Mobility Testing Overview

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Version: 1.1

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Client Logo

Introduction

- Your role
- Your background and experience in the subject
- What do you want from this course

Course Objectives

- At the end of the course, you will have acquired sufficient knowledge to know:
  - Mobile Testing Methodology
  - Types of mobility testing
  - Tools for mobility testing
  - Install OS emulators

Agenda

I. Mobile ApplicationTesting Capability

II. Test Approach

III. Functional Testing

IV. Testing with Emulators

V. Non Functional Testing

VI. Tools for Mobile Application Testing

Course Audience and Prerequisite

- The course is for all QCs
- The following are prerequisites to the course:
  - Testing Fundamental
  - Analyze and write test case
  - Test planning (preferred)

Assessment Disciplines

- Assignment: 60%
- Final Exam: 40%
- Passing Scores: 70%

Duration and Course Timetable

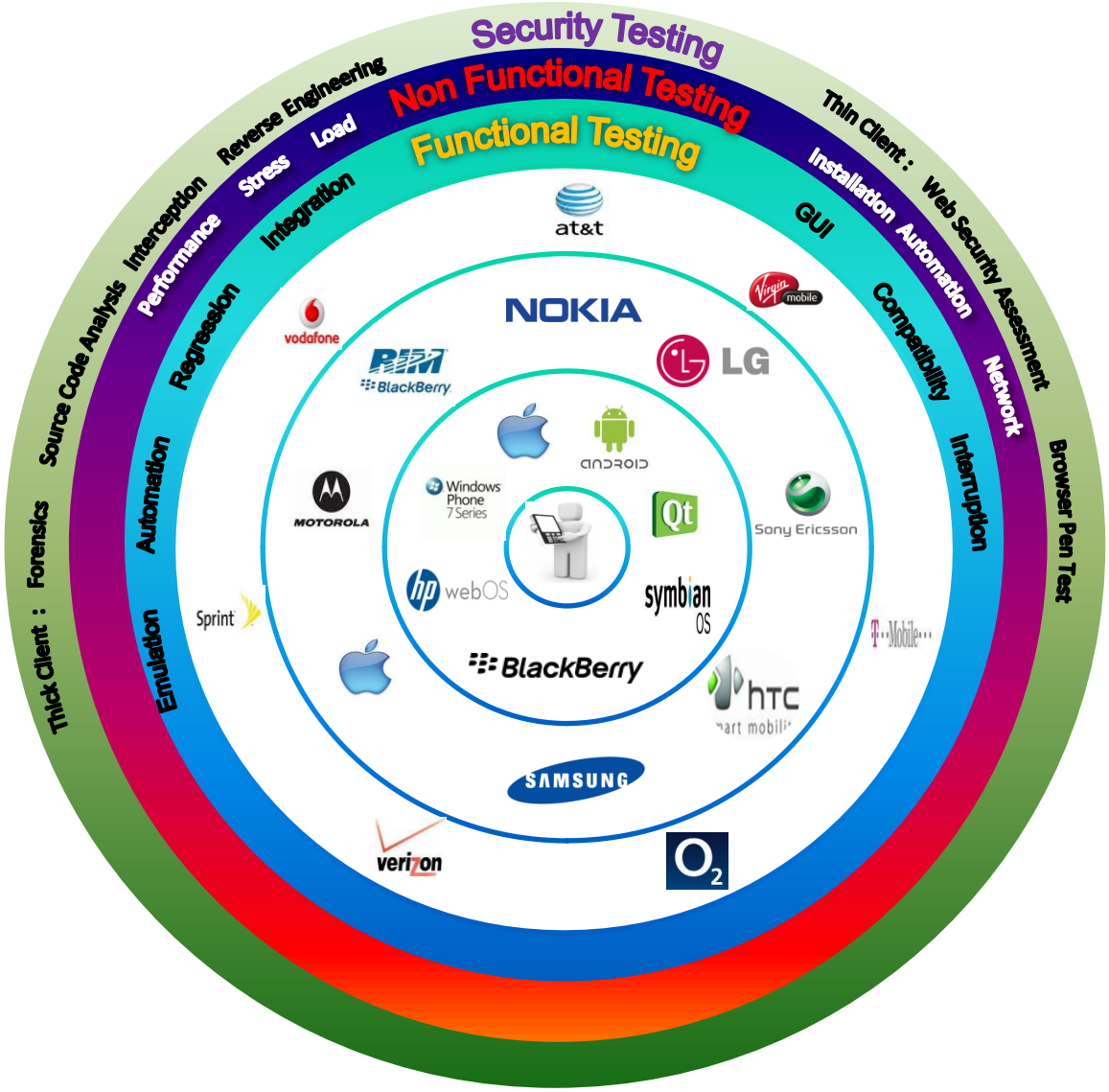
- Course Duration: 3 hrs
- Course Timetable:
  - From 09:00 to 10:30
  - Break 15 minutes from 10:30 to 10:45

Course Administration

- In order to complete the course you must:
  - Sign in the Class Attendance List
  - Participate in the course
  - Provide your feedback in the End of Course Evaluation

Mobile ApplicationTesting Capability

Mobile Application Testing Capability (CSC Testing Service)



