WEEK-8
Testing Mobile Apps
(Packaging preparation)

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Outline
1. Testing purpose
2. Testing strategies
3. Types of Testing

Why Test is critical?

- One bad customer experience would spread via Social media platforms (Twitter, Facebook, …)and travel at the speed of light and reaches hundreds, thousands, or even more users.

- **App store ratings: Reviewers comment can 'kill' business**

- ***"There's no way to hide poor quality in the world of mobile." -*** *Michael Croghan, Mobile Solutions Architect.*

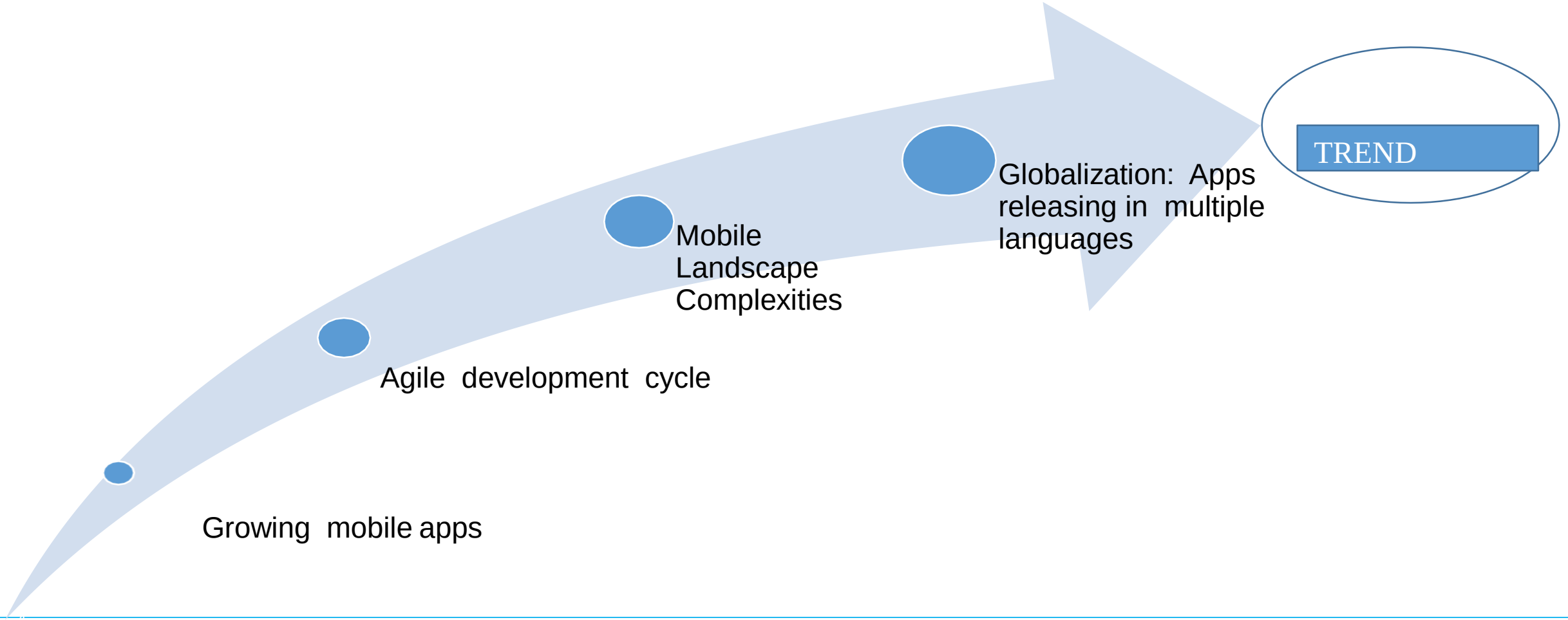
PURPOSE OF TESTING

Mobile application testing is a process by which a developed application of a mobile device is tested for its functionality, consistency and usability.

- Quality Assurance: The goal of any application testing is to understand the quality and performance of the feature offered.

- However, there are some critical factors that make mobile application testing a far greater challenge. Unlike and web-based application testing:
  - Device variation.
  - Mobile application testing tool availability.
  - Industry standards.

