

10 Years QiTASC

ANNUAL REPORT

2021

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 iTASC
the magic of E2E testing

Letter from the Management

Dear Employees, Partners, and Customers,

2021 was a paradoxical, stressful, and demanding year. While the effects of the coronavirus pandemic hit many business areas, we at QiTASC are prospering. Even better: 2021 was a record-breaking year. We managed to:

1. sell our remote testing equipment to many companies that were looking for tools to control devices in the lab remotely when employees work from home,
2. improve our customer base, even though travel was no longer possible,
3. develop additional modules for our test automation framework.

Our turnover reached EUR 5 million, a new dimension for QiTASC. This is a historic achievement which we reached together with our wonderful employees and partners. Thanks a lot for your efforts: it is you who form the bedrock of our growth – an organic growth based on our good work.

I also want to mention that Denise, Michael and I are still highly motivated and working closely together. Working with my children has been the most important experience I ever had, and it has now lasted for more than 10 years. Unfortunately, Michael was affected by long Covid, but step by step he is coming back to work. We're keeping our fingers crossed.

We were able to acquire several new customers in 2021, all of whom are very happy with the services we provide and are asking us to provide additional ones. Our project managers are doing a great job, and I also want to mention our IT department, which saw major changes in what was a very challenging year for our small team. With our two new IT experts we will enter calmer waters in 2022.

Already offering the leading-edge technology for test automation, we continuously improve our IT landscape with new modules, features, and functions. Before Covid we were mainly using our automation framework for customer projects, and with the start of Covid many telecommunications experts started using QiTASC remote device control features. Currently, 200 experts in Europe use our remote control features.

We started with first type acceptance projects in 2012, and now perform factory acceptance, type acceptance, field acceptance, live network operation projects, and protocol verification projects for the telecommunications and IoT sectors.

Next year we will start with a new cloud-based testing service targeted at SMEs in Europe. We hope to build up another pillar in our successful business model.

We are now on the verge of becoming a medium-sized company. I am sure that we will successfully meet this challenge together. I firmly believe that companies like QiTASC are the backbone of our society.

Best regards,

Can Davutoglu (CMO)



Michael

Michael is the mastermind behind QiTASC. He developed the first version of intaQt® and is responsible for the design of the framework. He also defined the programming guidelines and the toolset which are responsible for our exceptional software quality.



Denise

Denise is responsible for all QiTASC projects. She coordinates the resources, requests new features from Development and devises strategies for efficient test run and optimized project preparation and configuration.



Can

Can is responsible for marketing and sales. He collects customer requirements and transforms them into internal feature requests. Can has worked for major telecommunications vendors and can therefore draw on an extensive network.



the magic of testing



"Quality is never an accident.
It is always the result of intelligent effort."

(John Ruskin)

intelligent effort



automation is our passion



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Business

QiTASC is an Austrian software company founded in 2005 (company number FN 269602z) with its main office at Diefenbachgasse 53, 1150 Vienna, Austria. An additional office is located at Prinzenallee 1, Düsseldorf, Germany.

QiTASC believes in test-driven development and continuous integration. Its expertise is in test automation – especially in telecommunications. The company has built a strong reputation with customer operators and integrators for its ability to execute end-to-end testing for functional and charging-related testing in lab and production environments.

For successful software testing and process optimization, QiTASC has developed intaQt®. Apart from intaQt® licenses, the company also provides managed testing and consulting services, project management, and training to optimize its customers' project development. The goal is to support customers with developing a flawless product which can be brought to the market as quickly as possible.

To support all automation activities related to a test factory or test pipe, QiTASC has developed several tools:

- intaQt
- intaQt web-ui
- conQlude
- reloQate
- cheQ
- mimiQ
- cdr-linQ

Areas of Activity

Telecommunications

Web & application testing

Internet of Things

IT projects and infrastructure in general

We started our business with Germany's second-biggest telco operator, and now have customers in Austria, Belgium, Czech Republic, Greece, Ireland, Italy, Spain, Turkey, and United Kingdom (in alphabetical order).

QiTASC's intaQt® end-to-end automation solution represents a state-of-the-art test automation software suite that forms the integral part of a future-proof test automation practice. We have developed additional modules to cover every test automation aspect of a test pipe or continuous testing approach. Modules for automated reporting, automated trace comparison, automated record verification and a message sequence engine to simulate missing systems.

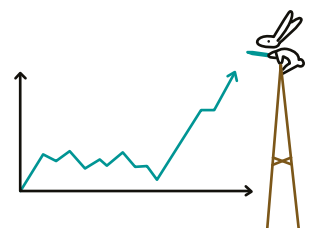
We offer our customers the simplicity and complexity required to validate use cases, starting with very basic use cases. Customers can decide how far they want to take the verification process. The final and most complex level is protocol conformity, where we check that all activities are in line with standards (e.g. 3GPP, ITU, ...) RFCs, and customer documentation.

intaQt® can automatically run and validate complex "end-to-end" use cases across multiple domains with a focus on the telecommunications and Internet of Things sectors.

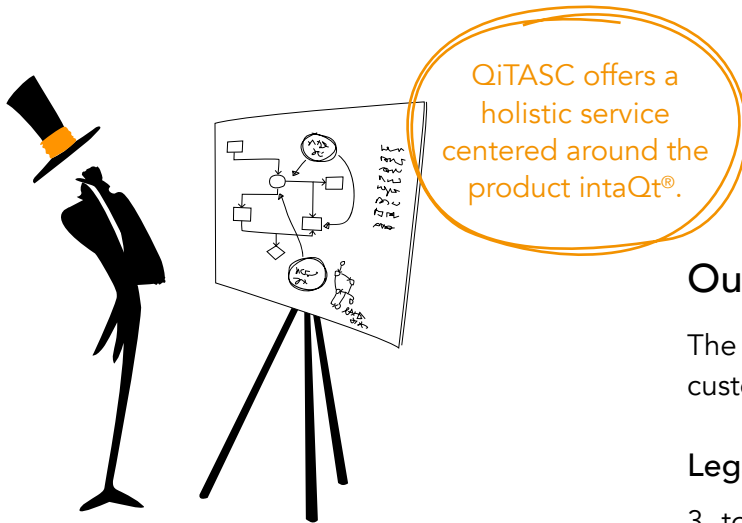
The solution is used to perform functional testing from the end customer's perspective in typical quality assurance processes employed by fixed or mobile telecommunications network operators, systems or service providers, and integrators. Integration tests, acceptance tests, field acceptance tests, first site applications, and live network probing are typical areas where QiTASC has already demonstrated its ability to establish a valid business case: eliminating repetitive tasks for testing professionals and realizing synergies across the product development life cycle and entire test chain.

The intaQt® test automation suite has been developed to achieve benefits through automation while executing and delivering for major telecommunications service implementation and migration programs such as Data Sharing Service, advance pre-paid service, VoLTE, and enterprise solutions for fixed/mobile/IP convergence. intaQt® is therefore tailored to the needs of experienced engineering and testing professionals.

We are committed to delivering against project schedules. The agile software development process of intaQt® releases new software on a bi-weekly basis (quality assured by several thousand automated test cases run by intaQt® Server), while corrections can be released ad hoc and made available to customers immediately via the intaQt® cockpit – a one-click upgrade or downgrade of intaQt® versions).



Business Strategies & Strengths



Challenges

- 56 % of our turnover comes from a single customer. Before Covid it was even 82%. We are well on the way to decreasing this share still further.
- Some customers prolong agreed payment terms without notice.
- A functioning customer laboratory is the most important thing for endorsing the full capability of test automation.
- Make small and medium-sized companies aware of QiTASC.

Strategic Decisions

- Start to cooperate with enablers and management and IT consulting companies, jointly participate in RFQs and bid for projects. QiTASC to provide tools and technology, cooperation partner to provide human resources.
- Ensure moderate growth in terms of human resources, focus on development resources and usability know-how.
- Organize free day-long workshops for existing and potential customers.

Our Strength in Customer Retention

The four perspectives for QiTASC's success in customer retention are:

Legal customer retention

3- to 5-year program for customer projects with 1- to 2-year lifetimes. We have long-term partnerships, e.g. with ATOS and capGemini.

Economical customer retention

intaQt® enables reusability of test cases in type acceptance as well as in production environments. A test case is also a documentation, a written in-plane test. With the investment done, you receive QiTASC hardware and test cases for the QiTASC environment. Third parties use the QiTASC solution and have invested in our know-how.

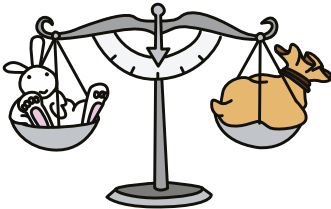
Commercial customer retention

Our successful projects result in satisfaction. Our customers/project managers appreciate our commitment. We provide everything necessary for E2E testing from a single source: hardware, software, resources, and professional services.

Technological customer retention

The QiTASC framework is integrated 100%, including devices and network components as well as access and authentication. Furthermore, it has been adapted for remote control operation if employees have to work from home because of Covid. Process and system know-how is integrated via network components. All in all we offer products which automate the whole test pipe.

Achieved Goals & Milestones



EUR 5 million

Turnover

QiTASC's turnover reached EUR 5 million in 2021. This is the first time we reached this symbolic threshold. The turnover is composed of hardware sales, license sales, and provided services.

- 5% hardware sales
- 20% recurring licenses
- 65% test projects
- 10% consulting & training services



+ 4 customers

Customer base stronger than ever

We managed to add several countries and customers to our customer base, namely a Belgian mobile operator, Vodafone Ireland, Vodafone Greece and ATOS-Spain. Other potential customers are in Austria, Italy, and Portugal.



+ 2 products

mimiQ and intaQt web-ui

mimiQ lets you define https message sequences. It can act as a simulator which behaves like a network element in telecommunications networks or provisioning systems. mimiQ is also operated as a load and stress test system, especially for 5G Nchf, Npcf, etc. interfaces. Furthermore, due to the trend to provide a portal with a web-based user interface, we have developed intaQt® web-ui as a complementary product to intaQt studio, which offers the option of web-hosted test services.

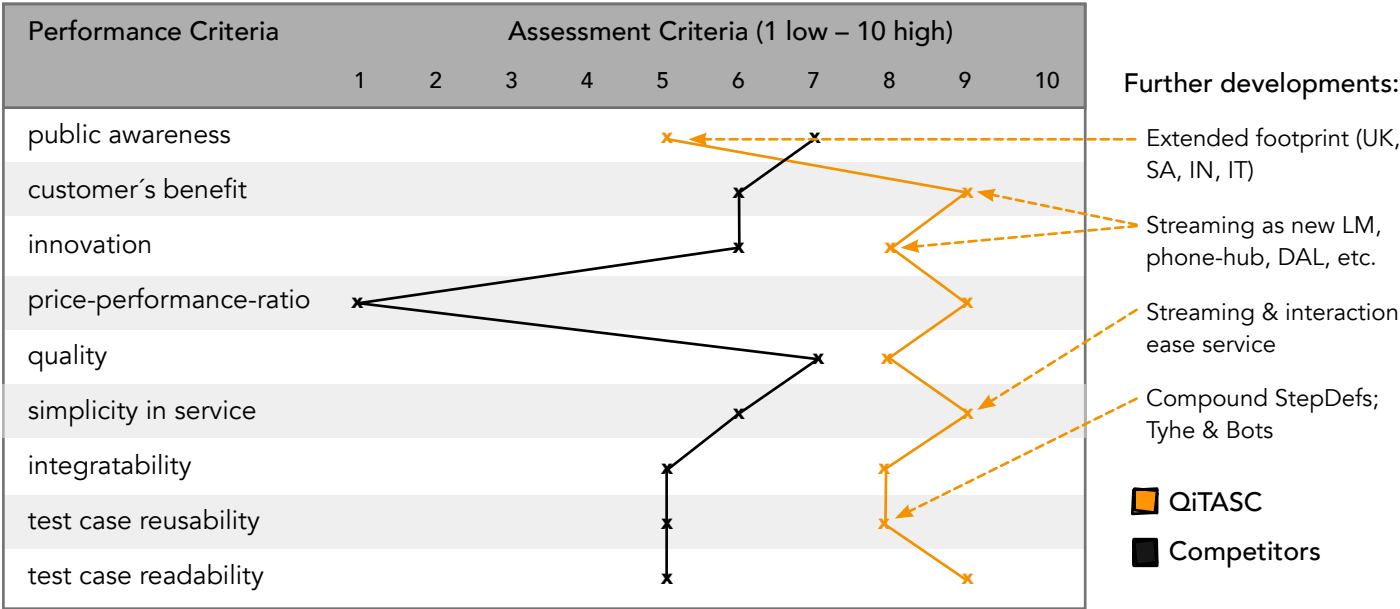


New Hardware

ISDN & POTS IPS

Another achievement was our ISDN- & POTS-capable intaQt phone service. Even though these technologies are not supported by many European network operators, there are many CPEs that do support them. Therefore there is still a need to test these technologies.

Competition



Competitors

- Tata Consulting Services
- Accenture
- Wipro
- STC THIRDEYE TECHNOLOGY
- QualiSystems
- TestComplete (Smartbear)
- Tricentis
- Qualitest
- Keynote Device Anywhere
- Perfecto Mobile
- Aubay
- Robot Framework
- Ericsson, Nokia, Huawei, etc.

Automation tools which cover one testing activity: www.capterra.com/automated-testing-software/

QiTASC, with its product **intaQt®**, is better than the competitors for the following reasons:

intaQt® is unique on the market

Many automation tools are isolated solutions that concentrate on a single function. **intaQt®** automates, validates, and reports in a breadth and depth that is unique!

End-to-End verification has been a fundamental requirement of **intaQt®** since the beginning.

The entire architecture is geared towards it. Other tools were often developed from specific sub-functions and then expanded. The more complex the environment, the more difficult it becomes for these competitors to develop a test case.

Competitor products are often technology-centered rather than process-oriented.

The questions QiTASC asks about achieving flexibility and standardization are: How can we make life easier for testers? How do we approach complex challenges? How do we overcome them?

QiTASC Insight

QiTASC's team of experts provides a QA solution that is tailored to your company and your project's specific goals, regardless of the size and scope.

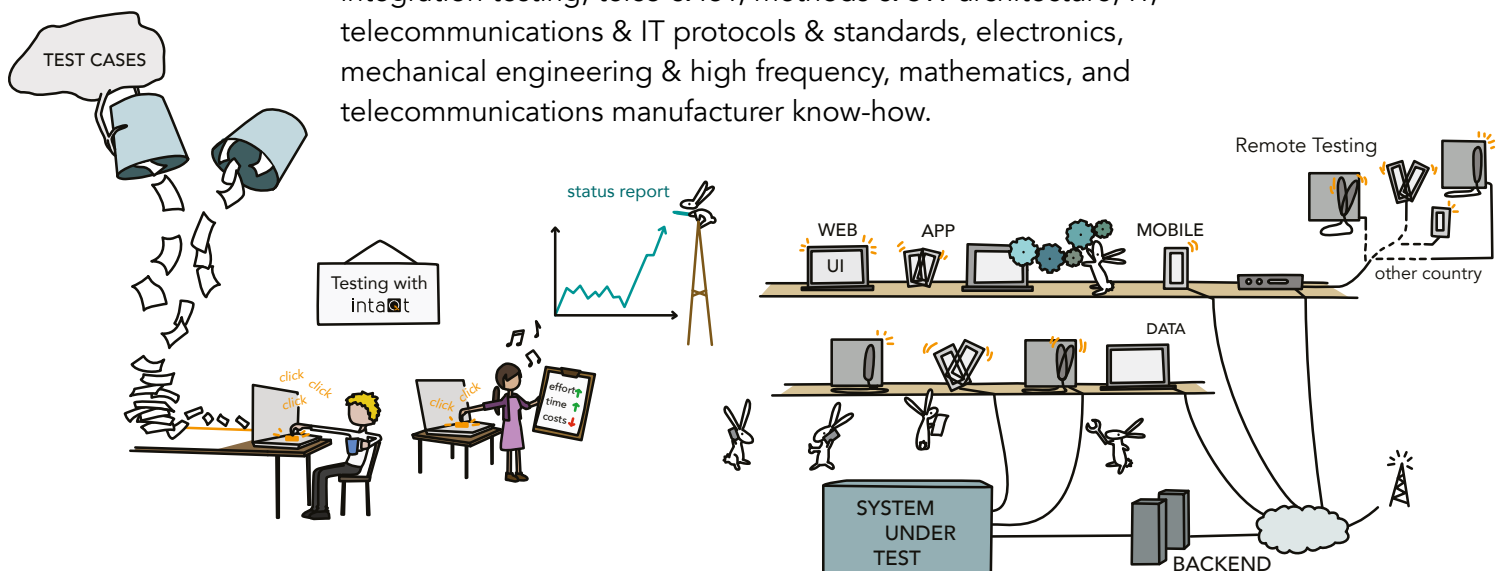
Our employees are the foundation of our success. They come from 12 different nations and cultures and from diverse technical backgrounds, which helps us find the right specialist to support you as you integrate into **Qt®** into your workflow.

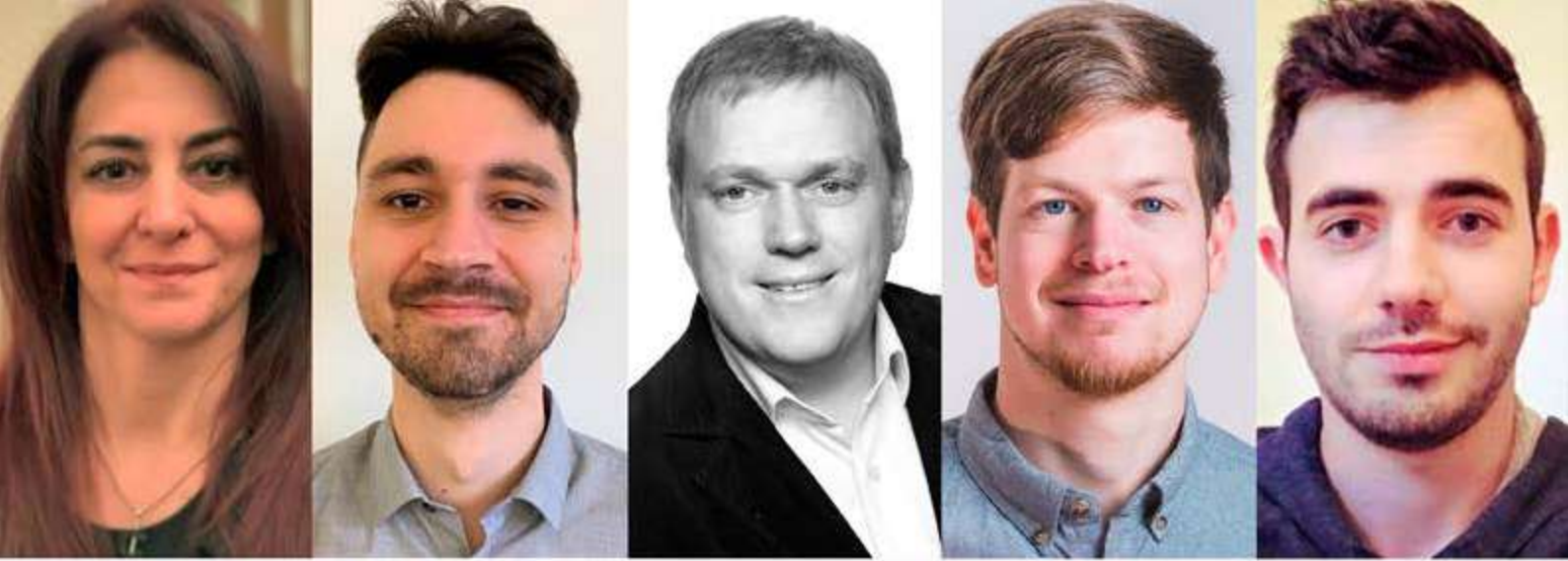
Staff loyalty

The QiTASC team that has come together over the past few years has the necessary experience and complementary skills. Some of our developers have been with us from the very early days. After organizational changes necessitated by the challenging years of the financial crisis, some teams at the manufacturers' were dissolved.

