers, (Fig. 3) and looking ahead another twelve months, 71% of respondents expect their organizations to continue to employ testers. (Fig. 4)

Has your organization added or reduced the number of testers in the past 12 months?

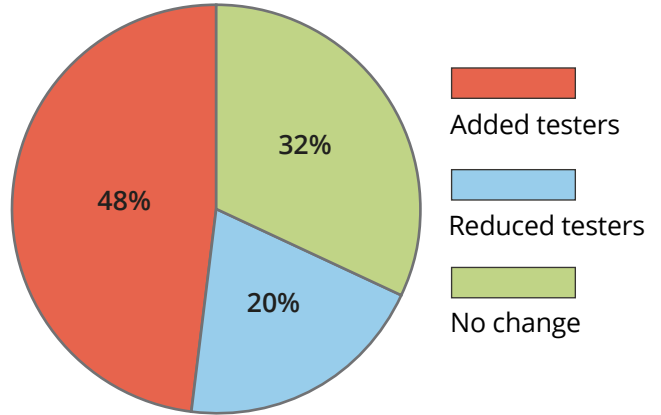32%

48%

20%

Added testers

Reduced testers

No change

Fig. 3

In the next 12 months, do you think your organization will continue to employ people in test-specific roles?

7%

13%
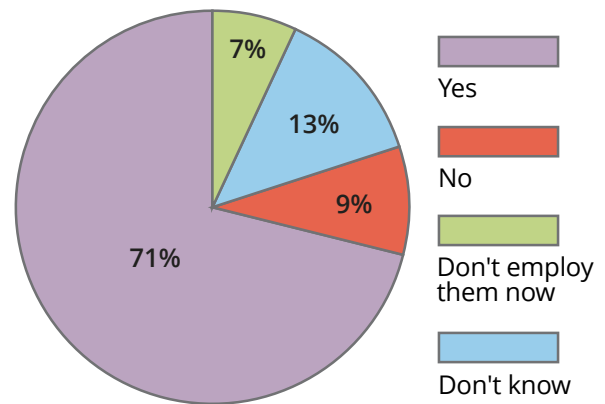
9%

71%

Yes

No

Don't employ them now

Don't know

Fig. 4

3. Tester roles and responsibilities are evolving

To butcher a phrase: Testers, they are a-changin. Looking ahead over the next twelve months, it is clear that many respondents expect at least some changes to their job responsibilities. (Fig. 5) Three common reasons cited for the evolution of the tester role are adoption of agile methodologies; a general push toward more automation, requiring greater technical proficiency; and the need for greater business and domain expertise. (Fig. 6)

Agile

With 75% of respondents currently using some type of iterative methodology, (Appendix 2) it's no surprise that agile is cited as driving a lot of the changes in the tester role.

Half of respondents started doing more work on agile teams in the twelve months preceding the survey, (Fig. 5) and a quarter expect to do more work on agile teams in the next twelve months. (Fig. 7) More than one-third of respondents say definitively that agile changed their role. (Fig. 6)

Automation/Technical skills

Almost 70% of participants say they are automating more at either the unit or system level. (Fig. 5) One-third speculate that they will need to develop their automation and other technical skills over the next year, (Fig. 7) while another third state their role has already changed as a result of increased automation demands. (Fig. 6)

Non-testing responsibilities

About half of respondents anticipate they will be expected to gain business expertise or will be asked to perform more non-testing tasks as part of their job. (Fig. 7)

While some respondents are currently only anticipating changes, others have already been tasked by their supervisors to expand their skill sets in the coming year. The career development areas most reported are management and leadership skills (45%), technical automation skills (41%), domain or business expertise (35%), and proficiency in agile practices (25%). (Fig. 8)

Roles and tasks have changed because

"...the need to reduce costs while improving and moving testing to the left, and making testers more technical."
—Quality Assurance Analyst

"...multiple projects requiring more test management and less test execution."
—Test Analyst

"...our small team needs broad expertise and ability to take on many roles."
—Test Architect

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

Doing more

Doing less

No change

Test execution work
Test design work
Test automation work (unit level)
Test automation work (system level)
Work in an agile team
Test lead/management work
Work as an independent tester/in an independent test team

