

University of Pittsburgh

Guest Lecture



Eaton's overall vision with IT strategy

Our vision:

We improve the quality of life and environment through the use of power management technologies and services

Our IT strategy:

- Support margin expansion and accelerated growth by focusing on the key strategic programs while exploring innovative technologies that can create competitive differentiation
- Increase security, reliability, and efficiency by reducing unnecessary applications and technologies, by centralizing additional infrastructure, and by encouraging more process alignment across Eaton
- Enable our strategy by leveraging our global scale, by building a culture of innovation, and by creating a more disciplined prioritization process.

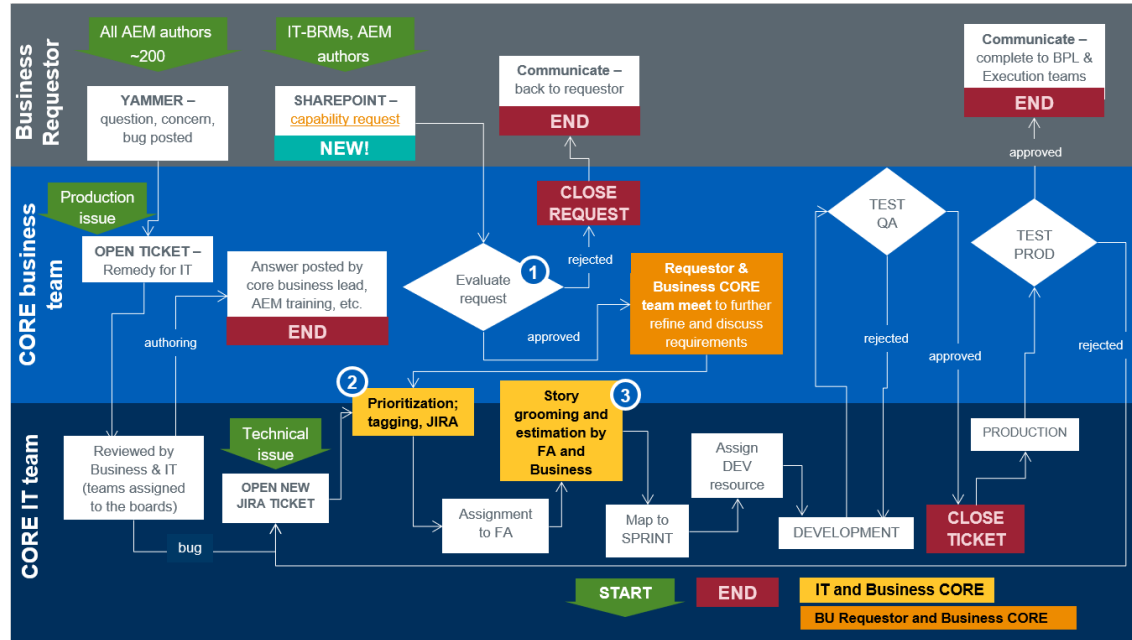
Agenda

- Business process and IT team integration
 - Eaton.com program overview
- Quality Assurance
 - A general overview of QA team
 - Eaton.com QA overall
- Integration/Collaboration between DEV and QA team
- Case Studies



The Business and IT Teams collaborate on Eaton.com

- Core business team members are primarily focused on product migrations, content migrations, translations & rollout, new content creation and driving traffic to the site. They also perform training and troubleshooting for broader authors
- Core IT team members are focused on business-funded enhancements, maintenance and support, and Remedy incidents and troubleshooting. Separate project teams are also created for project-sized efforts



Eaton.com Program Overview



Eaton.com IT Team (AEM) can be split into 3 groups

Core / overhead team

- Contains team members needed by both teams, such as scrum master, UI/UX, architects, and functional/quality analysts
- Mix of existing and new team members
- Time split 50/50 between support and projects

Project / enhancements team

- Focuses on enhancements, stories, change requests, new functionality, small project work

Charged via FlexIT process
(Orange Team)

Support / Tech team

- Focuses on bugs, incidents, production support, technical tickets

Charged via IT “support” allocation
(Blue Team)