We took the opportunity to hire these specialists. This happened three times and we built up our team, which strengthened mutual trust. Through respectful interaction we were able to build a stable and sustainable team.

We have an excellent mix of knowledgeable people from many fields: development languages, agile & continuous integration testing, telco & IoT, methods & SW architecture, IT, telecommunications & IT protocols & standards, electronics, mechanical engineering & high frequency, mathematics, and telecommunications manufacturer know-how.





Faces behind our success!

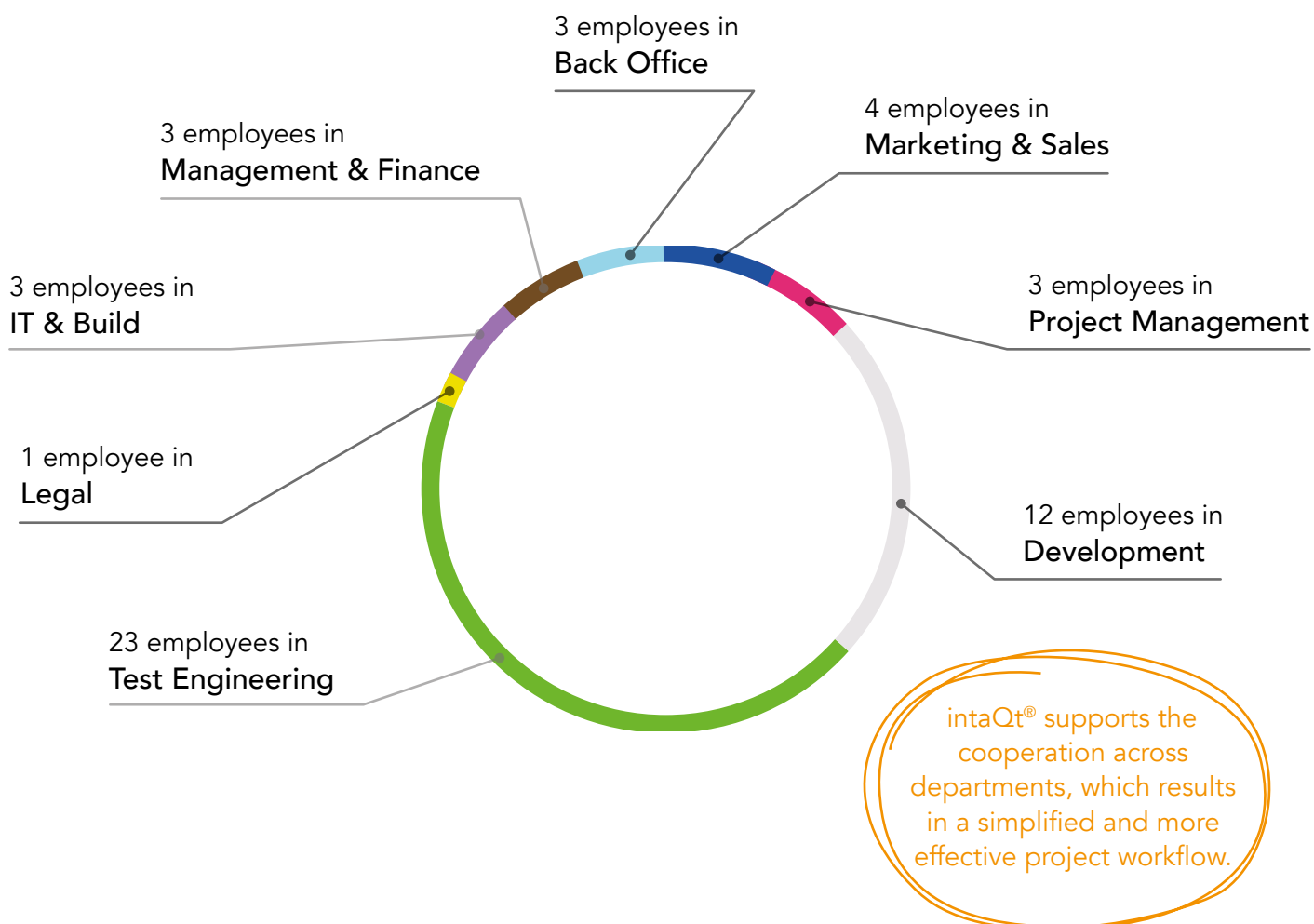
Our team of experts gives us the confidence to look ahead to a bright future! We would like to say thank you to every single member of the QiTASC family. We are grateful for and proud of such a professional and supportive team which ensures steady growth, stability, and success.





Employees per Department

in 2021



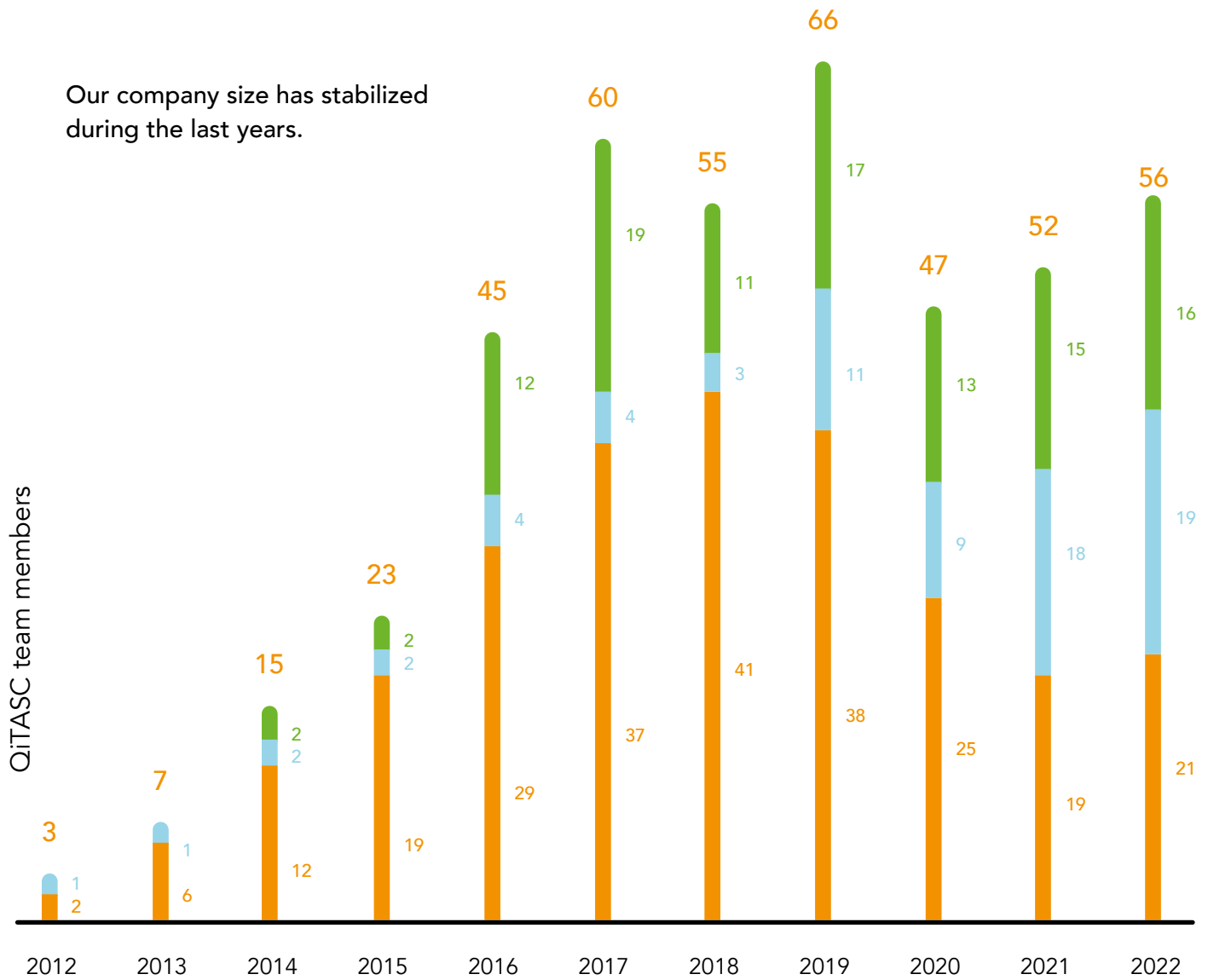
Gender Diversity



Human Resources

to 2021

Our company size has stabilized during the last years.



QiTASC
Austria



QiTASC
Germany

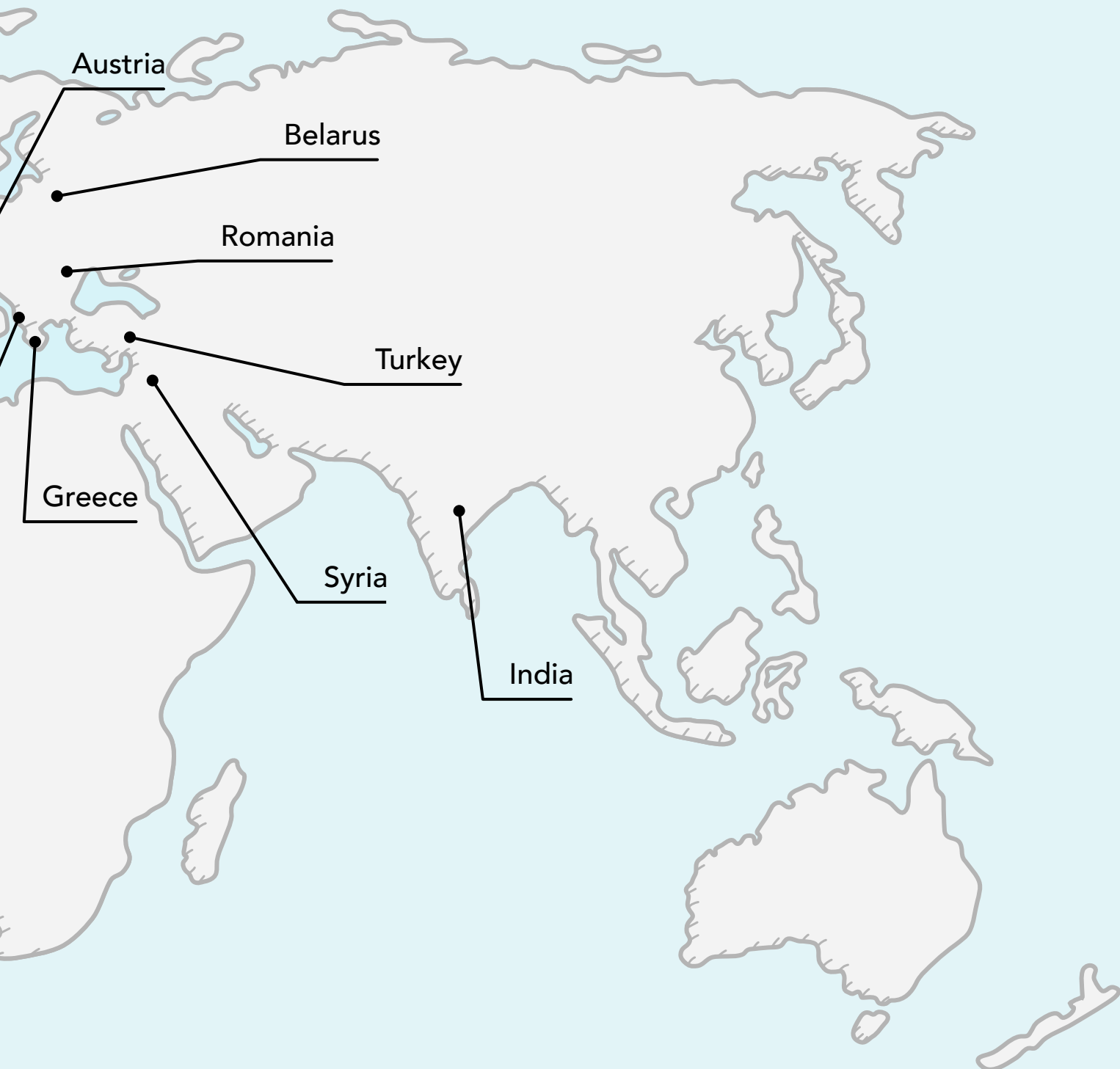


External
colleagues

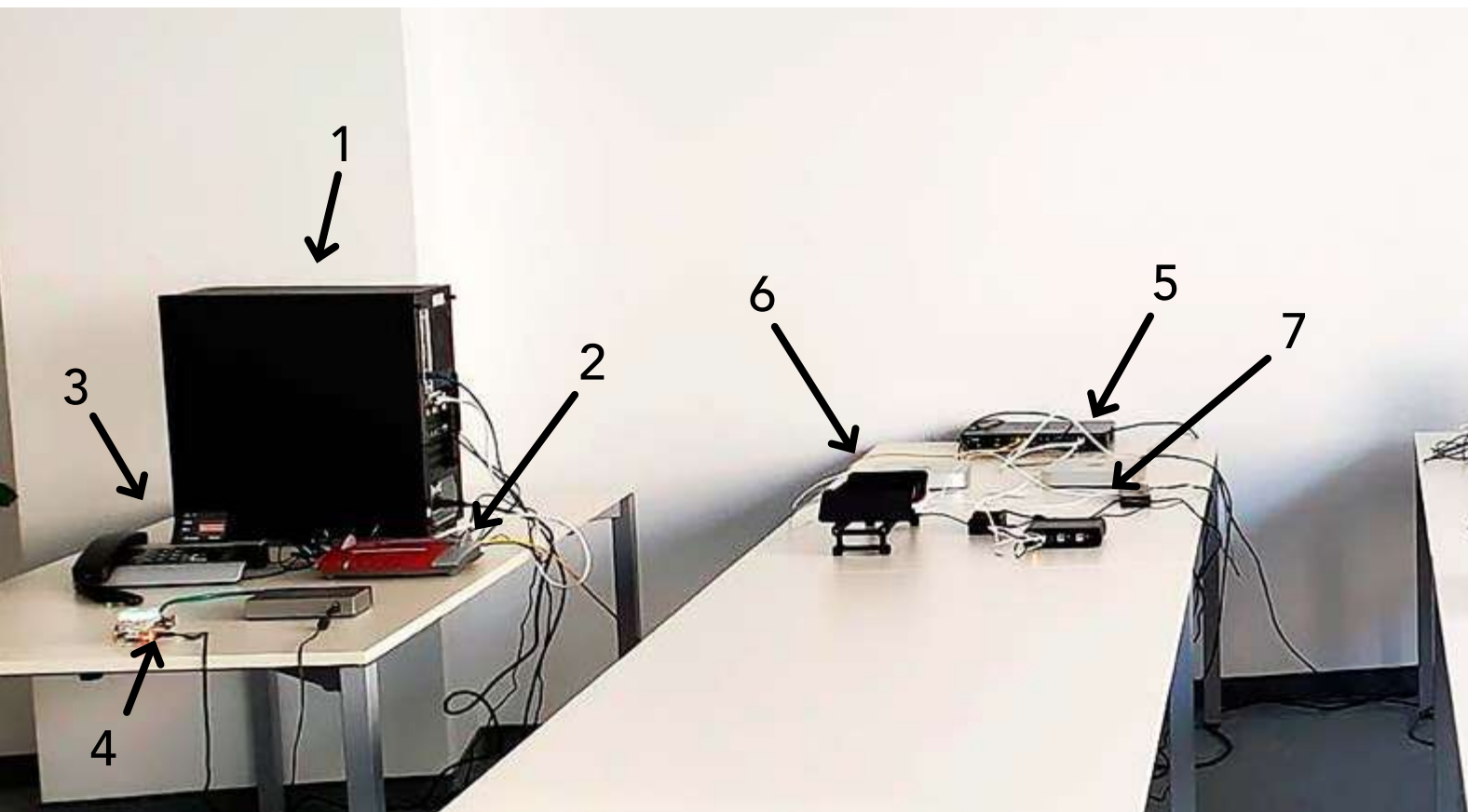
Nationalities of QiTASC's Employees in 2021

including external employees





QiTASC Lab:

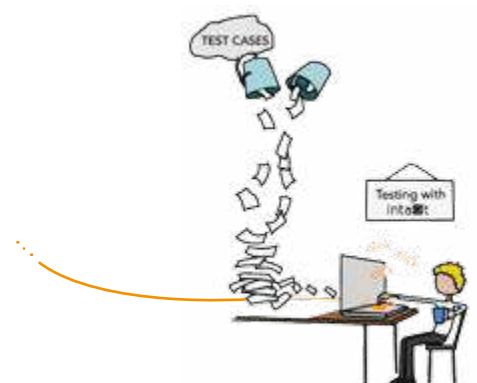


Legend of the QiTASC lab:

- 1 PSTN-IPS with Openvox card for CPE Testing
- 2 CPE Fritzbox 7490
- 3 Analog phone
- 4 RasPI IPS (mini IPS)
- 5 Mac mini IPS for iPhones
- 6 iPhones
- 7 phone-hub
- 8 Standard IPS
- 9 Android phones
- 10 phone-hub
- 11 SIM array (implementa)
- 12 Standard IPS
- 13 VoIP phones (Snom & Yealink)

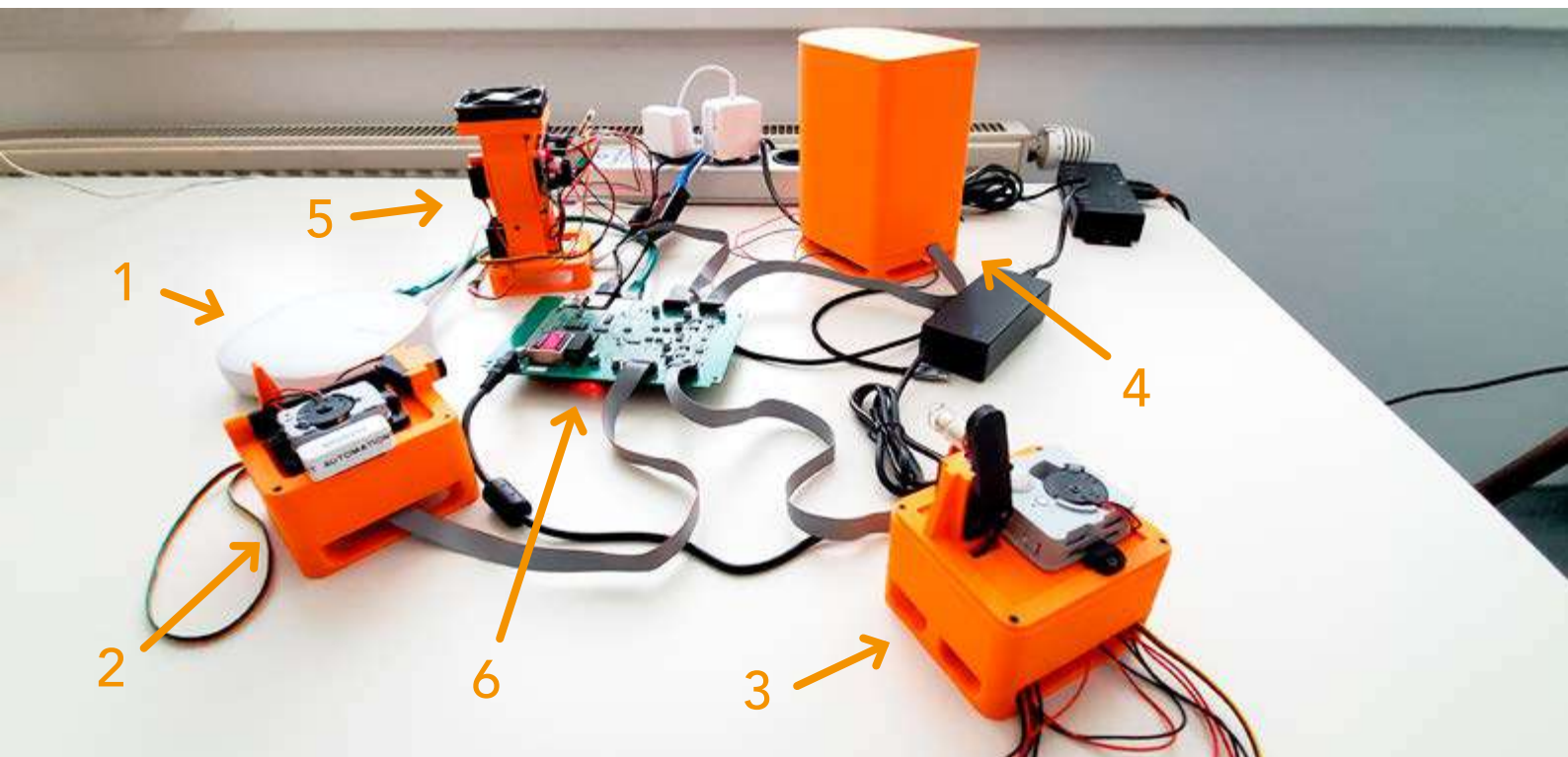
Legend of the IoT Setup:

- 1 Hub
- 2 Door/Window Contact
- 3 Motion Detector
- 4 Bulp
- 5 Smoke Detector
- 6 Generic Platform Controller





IoT Setup:



Internal Highlights

Working from Home

2021 was mainly influenced by the coronavirus pandemic. We again applied the rules for working from, and since we have developed remote working tools, we used our own framework to extend working from home.