Percent of Respondents
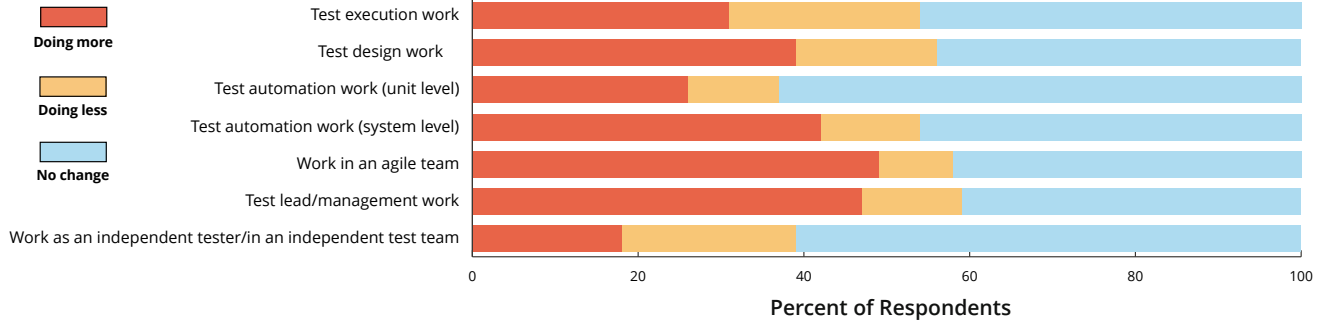
Fig. 5

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

Move to agile team structure	36%
Need for more automation	33%
Need for more business expertise	24%
No changes	18%
Other	17%
Got a promotion	16%
Don't know	2%

Percent of Respondents
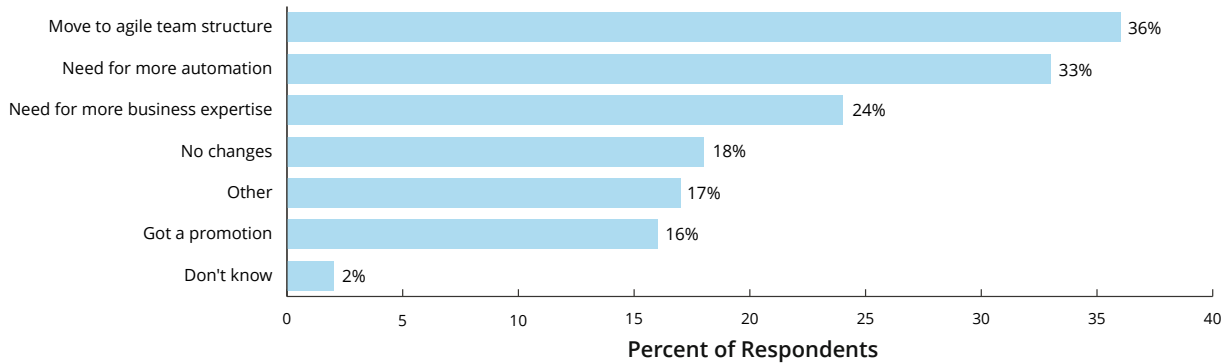
Fig. 6

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

Develop more technical skills	36%
Acquire more business expertise on SUT	27%
No changes	26%
Perform more non-testing tasks as part of an agile team	24%
Don't know	13%
Other	10%
Move out of tester role	6%

