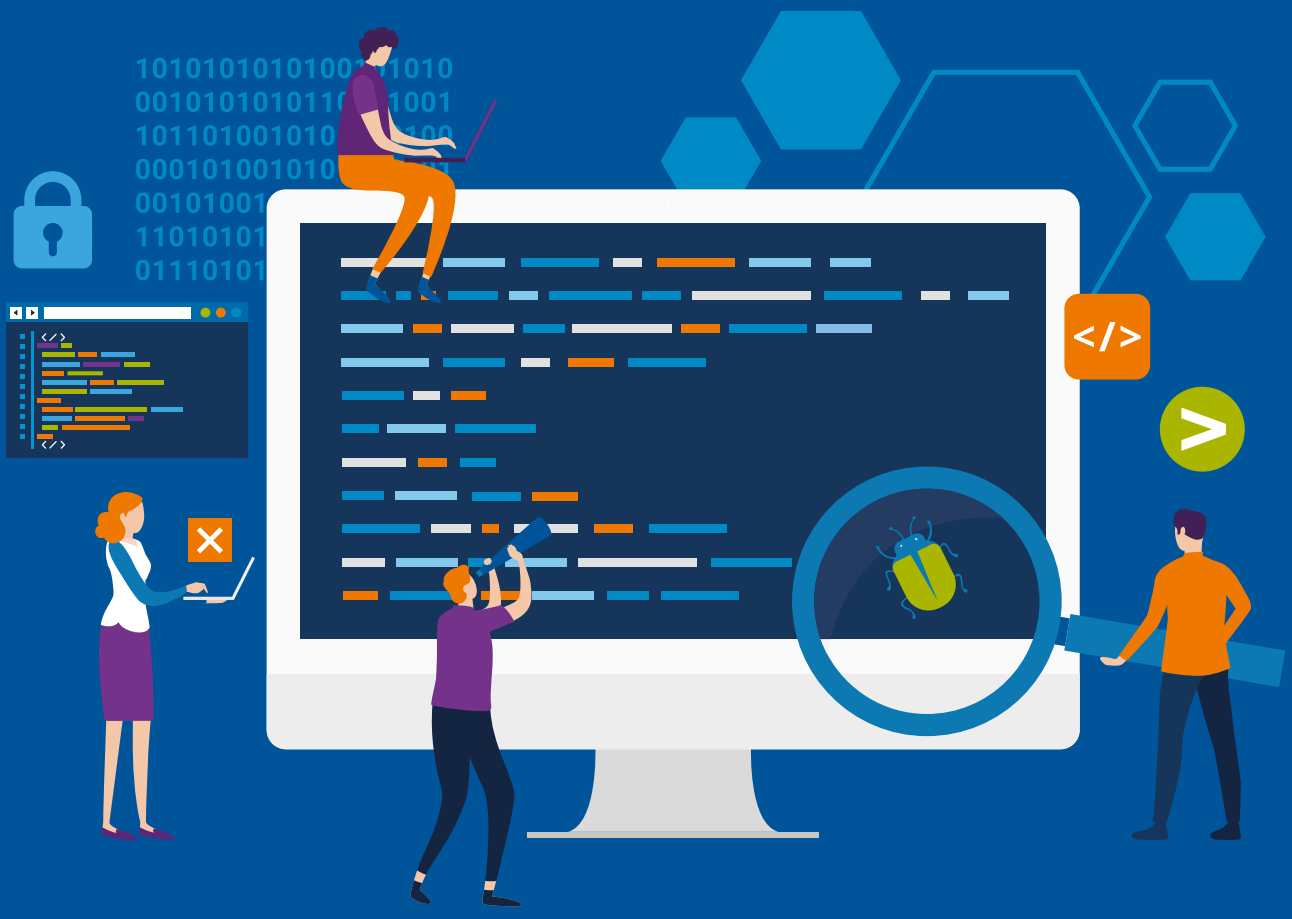