Businesses determine work for the project/enhancement team each sprint

- At the start of each sprint, the sprint capacity in points will be determined (based on working days, vacation time, etc.)
- Each paying Business Unit will get an allocation of sprint points equal to this % of funding
- Of available points, each group will determine which stories they want included in the sprint
 - Example: If a sprint has 80 points available, ES EMEA gets 57%, or 45 points to allocate. They can select as many stories they want until they use up their 45 points

	Funded \$	% of \$	Estimated Points	Estimated Stories
			80	26.7
ES EMEA	\$ 600,000	57%	45.3	15.1
ES NA	\$ 320,000	30%	24.2	8.1
IS	\$ -	0%	0.0	0.0
Corporate	\$ 139,260	13%	10.5	3.5
Total	\$ 1,059,260	100%	80.0	26.7

400 points projected for the year

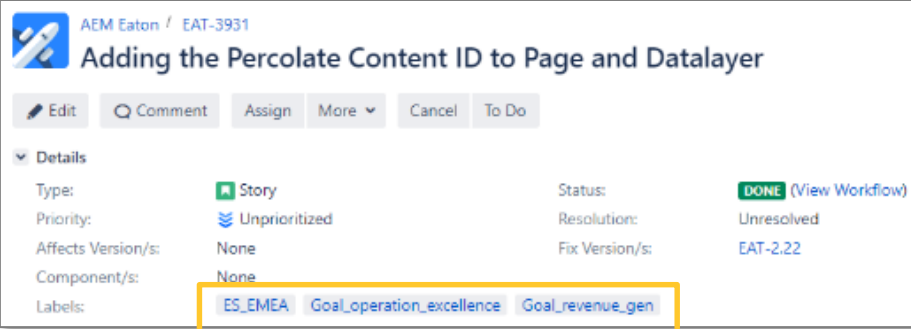
- ES EMEA=228
- ES NA=120
- Corp=52

Sprint planning for both teams will occur in one meeting

- Both Blue and Orange team sprint planning will occur in one meeting
- Business Unit representatives will need to attend (or send their priorities ahead of time)
- Start with Orange team planning and round robin through the BUs who indicate their next top story to add
 - Continue through round robin until each BU has exhausted their allocated capacity points for the sprint
 - BUs can pull tickets that would go to Blue team (e.g. bugs) if they want to ensure its inclusion in a sprint
 - Scrummaster will monitor capacity points and stories by discipline (e.g. AEM, FED, Endeca, UI/UX)
- Switch to Blue team planning where IT controls the sprint goal and stories

How do we ensure we meet the scope for the year?

- Establish agreed upon target scope for year per business before we start
 - *Business leaders, BRMs & the program team identify expected outcomes using measures/metrics/targets (how will we know we achieved the scope)*
- Within Jira, use business group field to identify the affected group(s)
- Within Jira, use the epic field or label that identifies the approved targeted scope items
- A business representative will attend Sprint Planning meetings to determine the scope for each sprint for their business
 - If a business wants to include something outside of their approved target scope in a sprint, they must have PCB board approval ahead of time



The screenshot shows a Jira ticket interface. At the top, it says 'AEM Eaton / EAT-3931'. The title is 'Adding the Percolate Content ID to Page and Datalayer'. Below the title are buttons for 'Edit', 'Comment', 'Assign', 'More', 'Cancel', and 'To Do'. Under the 'Details' section, there is a table of fields:

Type:	Story	Status:	DONE (View Workflow)
Priority:	Unprioritized	Resolution:	Unresolved
Affects Version/s:	None	Fix Version/s:	EAT-2.22
Component/s:	None		
Labels:	ES_EMEA Goal_operation_excellence Goal_revenue_gen		

The labels 'ES_EMEA', 'Goal_operation_excellence', and 'Goal_revenue_gen' are highlighted with an orange box.