CO2 Reduction in Sales & Marketing

Sales & marketing activities have been reduced to web meetings, social media contacts, and word of mouth. Before Covid, the QiTASC sales team traveled once a week in Europe, but in 2021 this activity was completely suspended.

First Floor Golf

Due to Covid, our training activities at our training center on the first floor of the Vienna office were unfortunately also suspended. We assigned one room an "indoor golf driving range".

One week more vacation

To show how much we value our employees, we have given them an extra week of vacation for the New Year 2021.

Outlook for 2022

Barcelona, here we come!

In 2022, we will attend two international conferences: Mobile World Congress and IOT Solutions World Congress in Barcelona.

Antalya, here we come!

Due to the Covid pandemic we could not hold our yearly workshops in 2020 and 2021. We are therefore planning a week-long event in May 2022 in Antalya at the Miracle Hotel.



Products & Services

intaQt® & Complemented Software

In addition to our flagship product intaQt® we offer a range of other products that complement one another in order to optimize the automation pipe.

Features

intaQt® offers a range of features that allow the user to execute and validate automated end-to-end tests based on complex use cases spanning multiple domains.

intaQt® supports all domains

Voice: 2G, 3G, 4G, 5G, POTS,
ISDN, WiFi, VoLTE aut.

SMS, MMS, USSD automation

Data usage automation

Automation of provisioning &
charging verification

Web-UI & app automation

IOT & 5G automation

CPE & device automation

Workshop & Training

Workshops take place in our new training rooms on a regular basis to provide and maintain intaQt® knowledge. Training modules support and improve intaQt®-enhanced software development results.

Managed Services

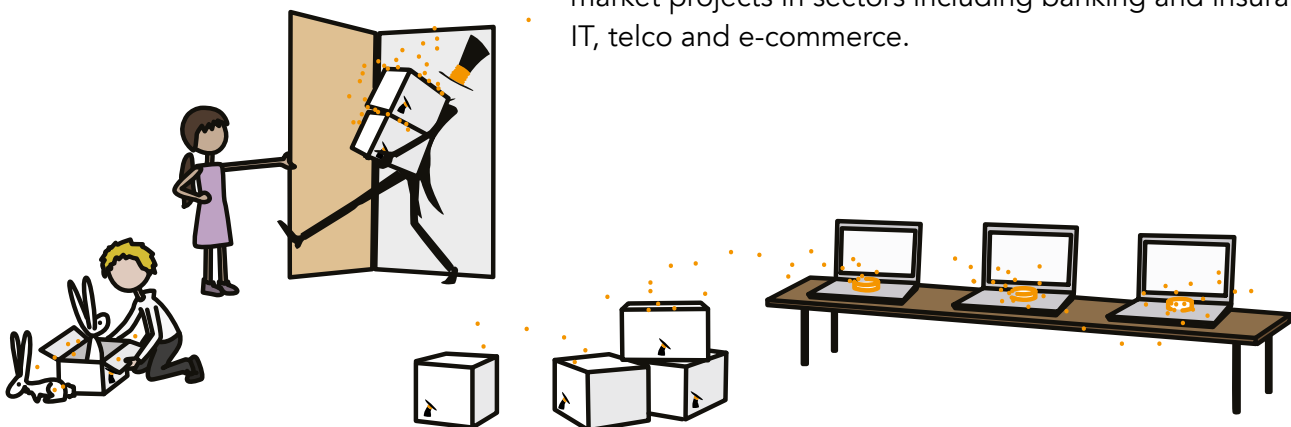
QiTASC provides licenses, a testing team, and project management to support customers' integration, provide configuration activities, develop and execute test cases (including verification), and carry out reporting and defect management.

All-In Services

QiTASC focuses on test-driven development and continuous integration to satisfy project development needs.

Business Partnering

International partners resell QiTASC's products for local market projects in sectors including banking and insurance, IT, telco and e-commerce.



Product Overview

Get to know details of our products in the appendix.



intaQt

Manage Test Automation Projects

Create, manage and execute automated tests that reflect real-world scenarios, customer experiences and complex interactions with backend systems. intaQt® supports real and simulated devices, and provides configurations to ensure that resources, including phones, are managed efficiently and that test cases and their results reflect real-life scenarios.



intaQt studio

Test Case Development Environment

intaQt studio supports you and your code as you create test cases. Our integrated development environment, which is based on the IntelliJ IDEA platform, includes the most important and useful features required for robust and easy-to-understand test cases.



intaQt client

Command Line Test Case Development

intaQt client provides a customizable way to execute test cases and projects, including XML configuration files, via the command line.



intaQt verification

Verification

Verify hundreds of parameters and metadata of a test case within seconds during a test or after data has been collected. With the click of a button, intaQt verification checks device, subscriber and event details, internal infrastructure, legal requirements, financial characteristics and more.



intaQt web-ui

Web-based User Interface

intaQt web-ui is a portal with a web-based user interface. It is a complementary product to intaQt studio, which offers the option for web-hosted test services.



cheQ

Trace Comparison & Verification

Compare two traces in an intelligent, automated way. Trace verification can be customized by packaging of trace data and correlation rules, simply edited in the tool (copy and paste). It also enables a record of previous comparisons to be kept.



sQedule

Resource-aware, Intelligent Scheduling Service

sQedule is a resource-aware smart scheduler that schedules tests on intaQ agents, then evaluates and allocates resources. It provides a monitor and actions to interfere with the test run.



colleQtor

Evidence Collector

colleQtor is a service for collecting evidence which comes as a stream and is then provided to the test case for verification purposes.



conQlude

Integrated Reporting and Issue Tracking

conQlude is a centrally accessible, secure web interface that collects, manages and exports intaQ test case project data and includes automated bug and error tracking.



mimiQ

Simulator for Network Elements

mimiQ lets you define https message sequences. It can act as a simulator for a network element in telecommunications networks, or provisioning systems. It is also operated as a load and stress test system, especially for 5G Nchf, Npcf, etc. interfaces.



cdr-linQ

CDR Web Service

The web service for collecting, filtering and presenting CDRs which have been generated by test cases. They are collected and decoded. Cdr-linQ shows two CDRs and compares them.



reloQate

SIM Card Detector

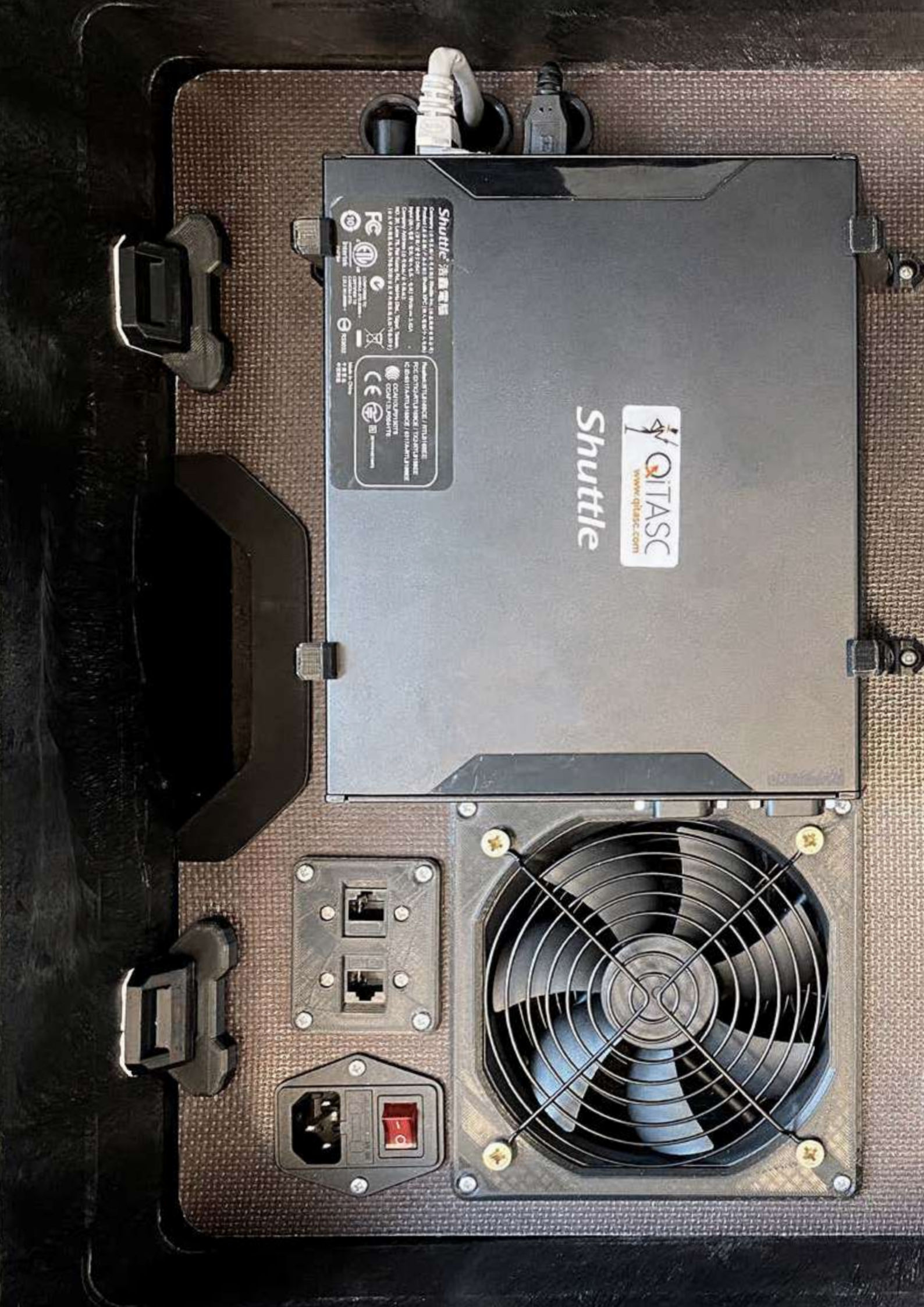
reloQate is a background service for checking and mapping SIM cards located in a SIM array/SIM Mux to a dedicated phone.



subscriber-db

Data Store

subscriber-DB is a data store for flexible SIM and device asset management, profile management and assignment, and much more.





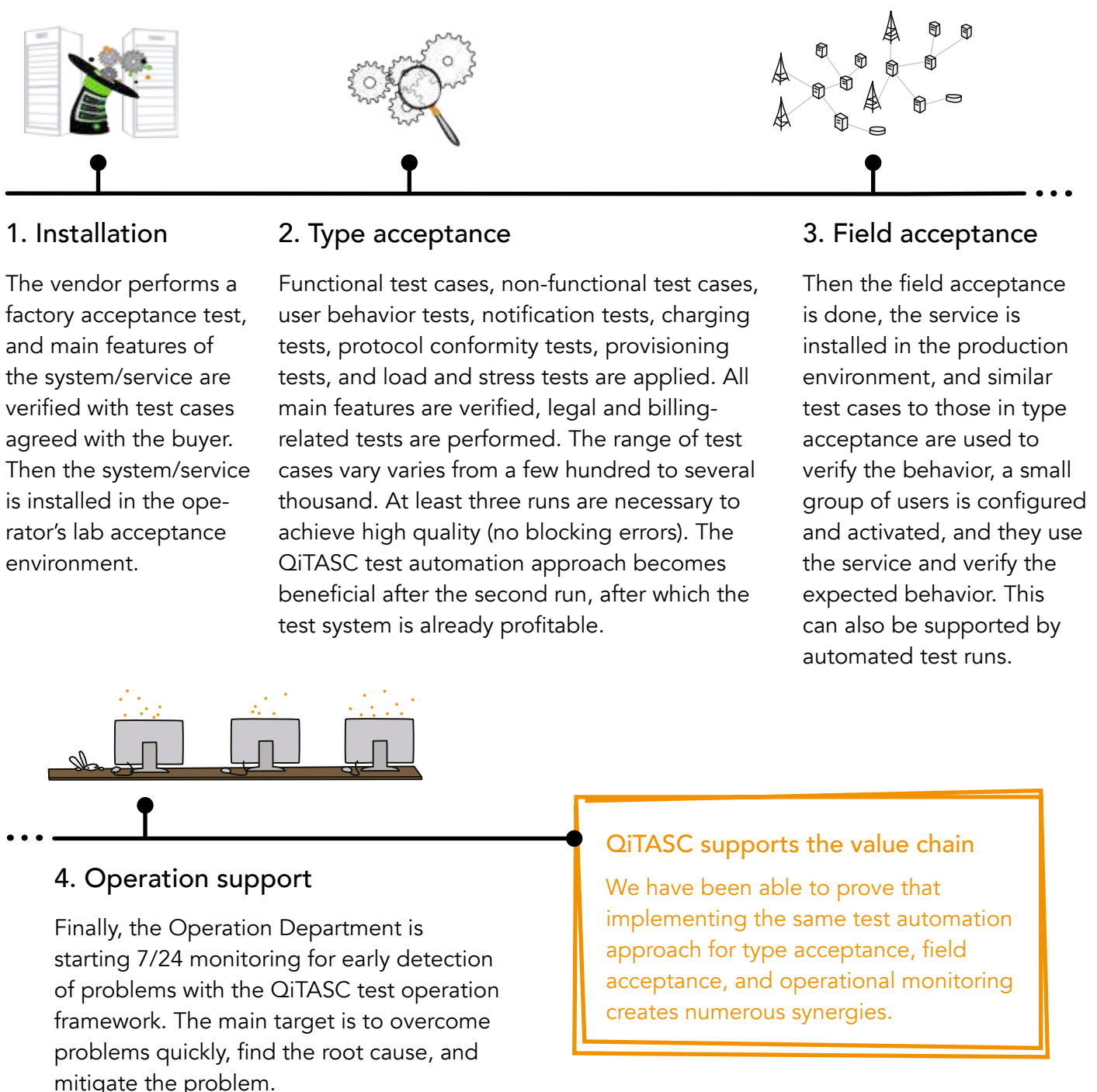
QiTASC Suitcase

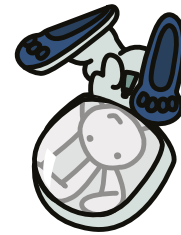
The intaQt® Case has been designed as an out-of-the-box, plug-and-play production testing unit. It inherits 2-5 phones, an IPS, phone-hub, and fan. All devices are already wired and can be used immediately. The systems are configured: insert the SIM cards, connect it to power and LAN >> GO!

Case Study: Telco Operator

The value chain when testing telecommunications systems is simple in some respects and complex when it comes to finalizing a project successfully. In principle, a vendor sells a system/service to the telco operator. Time to market is crucial for every telecommunications company: the type and field acceptance phases, combined with the operational monitoring needs, must be completed as quickly as possible. Consequently, test automation is becoming more and more important.

The Value Chain:





Testing in Times of the Coronavirus Pandemic

Although the last two years were very demanding for all of us, Covid-related social distancing rules led to a spike in demand for QiTASC's hardware and solutions. These rules required employees to work from home, and our ability to control devices and systems remotely offered new possibilities to all those who needed to control their devices in the labs from home.



Testing during the coronavirus pandemic requires special features, and our test automation provides several remote control capabilities for:



- Mobile devices, audio control included
- VoIP devices
- ISDN & POTS lines
- CPE, WiFi access points, etc.
- IoT devices, including 3D housing, actuators & sensors



In Q1 2022 we will add remote control for attenuators. The laboratory environment in combination with the QiTASC test automation tool enables a suitable remote working environment for all specialists who are working from home.

We realize that coronavirus is here to stay!

The coronavirus pandemic requires the reduction of social contacts in the laboratory, but with our solution all specialists can work from home and control the devices in the laboratory remotely without any loss of functionality.



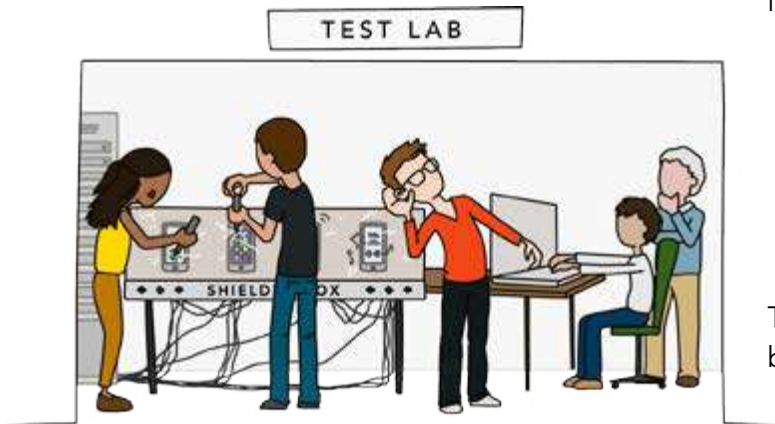
Using the Test Lab Before and After Covid

Before Covid

In the good, old days, testing was performed in labs by engineers. Those engineers ...

