indium
Make Technology Work

Compatibility Testing For Mobile Games
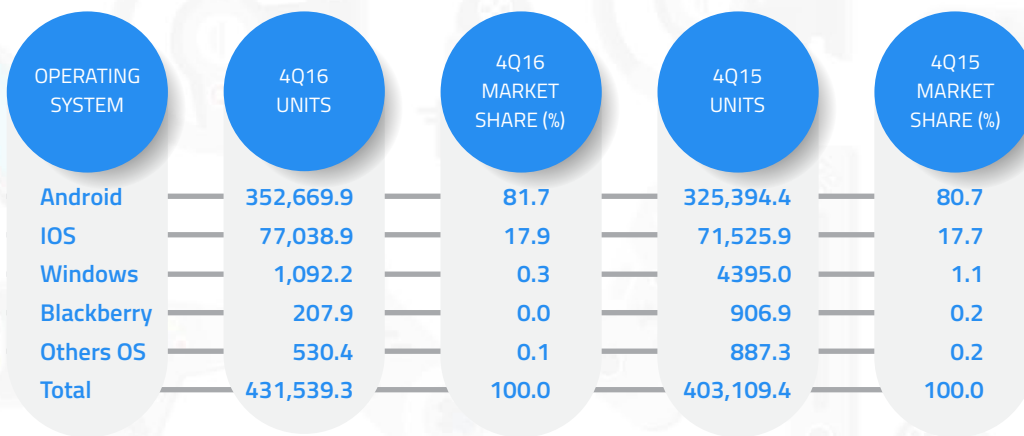
White Paper

Ensuring smooth performance of games across platforms and devices by testing their performance comprehensively.
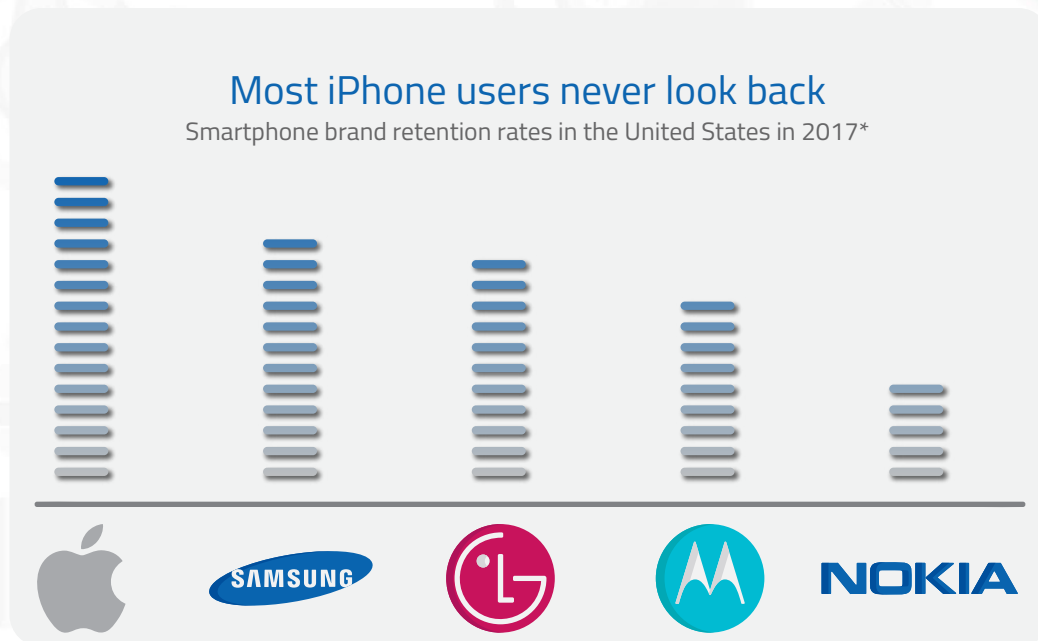
The Platform Variations

The mobile phone market is very dynamic, with new models and improved features luring customers by the minute. Increased features have made mobiles the de facto device for not just transactions but for entertainment, and games in particular.

A Gartner report shows that of the 432 million smartphones sold in the last quarter of 2016, 352 million ran Android (81.7 percent), 77 million ran iOS (17.9 percent) and Windows Phones cornered 0.3 percent of the market.

OPERATING SYSTEM	4Q16 UNITS	4Q16 MARKET SHARE (%)	4Q15 UNITS	4Q15 MARKET SHARE (%)
Android	352,669.9	81.7	325,394.4	80.7
IOS	77,038.9	17.9	71,525.9	17.7
Windows	1,092.2	0.3	4395.0	1.1
Blackberry	207.9	0.0	906.9	0.2
Others OS	530.4	0.1	887.3	0.2
Total	431,539.3	100.0	403,109.4	100.0

Market Share of Smartphones in 4th quarter of 2016

Game developers need to be aware of the trends and make sure their games can be played on any of these devices.

Most iPhone users never look back
Smartphone brand retention rates in the United States in 2017*

SAMSUNG LG NOKIA

April 2017 survey of 1,000 U.S. smartphone owners that are "likely" to upgrade in the next 12 months.
* Share that intend to replace their current phone with another from the same vendor.