Each “Orange Team” / business ticket is labeled with the business and goal(s) that it supports

Eaton.com Program Strategic Priorities



- Integrate ecommerce capabilities with public site
- Shopping cart functionality and enabling channel partners



- Leverage feedback to improve customer experience
- NPS improvements
- Revise SKU page experiences



- Launch new MyEaton authenticated experience
- Consistent user experience
- Improved content capabilities

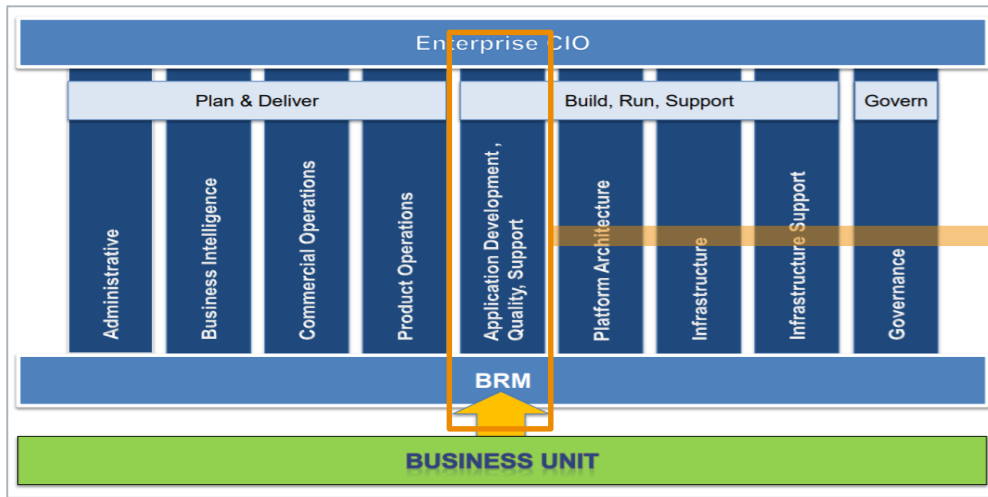


- Digital design system
- Consistency across tools and channels

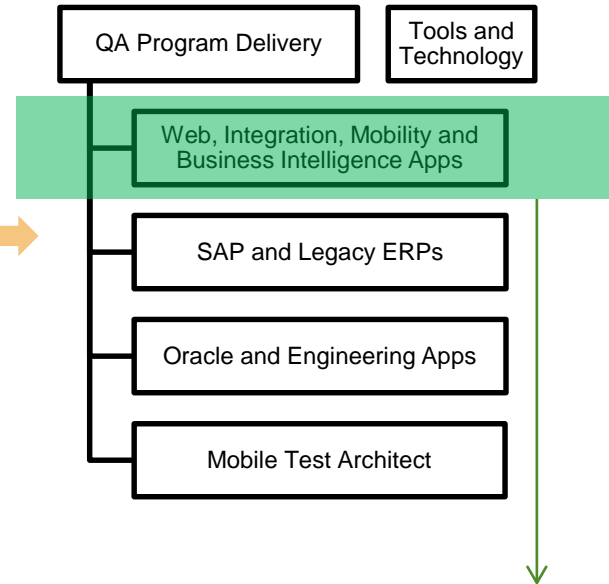
Eaton QA Organization overview



A general overview of Eaton QA team

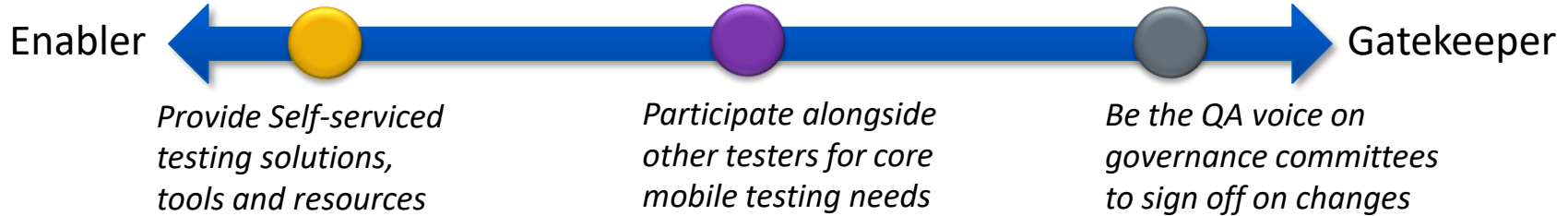






- QA delivery teams are tightly coupled with different development and support teams to together deliver projects planned by our “plan and deliver” COEs
- Our tools and tech part of QA helps in building foundation, capabilities and provides strategic direction to the delivery teams on technology aspects of QA