- ... operated devices in a shielded box
- ... shared a limited number of devices in that box
- ... were required to be on-site
- ... needed to check audio channels, announcements, sounds & music

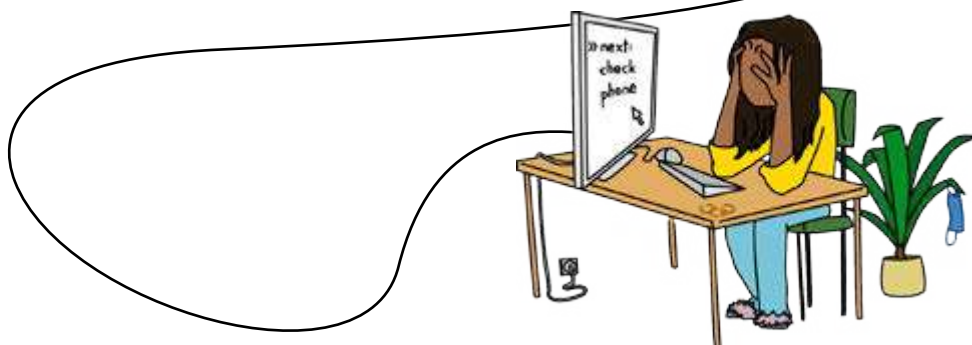
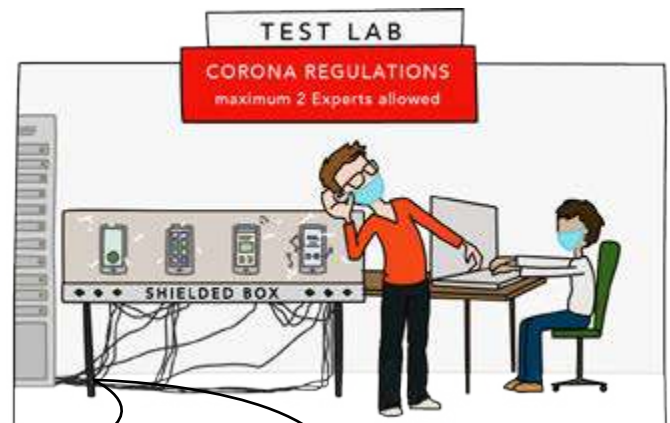
The operation of devices in a shielded box could be rather fiddly, but was essential.



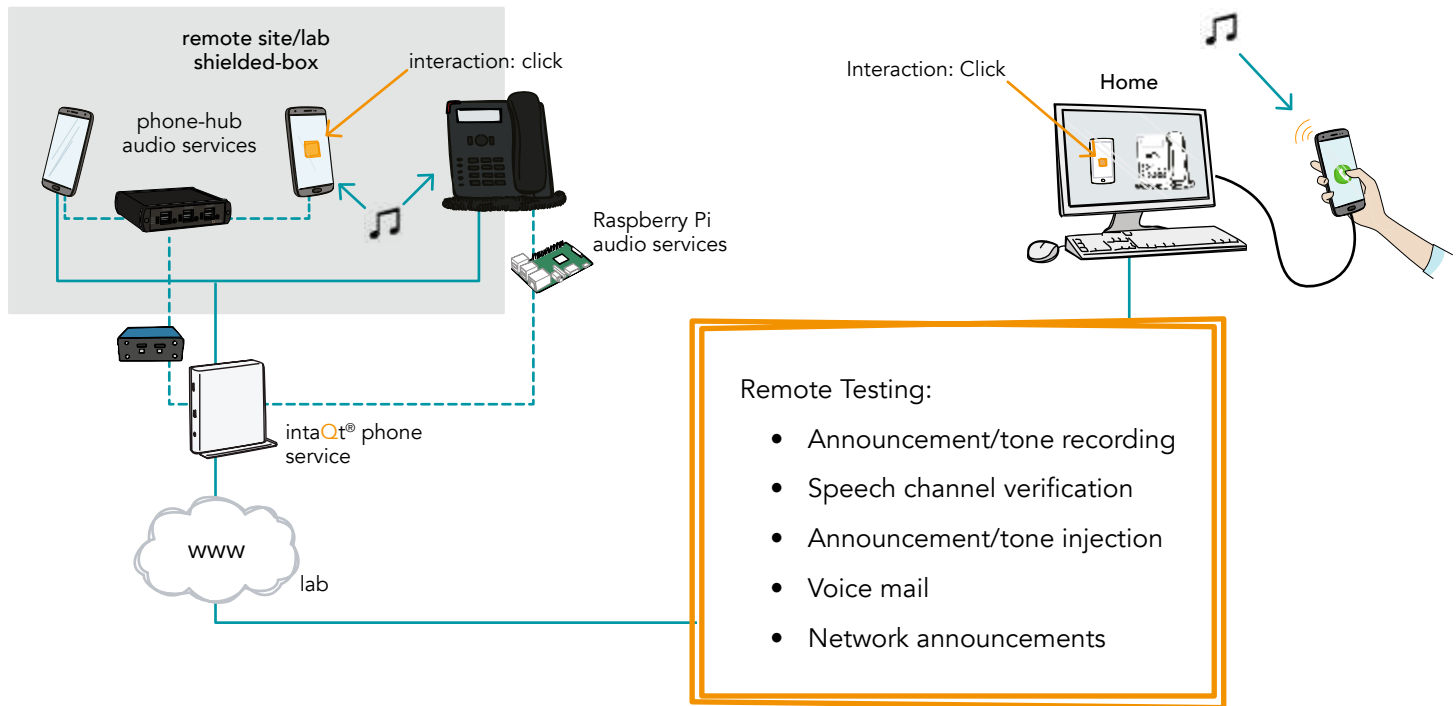
When Covid started

As soon as Covid started, problems with testing started. Engineers were only allowed inside a test lab in small numbers. They could not work from home, as long as a test-lab network was required.

There are some tools for remote testing but none of them provides audio power control for the devices. Testing is stopped in its tracks!



QiTASC Solution: Remote Test with Audio Support



Testing during Covid

Your advantages of testing with intaQt®:

- ✓ Full testing capacity restored
- ✓ No outlay for additional boxes or devices
- ✓ Engineers can work from home
- ✓ Full audio signal exchange

This experience can be used as starting point for test automation!

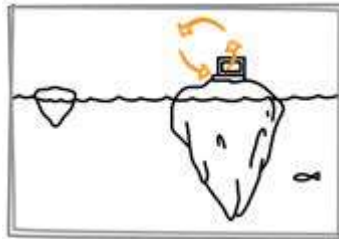


intaQt® covers the testing scenarios you are looking for!



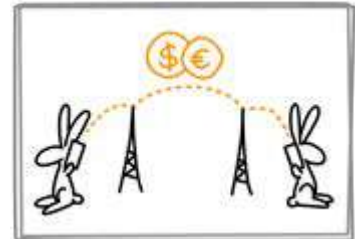
Acceptance Testing

The the software itself to ensure that your system is running smoothly.



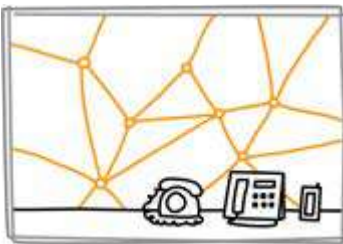
Backend Testing

Verify server-side functionality and the communication between interdependent components.



Tariff & Charging Verification

Make sure that convergent charging systems, online charging systems, and customer accounts are behaving correctly.



Core Network Testing

Confirm that all aspects of a network behave correctly for telephony, SMS, data, and everything else behind the scenes.



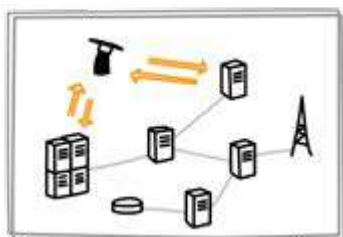
E2E & Migration Testing

Check that a network behaves exactly as it would when triggered by a customer, even for time-sensitive projects like migrations.



IFRS Testing

Ensure compliance with IFRS standards comparing huge sets of metadata against expected outcomes.



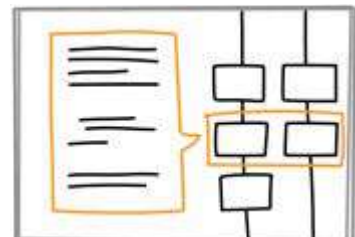
NW Element Simulation

mimiQ is a more general-purpose "interface testing tool". It is a test script executor with built-in support for any kind of http communication.



Internet of Things Testing

Automate smart devices to check that they communicate with their app and are working properly.



Protocol Testing

Ensure that data is transmitted between devices and over networks according to protocol specification.



International Customers and Partners

in 2021

-  Customers
-  Partners

Cooperation and Partnering

QiTASC's main business is testing projects in the telecommunications and IoT businesses. We have particular expertise in end-to-end testing with real devices. The main building blocks for this kind of projects are knowledgeable human resources and smart automation tools.

QiTASC has recognized that affordable sales and marketing requires partnerships for effectively tapping growth potentials. To this end, QiTASC looks for partnerships and marketing alliances. We hope to benefit from cooperation with international partners in order to:

- overcome the resource shortage
- reduce costs in marketing and sales
- offer local support in the local language and better customer relations
- gain additional expertise and know-how
- discover untapped market segments
- reach new customers

Ideal cooperation partners for QiTASC are leading providers of management and IT consulting, digital transformation companies as well as companies for technology and engineering services.

QiTASC provides hardware and automation tools which can be tailored to any customer environment and to any kind of device. The QiTASC automation framework also supports remote handling of devices, visualization of lab environments, and provisioning of customer management systems during the coronavirus pandemic.

QiTASC trains the cooperation partners' specialists and creates a pool of test automation experts who can handle testing projects all over the world. They develop test cases, run test cases, analyze the evidence, and carry out reporting and operation.

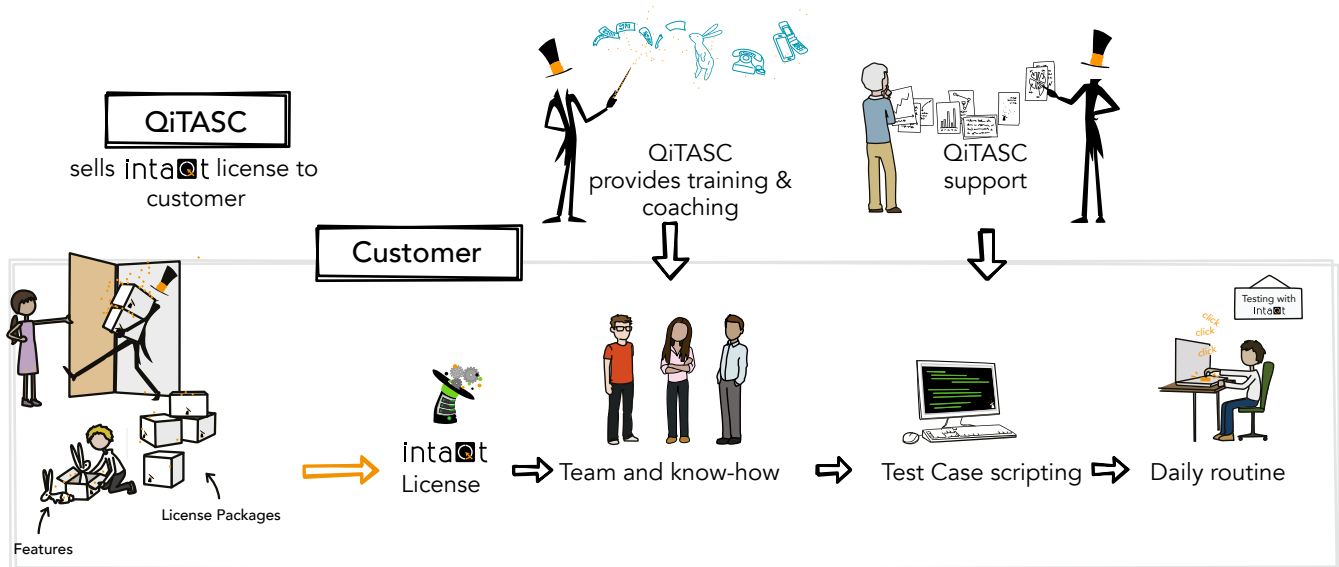
We count on our partners and support them as much as possible. We analyze the prospects environment, plan a smart automation environment, provide demonstrations, plan and handle proof of concept, and support them in all legal and procedural activities to handle RFQs and RFPs.

3 successful business models are explained on the following pages.

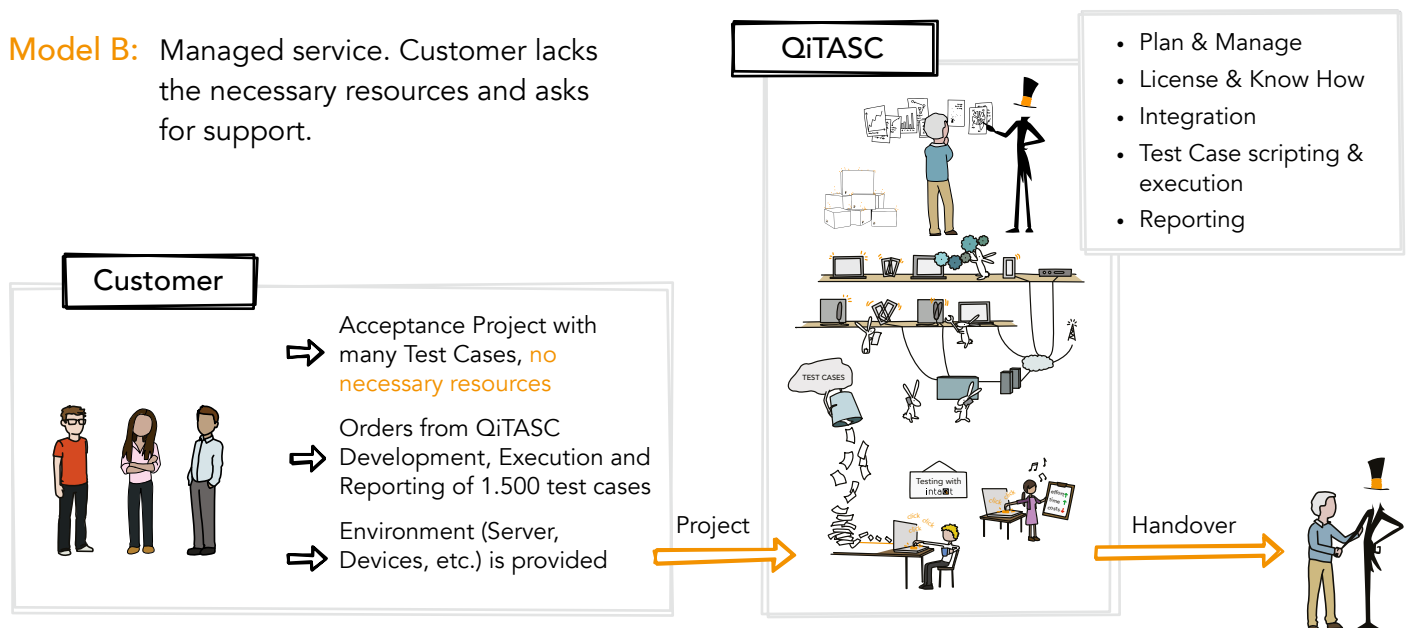
3 Business Models

The strategy of business partnering is based on the principle that you win more competitions as a team. We identified 3 successful business models:

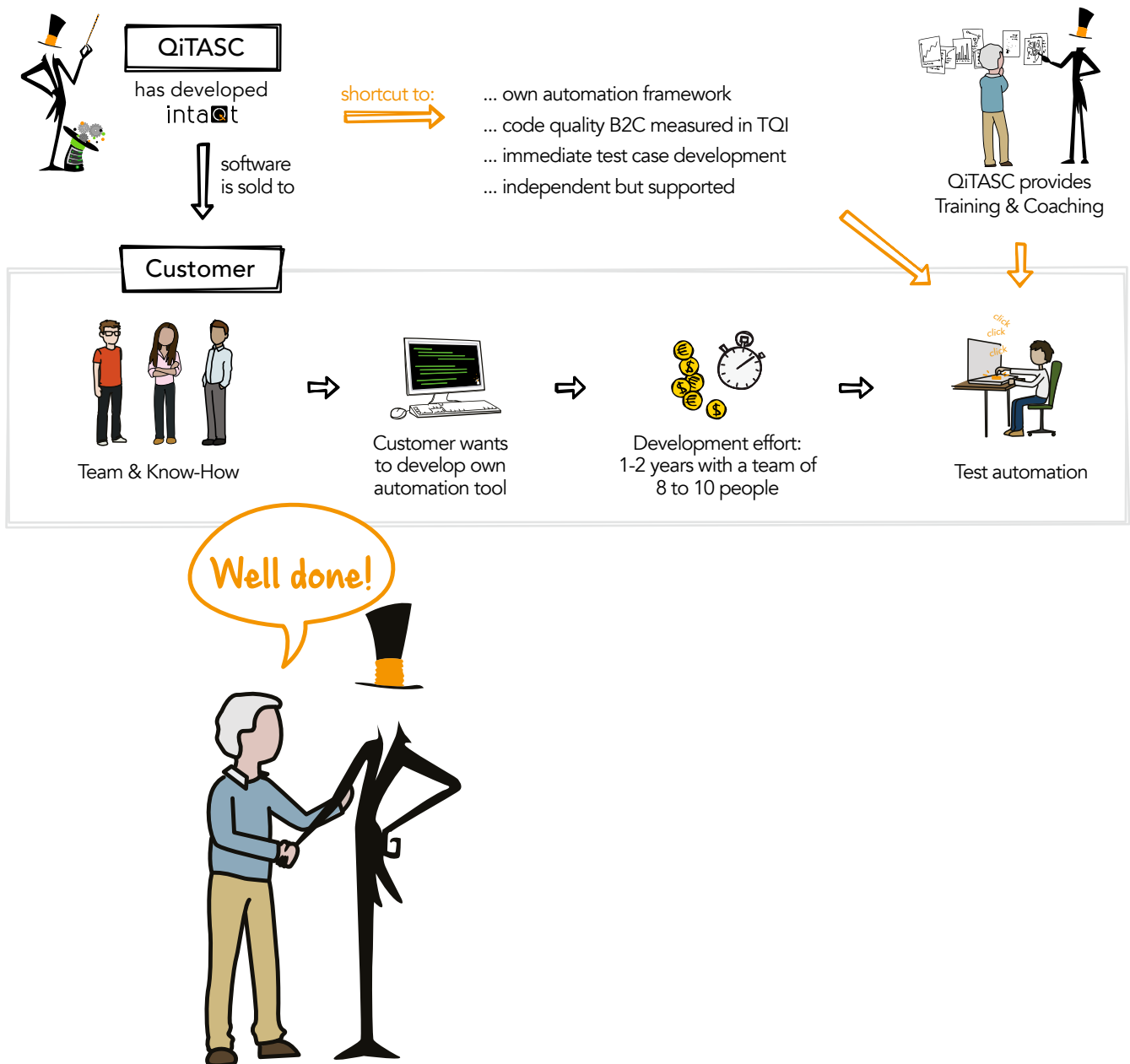
Model A: Customer wants to develop its own automation framework, QiTASC provides a working code base.



Model B: Managed service. Customer lacks the necessary resources and asks for support.



Model C: Customer wants to develop its own automation framework. QiTASC provides a working code base.