Mobile Application Testing Capability (CSC Testing Service)

Service Offerings

Functional Testing
- Emulation Testing
- Compatibility Testing
- Interrupt Testing

Non Functional
- Load and Stress Testing
- Performance Testing
- Installation Testing

Security Testing
- Forensics
- Source Code Analysis
- Interception
- Reverse Engineering
- Web Security Assessment
- Browser Penetration Test

Testing Consulting/Managed Test Services
- Testing Center of Excellence
- Test process optimization
- Test process consultancy
- Test program management
- Test maturity model

Verticals


FINANCE


Health Care


Tech / Consumer


CENR


Manufacturing

Process

Delivery Models
- Test Execution Only
- Partial Project Ownership
- Full Project Ownership
- Managed Test Center

PET methodology
- Process
- Experts
- Technology

ISO/IEEE/TMM/CMM Level5/PCMM

Tools

DeviceAnywhere

testQuest by b SQUARE

eggPlant User interface testing

SmartBear SOFTWARE

froglogic

Se

sikuli script

Apache JMeter

TestComplete

Platforms

BlackBerry

Windows Phone 7 Series

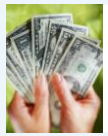
Windows Mobile

symbian OS

hp webOS

palm

Value Add


Reduced Delivery

Cost $$


Faster time to market

Increased Quality Delivery


Optimized Resource utilization

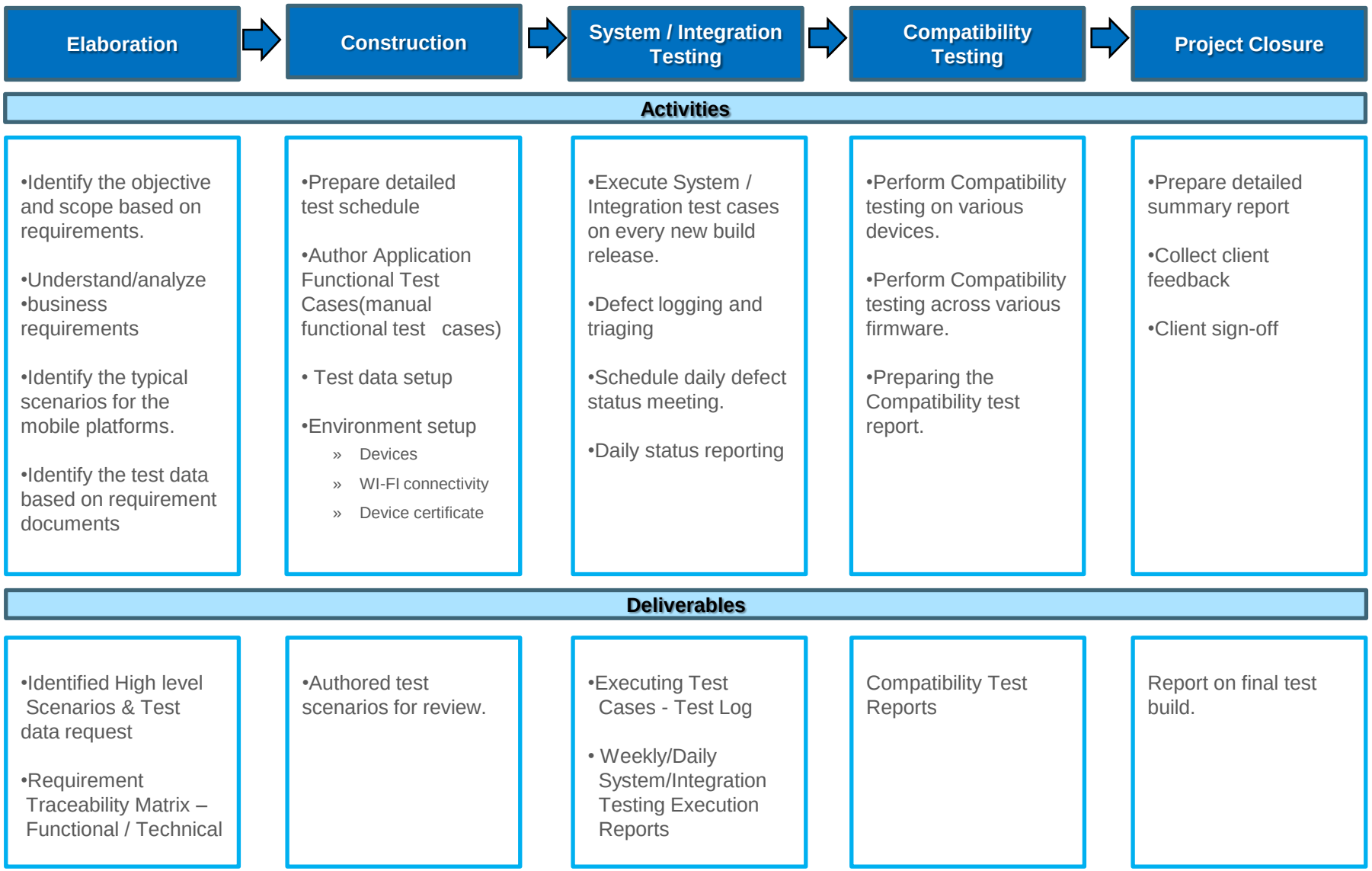

Quantitative Metrics mgmt.