The enterprise QA team supports a wide array of applications. Our focus today will on one of these applications –
Eaton.com

How do we operate



	Type of Project	Area of focus (apps)	Area of focus (Services)
	Foundation Projects ; First time implementation of apps	Business Critical Applications Ex: ERPs, eCommerce	Play an active role in defining the test strategy and deployment of test practices to ensure high quality at the foundational stages of a mobile app
	Capability Projects; Enhancing features of the app	Applications enabling ease of business Ex : Portals, web apps	Augment the Functional and Business Analysts in performing QA activities. Enable teams with self-serviced solutions for efficient testing
	Deployment Projects; Making the app available for additional user groups	All other applications Ex : Reporting apps	Provide self-serviced solutions, tools support and test consultancy to enable these projects to test efficiently
	Strategic Programs; All projects within the program	Top priority for organization Ex : Digitization program, Horatio program	Ensure right strategies and practices are adopted for our key apps by providing support as appropriate, participating in testing as needed and sign off on changes after reviewing quality metrics

How do we measure

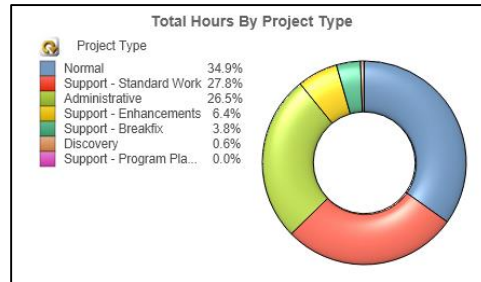
Heatmap for QA involvement on key apps

Application	Program	Eaton COE	QA Involvement				QA Score	
			Functional Testing	Regression	Test Automation	Performance Testing	Based on Test Type	Based on Sector coverage
Eaton.com	Web	COCOE	70	95	90	80	73.25	58
MyEaton	Web	COCOE	0	95	85	65	53.5	80
JOE	Portal	APPCOE	0	95	90	65	50.5	100
Order Center	Ecommerce	COCOE	50	85	90	50	65.75	60
Bid Manager	CPQ	COCOE	10	70	40	20	30.5	20
Zilliant / CPA	CPQ	COCOE	0	0	0	25	6.25	20
Customer 360 Mobile	CRM	COCOE	2	90	0	0	16.1	80
Project Center	Construction	COCOE	100	100	100	100	100	0
WISPER	SCM	PROCOE	40	70	65	30	48.5	100
Supplier Visualization	SCM	PROCOE	0	0	0	0	0	0
SharePoint/Yammer	O365	INFCOE	0	0	0	0	0	0

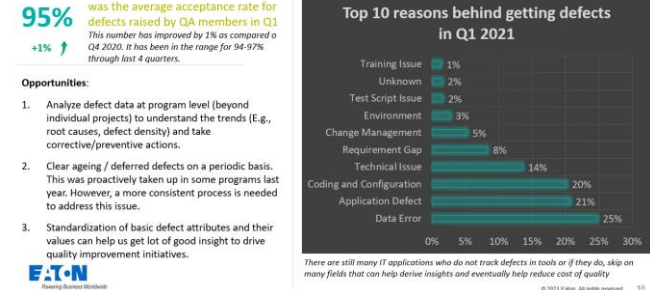
Adoption of QA tools and technology



Utilization and project delivery



QA trends and insights



Measurement and Tracking is a continuous improvement process. To evolve and modernize in this area is one of our key goals in current state