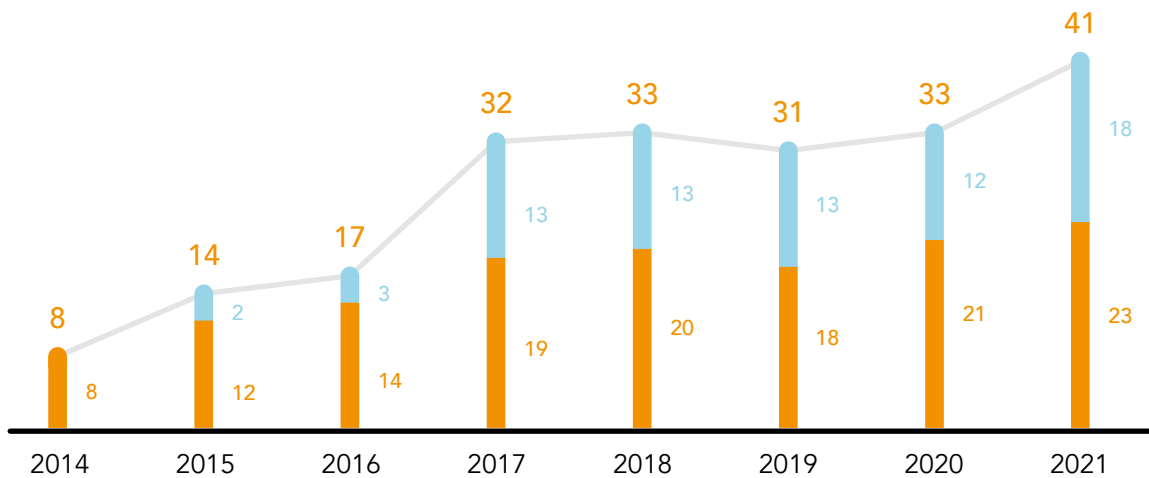




Tailored to the needs of experienced engineering and testing professionals.

Test engineers working with intaQt®

■ QiTASC testers ■ trained customers



Ease of use

intaQt® features a human readable, natural English scripting language that can be understood by all project stakeholders and allows modification, re-use and maintenance of test cases without programming skills. This is supported by intaQt® studio, a state-of-the-art user interface (supporting syntax highlighting/support, navigation, search, seamless Git version management, etc.).

Efficiency and speed of execution

intaQt sQedule, bot and phone service operators allow horizontal scaling of automated scheduling, sequencing, and parallel executions with full control of test resources. Test results and all evidence obtained are linked to the audit proof test report which can automatically be uploaded to existing life cycle or test management tools.

Efficiency of maintenance

Various abstraction layers of intaQt® Server ensure that very large test case libraries can be maintained and adapted to the rapid changes of environment and systems tested with minimum effort.

Cross technology/channel capability

Automation is E2E, and complete with regard to backend configuration or simulation, execution across user channels and devices (mobile voice, USSD, SMS, mobile web, app, VoLTE, data, fixed POTS, ISDN, IP, web) and verification of traces, logs, and call/event detail records.

Tailored features built in and ready to use

Example: pre-paid testing mandates consumables database (Voucher) and flexible rater, data download speed over time measuring, threshold supervision. These are built-in features of intaQt® that set it apart from other, less mature solutions.

Services, Licensing & Feature Development



+50%

More Test Automation Modules than 2019

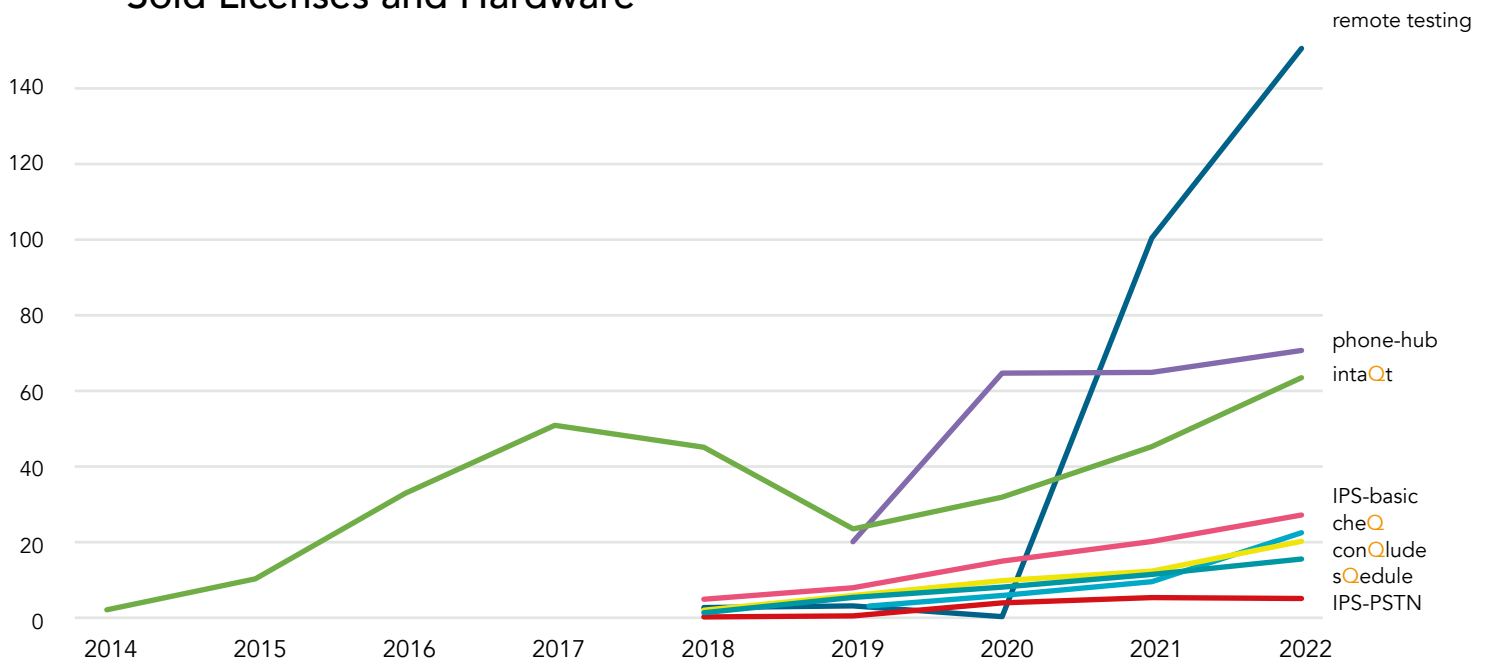
Starting with 2 test automation modules in 2013, we constantly increased the number of modules. Each year, we added 1 to 2 modules to the existing list.

This year, in 2021, the number of test automation modules was 13. We can already forecast another increase of +1 for 2022 to a total number of 14.

We also provide reporting and defect management, supported by intaQt®.

A standard license is linked to a user, while a sQedule license provides access to several intaQt® servers at a time across a shared environment. intaQt® can then be flexibly incorporated into a team's collaborative effort with parallel test case runs.

Sold Licenses and Hardware



Benefits of working with automation:

intaQ[®]t in numbers



Efficiency

5x more test cases executed than manual tests in same time-period

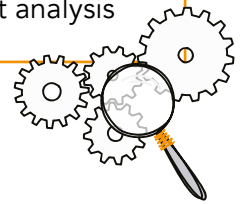
Automated Provisioning

70% effort reduction in preparation and configuration



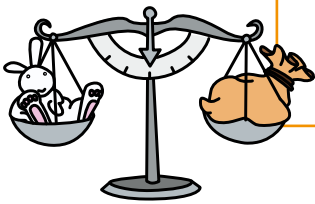
Accelerated Analysis

40% time reduction for defect analysis



Operation Gain

7x24 tall test cases can be reused and run permanently



Automated Reporting

80% reporting work is automated

Health Check

& Lab Verification

25% better lab quality



Fast Integration

In **5** days integration is done



Effectiveness

60% gain in time & resources



57

employees of our customers trained in 2021

8 training sessions before Covid in 2019



Projects, Customers, Finances

A highlight of this year's marketing and sales activities was our selection as test automation vendor by a Belgium mobile network operator. From the first day of our communication, the RFQ process, and the final selection it was a very fruitful relationship based on respect and mutual trust.

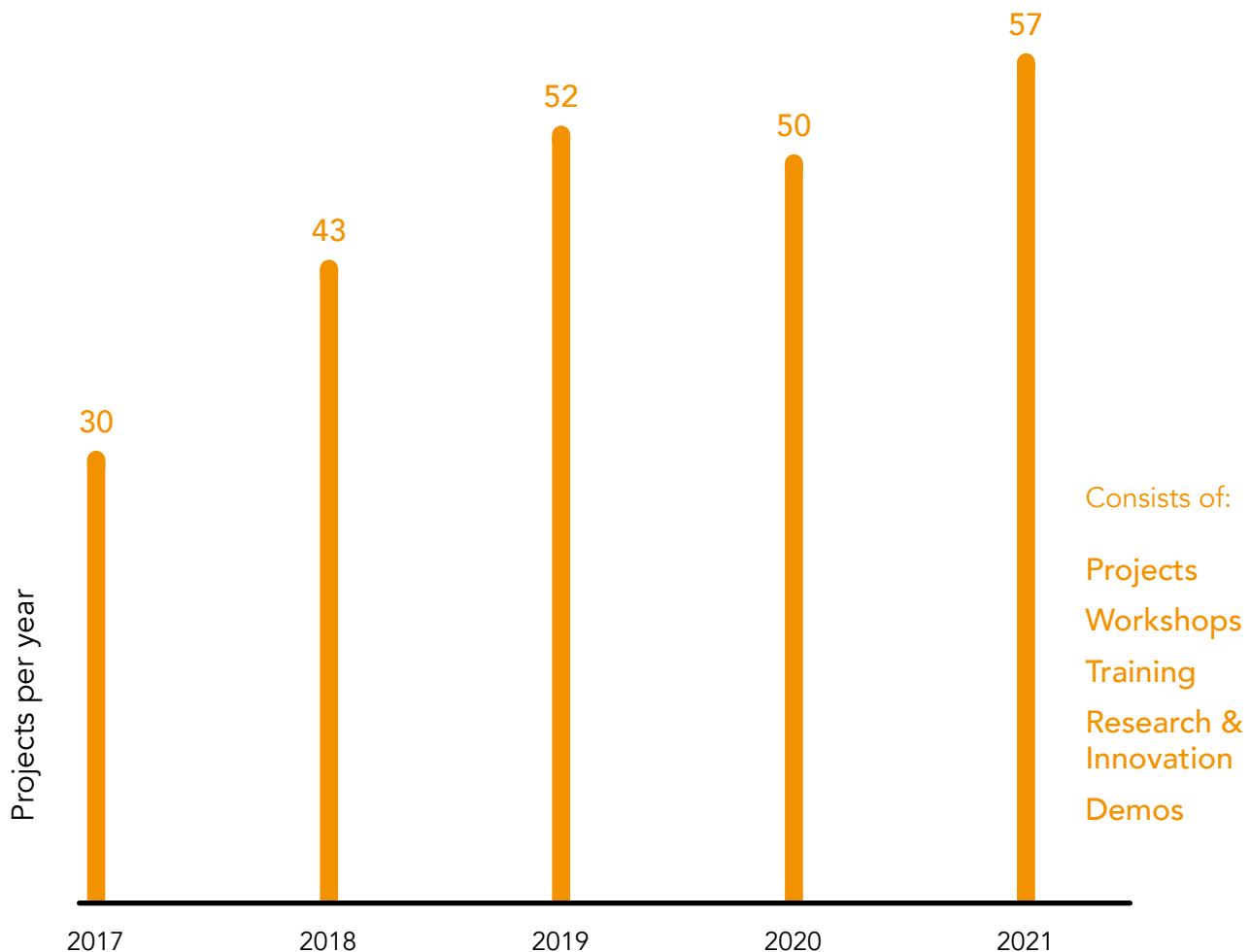
The trust in our product and team is shown by a look at our project development, customers, and increasing net financial result.

Project Development in 2021

+ 14%

more projects

in 2021 than before Covid in 2019



Discussion and Analysis of Financial Condition

QiTASC is a test automation company focused on helping companies to utilize the full potential of quality assurance via test automation.

We develop tools and services that transform the way test experts work into highly automated processes supported by QiTASC's automation framework.

During 2021 we focused on aligning our costs, invested in web-based remote control, and developed a smart message sequence generator for 5G network element communication.

Regardless of technology and domains, regardless of remote or local control, regardless of pandemics: we ease test experts' load.

Financial discussion

QiTASC generates revenue by developing test cases, licensing our automation environment, and supporting operation of third-party systems.

- › 20% of our turnover was generated from recurring licenses
- › 5% from hardware sales
- › Hardware sales increased by 3%, which indicates the increased use of our services
- › 10% of our revenue was generated by body leasing
- › Due to our excellent know-how, we were able to generate 10% from operational services and maintenance of third-party systems
- › 55% is generated from test case development and other testing-related activities

Expenses

In 2021 we started using external developers and test experts. This means that we can react more flexibly to fluctuations in the assignment. The number of our external developers and test experts increased from two to eleven. Our team of permanent employees has grown by three. All other teams remained unchanged. We will reduce our expenses in 2022 due to working from home, as a result of which we will cancel the contract for the first floor of the Vienna office.

Customer base

QiTASC continuously increases the customer base. This year we had four new customers from Belgium, Spain, Italy, and Portugal. In 2022 we expect to have new customers from Turkey, France, Italy, Germany, and South America.

Partnerships

We were able to conclude two new partnerships in 2021, one with a management & IT consulting company and the other with a manufacturer of telecommunications solutions. Together with the partners we were able to submit 50% more offers.

Key opportunities and investments

In 2022 we planned to enhance our simulation module mimiQ with Diameter & SIP. QiTASC will also introduce a new module for roles and access management.

⇒ Conclusion

With the continuously improving test automation framework we increase our chances of acquiring new customers and more projects from existing ones. Our partnerships will grow, and additional new customers will be acquired together with our partners. We plan to increase our turnover by 20%.

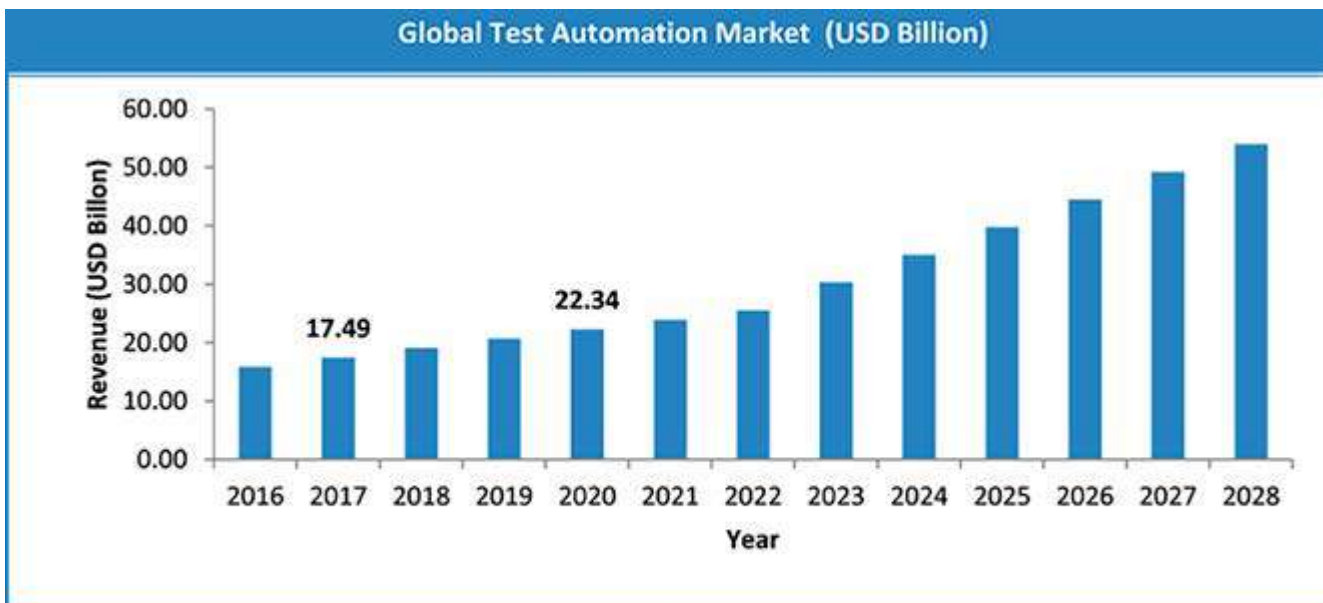
Discussion on Future Possibilities

Test Automation Market & Growth

Telecom companies are driving digital transformation forward by commercializing 5G services across developing economies such as India, Brazil, Argentina, and South Africa. The proliferation of 5G technology will increase the deployment of software and hardware infrastructure, creating a high demand for test automation services across the industry.

Market demand can be attributed to the increasing penetration of smart consumer products, such as smart TVs, smart home appliances, gaming consoles and laptops. Smart consumer devices are highly integrated with software, web applications, and operating systems (OS) which require extensive software test automation. The widespread adoption of these smart consumer devices will increase the demand for test automation.

- Growth drivers
- AI and ML in automated testing
- DevOps methodology
- Agile development for QA and testing
- Mobile-based applications
- 5G & home automation devices
- Digitalization in developing countries
- Remote testing (working from home) in times of a pandemic



The IT & telecom segment accounted for 20% of the market share in 2020 and is estimated to attain a CAGR of 15% through 2027. The industry expansion is attributed to growing demand for secured software testing services across IT & telecom enterprises. These are integrating a great many automated software solutions into their billing update systems, web-based platforms, and operations & maintenance platforms. These platforms require a highly secure and scalable interface, which will increase the demand for automated software testing services in the market.

The test automation market is continuously growing and accelerating. Business in the near future is based on IT services, apps, IoT & 5G devices, and their interaction. Smart cities, smart and multi-channel entertainment, AI, and smart communication will impact all our lives. To test these connected applications will be a huge challenge.

New Business Models

intaQt® with a reduced scope for SMEs

Our test automation framework is mature and smart, it looks very mighty: SMEs only need 5-10% of our capabilities, and for this reason we will provide an intaQt® version with a reduced capability set. With limited free test licenses, we will try to attract SMEs.

Cloud testing

With the development of intaQt web-ui we have the option to provide testing services out of the cloud. Customers can purchase our mini intaQt phone service and connect their devices to the mini IPS. Once the mini IPS is connected to the cloud server, test cases can be scripted and run in the test automation framework located in the cloud.



Outlook for 2022

Preamble

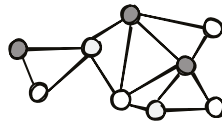
As a basis for our discussion of future possibilities and strategic decisions for 2022, let us look at the latest trends and driving forces for test automation.

The test automation industry is constantly growing. The reasons for companies to trust in this effective method of project optimization may vary, but follow a certain pattern. Based on our experience, we want to share our observations on the driving forces for test automation:



Project managers need transparent data

An automated and on-demand project verification by automated testing provides necessary insights.



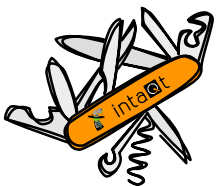
Complex, networked applications can no longer be tested manually

Increasing number of variations, lack of time, complexity, and lack of know-how.



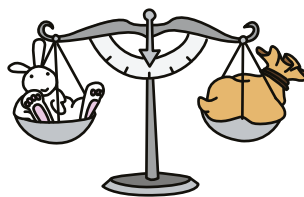
Agile projects require test automation

A few years ago, we had SW releases once a year, today they are every second month.

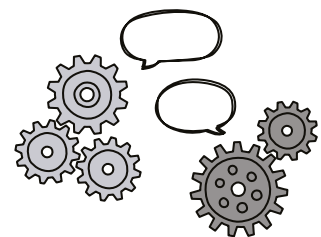


Innovations & new approaches facilitate automation

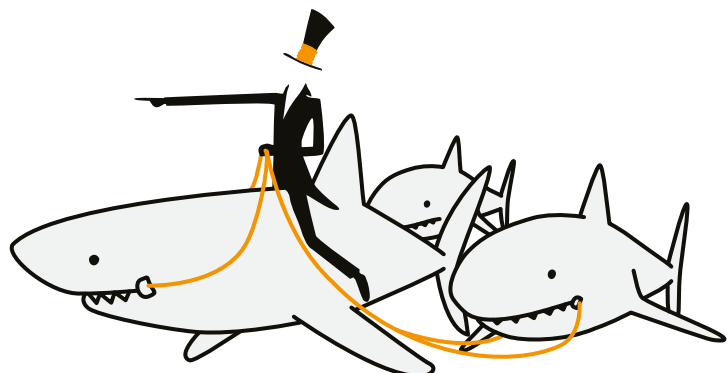
Open-source tools, new development platforms, etc.