Percent of Respondents
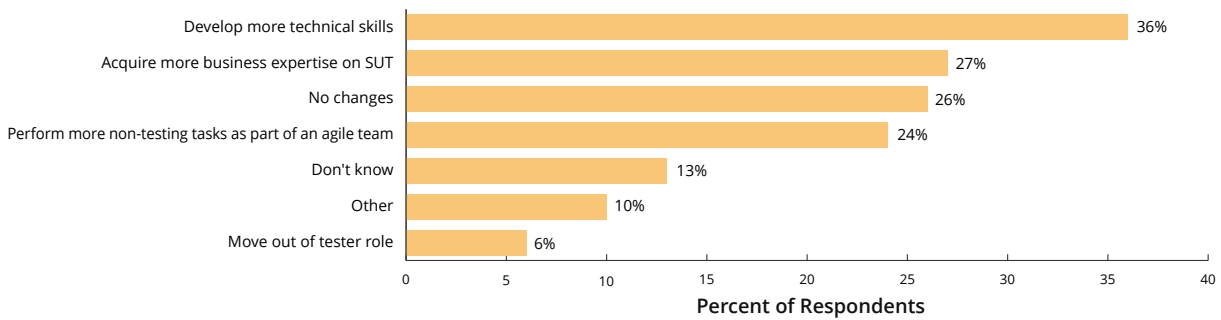
Fig. 7

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

Improve management and leadership skills	45%
Develop technical automation skills	41%
Develop domain or business expertise	35%
Become proficient in agile practices	25%
None	8%
Don't know	8%
Other	6%

Percent of Respondents

Fig. 8

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4. Testers want to keep testing

One-third of respondents say they chose their career because they are passionate about software testing. (Fig. 9) Overwhelmingly, survey participants are devoted to their testing careers, with 75% of testers reporting they want to continue on this path. Only 10% say they want to call it quits, and 15% are undecided whether they want to stay in testing . (Fig. 10)
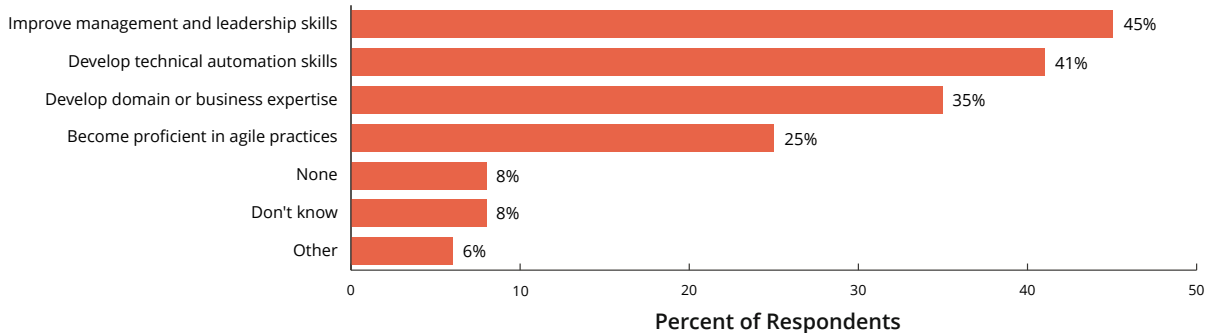
Do you want to continue your testing career?

Yes: "I really enjoy trying to find defects preproduction, coaching newer testers, learning about different development techniques, and getting to work with virtually every area of the business. I think testers are an unsung bridge that connects all the pieces."
—Test Manager

No: "As a test manager, I am often asked to fix a broken development process by fixing the testers. Testing is a piece of the puzzle, but it's not going to fix a broken process."
—Agile Coach

Undecided: "It is changing so much and I don't have direct experience in agile. Perhaps I'm too old for anyone to give me the opportunity to learn."
—Test Manager

Why did you first become a tester or test manager?

Reason	Percent
Testing is my passion	33%
Assigned by my company to test	16%
Opportunity to use business knowledge	14%
Other	13%
It was the best paying job I could find at the time	13%
As a stepping stone to another job in software development	7%
As a stepping stone to another job in management	3%
Don't know	1%

Percent of Respondents

Fig. 9

Do you want to continue your testing career?

- Yes — 75%
- No — 10%
- Undecided — 15%

Fig. 10

5. DevOps and mobile continue to grow and challenge testers

DevOps and mobile are current industry buzzwords. So, we wanted to know if testers are or will be incorporating DevOps or mobile into their organizations, and what challenges they are facing.

Half of respondents are or plan to implement continuous integration in the next twelve months, half will implement continuous testing, and one-third will or are utilizing continuous delivery. (Fig. 11)

The majority of respondents are doing some sort of mobile testing, but only 25% feel they are currently equipped with all the knowledge, skills, and tools they need. (Fig. 12) Some specific challenges cited include availability of tools, such as emulators; ability to automate mobile tests; having enough testers with knowledge of mobile; and schedule and budget limitations. (Fig. 13)

Mobile Testing Challenges

"Mobile requires a different context than the processes we have used supporting other embedded systems testing. For example, gotta get outside the lab and use a blend of device/emulators."