QA Toolset



Test Management



Mobile Testing



CD-CT



Jenkins



Performance Engineering



DG DIAGNOSTICS



Performance Testing



Test Automation



Data Testing



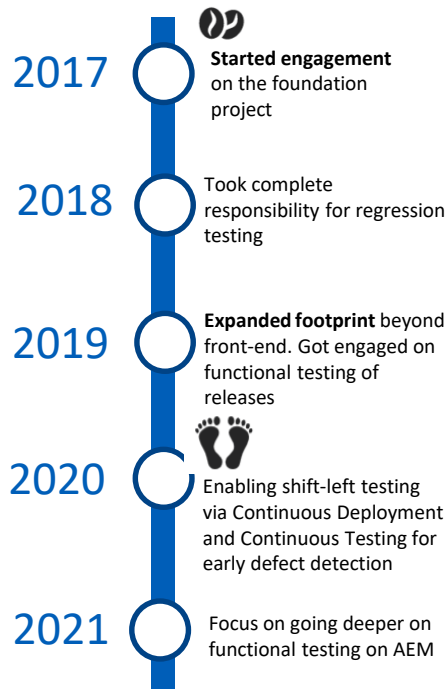
Powering Business Worldwide

Eaton.com QA overview



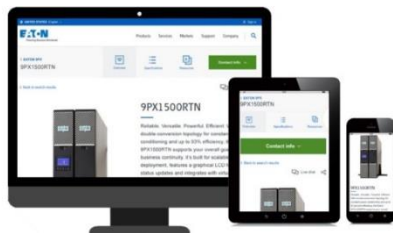
Eaton.com – A snapshot of our journey so far

Journey



Powering Business Worldwide

Key Capabilities



Key Capabilities :

- Regression Testing
- Functional Testing

Top Opportunities :

- E2E Automation
- Additional API Testing

Top Challenges :

- Functional and platform level knowledge for AEM

USP



First implementation of CD-CT within IT for Eaton.com

Continuous deployment (CD)- Continuous Testing(CT) has been implemented for the first time within IT for Eaton.com. It enables sanity testing without any human intervention

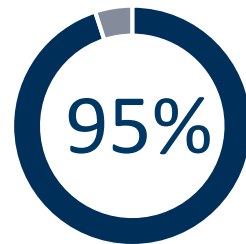


Performance Testing based on learning from PROD Analytics

We reviewed user hits in PRODs for eaton.com pages to learn which pages attract the most traffic and accordingly fined-tuned performance testing suite

Tools and Tech

Test Automation Meter



Performance Testing

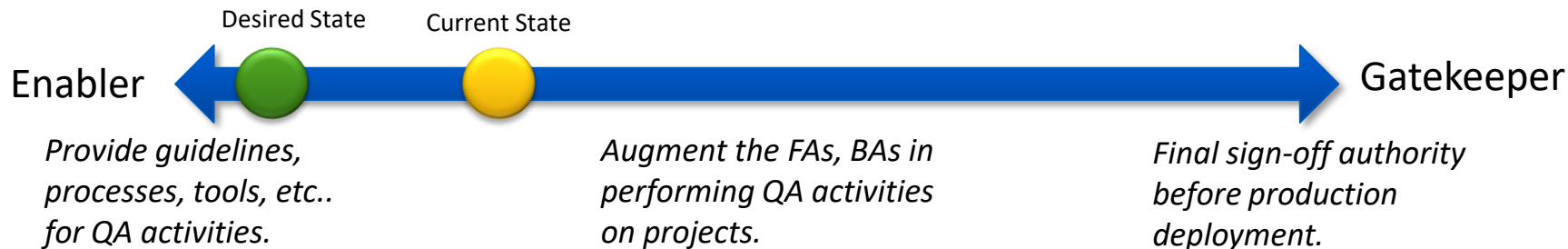


Regular performance testing conducted every month

Tool Gallery



QA Strategy for Eaton.com



Top priorities

- Ensuring quality for existing functionality in production is up to the mark
- Supporting functional testing on new projects/APIs