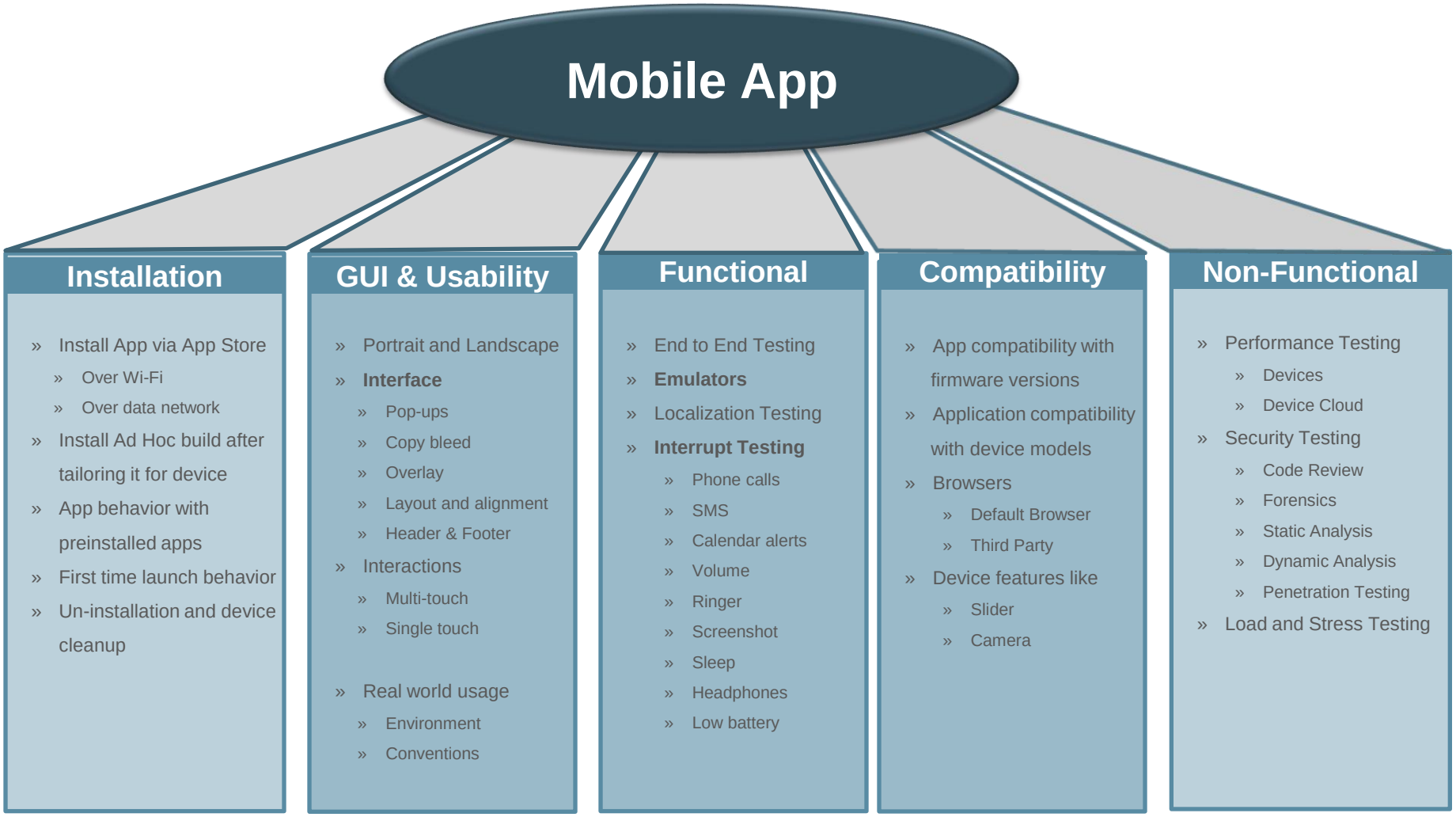

Increased Customer Satisfaction

CSC

Test Approach

Test Approach



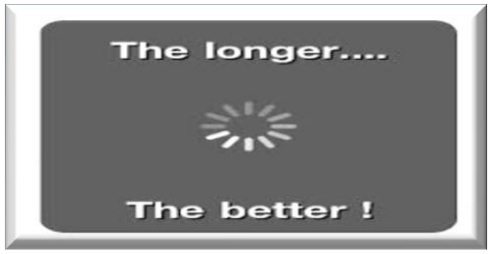

Mobile App
Installation
» Install App via App Store
» Over Wi-Fi
» Over data network
» Install Ad Hoc build after tailoring it for device
» App behavior with preinstalled apps
» First time launch behavior
» Un-installation and device cleanup
GUI & Usability
» Portrait and Landscape
» Interface
» Pop-ups
» Copy bleed
» Overlay
» Layout and alignment
» Header & Footer
» Interactions
» Multi-touch
» Single touch
» Real world usage
» Environment
» Conventions
Functional
» End to End Testing
» Emulators
» Localization Testing
» Interrupt Testing
» Phone calls
» SMS
» Calendar alerts
» Volume
» Ringer
» Screenshot
» Sleep
» Headphones
» Low battery
Compatibility
» App compatibility with firmware versions
» Application compatibility with device models
» Browsers
» Default Browser
» Third Party
» Device features like
» Slider
» Camera
Non-Functional
» Performance Testing
» Devices
» Device Cloud
» Security Testing
» Code Review
» Forensics
» Static Analysis
» Dynamic Analysis
» Penetration Testing
» Load and Stress Testing
Non functional
Functional