—QA Manager

"My organization makes use of mobile devices difficult: no company wireless, wireless access to internal resources tightly limited."

—Quality Assurance Analyst

"Defining a mobile test strategy and getting the test team the right training"

—Test Manager

"Security of data when testing in the cloud. Keeping up with updates on browsers and devices—both on emulators and actual devices"

—Test Manager

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)

Practice	Percent
Continuous integration	55%
Continuous testing	55%
Continuous delivery	39%
Don't know	19%
Other	4%

Percent of Respondents
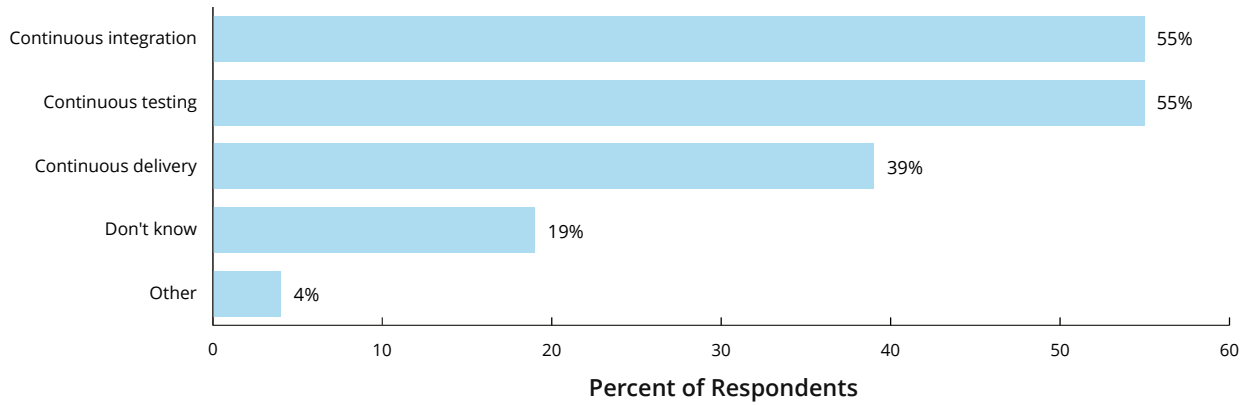
Fig. 11

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

Response	Percent
Equipped with neither knowledge/skills nor tools	35%
Equipped with knowledge/skills, but not tools	27%
Equipped with both the knowledge/skills and the tools	25%
Don't know	7%
Equipped with tools, but not knowledge/skills	6%

Percent of Respondents
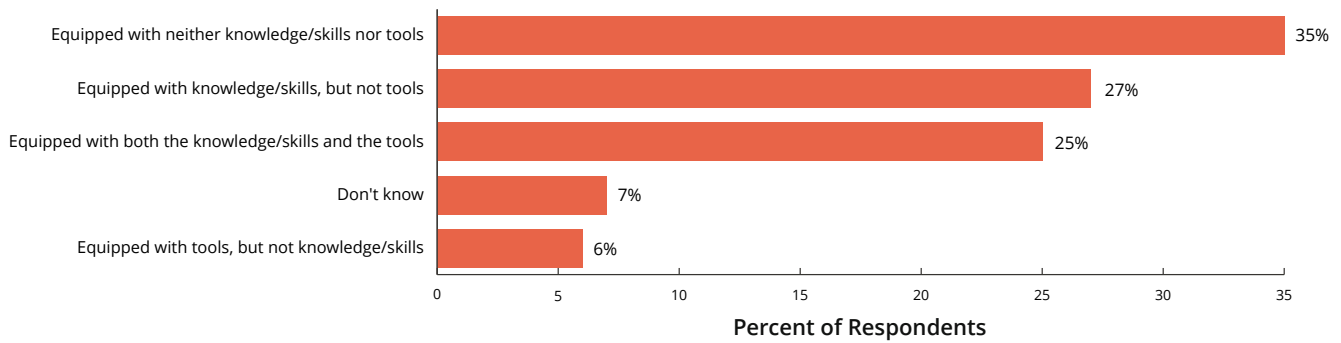
Fig. 12

What aspect of mobile testing do you find most challenging?