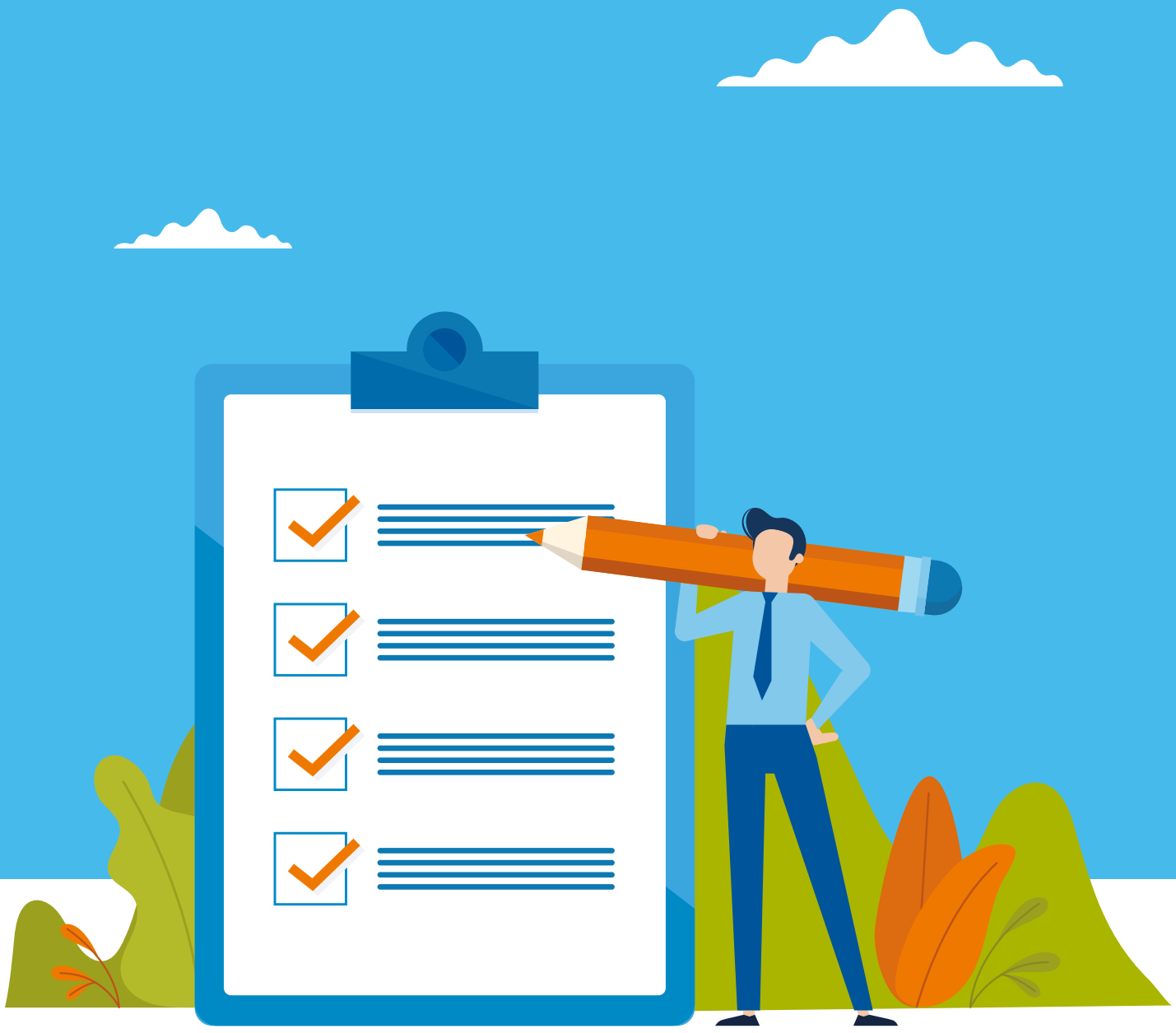
CYBERCOM GROUP

