Let’s plan Your Success, starting 2021!
Quality is more important than quantity.
One home run is much better than two doubles.

Steve Jobs
The QiTASC tool framework overcomes many challenges:

1. Shortened project timeline
2. Higher quality, transparency & deep dive test cases
3. Reduced cost, more test cases in same timeline
4. Test case scripting in natural English language as support for diverse teams
5. Shortened defect life cycle
6. Automated workflow, test case analysis and reporting
7. Risk mitigation, by on-demand regression capabilities
8. Bring lab to home capabilities, remote manual testing
**Critical Success Factors (2)**

**intaQt® covers all aspects of automation**

<table>
<thead>
<tr>
<th>App automation</th>
<th>Mobile device automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native – UI automation</td>
<td>Audio/Anno verification/injection e.g. Alexa, Siri, IVR</td>
</tr>
<tr>
<td>Unique scripting language for all use cases</td>
<td>VOIP-phone automation</td>
</tr>
<tr>
<td>Command line interface for CI</td>
<td>Backend automation e.g. SOAP, REST, LDAP, SQL, ssh, sftp</td>
</tr>
<tr>
<td>Automated correlation &amp; verification e.g. bill, ticket, catalog</td>
<td>SIM-array integration</td>
</tr>
<tr>
<td>Protocol &amp; data conformance e.g. 3GPPP, ETSI</td>
<td>Trace integration &amp; verification e.g. Zigbee, CAP, MQTT</td>
</tr>
<tr>
<td>Source code quality according to ISO 25010, TIOBE verified</td>
<td>Smart UI, scheduling, git client integration</td>
</tr>
<tr>
<td>Roaming automation</td>
<td>Web – UI automation</td>
</tr>
<tr>
<td>Automated reporting e.g. HP-ALM, Jira</td>
<td>Attenuator automation 2G/ 3G/ 4G/ 5G</td>
</tr>
<tr>
<td>IoT &amp; robot automation</td>
<td>Remote access automation</td>
</tr>
<tr>
<td>Online documentation docs.qitasc.com</td>
<td></td>
</tr>
</tbody>
</table>
Critical Success Factors (3)

End-to-end use case with deep dive through protocols

Legend:
- Automation Endpoints
- Automated CPE/System

04 December 2020
Critical Success Factors (4)

Simple scripting, anybody is able to understand, modify and sign-off test cases

*IntaQt®:* executable tests are written in almost natural English language. No Java®, Ruby, other programming language know-how is needed!
Critical Success Factors (5)

More than a tool: Combine our products as part of the SDLC

**model-builder**
Use case modelling tool to generate automated test cases.

**intaQt**
For active probing & monitoring during operation.

**conclude**
Reporting Server provides dashboards & filters features, combined with automated upload for HP-ALM/Jira.

**TIOBE/TICS**
Partner for code quality analysis according to ISO 25010, generates project dashboard code quality level.

**intaQt**
Automation tool for any digital business use case (esp. telecom, IOT, digital transformation).

**cheQ**
Compares & verifies traces automatically.
Critical Success Factors (6)

Level of test case development and analysis can be freely defined

- Simple test cases
  - Built-in (existing) test steps
- Complex test cases
  - Built-in Verification & correlation steps
  - Customer defined steps
  - Customer defined functions
- Very complex test cases
  - Customized verification steps
  - 3GPP protocol conformity rules
  - Trace comparison rules

Depth of test case development, expected result & analysis
Critical Success Factors (7)

Same automation solution across all project phases drives synergies

Reuse synergy gain

Factory Acceptance | Integration Test | Type Acceptance | Field Acceptance | First Site Application | Ongoing Operation

E2E Test | Data Verification | Regression Test | Active Probing
Critical Success Factors (8)

Data driven test case variations via examples and audit proof reporting

Data driven test attributes and scenarios

- DataSet: 1a, DataSet: 1b, DataSet: 1c
- Environment Config & Test
- Project/Campaign Config
- Rules & Context Objects

Test Case Execution

Test Scenario 1a

Use of variables & fast variation development

Summary reports with drill down capability

- Report: 1a, Report: 1b, Report: 1c
- Results
- Logs
- Dumps
- Screen Shots
- Reports
- Audio Recs
Critical Success Factors (9)