Aspect	Percent
Availability of emulators, etc.	20%
Ability to automate mobile tests	16%
Availability of trained resources	14%
Organization doesn't see need for mobile testing	11%
Limited schedule	10%
Limited budget	9%
Ability to design effective mobile tests	8%
Other	7%
Availability of cloud-based testing services	5%

Percent of Respondents
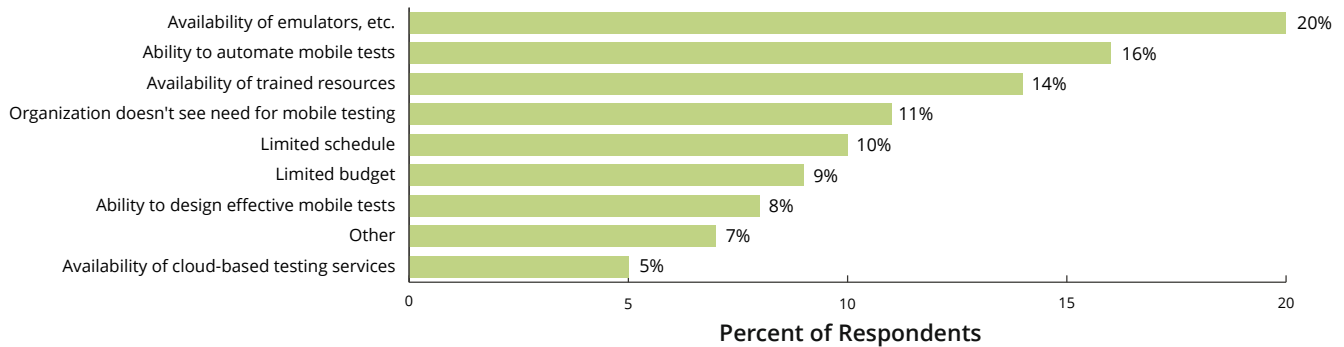
Fig. 13

6. Quality is up; post-release defects are down

Agile methodologies and DevOps practices are purported to improve software quality. While it's premature to say the growing popularity of agile and DevOps is definitely making software better, we are seeing improvements in release times and reports of fewer defects.

Half of respondents report an increase in the number of production-ready features or stories delivered during the previous twelve months, (Fig. 14) 51% say the number of post-release defects is down, (Fig 15) and 43% report improvement in the quality of development builds. (Fig. 16)

In the past 12 months, how has delivery speed of features or stories changed?

50% 40% 10%

Increased
Decreased
No Change
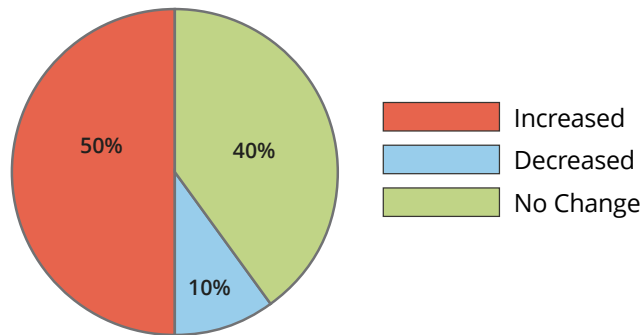
Fig. 14

In the past 12 months, how has the number of post-release defects changed?

21% 28% 51%

Increased
Decreased
No change
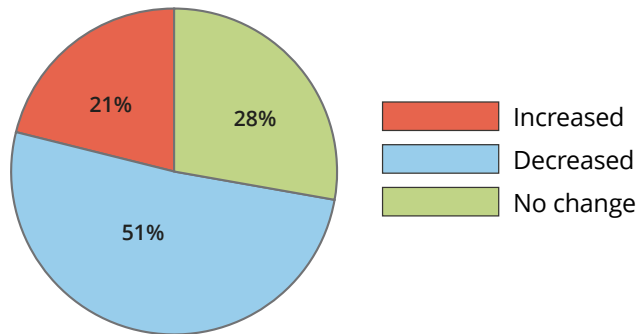
Fig. 15

In the past 12 months, how has development build quality changed?