TEST TREND


Growing mobile apps
Agile development cycle
Mobile Landscape Complexities
Globalization: Apps releasing in multiple languages
TREND

QA CHALLENGE 1: Device Variation:

- Mobile application testing is difficult due to compatibility issues as a mobile application can be deployed across devices which have different:
  - Operating Systems like iOS, Android, Windows, BlackBerry, etc.
  - Versions of an operating system such as iOS 4.x, iOS 5.x, BB4.x, 5.x, 6.x etc.
  - Manufacturer standards like Samsung, HTC, Nokia, Sony, etc.
  - Keypad type such as virtual keypad, hard keypad, etc.

NOTE

- *If a tested application works well on a given device, it will not work 100% on another device even if it's from the same product family because the screen resolution, CPU, Memory, OS optimization, and hardware could differ.*

QA CHALLENGE 2: Mobile Testing Tool Availability:

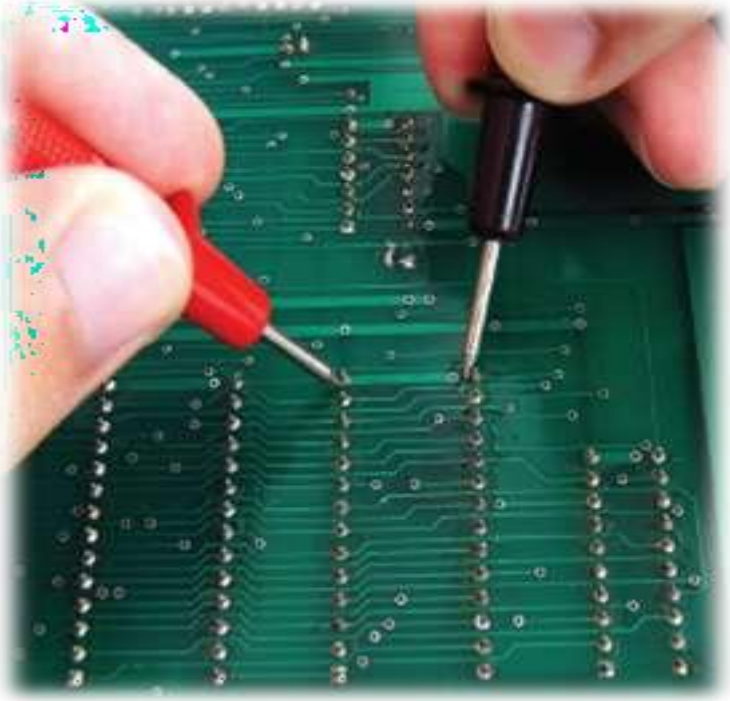
- The tools used for desktop & web-based applications do not work for mobile apps.
- Complex scripting technique and new tool development is required.

QA CHALLENGE 3: Industry Standards:

- Mobile application testing must meet industry standards for an application to be globally acceptable and popular.

Mobile Application Testing Strategies

Type 1: Real Time Devices with Real Time Networks:



- Real device testing will give the most realistic view of test results.
- High cost.
- This is important since the mobile application will always be used on mobile devices by end users.
- All possible types of testing activities can be performed including that are dependent on hardware.
- Up to 100% test coverage can be achieved.

Type 2: Device Emulator:

- This is a cost effective solution.
- All application can be deployed and tested on emulator without investing in Mobile Handset for various OS.
- Emulators are mostly available free, and we can also perform UI, Stress and performance testing on that.
- 30 – 40 % test. (early stages of app development)

Type 3: Cloud Testing Solution (Remote Real Devices):

- The QA team can use the mobile cloud computing environment to deploy and test an application.

- In the cloud approach, the task and data are kept on the internet rather than on an individual device, providing on-demand access.

User provides the inputs to the web Interface using Internet

Server receives the user request and send it to actual device for compilation

Mobile devices solve the user request and send compiled results back to server for displaying the results to user on the web interface

BENEFITS of Cloud Testing Solution (Remote Real Devices):

- Benefits:
  - Rent per hour.
  - Device logs are recorded to help with troubleshooting.
  - Large number of devices available for testing.
  - Tests can be run on several devices in parallel.
- Problems:
  - Internet connectivity issues.
  - Automation is image-based.
  - It’s time consuming.