Continuous *IntaQt*® improvement and project specific features

- App automation
- Native – UI automation
- Unique scripting language for all use cases
- Command line interface for ci
- Backend automation
- Protocol & data conformance
- Mobile device automation
- Source code quality according to ISO 25010, TIOBE verified
- VIOP-phone automation
- SIM-array integration
- Trace integration & verification
- Automated correlation & verification
- Smart UI, scheduling, git client integration
- Roaming automation
- Web – UI automation
- Automated reporting
- Attenuator automation
- IoT & robot automation
- Remote access automation
- Online documentation
- Audio/Anno verification/injection

New features

- Resource database
- Trace comparison
- Remote manual testing
Test Case Maintenance optimized due to smart abstraction layers

Critical Success Factors (10)

User I/F

intaQt® Commander: Execution

Feature file / Scenario Outline / Scenario (Text based)

Data Driven Examples

Custom configurations (project/phase/campaign/run)

Global & Local integration configurations (environment, components) /JSON

Domain Specific Languages: UI interaction & 3rd party interfaces

Core StepDef Implementation, Execution Environment, StepDef Interpreter

LDAP

SQL

SOAP

http

APP

Web

Android

Snom

sftp

Transfer

SQL-DB

SOAP

http

Selendroid

Selenium

Device

Device

ssh

Nexus, S5

Snom

Simulator
Critical Success Factors (11)

Flexible Business Models

**Managed Service Testing**
- Project is handed over to QiTASC
- QiTASC provides licenses, hardware and processes to maintain the project
- Customer receives results

**Provide Source Code**
- Customer purchase intaQt® source code and develop its own tool framework
- QiTASC provides training & coaching
- The code quality of the intaQt® software is B-Level measured in TQI according to ISO 25010

**Licenses & Professional Service**
- Customer purchase intaQt® license, conQlude & tools
- QiTASC supports with training and coaching
- Customer does planning, test scripting, execution & reporting

**Testing Project**
- Customer lack resources
- Project is handed over to QiTASC; planning, test scripting, execution, reporting done by QiTASC
- Customer receives result & report
Integrate Open Source tools where it makes sense

QiTASC has developed a simple and intuitive language

We encapsulate 3rd party tools and provide our own language. A tester does not need to know Java®, Python® or any other programming language.

The intaQt® language is the same...

... regardless which 3rd party tool runs in the background

Same language for:

- UI control
- App control
- web control
- interface control
- workflow control
- Trace integration
- CDR verification
- etc.
Critical Success Factors (13)

Independent and focused

1. Vendors of IT & Telecommunication systems do their main business with HW and Application Software; QiTASC offers mainly services and tools for “End to End” testing and verification.

2. QiTASC is not in competition with big IT & Telecommunication HW and SW vendors.

3. QiTASC provides a quality check as an objective, third party.

4. QiTASC is only focused on testing, nothing else.
Critical Success Factors (14)

Team know-how: testing requires a very broad knowledge base

Development languages:
- Kotlin, Java, C++, C, GO, Rust, Python,
- Clojure, Ruby, Elm, SQL, Haskell, Typescript,
- SciPy, NumPy...

Telco & IoT:
- Prepaid, Home Area, IP-Centre, Virtual Private
- Network, Tariff Testing, Customer Relationship
- Management, Value Added Service,
- Convergent Charging, Mobile-Centrex, Multi-
- SIM, Policy & Charging Rules Function, Over
- The Air Service, Mobile Payment, Point of
- Sales, Postpaid, Supplementary Services, Core
- Network & IMS interoperability, Charging
- Conformity, IFRS Conformity, Internet of
- Things „End to End“ Testing, Tariff Verification,
- SBC & Data Verification, etc.

IT Know-how:
- Amazon EC2, VM Ware, OVirt, KVM, Virtual
- Box, Vagrant, Kubernetes, Docker, Cisco,
- Ruckus, Qnap, Ceph, GlusterFS Ansible,
- Terraform, git, OpenVPN, IPSec, TCP/IP

Agile & Continuous Integration & Test:
- Test Driven Development, Behavior Driven
- Development, Continuous Integration &
- Delivery, Continuous Acceptance Testing, Pair
- Programming, DevOps,...

Methods & SW know-how:
- TSA+, Verified Design By Contract, UML,
- BPMN, Mathematica, Maple, Cucumber,
- Selenium, Appium, Sikuli,...

Protocol know-how:
- SOAP, REST, HTTP, JMS, LDAP, MAP, CAP,
- INAP, SS7, Diameter, SIP, ISDN, ftp, sftp, ssh,
- Zigbee, Dect,...