Increasing costs



Covid and the necessity of remote control in the lab environment



Strategic Decisions & Risks for 2022

We expect the coronavirus pandemic to continue until summer 2022. We acquired a few new customers in 2021, and expect that they will also make use of our remote control environment designed specifically for working from home.

Turnover over 6 million €

We have finalized the development of new modules, but are only marketing two of our products. Five new modules are in the pipeline. With these additional modules we will boost our sales activities in 2022.

Increase recurring license share to 27%

QiTASC's business model is to increase sales of recurring licenses. These account for 20% of our turnover, and with the new product licenses and the increased customer base we will increase our license turnover by 35%.

2 new modules: restriQot & sQreen

Next year we will focus on two new modules. Since we have more than 200 users of our framework, the projects require different user roles. restriQot is planned to assign users, restrictions, and user roles.

The second module is called sQreen, and is a tool to manage projects, plan resources, and collect project specific KPIs.

Gain 6 more new customers

We made many POCs in 2021 and hope that at least 4 of 7 business opportunities plus 2 additional new opportunities will be finalized successfully.

Covid reduces project activities

A danger is the ongoing coronavirus pandemic, and it is possible that telco operators will reduce their project activities.

Covid leads to more remote testing projects

Covid is a driver for more remote testing projects which could be door openers for test automation. On the other hand, test automation is a necessary and indisputable part of any digital transformation project. The necessity of introducing new products faster and more effectively drives test automation.

International conferences



A highlight for 2022 will be our attendance at the Mobile World Congress 2022 in Barcelona at the 5G.nrw stand together with other IT and telecommunications companies from NRW.

IOT SOLUTIONS WORLD CONGRESS

A second highlight will be the IoT Solutions World Congress in Barcelona. Here we will show our test automation solution for end-to-end testing of IoT devices and related services.

QiTASC Corporate Social Responsibility

In every society, organization and even in each individual there is an ongoing conflict between a pressure to change and an inertia that resists change. In the long run, however, change always wins. At QiTASC, we believe it is better to be a driving force for change than to be driven by it. We also believe that our decisions have an impact, no matter how small it may be, on the direction change will take.

We want change for the better.

From this aim and our understanding that we can play a part in bringing about this change comes a responsibility for our actions as a company. To reflect this, we have compiled the following guidelines for our business policy.

You are most welcome to make a contribution to alter, expand, or hone these guidelines. If you have any suggestions, please contact the relevant persons named in each section.

Business Ethics

It is not up to us to judge to what extent a large tech firm from California still meets the criterion "Don't be evil", but it is, of course, a good starting point for business ethics.

At the very least this means that all our business operations are legitimate and that we respect the law in everything we do. It also means that we respect our customers and partners.

Business relations should be satisfactory for all parties involved. Things are probably wrong if there is a feeling that one side got a much better deal. They almost certainly are if one side is triumphant. We want to make sure that our customers are satisfied with our performance.

That includes selling only those products and services that we think will benefit the customer. A quick "junk" sale may boost our revenue but will damage our reputation, and reputation is the real hard currency in all business operations.

We also respect our competitors. We are convinced that our products and services offer a real benefit for our customers, so we take every chance

to convince them of these advantages. Consequently, we will not spread rumors or lie about other companies in the field. Most certainly, we will not engage in or be subject to corruption and bribery.

There may even be cases when our solutions are not the best fit for a potential customer. Pointing this out, and possibly redirecting the customer to another vendor, will strengthen our reputation as an honest and reliable partner.

Environment

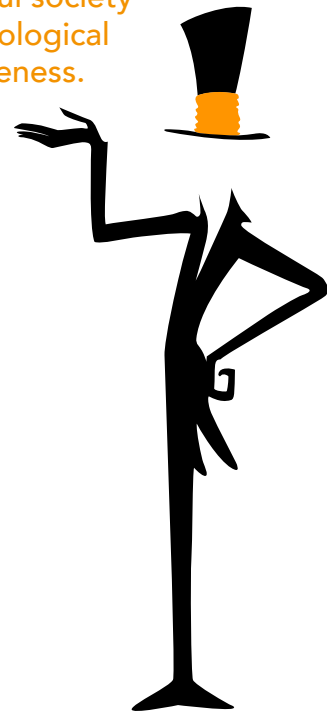
Protecting the environment is as important to us as it is for the planet. You may think that a software company does not have a major impact on the environment but it is the little steps that add up. There are, for example, our efforts to reduce waste as much as possible and to continually increase our recycling rate. You may have noticed that our refreshments come in recyclable bottles. Apart from that, we also try to come as close as possible to a paperless office.

Energy conservation plays a major role in trying to reduce our carbon footprint. We only use renewable energy for all our operations and all our devices are at least in the energy efficiency class A+.

Business travel is kept to a minimum and if required we prefer trains over cars or airplanes. Easy access to our offices with public transport allows you to leave your car at home, easing congestion and reducing CO₂ emissions.

But there is also the impact our products have. Smart home devices can play a major role in reducing energy consumption. In fact, smart metering is a key factor in the EU energy efficiency directive. QiTASC makes these devices more reliable and thus increases consumer acceptance. So your work does have a direct impact on our environment.

At QiTASC, we contribute to a respectful society and ecological awareness.



Working Environment

Shrinking carbon footprint

Reduction of waste

Refreshments in
recyclable packages

Nearly paperless office

Renewable energy for
all operations

Devices with energy
efficiency A+

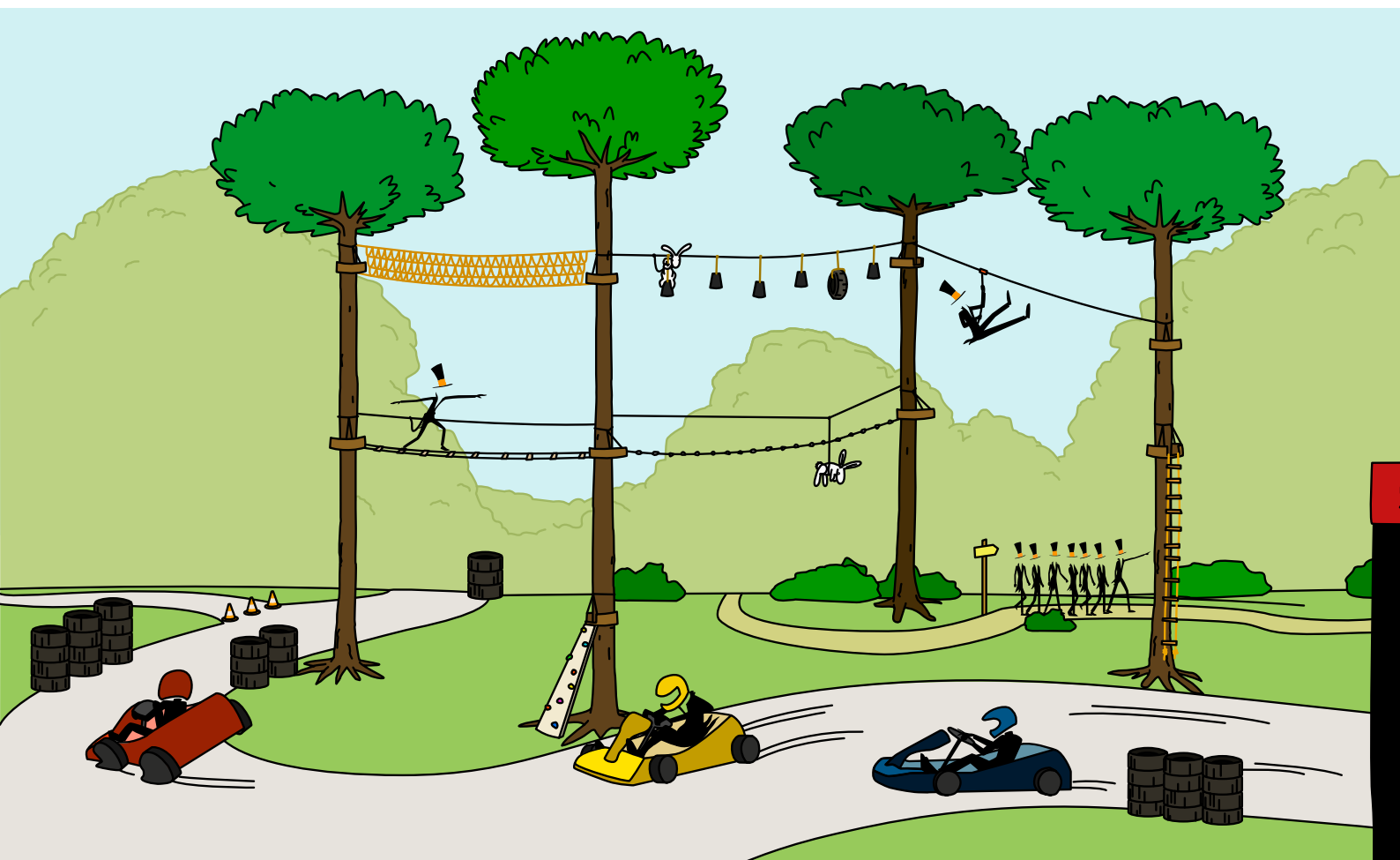
Business travel mostly by
train

Offices address near
public transport

"We value our employees" is a statement you will find in just about every company brochure. Well, what can we say? It is probably best to tell you what we do to show our appreciation. We follow an open door policy, so you can always rely on your supervisors to lend you an ear. While some companies dread the idea of trade unions, we welcome the role unions play in consulting management, and actively encourage union engagement. We like to use all possible channels to gather your feedback.

It is important to us that work gets done, not when and where you do it. So, flexible hours or working from home are options open to you to create a favorable work-life balance. Also, any ideas for improving your personal workspace are most welcome.

As we like to go forward, we need our staff to go forward with us. This means that we will invest in your training, making sure our staff is up-to-date with the latest developments in the industry. If you feel a specific course or training will benefit your role in the company, talk to us. We are not afraid of losing you to a competitor as we are



convinced that we can offer you a working environment you will not want to leave. In fact, you will find that our employee retention rate is above average in our field.

We have offices in Vienna, Düsseldorf and Duisburg. We organize a one-week workshop once a year in a wellness hotel in Austria, with workshops and meetings in the morning and time for sports and leisure after lunch.

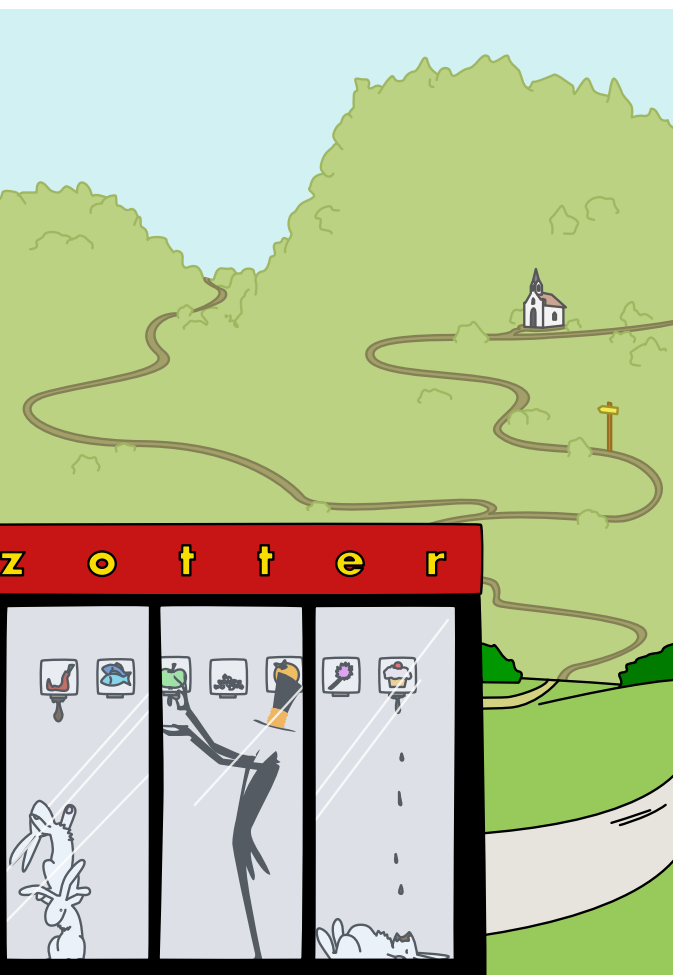
As one of the few IT companies with a female CEO, QiTASC promotes diversity among its employees. You will find colleagues from all cultural backgrounds. Currently we employ people with over 9 different nationalities. We integrated testers in our team who are on the autism spectrum, as their concentration and ability to carry out verification tasks meticulously strengthen us as a company. We also value experience. A good mix of young employees with experienced experts makes us flexible and successful; our team members' ages are between 21 -59. We are interested in human beings, regardless of nationality, ethnicity, or sexual orientation or identification.

Open-mindedness is a quality that is of extreme importance to us and something that we expect from all our employees. We follow a zero-tolerance policy when it comes to harassment in any form.

Well-being

Covid has shown all of us the importance of health and well-being. Health, both physical and mental, is vital for good performance. We will do everything we can for you to retain or, as the case may be, regain your health. While physical health, or its lack, is easier to recognize, we are also concerned about other issues that are harder to detect. You can rely on your supervisors and the works council to treat any health issues confidentially, so you are encouraged to seek advice if you feel stressed out or depressed. We will find ways to assist your recovery.

We have an office space of 1010 m² in Vienna for 35 employees and the management team, and provide our



Free food for employees

Coffee, tea, soft drinks

Organic fresh fruits

Cake, at times home-baked

Ice cream & cookies

Brain food

employees with coffee, tea, and soft drinks as well as fresh fruits, cake, ice cream and cookies as brain food, all free of charge.

Ergonomics is a major factor in retaining your physical well-being. All our workspaces follow industry best practices but if you feel you need any specific equipment, you are welcome to ask.

Workspace hazards should, of course, be avoided. While we do what we can to create a safe working environment, we rely on feedback from our staff to recognize and eliminate any hazards we may have missed, so tell us if something is amiss.

To make sure you can contribute to the well-being of others, please familiarize yourself with the position of fire extinguishers and first aid kits. Knowing where to find these and how to use them is essential in emergencies and can save lives. QiTASC has two designated first aiders.

Accountability

Accepting social responsibility for our operations goes beyond laying down policies and guidelines. We have appointed staff for all the measures discussed here. It is their job to make sure we meet the high standards set out above, so contact them if you feel the need to discuss any issues that might arise.

But most importantly, it is up to you to bring our social responsibility policy to life. While we believe that our actions as a company can make a difference and bring change forward in the right direction, it is your actions that will advance our company.

Appendix

Please see the following details and screenshots of our products:

intaQt server alias intaQt®

conQlude

intaQt studio

mimiQ

intaQt client

cdr-linQ

intaQt verification

reloQate

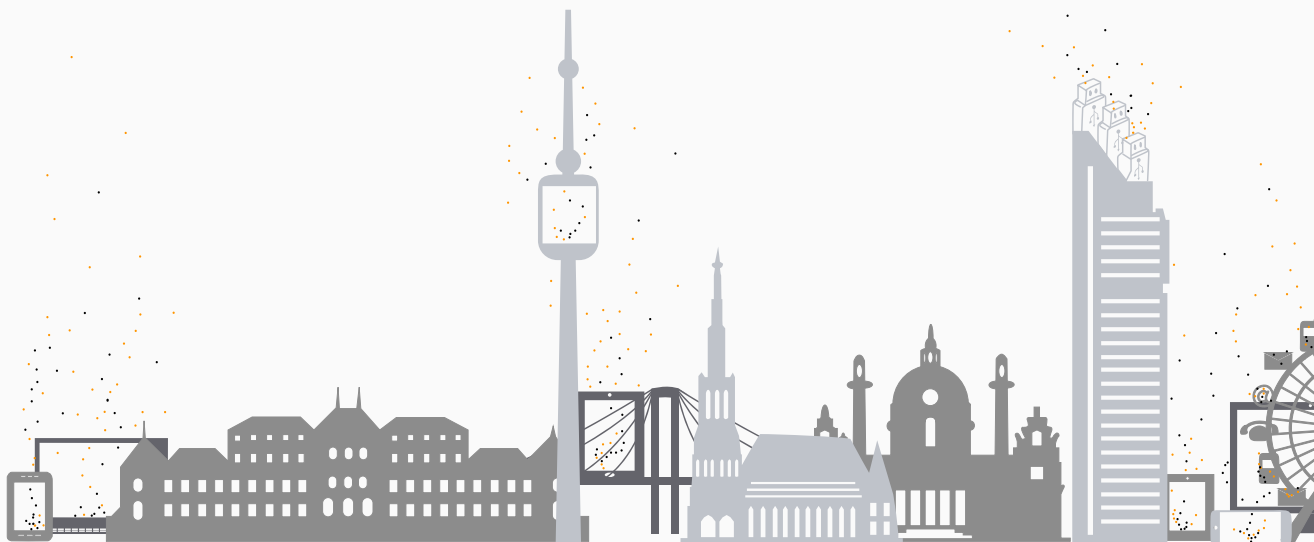
intaQt web-ui

colleQtor

cheQ

subsQriber-db

sQedule





intaQt

Manage Test Automation Projects

Create, manage and execute automated tests that reflect real-world scenarios, customer experiences and complex interactions with backend systems. intaQt supports real and simulated devices, and provides configurations to ensure that resources, including phones, are managed efficiently and that test cases and their results reflect real-life scenarios.

Platforms and Languages

intaQt® is fully compatible with Windows, Linux and Mac OS, and includes a built-in vocable expression language as well as the custom QiTASC steps language and the QiTASC UI steps language for testing web and app functionality.



Telephony

Our software helps introduce, test and integrate new services, technologies and legal requirements into telecommunications products. At the touch of a button, intaQt® executes complex end-to-end testing scenarios quickly, accurately and efficiently.



Telephony - Audio Testing

The intaQt audio service enables the automated testing of audio recordings, audio matching and speech channel monitoring within telephony test cases. This is especially useful for verifying IVR prompts, audio recordings that subscribers hear or assessing sound quality.