Activity	P & D COE	APPCOE Dev/Supp	APPCOE QA
Test Strategy	R	A	A
Test Planning	R	A	A
Test Design and Traceability	R	A	R
Test Execution	R	S/C	R
Defect Management	A	R	A
Test Status Reporting	R	R	R
QA Sign-Off	R	S	S
Test suite maintenance	R	S	R
Post-project testing support(for releases)	S	S	R

OIs/ Support Required

- Measurement and tracking

Typical process for different testing types

Regression Testing

1. Understand changes planned in a sprint
2. Once changes are deployed to QA, execute regression testing
3. Share results, retest defects, confirm changes planned for go-live
4. Create, update, maintain regression test suite

Operational Sprint testing

1. Understand changes planned in a sprint
2. Start script creation wherever applicable
3. Test alongside developers in DEV, SIT or QA environment
4. Note observations or defects in tickets. Share status on sprint calls
5. Once tickets go-live, add applicable scripts to regression suite. Automate scripts wherever necessary

Project based testing

1. Phase 1 – understand requirements
2. Phase 2 – define test strategy, test plan. Share estimates and resource plan
3. Phase 3 - Start manual script creation wherever applicable. Create requirement traceability matrix
4. Phase 4 – Validation as per testing types defined in test strategy.
5. Phase 5 and 6 – Test in case of emergency changes. Automate scripts for addition in regression suite

Performance Testing

1. If baseline exists :
 1. Run performance twice a month
 2. Share results and discuss defects/issues if any
 3. Re-run if required
2. If baseline doesn't exist
 1. Create scripts
 2. Understand userload
 3. Understand architecture, servers
 4. Conduct performance test
 5. Document baseline and different performance parameters

Tools and Technology

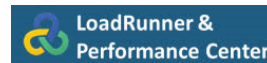
Test Automation



Mobile Testing



Performance Testing



API Testing



- Hybrid Selenium framework based on TestNG used for regression testing
- Robot framework used for smoke testing
- Both tests run on virtual machines and CI-CD tools

- Usability testing performed on Eaton.com mobile responsive site
- Appium used for automation
- Focus on using combination of real and simulation devices to cover diversity of screen sizes

- Bi-weekly performance testing conducted for core site
- For new requirements, project-based testing conducted
- Production performance monitoring using Site Scope, Diagnostics, etc.

- Customized excel based tool used for automated API testing
- Tool developed using Selenium and Robot framework
- Interfaces tested via projects based on changes made

DEV-QA Collaboration



DEV and QA team collaboration



Collaboration governed by **Eaton's own hybrid agile Lifecycle** for project and release management

Process

- Participate together on requirement understanding
- Work closely on unit and SIT testing
- Engage on defect triage
- DevOps tools – Jenkins
- Retrospect and action on improvement areas

Communication

- Daily scrum meetings for releases
- Regular touch-base for projects
- Strategy meetings on quarterly basis