Architecture know-how:
- Client Server, Service Oriented Architecture,
- Domain Driven Design, Aspect Oriented
- Programming, Event Streaming, The Elm
- Architecture, ML & AI,...

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- Client Server, Service Oriented Architecture,
- Domain Driven Design, Aspect Oriented
- Programming, Event Streaming, The Elm
- Architecture, ML & AI,...

Electronics & Mechanical engineering & High-frequency:
- High frequency, Attenuation, USB, Audio,
- CAD, Eagle, CNC,...

Mathematics:
- Quantum Field Theory, Path Integrals, Group
- Theory, Differential Geometry, Set Theory,
- Analysis and Calculus, Statistical Physics,
- Topology, Category Theory, Signal Processing

Vendor know-how:
- Nokia Surepay CCS, Huawei CCS, i-new
- MVNO, Optiva CCS, Nokia PCRF, Oracle IMS,
- Ericsson IMS, Nokia IMS, ...
Critical Success Factors (15)

Reduce Bottlenecks

The testing process consists of several phases

Every phase has its own bottlenecks:
- Test environment set-up and prerequisites
- Scripting of necessary test cases
- Collect evidence & analyse test cases
- Reduce defect resolution
- Report test cases

All of above issues must be solved, otherwise the automation process is slowed down.

→ Automate all activities
→ Overcome the challenges of test automation
→ Fulfil the expectations
Remote Manual Testing

Testing during Corona

Your advantages with QiTASC:

- 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!
Manual test projects and manual testing activities require support for any kind of devices

QiTASC has developed own electronical components and 3D-housings to standardize integration of:

- IOT devices
- Smartphones
- 3D Housings & Controller
- Sniffer & Trace components
Critical Success Factors (18)

Your advantages of analyzing with cheQ®

**cheQ** – an intelligent, automated trace comparison tool
Use as stand-alone tool or as part of continuous testing and analysis process

smart naming & configuration of environment related data

Customizable comparison rules.

Easy to use web UI

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**intat Server**
- Run test case
- Collect evidence

**Test Automation UI**

**QM Tools** e.g. Jira

**Automated upload**

**TC, Evidence PCAP & Report**

**Reporting Server**
Dashboard and consolidated view

**PCAP trace QiTASC integrated**

Comparison report

**PCAP trace Standalone**

**Comparison report**

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**Trace Server**

Golden Trace TC XY

Current Trace TC XY

19 December 2020
Our innovation: cheQ®

- Web based PCAP comparison tool
- Define test cases with an example of how a trace should look
- Select and filter packets you are interested in
- Advanced comparisons – customize test case with expected properties on both sides and check they match
- Easily copy and paste existing comparison rules to other test cases
- Keep a record of previous comparisons
Critical Success Factors (20)

Proven Success, Footprint

Dublin
London
Düsseldorf
Köln
Madrid
Eschborn
Praha
Vienna
Milano
Ankara
Athens
Testing Experience

- Online Charging System
- Convergent Charging System
- Home Location
- IP-Centrex
- Mobile-Centrex
- Virtual Private Network
- Tariff Testing
- Customer Care System
- Value Added Service
- Multi-SIM
- Policy & Charging Rules Function
- Over The Air Service
- Mobile Payment
- Point of Sales
- Supplementary Services
- Core Network & IMS Core
- Circuit Switched Core
- Packet Switched Core
- App Automation, Android & iOS (more than 100 Apps)
- Evolved Packet Core & HGW
- SBC & Data Verification
- Charging Conformity
- “End to End” Testing,
- Prepaid & Postpaid Tariff Verification
- Telephony Application Server
- IFRS S15 Conformity
- App Data Usage & Charging Verification
- Protocol Conformity for Data Core
- Telco Cloud Verification
- Internet of Things “End to End” automation
- Internet of Things Protocol Verification
Critical Success Factors (23)

Excellent code quality: Quality level “B” in TIOBE classification

ISO Quality attributes

- Functional Suitability
- Reliability
- Compatibility
- Maintainability
- Security
- Performance Efficiency

Number of rules per quality metric

- Code Coverage: 2
- Compiler Warnings: 100
- Fan Out: 1
- Abstract Interpretation: 50
- Security: 10
- Code Duplication: 1
- Coding Standards: 200
- Cyclomatic Complexity: 1

Source: [www.tiobe.com](http://www.tiobe.com)
The QiTASC team wishes you happy holidays & a successful year 2021.
We would be honored to talk to YOU.

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