Cybercom QA Competence Center



Due to changes made in software development processes and approach over recent years, it became crucial for Quality Assurance to be able to keep up the pace. Due to this shift, QA needed to develop a strong connection with business to become a facilitator of connection between business, operations and development team.

To meet these challenges head-on Cybercom created a Competence Center which is a group of QA specialists with diverse background and skill set which allows them to quickly integrate into any role and perform any task necessary.



COMPETENCE LIST

01 QA consulting

Digital transformation has brought many multilayered changes in the organization's approach to software development. Assurance-based activities have expanded and gained a new meaning. The ability to build a faultless application is just the tip of the iceberg.

Quality assurance is now associated with the business to the same extent as in technical matters. Quality Assurance specialists should become an integral part of the development team, serving as a connection between programmers, operational departments and business.

There is a growing tendency of companies creating internal quality assurance departments to gain practical experience in a dedicated workspace. It is an opportunity to raise their knowledge so that they can work on preventing problems from happening. This leads to more frequent releases, allowing quick and precise feedback from users. On the other hand, this situation forces companies to adopt a new framework, adapted to work in cross-functional teams, as well as to build and maintain a quality culture throughout the organization.

BENEFIT

The Agile / DevOps methodologies which are focused on building strong relationships between stakeholders as well as bringing speed and quality as a project baseline.

A modern model of providing business requires creating an appropriate quality assurance strategy to meet all the requirements. And that's where it shines.

The results of the right QA solution:

- Swift verification of business value, validation and delivery
- Increased product quality in all aspects (including efficiency and safety)
- Proper set of metrics enabling the improvement of the process

02 Test Automation

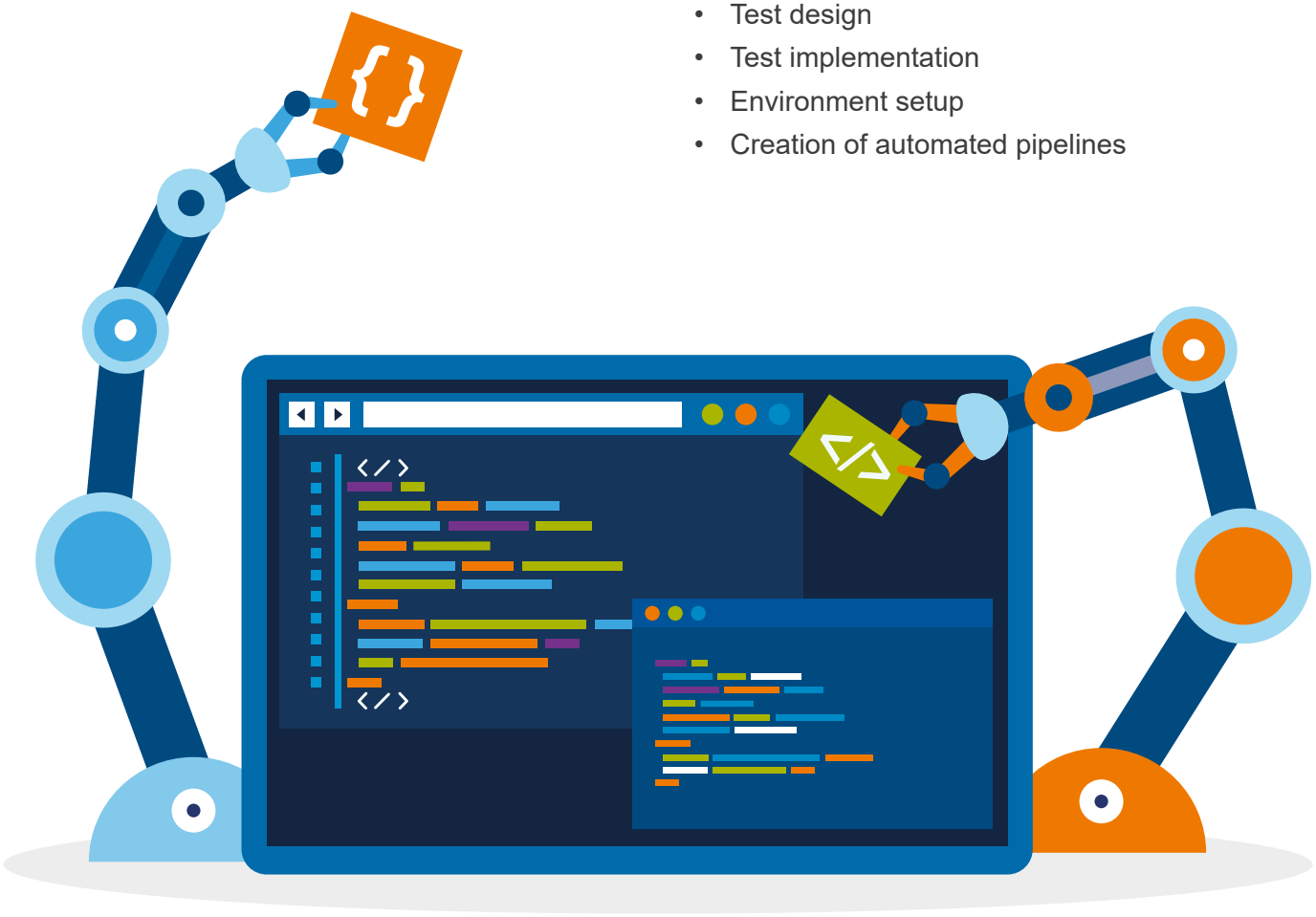
In the Agile environment where new product versions can be delivered multiple times in the same day, the ability to test each and every release to the highest standard becomes crucial. In such an environment manual testing is not always viable due to personnel or time constraints. In the light of that building automated tests suites that could test application efficiently and always to the same standard (as factors of fatigue and human error are removed from the equation) become very important. It also frees testers to pursue more creative test scenarios as repeatable and dull tasks are no longer draining their creativity.