Functional Testing

Application look and feel

- Style and color of icons

- Progress indicators when pages are loading

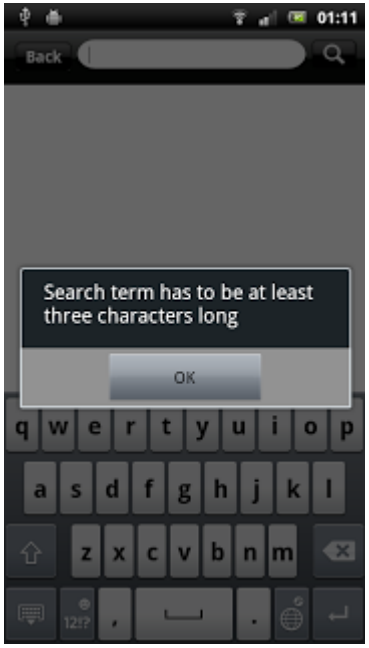


- Overall responsiveness of applications on the device

- Menus. How they are invoked and typical items they contain

Reference:
https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/Introduction/Introduction.html (iOS Human Interface Guidelines)

Application look and feel – Examples of bad design



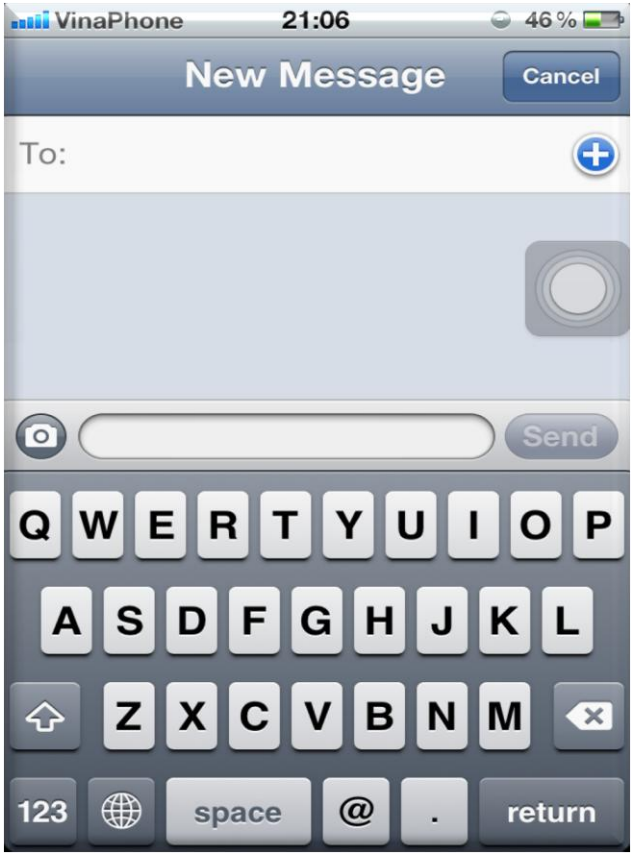
Screen orientation/resolution

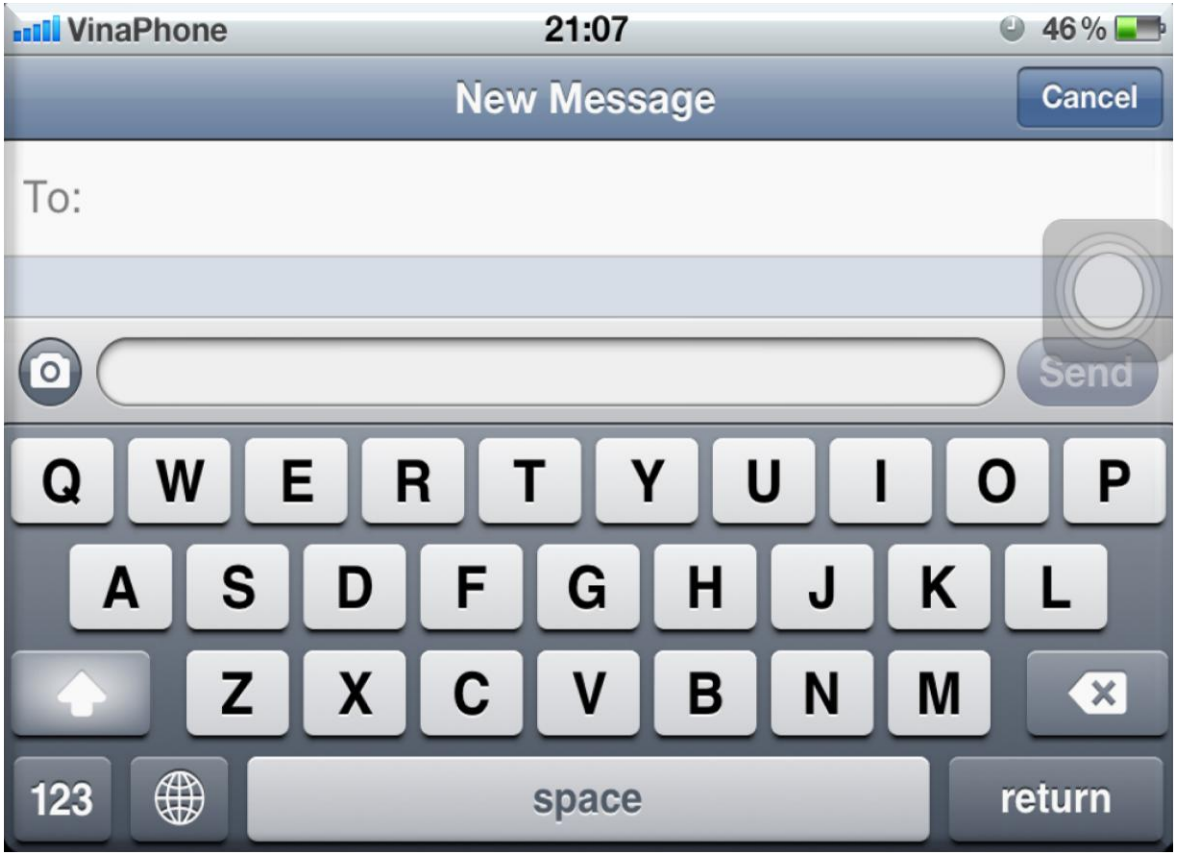
- **Test early with the device that has the smallest screen** if the application is supported on various devices that have different screen resolutions on a specific device (e.g Smartphone)

Screen orientation/resolution

- **Rotate the device from portrait to landscape display**, and vice versa, on all of the pages within the application if the device supports screen orientation changes

- **Test input reactions when the screen orientation is changed** by using the soft keyboard while changing the orientation repeatedly





Touchscreens

1. **Multi-touch vs. single touch screens:** if the device and application support multi-touch features, like the pinch-to-zoom effect on iPhone, be sure to include test case involving touching the screen in more than one place simultaneously