Some Realistic Approaches:

Steps Beta Testing:

1. Select a list of devices that your company will ensure compatibility.

2. Engage groups of Beta testers to test the application on their devices and report any issues or incompatibilities.

3. Avoid supporting devices or operating systems that the manufacturers or vendors no longer support.

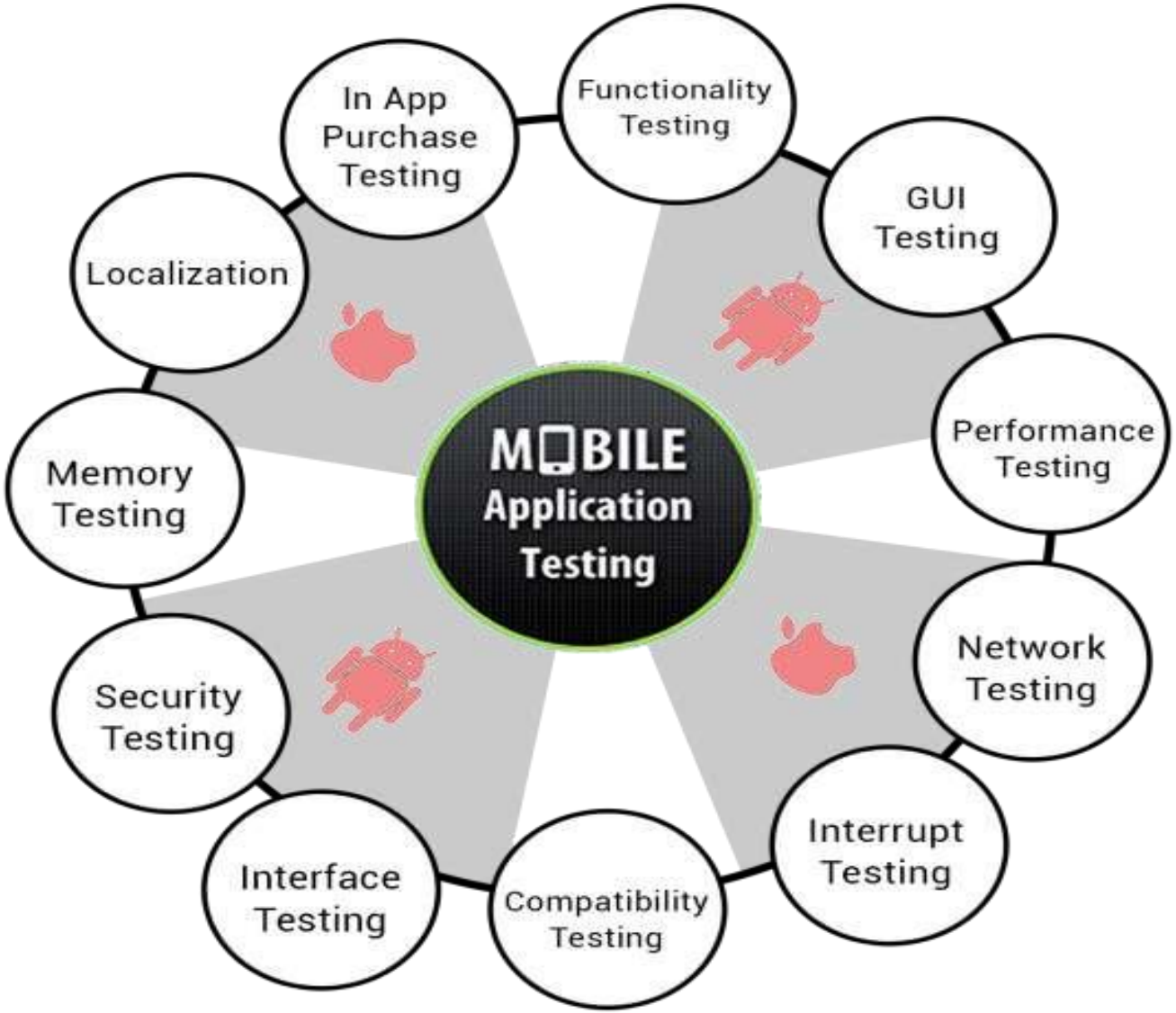
4. Trying to test on unsupported devices and O.S. versions increases costs exponentially.