BENEFIT

Our staff has experience working with multiple test automation frameworks as well as ability to create new ones tailored to particular product if needed.

Our team is also able to create automated test artifacts at all levels which are:

- Test Automation Framework
- Test design
- Test implementation
- Environment setup
- Creation of automated pipelines



03 Performance testing

When it comes to IT solutions, the importance of speed can not be overestimated in the present times. It is placed at the top of the „best applications" indicators, along with functionality and security. Insufficient performance is one of the main reasons why your customers start looking for an alternative and eventually move to the competition. Performance indicators are a huge thing from a business perspective because they can make a real difference when pursuing market advantage.

Our test team can pinpoint bottlenecks and test how the system behaves under a lot of stress by using multiple tools.

BENEFIT

Well conducted performance testing can save the product from situations where system operability is being disrupted by huge data load. It also makes denial of service attacks less threatening by creating proper protocols and redirects in case of abnormal traffic.

Types of performance tests that can be performed by our team:

- Performance testing
- Load testing
- Stress testing
- Soak testing
- Spike testing

04 Functional testing

Mature organizations have a complex approach to testing and quality assurance. All activities begin at the first stages of the software development life cycle (SDLC), during ideational work, and continue after. To stay competitive in a customer-oriented business environment also means data-driven development to predict the use of applications. Performing functional tests of desktop, web and mobile applications is more than a necessity.

To improve the workflow and increase the dynamics of the partnership with Cybercom, there is a need to establish a scalable and process-based agile and lean approach. We combine functionalities with general business goals, fuse the right mixture of scenario-based and process-oriented testing with creative exploration.

BENEFIT

This approach makes the application resistant to major defects and provides a full understanding of the activities and expectations of users. Thanks to the implemented automation, new changes and fixes are implemented almost immediately, increasing the frequency of gathering feedback.

OUR OFFER

Types of performance tests that can be performed by our team:

DOCUMENTATION-BASED TESTING:
Functional tests based on user stories, test cases and scenarios. The process is adapted to the customer's methodology and can be optimized for the best results.

PROCESS-ORIENTED TESTING:
An approach to improve the performance of the entire team, the best for the Agile and DevOps methodologies. Focuses on preventing and validating business value.