2. **Long touch vs. short touch:** there is usually no concept of a double-click on touchscreen devices

- long touches: pressing and holding an item will bring up a context menu in the middle of the screen

- short touches: short-clicking the same item will automatically perform the first action in that context menu

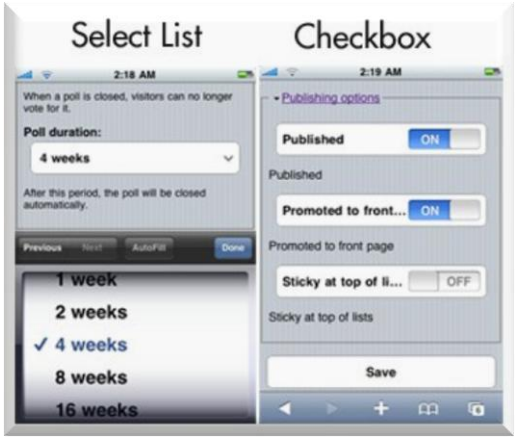
Touchscreens

3. **Button size and position:**

- Ensure that buttons and icons are large enough and far enough from the edges of the screen to be easily clicked by a large fingertip

- If the button is not large enough for a finger to press, such as the Close button on a Windows Mobile device application, verify that a stylus can be used to access and operate such buttons

4. **Workflow:** Applications should ideally make use of wizards with multiple choice selections like radio buttons and checkboxes to minimize the amount of typing the user needs to do, which can be excessively time-consuming



Soft keyboards

If the device has one, pay special attention to how the user must interact with the soft keyboard

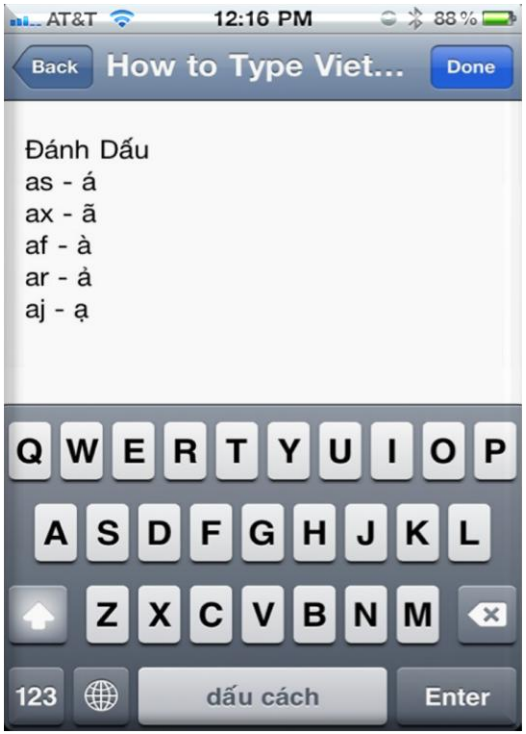
- Does the soft keyboard automatically appear if the user's main action is to enter some text?