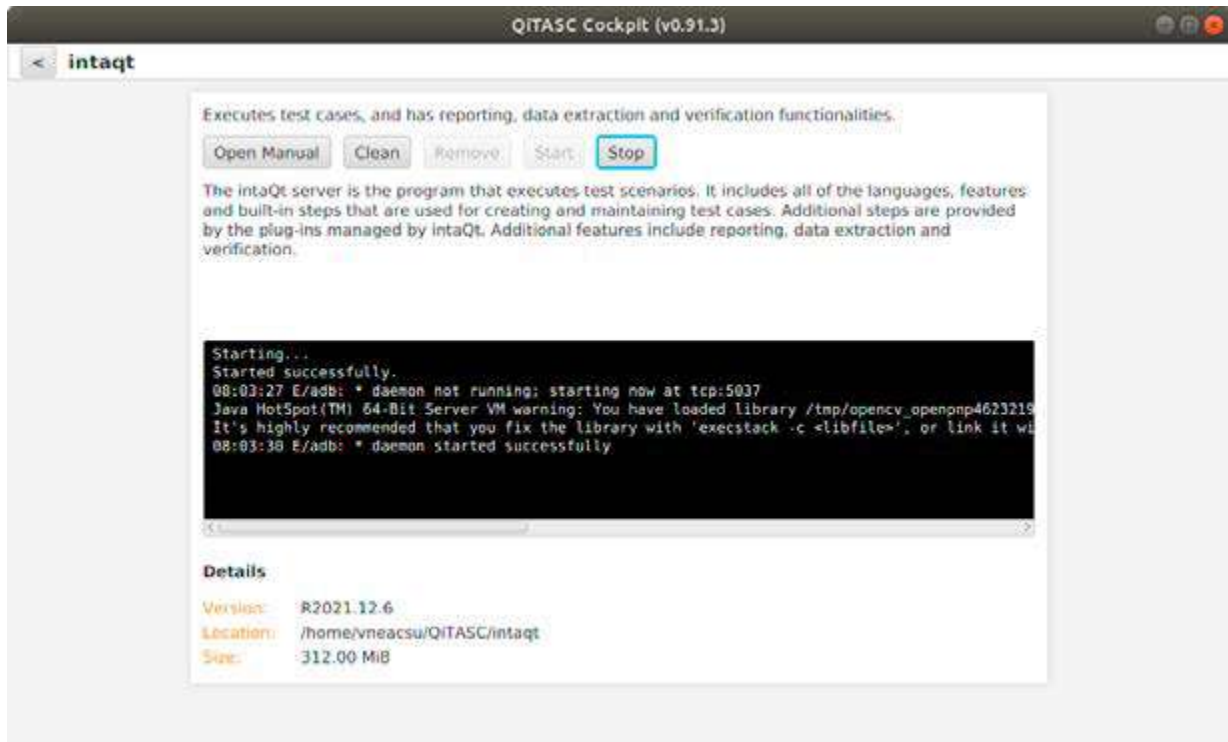
Web, App and IoT

intaQt UI steps language automates activities performed while using websites, Android & iOS apps and Internet of Things (IoT) devices. This is done by defining elements, such as XPath, applying actions to these elements and writing test steps that mirror a user's real-life behavior.



Built-ins for Backend Systems

intaQt® includes extensive built-in functionalities for communicating with backend systems. This includes HTTP/REST, SSH, JSON, XML, SQL, e-mail and more.



the QiTASC Cockpit allows users to manage all QiTASC products from a central place

```

1 stepdef "post_string"
2   body := Http.stringEntity("Hello world", "UTF-8")
3
4   request := Http.post("http://httpbin.org/post")
5     .setEntity(body)
6     .addHeader("hello", "2")
7     .build()
8
9   response := Http.executeHttpRequest(request)
10
11   println(response.getContentString())
12
13 end
14
15

```

```

1 Feature: Basic Call
2
3 Scenario: Basic Call
4
5   Given a phone as A:
6     * of type Android
7     * where operator == "3 AT"
8     * with profile profileA
9   And a phone as B
10  And A starts a call to B as MYCALL:
11    * detect incoming call within 10 seconds
12

```

gerkhin

steps language

```

1 stepdef "open google page"
2   myView := open MyGoogle
3 end
4
5 stepdef "do google search for {}" / searchText /
6   GoogleModel.performSearch(searchText)
7 end
8
9
10
11 view MyGoogle
12
13 url "http://www.google.at"
14
15 elem searchField := "//*[@id='lst-ib']"
16 action (searchField) defineSearchText := type
17 action (searchField) clearSearchText := clear
18 action (searchField) doSearch := submit
19
20 end
21

```

UI steps language



intaQt studio

An IDE Made for Testing

intaQt studio supports you and your code as you create test cases. Our integrated development environment, which is based on the IntelliJ IDEA platform, includes the most important and useful features required for robust and easy-to-understand test cases.

Beginners and experienced testers alike find that intaQt studio helps them write, execute and manage all aspects of their intaQt® test projects.

Platforms and Integrated Language Support

intaQt studio is fully compatible with Windows, Linux and Mac OS. Our languages, steps language, UI steps language and vocable expression language, are supported by all the most important productivity features for writing and running test cases, including code completion, refactoring, and inspections.



Code Completion

Intelligent code completion is an essential part of test case creation and development. intaQt studio supports code completion for both built-in and custom steps, steps and UI steps languages and configuration files.



intaQt studio Phone Plugin

The new intaQt studio phone plugin app lets users access devices, find information about them, and watch phones work in real time. This means testers no longer need to leave their desk or contact someone at another location to check on a phone's

status or characteristics. The phone plugin lists all available phones in an active project, both local and remote. Manually selecting a phone displays its active screen during test executions, and allows toggling to view the phone's properties.



Inspections

When intaQt studio determines that a function is invoked, it attempts to find the function definition in the respective object. If no matching signature is found, the function invocation is marked as an error.

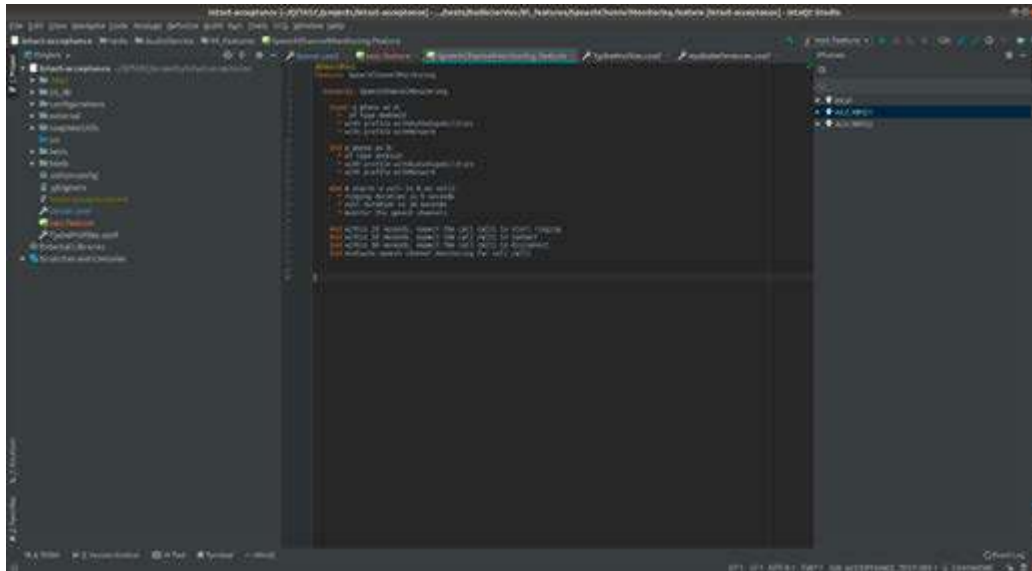
Productivity and Developer Tools

Additional productivity and shortcut tools simplify navigation through intaQt studio and let users integrate projects into version control systems and access command-line tools.

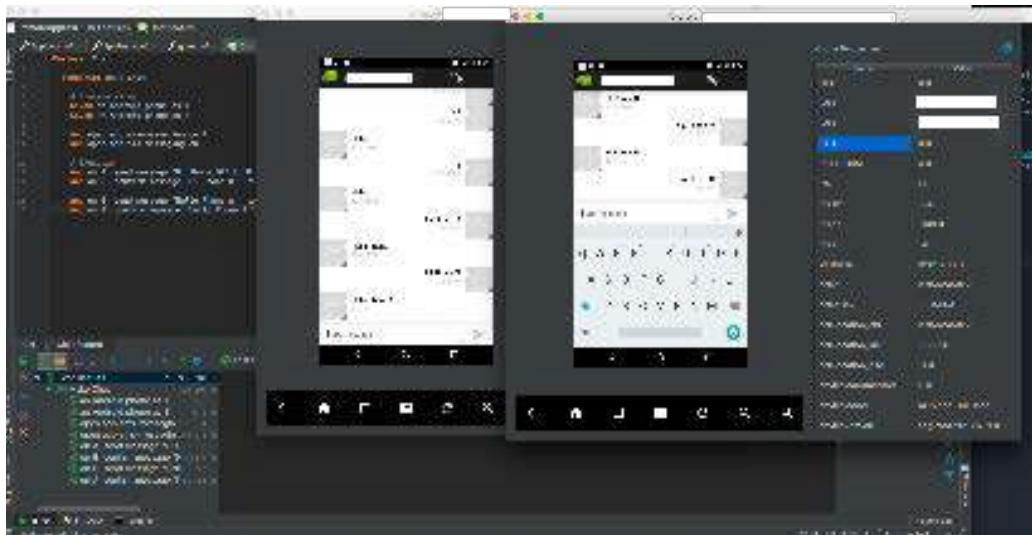


Logs and Reports

Toggle between trace, protocol, and server logs.



intaQt Studio is a convenient IDE for writing and executing intaQt® test cases. It provides features such as code suggestions, navigation, inspections and interactive control of remote intaQt® phones



intaQt® with remote phones



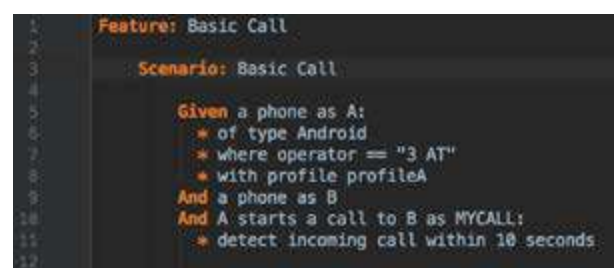
built-in steps



access device information



unknown functions and models



vocable expression language



intaQt client

Command-Line Interface & Continuous Integration Support

intaQt CLI is a command-line interface & continuous integration support and provides a customizable way to execute test cases and projects, including XML configuration files, via the command line.

Maximize your project's level of automation by executing entire intaQt® test projects in a continuous integration (CI) environment as part of a build. intaQt client provides a customizable way to execute test cases and projects, including XML configuration files, via the command line.



Flexible Configurations

intaQt client enables configuration of all of the following to ensure entire workflows are handled automatically:

- Project configuration files, which take precedence over default configurations
- XML report directories
- Automatically create summary report files after test executions
- Synchronize and upload local project changes to the server before execution

Cross-platform Command-Line Functionality

intaQt client is fully compatible with Windows, Linux and Mac OS. All the features and parameters below listed can be run from standard command-line interfaces.

Test Case & Execution Criteria

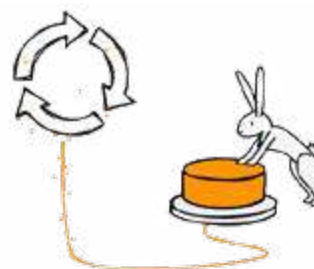
intaQt client provides parameters for test case selection and execution including:

- Tags for filtering test cases
- Number of retries for failing test cases
- Delays between each test case execution

Network Settings

Specify where test projects are hosted and execute tests remotely.

- Host name on which the project should be executed
- Port number



Continuous Integration

Configure test projects in Jenkins or TeamCity to run as a build.

In our online newsroom we offer a tutorial, in which we show you how to incorporate intaQt® into the Jenkins continuous integration framework. Try out our sample project out for yourself and see how easy it is to further automate your testing!



intaQt verification

Verify Complex Test Data

Verify hundreds of parameters and metadata within seconds during a test or after data has been collected. With the click of a button, intaQt verification checks device, subscriber and event details, internal infrastructure, legal requirements, financial characteristics and more.

Platform and Language Support

intaQt verification is fully compatible with Windows, Linux and Mac OS. Its rules files are compatible with intaQt's vocable expression language and UI steps language, meaning that verification test cases, their steps, and configurations can be integrated into larger intaQt® projects.

Verification Rules

intaQt verification automates the comparison of call detail records (CDRs) or event detail records (EDRs) and XML files against a configured set of verification rules. Rules define the type of check that intaQt verification will perform against the selected records, as well as which properties to compare. Its rules check parameters regarding test case structure, comparisons, and formats. Examples of verification rules include:

- Test case structure rules - concern the structure of test cases or their tickets
- Comparison rules - compare ticket properties relative to specified criteria
- Format Rules - check values, which must have a specific format

Verification Selectors

intaQt verification simplifies defining the criteria to be checked via its selectors. These selectors tell intaQt® which records to check against verification rules and which to exclude. Because only certain records or tickets should be chosen, selectors are a critical part of eliminating unnecessary data from the verification process, which helps to keep these

tests running smoothly and quickly.

Online and Offline Verification

intaQt verification is available for both online and offline testing. Online verification involves live intaQt test cases, which execute verification while the test case is in process.

Offline verification happens after a test case execution is no longer in process. For example, if CDRs/EDRs are only generated once per day, online verification may not be possible. While it is possible to set up a project to use online verification in this case, the process is intricate and requires extensive know-how. Therefore, we have implemented a verification UI specifically for such offline use cases.

Verification Built-ins

Verification built-ins provide additional flexibility and specificity in defining rules. These built-ins contain functions that filter for important criteria.

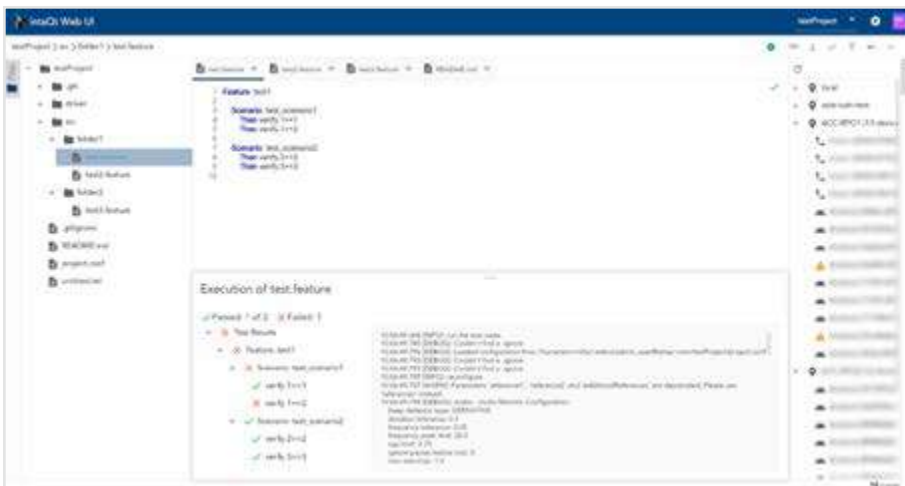
- Number matching - checks that two phone numbers match in a certain format
- Time matching - checks that a time occurs before or after a specified time
- Bit matching - checks that a bit's position corresponds to the bits of a given value converted to a binary
- Rounding - rounds values up or down in multiple ways including to full numbers, half numbers, to ceiling or to floor
- Date creation - create dates, with an optional date format specification



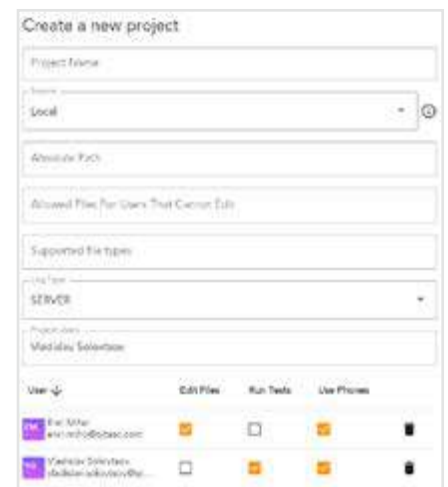
intaQt web-ui

Web-based User Interface

intaQt web-ui is a portal with a web-based user interface. It is a complementary product to intaQt studio, which would offer the option of web-hosted test services.



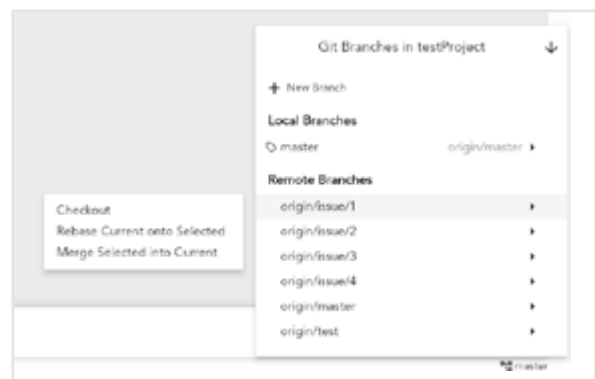
intaQt® web-ui main screen



user permission



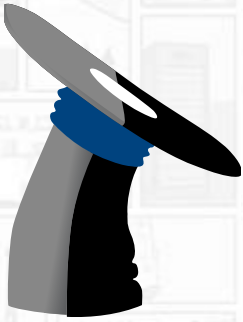
android phone



git

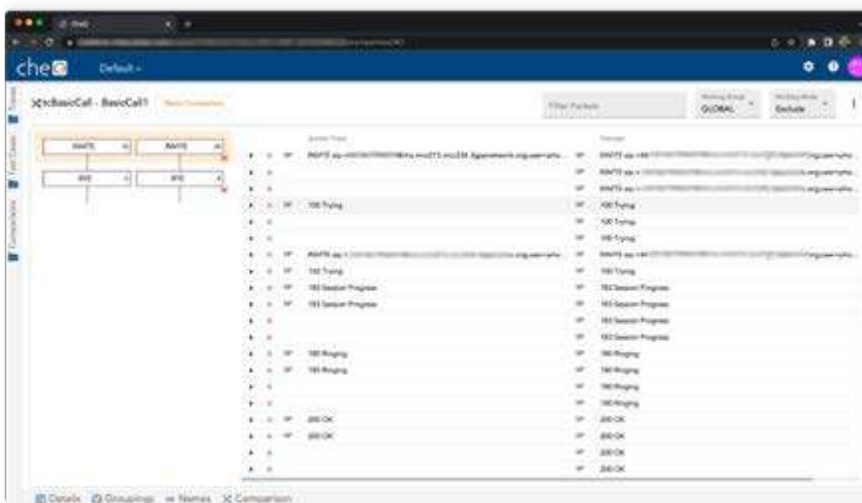
intaQt web-ui is a centrally accessible, secure web interface that provides an integrated development environment with many useful features to develop and manage test cases. The intaQt web-ui also

provides manual remote-control capabilities for android phones, VoIP phones and visualized POTS/ISDN clients. Git has been integrated to provide version management.