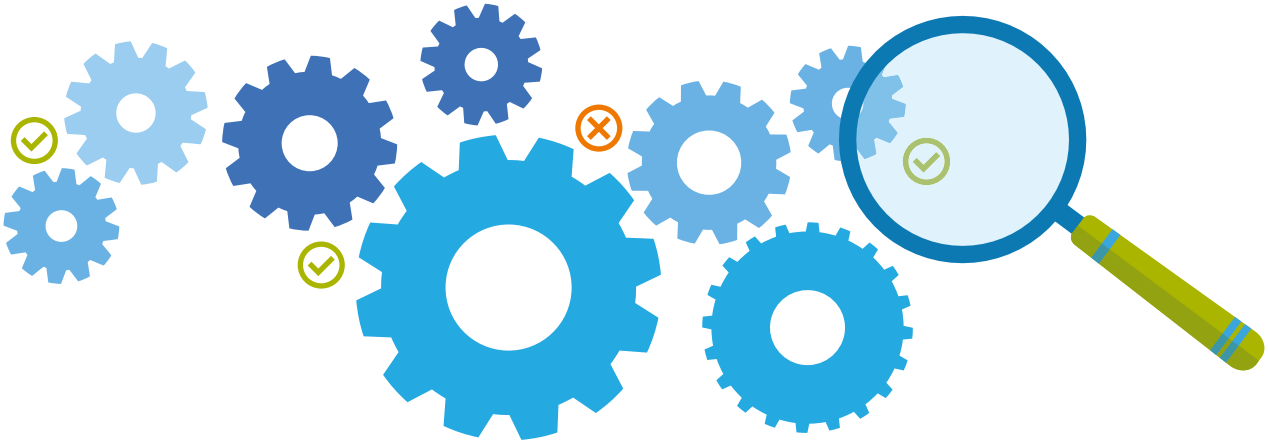
EXPLORATORY TESTING:
Creative exploration that allows you to learn about and understand the product, looking for non-obvious and less common defects and incorrect configurations.

TESTING PROCESS OPTIMIZATION:
Thorough analysis of testing processes to pinpoint bottlenecks and eliminate them. It improves internal quality assurance activities and helps to build a quality culture.

FUNCTIONAL TESTING AUTOMATION:
All activities supporting the automation of selected test areas to increase performance and extend the test coverage while maintaining high product quality.

USER ACCEPTANCE TESTS:
The last stage of quality assurance in the SDLC. Main goal is to assess your approach to user expectations and to add a finishing touches before the product is released.

MOBILE TESTING:
Mobile application tests performed on various mobile devices by our experts. In this proces application is tested for its functionality, consistency, and usability.



05 Competence Center main areas of testing experience

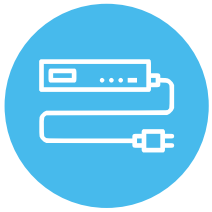
Mobile applications for Android, iOS, Windows Phone

Cloud (Azure)

REST and SOAP services

Web applications

STB devices



06 Certifications held by Competence Center team members

ISTQB Certified Tester Foundation Level

ISTQB Certified Agile Tester Extension

ISTQB Advanced Test Manager

Professional Scrum master I (PSM I)

Certified Scrum Product Owner

ITIL Foundation Level

07 Cybercom test team approach for joining the project

Once the Cybercom partakes in a project with allocated test resources we have created a process which is lightweight and repeatable for two main scenarios in which testing is conducted which are New project and Ongoing project described in detail below.

Joining the project consists of two phases which are project preparation and project execution. For the preparation phase there are following steps:

1. Kick-off in which we are gathering high level information about the project and its goals. At this point Competence Center member is assigned as testing representative for Cybercom which then conducts next steps as Competence Center representative.

2. Business value for the product in which we are determining what is most important from the business standpoint and where our priorities should lie.

3. Understanding way-of-working in which we are deepening our cooperation with the client and adjust to their processes and organizational culture if needed.

4. Outcome which is proposal for testing approach and tools and is applicable for both new and ongoing projects.

This phase will give us input for project execution phase. In the project execution phase Cybercom is conducting test activities which are based on previous agreement with the client applying expertise of Competence Center team members.

In the next segment of this document more detailed description of project joining approach is provided as well as case studies which are showing full path from initial project introduction up to execution phase.

08 New project

Member of Cybercom Competence Center is responsible for communication with a client to establish common understanding about testing goals and customers most pressing needs.

Based on that test approach is provided with recommendations regarding tools and methodology to be used.

Test effort is estimated, and appropriate resources allocated.

After finalizing discussion with the client methodology and automation tool(s) as well as documentation style is decided.

Test team is integrated into broader team (both developer and client representatives) to fully benefit from proper communication.