- Does the first layer of the soft keyboard include shortcut "@" and ".com" keys if the highlighted field is for entering email addresses?

- Does a long touch on a soft character key bring up several different character choices for that input, such as different accents and symbols? Ex: on a Windows Mobile device when entering contact information

Soft keyboards

- Can the soft keyboard be dismissed and re-displayed easily?
- Can the soft and hard keyboards be used interchangeably (if the device has both)?
- Do soft keyboard characters entered in password fields only show up as ****?
- Does the soft keyboard support localization?



Hardkeys, Widgets

- Be sure to include a lot of testing around the use of the device's available hard keys such as Start, Home, Menu, and Back.

- In order for the user to have a great experience, these should all interact with the application similarly to how they interact with the device's native applications

- If there are any expected widgets common for the device and test their use within the application.

Network connections

Since the application is going to be used on devices in various locations with various network connection speeds, it is important to plan testing coverage for the following scenarios:

1. Only Wi-Fi connection
2. Only 3G connection
3. Only 2G connection
4. With no SIM card in the device
5. In Airplane mode (or all connections disabled)

Network connections

6. Using the network through a USB connection to a PC
7. Test intermittent network scenarios that a user might encounter in the real world:

    a. Walk out of Wi-Fi range so the connection automatically switches to 3G/2G (for example, in a large building like a hospital or airport, or outdoors)

    b. Ride in an elevator or on a train where the network connection may go up and down

    c. No network connection available at all

SD card interactions

- If the application can potentially store or retrieve items on the device's SD card, then it is important to test the application's behavior when there is an SD card present or not. The application should provide user-friendly error messages when a function cannot be performed due to a missing SD card.

- Also consider removing the SD card in mid-operation (particularly on devices where it can be easily removed without taking the back off of the device)

Phone calls and other interruptions

Be sure to test the following scenarios to see how the application reacts before, during, and after the call:

1. The application is interrupted by an incoming call, originator hangs up the call
2. The application is interrupted by an incoming call, terminator hangs up the call
3. The application is interrupted by placing an outgoing call, originator hangs up the call
4. The application is interrupted by placing an outgoing call, terminator hangs up the call

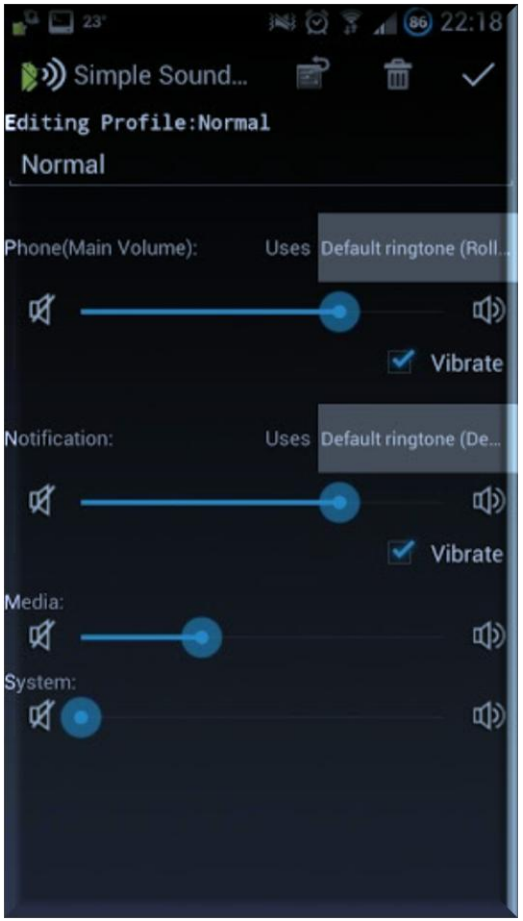
Phone calls and other interruptions

5. Text messages
6. Voicemail notifications
7. Calendar events
8. Social media notifications (Facebook, Twitter, etc)
9. Alarm clocks
10. Low battery notifications

Device options

Explore the device's options, and change settings such as the following to see how they affect the application:

1. **Sound profiles**
2. **Device password/unlock pattern**
3. **Font**
4. **Screen timeout/Auto on, off**
5. **Screen orientation**
6. **Connections**



Testing with Emulators

Why emulators?

- Emulators can be very useful to cover a breadth of devices
- Use some combination of real device and emulator testing

Type of Testing	Manual Testing		Automated Testing
	Using Devices	Using Emulators	
Unit Testing	No	Yes	Yes
Integration Testing	No	Yes	Yes
System Testing	Yes	No	Yes
Regression Testing	Yes	No	Yes
Compatibility Testing	Yes	No	Yes
GUI Testing	Yes	Yes	Yes
Performance Testing	Yes	No	Yes
Security Testing	Yes	No	Yes
Compliance Testing	Yes	No	No
Synchronization Testing	Yes	No	No

Excercise

- Install Android emulator
- Install applications into Adroid emulator
- Test the installed applications and find bug(s)