Tools

- Jira
- Portfolio
- Email/Teams
- Versioning tools
- DevOps tools – Jenkins

Case Studies



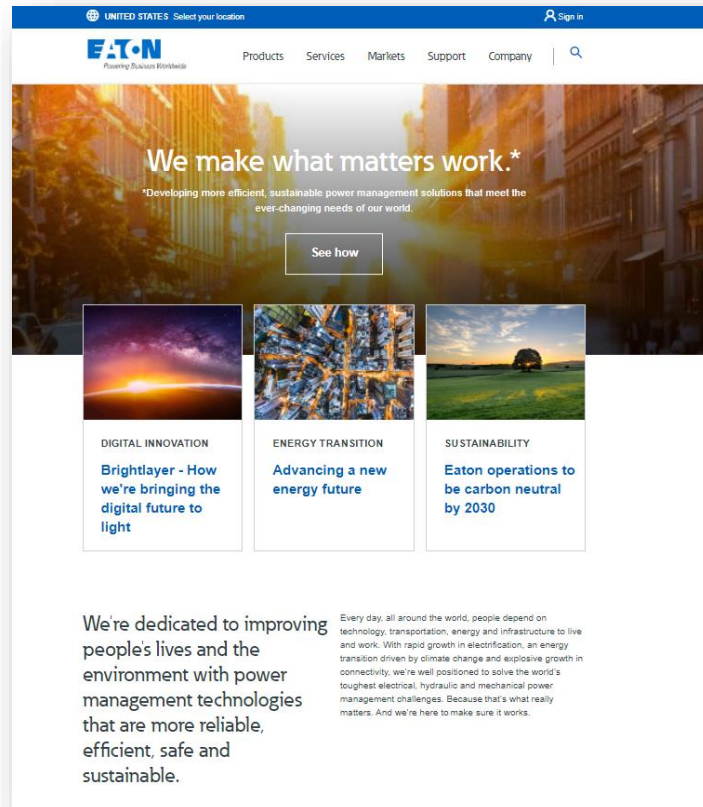
Case Study – 1 : Test Automation

Background :

- Consider a website like Eaton.com where the front-end is dynamic. The page template more or less remains the same, but the data is newly authored on a daily basis
- It is observed that due to these changing objects on your web page, your automation scripts show high failure rate

Task :

- What changes will you suggest at a framework level to contain automation failure rate ?
- How will you design a process to proactively keep the automation scripts up to date ?
- How do you think the development team can help in this process ?



Case Study – 2 : Mobile Testing

Background :

- Consider a responsive mobile app like eaton.com
- The app is customer facing, available all over the world
- You are an QA engineer responsible to create a test strategy for eaton.com mobile apps

Task :

- What all factors will you take into consideration while designing the test strategy ?
- What types of mobile test would you recommend ?
- Will you suggest automated testing ? If yes, what framework do you think suits best ?
- Given the wide array of devices available in the market today, how will you determine the right device coverage for your testing ?



Case Study – 3 : Modernizing QA

Background :

- Please read the attached white paper on smarter testing methods suggested by a company called AppSurify.
- Suggest your views on the pros and cons of a solution like TestBrain based on the context you heard w.r.t. Eaton.com so far.

Task :

- How do you think this benefits ?
- What could be the potential challenges with modernizing QA ?
- Do you think it is just a technical change or behavioral change for members within Dev and QA groups ?



Source : AppSurify



Adobe Acrobat
Document



Thank you ! It was great to be amongst you today.

Feel free to reach out to us :

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Appendix



Case Study 1 - Learnings

Approach

- Multiple behavior-driven or test-driven frameworks can help. Key is to be able to locate the right object attribute while creating the automated script
- If it suits your app, you can go for any low-code-no-code platform or HTML-driven HTTP GET requests call to verify certain types of errors
- Proactive maintenance or dynamically picking objects at runtime, if it suits your use-case, can help you cut down on maintenance cost
- API-first testing can help you further contain failure rate
- Working closely alongside the development team will help you understand where the code changes are happening, and which areas are error-prone

Competencies involved

- Analytical thinking
- Strategic thinking
- Problem solving
- Collaboration

Recommended Reading

- To be updated

Case Study 2 - Learnings

Approach

- Factors in play :
 1. Understand your app's end users
 2. Understand the Application, Business Environment and User Requirements
 3. Understand Project/Program Requirements
 4. Understand App Design
 5. Understand Environments and Data Requirements
- Device Coverage
 - Production analytics
 - Production incidents
 - Comparison with similar apps within your org
 - Comparison with market device trends

Competencies involved

- Learning agility
- Thinking and acting strategically
- Developing customer centric solutions
- Working across organizational boundaries

Recommended Reading

- To be updated



Mobile Test
Strategy details

Case Study 3 - Learnings

Approach

- When evaluating any new product/service your org/team :
 - Did you define a checklist ?
 - Did you define your needs ?
 - Did you consult the your team on their pain points ?
 - Did you ask the vendor for “voice of customer” from their other customers ?
 - Did you recommend a POC ?
 - How did you perform the cost vs benefit analysis ?
 - In what areas was it a closed group discussions, where did you involve the larger team ?

Competencies involved

- Teamwork
- Networking / Market study and awareness
- Leadership attributes
- Efficiency – courage to accept ideas, opinions from across the table to get better
- Decision making

Recommended Reading

- To be updated