QA Lead becomes responsible for test approach.

Test harness and initial test documentation is being created.

First automated scripts are created if status of the created application permits it and later, they become part of the regression suite.

Tasks are allocated between main activities and split between manual, automated and acceptance testing.

During duration of the project test activities are constantly monitored and new solutions are proposed if needed.

09 Ongoing project

In case of ongoing project, it is crucial for Cybercom team to asses current project status. Many factors need to be taken into consideration at this point for example system architecture, methodology and testing approach if it exists.

After this assessment test approach is proposed which will either consist of proposing improvements to currently used methodology/ tools or new approach will be proposed.

Afterwards test team is quickly integrated into existing team, on-site visit in the rest of the team location for knowledge sharing is done if necessary.

If the previously introduced tools are used the team starts testing and automation tasks as soon as possible.

If new approach is used test team first build testing framework and creates documentation.

Tasks are allocated between main activities and split between manual, automated and acceptance testing.

During duration of the project test activities are constantly monitored and new solutions are proposed if needed.

Case study 1

Backend testing of Video on Demand platform

Project description:

Client is supplier of Video on Demand platform which is going to be recreated using new technologies and architecture. The client's video content platform has some limitation in the field of both technology and architecture. The biggest difficulty was that it could handle just one client at the same time, and every additional user needed a new separate instance. The client has decided to use expert's help and improve their solution.

Project methodology selected by client was SCRUM.

Challenges:

After meeting with the customer, it was clarified that platform will be created in Azure Cloud and main concerns of the client are stability and reliability.

Based on that test team proposed the solution of mix between automatic and manual testing in which new features are going though manual acceptance testing first and then automated scripts are created. Tools proposed at this stage are Postman with JavaScript for functional testing and JMeter for stress and load testing.

Client is providing services for multitude of platforms (mobile, web and STB). As such platform must be fully scalable, able to withstand vast amounts and be as reliable as possible.

Platform is also expected to integrate with multiple 3rd party api's for example external authorization and payment.

Solution and implementation:

After second meeting client agreed to the initial plan changing required language for Postman scripts to C# (company having multiple projects and being adamant about keeping programming language consistency across all of them). Another added requirement is to keep all documentation and tickets in Azure DevOps.

After client acceptance testers begin to manually test first features and creating automated scripts afterwards. Alongside those activities documentation is created which records activities as well as the results of testing. Team decides at which stage platform will be developed enough to start load and stress testing.

Integration of tests scripts inside Continuous Integration is performed at this point.

During upcoming sprints test team refines the process and proposes additional ideas which will benefit the project for example addition of frontend automated testing using Selenium with POC sample created.

After few sprints following test types are regularly performed:

- system testing when new features are being introduced
- integration testing when integration with 3rd party api integration is required
- acceptance testing for all new development work done on the project
- test automation for accepted features

Benefits:

As test automation was successfully introduced and merged into continuous integration regression testing became more reliable and much less time consuming. New defects detection became faster as well as overall build quality improved. Testers could spend more time on acceptance and exploratory testing which further increased product quality.

Automation was also helpful with cost effectiveness as after automation introduction overall output in case of new functionalities grown by 10%.

Due to adhering to SCRUM best practices test team was able to quickly gather requirements as well as adapt frequently satisfying client needs.

Introduction of clear documentation allowed to better reflect project status as well as simplified communication with the client.

Groundwork was made to further optimize testing in the future by proposed addition of UI testing.
In conclusion the client received a modern, easy-to-use, user-friendly platform for VOD services. The system was also equipped with many new features, such as ability to have more than one affiliate (multi-tenant solution), simpler and faster video ordering and various types of subscriptions. All of that would be impossible without effective and professional testing activities employed on this project.

Tools used:

- Postman
- JMeter
- Selenium
- Azure DevOps
- Portal Azure

Case study 2

User interface in custom devices for elevator solutions

Project description:

Client is a worldwide supplier of elevator system. For their newest product they wanted to create advanced displays using custom build devices operating on Android system.

Project is conducted in SCRUM methodology.