43% 31% 26%

Quality increased
Quality decreased
No Change

Fig. 16

12
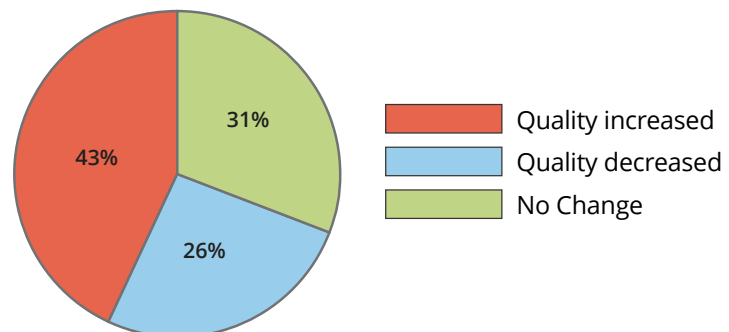
Conclusion

Is the tester of the future a domain expert who skillfully manages the team's backlog on a kanban board with one hand while writing automated scripts with the other? According to the 2015 survey results, that persona is not too far-fetched.

The five big trends we see shaping the profession are adapting testing to agile methodologies, bringing testers into more technical roles alongside developers, the growing impact of DevOps on testing, increasing focus on automation, and requiring greater domain and business expertise for testers.

As mobile and embedded systems continue to proliferate, the role of tester will evolve even further. TechWell will continue to solicit input from the test community to measure and report how these changes affect the state of the testing profession.

About TechWell Corporation

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

Through respected software conferences, expert-led training classes, and in-depth online resources, 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 inaugural survey. Your input is invaluable to helping us understand the changing role of the tester and to set a baseline for tracking data trends in the future.

Special thanks to our survey review panel: Lee Copeland, Rick Craig, Dorothy Graham, Jon Hagar, Matt Heusser, Dale Perry, and Rob Sabourin. Your insight and expertise are always appreciated.

About the Survey:
The State of the Software Testing Profession 2015 –2016 report is based on the survey responses of 529 software professionals. Survey participants include TechWell community members and STAR*EAST* 2015 testing conference attendees.

References and
Additional Information

[1] Savoia, Alberto. GTAC 2011 Keynote: Test Is Dead

STAR*EAST* 2015 Keynote: The Future of the Testing Profession

Appendix 1
Demographics

WHAT IS YOUR PRIMARY JOB FUNCTION?

Test manager. 19%
Test analyst 18%
Quality assurance analyst 17%
Quality assurance manager 13%
Other 10%
Test automation engineer 7%
Test architect. 4%
Project manager 3%
Business analyst 3%
Independent consultant 3%
Software manager/director. 2%
Developer/programmer 1%

WHAT IS THE FOCUS OF YOUR PERSONAL TESTING EFFORTS?
(Respondents could select more than one answer)

Functional system testing 83%
Regression testing 76%
Integration testing 61%
Usability/user experience 56%
User acceptance testing 54%
Load/performance testing 35%
Build verification testing 35%
Security testing 25%
Unit testing 17%
Other 7%
None. 3%

HOW MANY YEARS OF EXPERIENCE DO YOU HAVE IN TESTING?

More than 15. . . . . 38%
11 to 15 . . . . 25%
6 to 10 . . . . 19%
3 to 5. . . . . 10%
0 to 2. . . . . .6%
I do not test 2%

DO YOU HAVE A TESTING CERTIFICATION?

Yes. 46%
No 54%

IF YOU AREN'T CURRENTLY CERTIFIED, DO YOU PLAN TO OBTAIN CERTIFICATION IN THE NEXT 12 MONTHS?

Yes. 12%
No 41%
Undecided 10%
Not applicable—I'm certified. 37%

HOW DID YOU FIRST DEVELOP YOUR TESTING KNOWLEDGE?
(Respondents could select more than one answer)

On the job from other testers. 74%
Trial and error 51%
Articles and blogs about testing. 48%
Books about testing 47%
Instructor-led training 32%
Conferences 22%
Web-based/virtual training 17%
College courses. 14%
Tutorial videos (YouTube, etc.) 14%
Other 8%
Not applicable. 1%

WHAT WAS YOUR JOB BEFORE GETTING INTO TESTING?