Non Functional Testing

Techniques

1. Load the application with as much data as possible

2. Perform the same operations over and over again, particularly those that load large amounts of data repeatedly.

3. Perform the repeated operations at varying speeds – very quickly or very slowly

4. Leave the application running for a long period of time

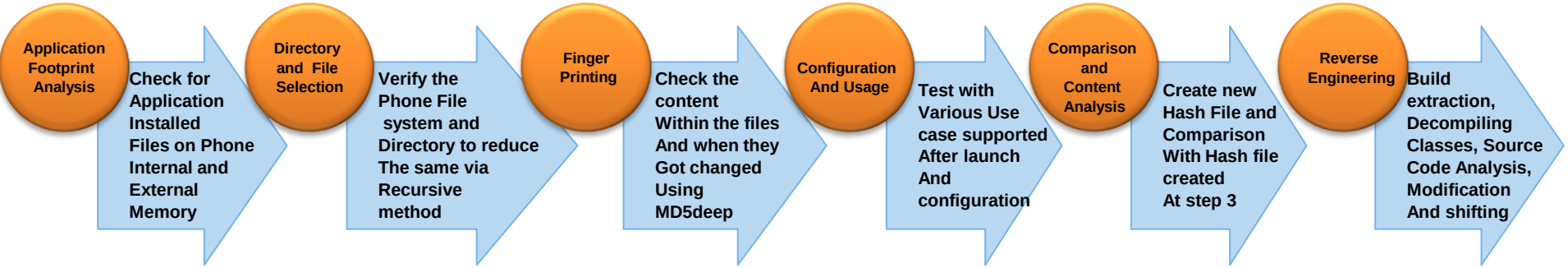
5. Have multiple applications running on the device

6. **Use CloudTest with SOASTA for Load Test**

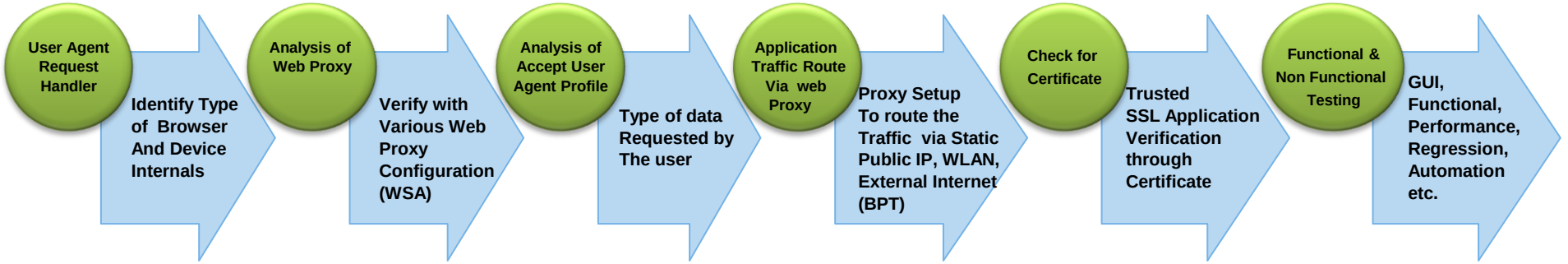
Non-reproducible issues

Another general tip related to stress testing – do not be afraid to report bugs that you haven't yet found a way to reproduce 100% of the time. If we can at least provide crash logs and a best guess as to how to trigger the problem, that is usually enough to give the developer some ideas on narrowing down the root cause

Installer Based Application



Browser Based Application



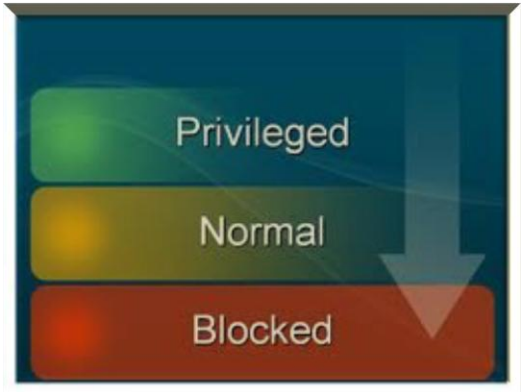
Web applications

- Running most web security testing tools on a mobile device is virtually impossible

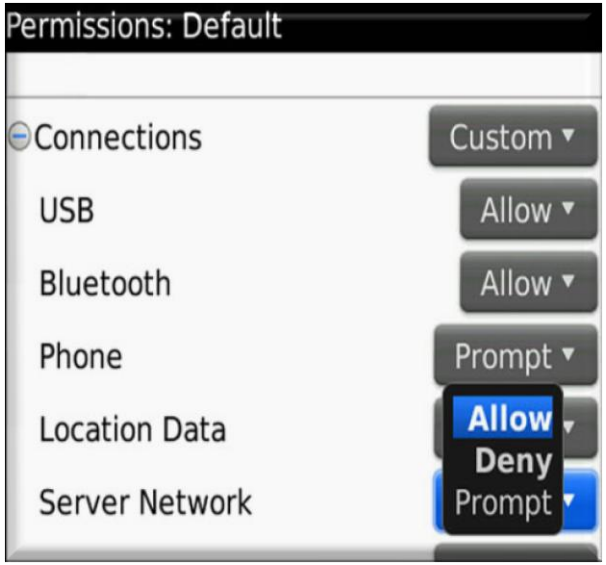
- Run mobile website on a PC itself. Then use security testing tools (e.g HP WebInspect) to test the website.