5. Have an explicit list of devices on which QA will be performed.

6. Include specification clause. For examples, the users will be informed that even though the application might work on other devices, the company will not be held responsible for unexpected issues.

Types of Mobile Testing

- Functional Testing
- Laboratory Testing [ALPHA]
- Performance Testing
- Security Testing
- Load & Performance Testing
- Localization Testing
- Usability Testing



Testing Strategy

Image courtesy: www.**testingworld**.net

Types of Mobile Testing

Cheklist 1: Interface Testing :

- Validation of buttons, text inputs, labels, etc.
- Validate each screen in a comprehensive manner (does it do what it is supposed to do?)
- Validate navigation flow.

Usability testing is a process in which an application is tested in the users centered environment. Usability testing focuses on measuring a human-made product's capacity to meet its intended purpose.

Checklist 2: Usability Testing:

- Is it easy to navigate between screens or does it require weird steps?
- Does it show user redundant information or low value information?
- Can it display text properly, in the language selected?
- NOTIFICATION: Your error messages should be clear, concise and actionable.
- Verification of the functionality OFFLINE / ONLINE. Does the user lose information that is sent to a server while in a non-coverage area?

Performance testing is defined as a testing of an application to determine how a system performs in terms of responsiveness and stability under a particular workload.

Checklist 3: Performance AND Network Testing:

- Users will not accept apps that take too long to load or perform simple actions. (About 60% of mobile users will abandon your app or site if it doesn't load within three seconds)
- What if the connection to a server is over 3G instead of Wi-Fi? What about 2G?
- Are the images used the "right" size [400x400]?
- Redundant code => CPU cycles => + battery consumption => unhappy users.
- Are there memory leaks?
- Are all resources being freed (GPS, camera)?

Security testing is defined as the testing an application to determine that an information system protects is data or not.

Some basic concepts in security testing :
Confidentiality
Authorization
Integrity
Availability
Authentication

Checklist 4: Security Testing:

- Any sensitive data being sent or received must be encoded: Encryption.
- Consider potential detection of areas in the app that could receive malicious information.
- Multiuser support without interfering with the data between them.

Checklist 5: Service Testing:

- The Mobile Apps may act as the client, not the server.
- What happens if you try to access a service offline?
- What if I get disconnected during transmission of information?
- Have we included API testing?
  - This is very important since our app could be using APIs and we should make sure that we know these APIs and the way to interact with them.
  - Sometimes the problem is not in the mobile app!

Load testing or Low-level resources testing is performed to determine the behavior of an application under the normal load and the anticipated peak load conditions.

Checklist 6: Low-level Resources Testing [OS]:

- Is the App generating "garbage" of some sort? Temporary files not cleaned, local database growing too much...
- Are we correctly using the sensors? Are we freeing the GPS? Do we make more calls to the server than needed?
- Are we using too much memory? Or, are we not releasing memory properly?

Checklist 7: Operational Testing:

- Are we "backing up" necessary information in the app?
- If you upgrade to a new version of the App on the corresponding "Market", is data lost?
- What if the user gets a call while using the app? What if there comes an SMS?
- Does the battery seem to go down dramatically with the use of our App?

Checklist 8: Localization Testing:

- Date formats
- Text direction (right to left)
- Languages with different set of characters
- Address formats
- Currency conversion

Checklist 9: Functional/ Business needs/ In-App Testing:

Testing an application against the business requirement is called the functional testing. In simple words testing all the specifications given by the client is functional testing.

Checklist-10: In-App Testing

To verify application works proper after purchasing any item into application.

- Verifying proper debit of the account and residing f the item purchased
- Verify if user updates version of application , user does not need to purchase any already purchased items again.

  Verify review comments or rating by other users

ASSIGNMENT

WRITE SHORT NOTES ON THE FOLLOWING TESTING TOOLS

1. Monkey Runner
2. UI Automator
3. Monkey Talk
4. Appium

THANK YOU