Challenges:

The challenge of this project came from the nature of the environment in which product operates. Displays need to be properly integrated with elevator system which are very different from usual IT environment setup. All communication between display and elevator needs to be performed at a very low level using special protocol for ethernet communication.

Since elevators are safety critical the displays software needs to be reliable and tested thoroughly to prevent any issues. Two display types are being developed. Interactive on to be used in the halls and informational in the elevator itself.

Initial proposal was to build mock setup for the elevator at Cybercom office to recreate environment as closely as possible. Team of three testers were selected for manual testing and automation. Proposal was made to set up Jenkins server for work efficiency.

Solution and implementation:

Client agreed to proposed solution stipulating that due to safety critical nature of the product as much automation as possible need to be done for every feature.

Displays were brought in and properly set up using group controller as elevator mockup to simulate as closely as possible environment in which product will exists. Only the physical connection using ethernet cables were permitted- no wireless communication with displays were possible.

Jenkins were set up for work efficiency as only one display of each kind were provided and each of them needs to be hooked to a physical computer as wireless communication was impossible. This allow test team to work on test scripts and test execution in parallel.

After introduction of any new story or feature manual tests are performed and as many automated scripts as possible are created to test that part of delivered product. Alongside those activities documentation is created which records activities as well as the results of testing.

Integration of tests scripts inside Continuous Integration is performed at this point.

During upcoming sprints test team refines the process and proposes additional ideas which will benefit the project and address new features for example preparing switch that will simulate usage of RFID card.

After few sprints following test types are regularly performed:

- system testing when new features are being introduced
- acceptance testing for all new development work done on the project
- test automation for new features

Benefits:

As test automation was successfully introduced it allowed all teams with suitable setup to run automation on environment closely resembling real product usage. Thanks to that reliability and new defect finding became much more efficient responding to client main goals.

Creating Jenkins setup allowed test team to significantly boost its performance.

Due to adhering to SCRUM best practices test team was able to quickly gather requirements as well as adapt frequently satisfying client needs.

Introduction of clear documentation allowed to better reflect project status as well as simplified communication with the client.

In conclusion the client received a quick and reliable setup for the project which is complainant with the main project goals as well as clear vision how to proceed in the future in case of newly added features.

Tools used:

- Robot Framework
- Appium
- National Instruments Digital I/O Device
- Proprietary tools and libraries for RS485 communication

Case study 3

Mobile application for correspondence circulation

Project description:

Mobile application for correspondence circulation is being prepared to enhance communication between citizens and various government offices in cases when personal visit to the office is not needed.

Challenges:

Mobile application which was developed for more than a year in Android and iOS versions lacks internal testing resources. Only testing is done manually by outside acceptance team.

Test automation was attempted but later abandoned due to lack of resources. Outdated test scripts in Robot Framework remained as well as partially setup Jenkins pipeline for Android.

Due to independent test team approaching testing as full regression for every single change time to market for application is very long.

Solution and implementation:

It was decided that additional acceptance testing will be performed by Cybercom tester before sending the application to outside acceptance team to raise the quality of releases.

Test team agreed to keep first automation approach as Robot Framework paired with Appium can be used cross-platform.

Existing test scripts were assessed, updated and changed to become more robust. Jenkins pipeline for Android was finished as well as iOS one set up.

Testing model focused on providing highest quality releases for outside acceptance team as such regression was heavily automated to run on each build as well as manual acceptance tests became top priority.

Benefits:

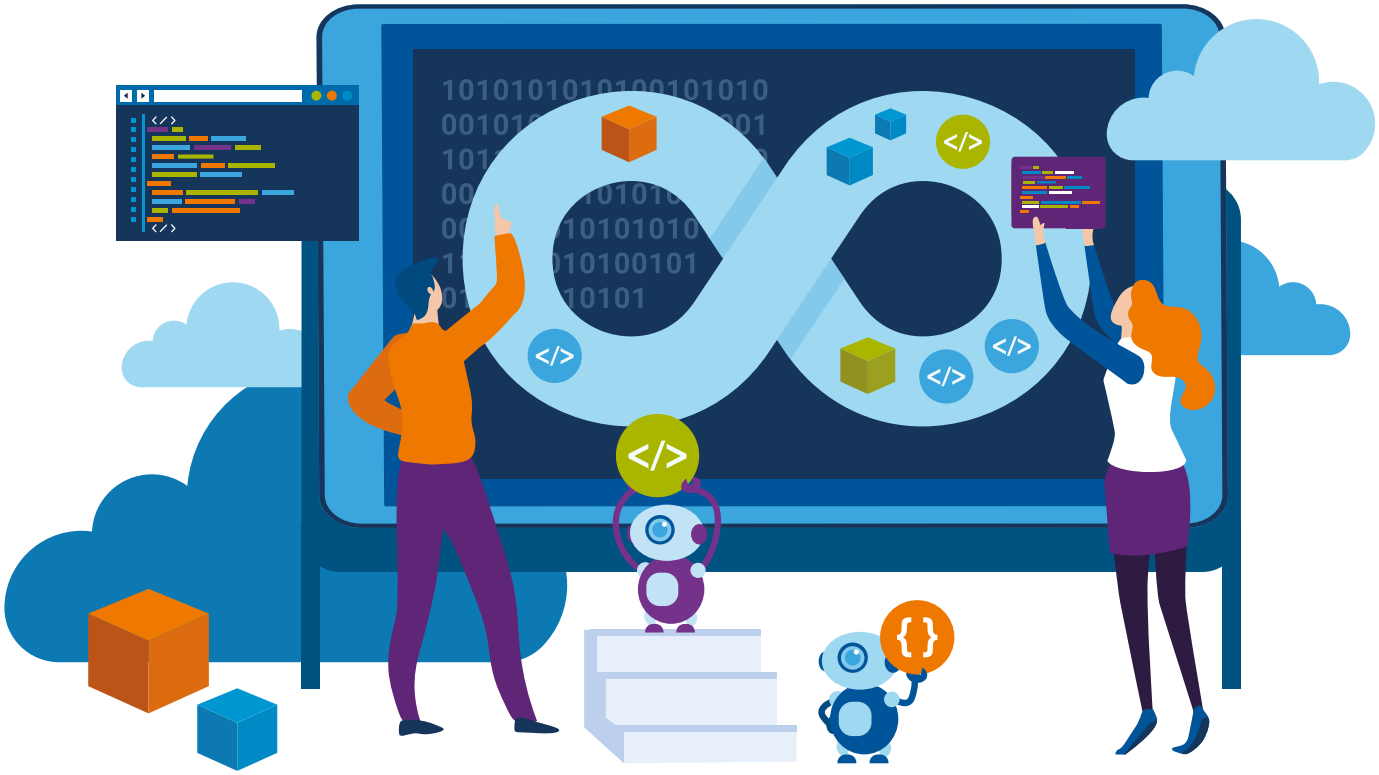
As first release candidate with automation and additional testing was presented for acceptance time to marked was reduced significantly due to acceptance team finding only minor issues if any.

Overall quality of application raised as well as it’s store reviews.

Cross platform usage of Robot Framework and Appium allowed team to be flexible in taking automation tasks between platforms.

Tools used:

- Robot Framework
- Appium
- Jenkins



Case study 4

Mobile payment platform

Project description:

Web-based payment platform designed for bill payment and subscription top-up for mobile. Client want to crate backend and frontend solution which will support the vendors.

Challenges:

First phase of the project was done many years ago. Client currently is working on rewriting solution for SOA based architecture. previous development and test team which started this phase was replaced by Cybercom.

Due to nature of the solution platform need to be reliable and stable as well as provide good user experience for vendors.

Initial automation in SOAP UI was already created as well as some test documentation.

Solution and implementation:

After familiarization with the project and its goals two testers were chosen to undertake testing after familiarization with already created work.

Some of the script could be re-used right away and around 40% needed to be rewritten.

For the documentation team proposed to introduce more formal approach which would help in communication with the client.

Client agreed with the proposal. Due to time constraints automation focus was put into most critical components and features.

Benefits:

Due to carefully targeted approach automation encompassed the most vital solution areas which resulted in more frequent and more stable releases.

More formal documentation allowed better communication with the client by ensuring common understanding of processes and architecture.

Tools used:

- SOAP UI