Application and device permissions

- Prompt to install applications ruring installation based on the permissions settings on the device



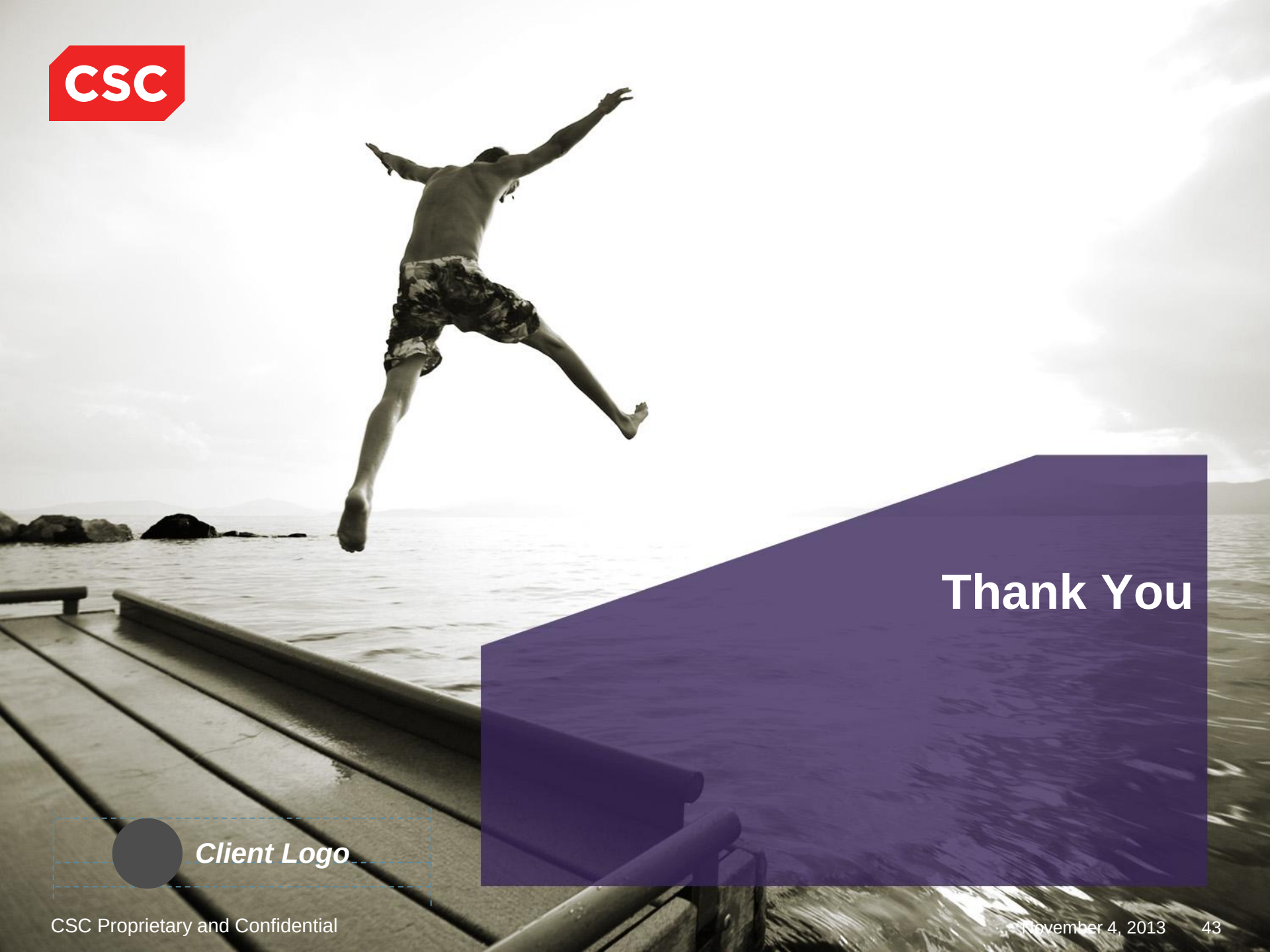
- Data is encrypted on the device or transfer data using SSL



Tools for Mobile Application Testing

TestQuest	Used for automation functional testing (regression, system test)
DeviceAnywhere	Gives online access to numerous real devices on various networks
•HP WebInspect •FlawFinder •Firefox Web Developer •SQL Inject Me •XXS Me •WebScarab	Used for security testing
Sikuli	Used for automation GUI testing

Q&A



Thank You

Client Logo

Revision History

Date	Version	Description	Updated by	Reviewed and Approved By
16-May-13	0.1	Initial draft for seminar	Huong v Nguyen	Anh Nguyen, Dat Le, Mai H Nguyen
17-Jul-13	1.0	Converted to a course	Huong Nguyen	
04-Sep-13	1.1	Updated after pilot review	Huong Nguyen	Nam Lam, Lam Ngo, Anh Nguyen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