Other 32%
Developer/programmer 20%
Nothing, testing is my first job 18%
Business analyst 7%
Business user 7%
Not applicable. 6%
Project manager 4%
Quality assurance analyst 2%
Quality assurance manager 2%
Software manager/director. 2%

Appendix 2
Testing in the Organization

WHAT PRIMARY LIFECYCLE MODEL DOES YOUR TEAM USE?

Agile-Scrum	35%
Agile-Waterfall hybrid	24%
Waterfall	15%
Agile-Other	.5%
V-model	.5%
Scrum-But	.4%
Iterative (e.g., RUP)	.4%
Other	.4%
Kanban	.2%
None	.2%

FOR THE AVERAGE PROJECT YOU WORK ON, WHAT PERCENTAGE IS TESTING OF THE TOTAL EFFORT?
(i.e., all testing stages: unit, integration, system, acceptance, etc.)

26% to 50%	40%
10% to 25%	26%
51% to 75%	17%
Don't know	.7%
76% to 100%	.6%
0% to 9%	.3%
Not applicable	.1%

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

Websites	69%
Web services	63%
Client/server	55%
Mobile apps (e.g., smartphones, tablets)	42%
APIs	41%
Database/Big Data	38%
Packaged applications (e.g., SAP, Oracle, Lawson, etc.)	21%
Mainframe	20%
Embedded systems	16%
Other	.4%
Internet of Things/wearables	.4%
None/not applicable	.1%

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

Requirements-based testing	88%
Exploratory testing	83%
Risk-based testing	62%
Boundary analysis and equivalence partitioning	62%
Test-driven development	33%
Structural—white box testing	29%
State transitions	29%
Combinatorial techniques	29%
Decision tables	28%
Static analysis	28%
Model-based testing	15%
Other	.4%
Not applicable	.2%

FOR EACH TEST STAGE, WHAT PERCENTAGE OF YOUR TEAM'S TESTING EFFORTS ARE AUTOMATED?

	None	1% to 9%	10% to 24%	25% to 49%	50% to 74%	75% or more	Don't know/not applicable
Unit testing	26%	16%	10%	9%	6%	14%	19%
Integration testing	31%	17%	17%	10%	5%	7%	13%
Build verification testing	26%	17%	13%	7%	6%	17%	14%
Functional verification testing	26%	21%	15%	13%	10%	7%	8%
Regression testing	21%	16%	19%	11%	12%	13%	8%
Load/performance testing	29%	14%	8%	5%	7%	20%	17%
Security testing	46%	15%	6%	2%	3%	4%	24%
System testing	28%	19%	16%	12%	7%	5%	13%
System integration/end-to-end testing	35%	18%	13%	12%	6%	5%	11%
User acceptance testing	56%	11%	7%	5%	4%	3%	14%

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

Commercial functional testing software (test execution)......................................48%
Open source functional testing software (e.g., Selenium) 49%
In-house developed functional testing software 33%
Commercial performance testing software (e.g., LoadRunner)................................32%
Open source performance testing software (e.g., JMeter) 23%
In-house developed performance testing software 13%
Test data generation software 15%
Programming languages 39%
Scripting languages 49%
Static analysis (code scanning) software..19%
Continuous integration software 29%
Continuous deployment software 13%
Defect- or incident-tracking software 59%
Web browser developer tools..36%
Debugging software..29%
Text documents and spreadsheets 58%
None...2%
Other 5%

APPROXIMATELY HOW MANY EMPLOYEES ARE IN YOUR ORGANIZATION?

0 to 99 . . . . 19%
100 to 499 . . . . 27%
500 to 999 . . . . .8%
1000 or more. 44%
Don't know. 2%

WHAT IS YOUR ORGANIZATION'S PRIMARY INDUSTRY?

Software development/testing services 24%
Financial services / banking / insurance 19%
Computer software / software-as-a-service 14%
Other (please specify) 9%
Government 6%
Healthcare / pharmaceuticals / biotech 5%
Manufacturing / utilities / communications (non-computer). 5%
Education. 4%
Media / marketing / advertising 4%
Other business services / consulting / nonprofit. 3%
Travel / hospitality / recreation / entertainment 2%
Transportation / logistics / aerospace 2%
Computer manufacturer (hardware, peripherals, etc.). 2%
Computer services (web hosting, integrator). 1%