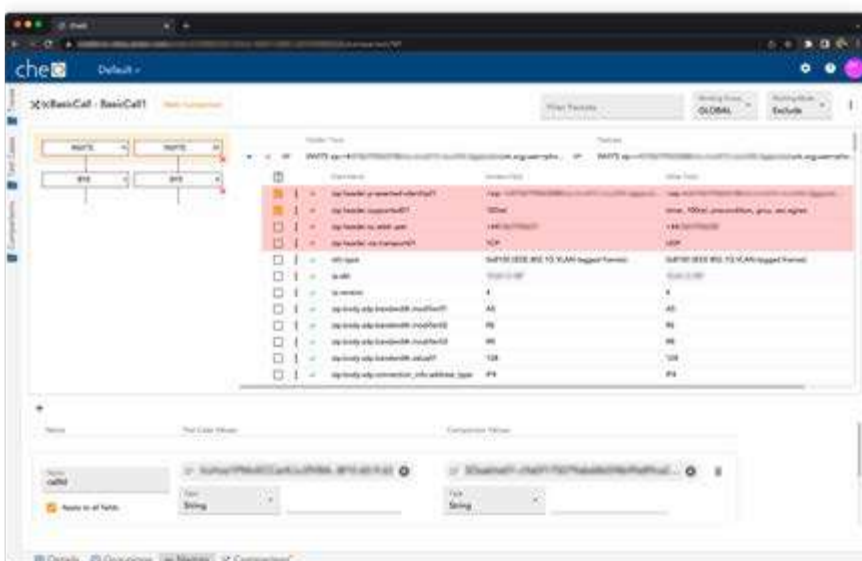


Trace Comparison & Verification

cheQ is a trace compare tool for intelligent comparison of two traces. Trace verification can be customized by packaging of trace data and correlation rules, simply edited in the tool.



cheQ comparison between packets



Expanded cheQ comparison showing fields within a packet

Using cheQ, new traces are compared automatically. cheQ allows you to:

- customize trace verification by packaging trace data and correlation rules, simply edited in the tool
- easily copy and paste existing comparison rules to other test cases
- repeatedly compare this to new traces automatically
- keep a record of previous comparisons



sQedule

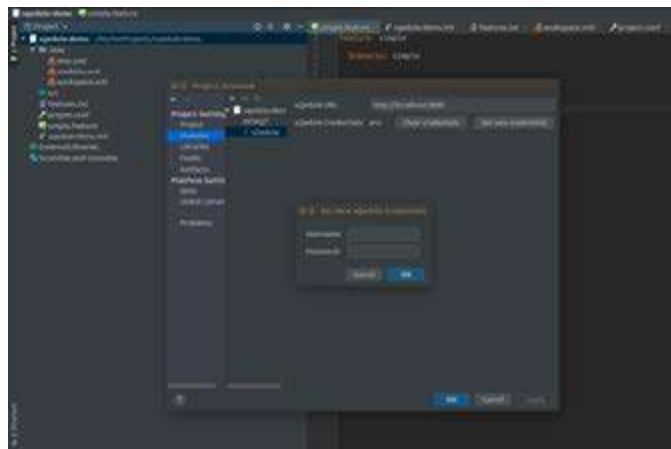
Resource-aware, Intelligent Scheduling

QiTASC's sQedule is a resource-aware scheduler that schedules tests on intaQt agents. sQedule then evaluates and allocates phones to test cases based on availability and priority. sQedule always executes the maximum amount of possible test cases by optimizing the test cases' properties and available devices, which improves the volume of testing while preventing failures due to unavailable phones or incorrect test case selection.

Cross-platform Functionality

sQedule is fully compatible with Windows, Linux and Mac OS. All the features and parameters listed below can be run and specified from within intaQt studio or via standard command-line interfaces.

- How many times to retry tests upon failure
- What type of order (eager, random, or sequential) to use
- The maximum number of parallel test case executions
- Delays between test cases, such as for cool-down periods
- The sQedule server URL
- Optional authentication credentials



The sQedule UI

sQedule is available as a user interface within intaQt studio and as a command-line tool. The user interface lets users specify parameters so that tests are optimally executed. You can access by right-clicking on the project file, clicking on Open Module Settings or by tapping the F4 key. Click on Modules to type your username and password under Set new credentials.

The UI lets users define:

- Which tests (features) to execute
- When tests should be run

Customizable Scalability

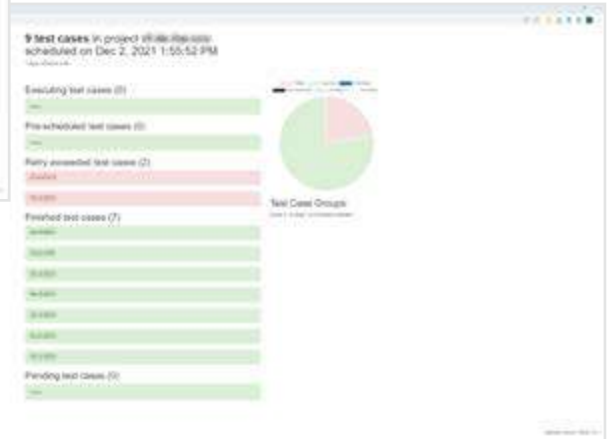
Resource-aware scheduling helps teams scale up their test execution volume. This is done by automating the selection, and prioritizing and scheduling tests that do not need human supervision such as regression tests. Furthermore, sQedule's resource-aware intelligence allows it to execute several magnitudes more of test cases than would be possible by a team of testers.

In addition to test case selection and execution, sQedule has been developed to:

- Assign the correct devices to each test case based on availability
- Ensure the optimal combination of test cases and devices is running at any given time
- Reduce or eliminate test case failures that occur when devices aren't available



the user interface of sQedule lets the user define which tests to execute, when they should be run, how many times, in which order, and so forth



Reduce Testing Costs for your Team

Because sQedule takes over time-consuming manual activities such as test case assignment, scheduling, and prioritization, it reduces the number of intaQt® licenses that teams need. For small teams with limited budgets, this is especially helpful. For example, if you have a team of five testers but they aren't always running test cases at the same time, one or two floating intaQt® licenses and one sQedule subscription is a cost-effective alternative to purchasing individual licenses to cover each tester in the team.

Despite having fewer intaQt® licenses, your team will still see an improvement in its output. By allocating test suites to sQedule, it also leaves your testers with even more time to focus on complex tests and urgent tasks.

The sQedule Client

The sQedule command-line tool provides the same functionality and customization as the UI. Teams that use continuous integration environments such as Jenkins or TeamCity can therefore incorporate sQedule into their builds to further increase levels of automation across projects.

Like the UI, sQedule CLI lets users define:

- Which tests (features) to execute
- When tests should be run

- How many times to retry tests upon failure
- What type of order (eager, random, or sequential) to use
- The maximum number of parallel test case executions
- Delays between test cases, such as for cool-down periods
- The sQedule server URL
- Optional authentication credentials

Additional Features

sQedule also supports more advanced configuration options for more complex test case scheduling use cases, such as:

- Recognizing configuration switches or IoT devices
- Schedule constraints, such as time constraints where certain test cases are only run on even days or during the last quarter of an hour
- Test case grouping mechanisms, to automatically schedule constrained groups of test cases



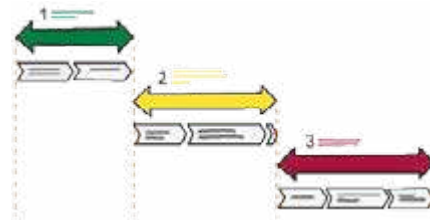
conclude

Integrated Reporting and Issue Tracking

conclude is a centrally accessible, secure web interface that collects, manages, and exports intaQt® test case project data and also includes automated bug and error tracking. conclude makes test data available to all users of a project including reports, logs, media attachments, and metadata. This eliminates the need for using spreadsheets, manually collecting test information, and reformatting it for recognition by additional databases.

Platform and Browser Support

conclude is fully compatible with Windows, Linux and Mac OS. Currently it is supported by Mozilla Firefox and Google Chrome, with support for other browsers coming soon.



Features for Test Managers and Project Managers

Test managers have access to all conclude features available to test engineers as well as:

- configure test categories (as seen on the right)
- approval workflow
- error category configuration

Features for Administrators/IT

Administrators have access to all conclude features available to test engineers as well as:

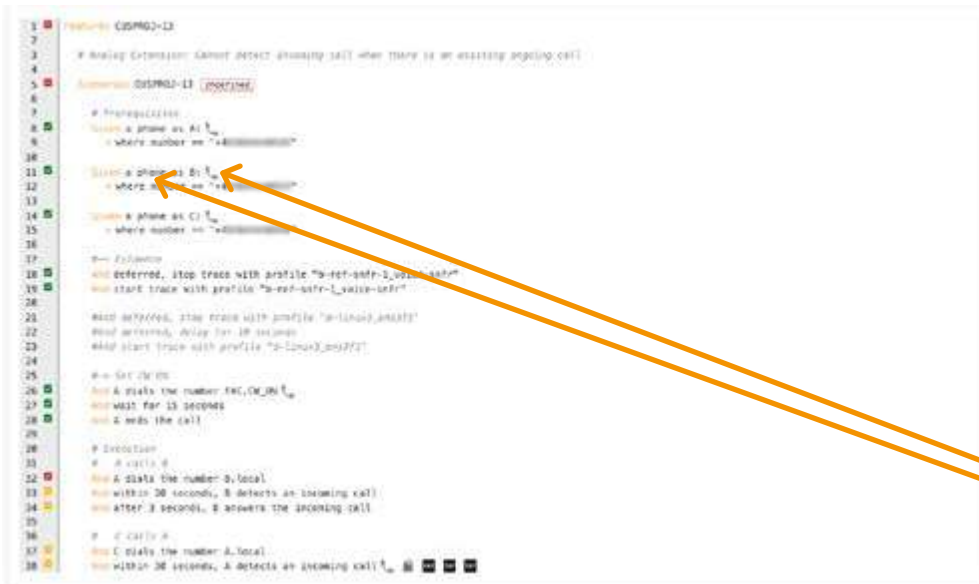
- administer project settings
- external integration configurations



Features for Testers and Project Members

Access test reports from your entire team in a centralized location, track bugs, and take a closer look at multimedia attachments, metadata, and logs.

- review & verify
- attachments
- bug and issue tracking
- charts
- data export



test case step and evidence are linked to each other

TEST RUN REPORT	TEST SUITE HISTORY	ERROR CATEGORY	UNASSIGNED REPORTS
Test Run Report			
Test Name	Test Category	Test	Test Date
07.00.0070	Unknown	test070	19.02.2019, 04:13:30
09.00.0070	Unknown	test070	19.02.2019, 04:13:30
09.01.0070	CDR evaluation failed	test070	19.02.2019, 04:13:30
09.02.0070		test070	19.02.2019, 04:13:30
09.03.0070		test070	19.02.2019, 04:13:30
09.04.0070		test070	19.02.2019, 04:13:30
09.05.0070		test070	19.02.2019, 04:13:30
09.06.0070		test070	19.02.2019, 04:13:30
09.07.0070		test070	19.02.2019, 04:13:30
09.08.0070		test070	19.02.2019, 04:13:30
09.09.0070		test070	19.02.2019, 04:13:30
09.10.0070		test070	19.02.2019, 04:13:30
09.11.0070		test070	19.02.2019, 04:13:30
09.12.0070		test070	19.02.2019, 04:13:30



Charts: View visualizations of test data to get a quick overview of your project's progress. Charts provide details of the daily test run history, pass and fail rates, and defect incidence.

Review & Verify: The Test Run Reports feature lets users view and review a project's test reports and their metadata. Because conQlude collects test results and artifacts from all members of a team, users can access reports and data from the tests they executed as well as those of their teammates.



Attachments: Download or preview test attachments, including media, text, XML, logs, and step-specific metadata. conQlude even lets users listen to audio recordings, view screenshots, and access metadata in its original format.

TEST CATEGORIES	HPQC TEST SETS	HPQC SETTINGS
Test Categories		
Name	Tag	
Telephony	@phone	
Webtest	@web	
Apptest	@app	
+		

Configure Test Categories: conQlude automatically recognizes test categories using tags from intaQt® feature files. Categories can also be changed or added within conQlude. These configurations can also be mapped to projects and configurations in external issue track and test management systems.



mimiQ

Simulator for Network Elements

mimiQ lets you define https message sequences. It can act as a simulator for a network element in telecommunications networks or provisioning systems. It is also operated as a load and stress test system, especially for 5G Nchf, Npcf, etc. interfaces.

```

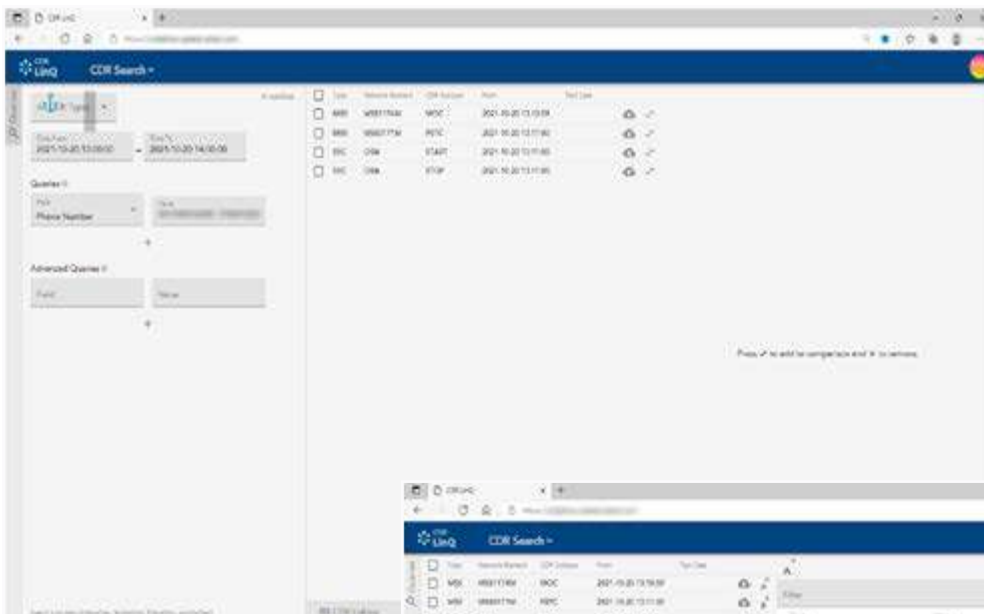
charging_server.rhai
1  let request = env.receive_http();
2  assert(request != {});
3  print("Request uri: " + request.uri);
4  reqbody = request.get_json_body();
5  if reqbody != {} && reqbody.value("notification") != {} {
6    PCF_notification = reqbody.value("notification");
7  }
8
9  if "/update" in request.uri {
10   sendRequest(env, request.PCF_notification);
11 }
12
13 if "/nchf-convergentcharging/v2/chargingdata" in request.uri {
14   sendResponse404(env, request);
15 }
16
17 if "/nchf-spendinglimitcontrol/v1/subscriptions" in request.uri {
18   sendResponse408(env, request);
19 }
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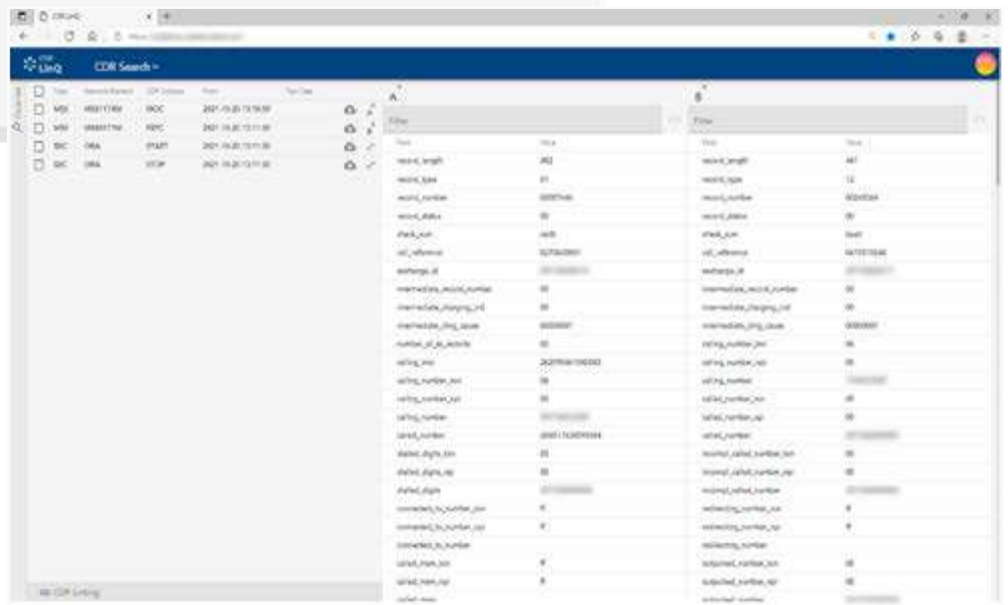
cdr-lin 

CDR Web Service

Cdr-linQ is a web service for collecting, filtering and presenting CDRs which have been generated by test cases. CDRs written by network elements are collected and decoded. Cdr-linQ shows two CDRs and compares them.



Left window: Based on the criteria defined on the left side, CDRs found and listed on the right



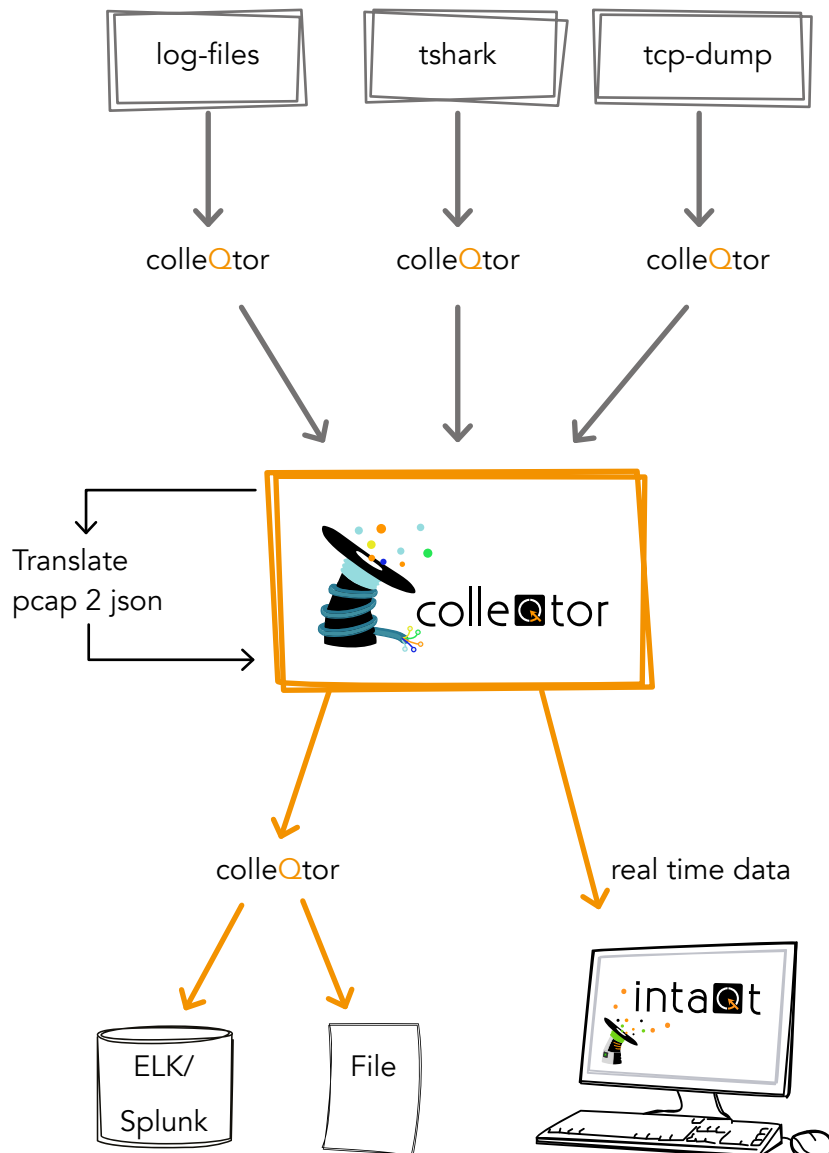
Right window: CDRs can be viewed online by clicking on it, maximum 2 CDRs next to each other



colleQtor

Evidence Collector

The colleQtor is a service for collecting evidence which comes as a stream and is then provided to the test case for verification purposes.



colleQtor allows you to:

- collect various trace data in real time
- intaQt® integration to be used for test case verification/processing in real time, while the test case is running
- Export of data into file/ELK/etc.



subscriber-db

Data Store

subsQriber-db is a data store for flexible SIM and device asset management, profile management and assignment, voucher management, multi-environment support such as transparent request proxy, request templates, multi sequence templates, and GUI-driven request execution, execution, voucher and request history, permissions at subscriber level, SAML2 integration.