@StatistaCharts   Source: Morgan Stanley via media reports

statista

The ever changing customer preferences Game testing needs to be an integral part of game development. It requires a comprehensive testing strategy like any other software application, for gaming is serious business. Any fall in user experience can cause the game to fail and cause not only a loss but also create a bad reputation affecting future releases.

Every game testing strategy should be comprehensive and include the following:
- Functionality
- Gameplay
- Compliance
- Compatibility
- Network
- Localization / Internationalization

Why Compatibility Testing

As seen above, the market is flooded with thousands of variants of Android, Kindle and iOS devices with different operating systems and platforms. The screen sizes differ, as also compliance requirements for each of the devices.

The three major concerns that affect the success of a game include:
- Performance – the behavior of a game may differ from device to device
- Visuals – Since each device type has a different screen size, hardware and software drivers
  driving it, even the colours may look different in different screens. This can impact gaming experience.
- The impact on the device – Especially in the case of mobiles, the impact of the game on the
  performance of the device can influence gaming experience.

Though there are many indie mobile games being published almost on a daily basis, only those published by leading and established publishers find themselves

rated high on popularity. Apart from other factors such as branding and promotions that could help push up a game, a key factor is the time and effort spent on compatibility testing.

In case of localisation, checking for compatibility of the content is just as important as that for the original content – yet another oversight that can cost the games to lose out indifferent regions.

Performance and Compatibility Testing – The Difference
Performance testing refers to testing a game for its speed, effectiveness and, well, performance. This testing is about the game itself and if it behaves as expected. A game may perform well on the device it is being tested and the game can be considered robust. But, a game is not played only on one kind of device. To test whether it behaves the same way in the various possible and popular devices and gives a good gaming experience is called compatibility testing

Common Misconceptions
Game developers and many testers test the game on high end devices.
This is insufficient as the game's performance will be different in mid and lower devices, where the performance of the game can drop. Compatibility testing needs to be of two kinds:

Compatibility Testing: The game needs to be tested for compatibility with newer or upcoming versions.

Backward Compatibility Testing: The game is tested for compatibility with older versions.

Compatibility Testing Process

Testing on actual device: Several emulators and simulators are available for testing. However, to get an accurate picture, nothing can beat testing on the actual device. For instance, if a game supports Android 4.X.X and above, then testing in each of the relevant devices is a must. This applies to iOS and Kindle as well.

Each device is unique and can manifest different problems including:

- Hardware usage
- Graphic detailing
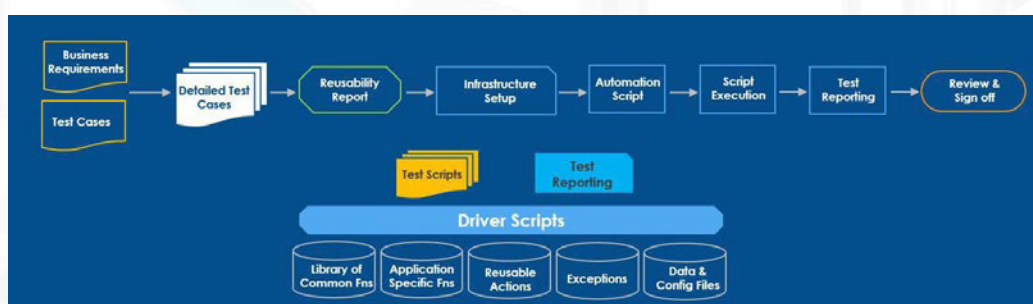- Screen sizes
- Background applications

Emulators help identify the potential errors in a limited way and are not reliable judge of the production-readiness of the game.

Though there are device farms on the web which are cost effective, they cannot replicate real-time actions, which is essential for video games. They will not be able to match the feedback that we get from the physical devices.

Performing the conventional compatibility on physical devices is the best way to determine the performance as well as knowing the end user experience accurately.

Recommending the right device: Given the plethora of varied devices available in the market, selecting the right, representative and popular devices for testing is critical. Some of these devices are a benchmark in their category and selecting them during the testing process improves the predictability of performance of the game on devices belonging to that category. This applies to PCs and Macs as well.

A well-equipped lab: Having all the important and representative devices, acquiring the latest ones as they arrive in the market, testing on various network speeds and bandwidth will provide a more realistic approach that is more accurate and effective. Technology Updates: Keeping abreast of technological trends and equipping oneself to meet the changing scenario is important for compatibility testing. For instance, games are being moved from IPv4 to IPv6. Apple requires the games to be downloaded on IPv6 for all their iOS 10 releases.

Plan & Analyze
- Understanding of application / architecture.
- Analysis of the Requirements and Test Cases.
- Reusability analysis.
- Test Automation Plan.

Adapt & Set Up
- Infrastructure & Environment set up.
- Customize iFACT, reporting, driver scripts etc.
- Design automation scripts.

Execute & Report
- Execute test scripts on AUT
- Review test results.
- Test status reporting.
- Retest, Review & Sign off.

Indium Software Approach

Compatibility testing is critical to Indium's QA strategy for game testing. The game is tested on all the required devices to test its performance across different configurations.

The key aspects of the testing include:

- Loading art objects to check the display on different devices
- Burden the system to test for game performance in case of low memory availability
- Run the game for long periods of time to check for bugs
- In case of testing on mobile, check phone performance, and game behavior in case of a call or message.

At every stage, the game developers are alerted with accurate feedback for easy bug fixing and improving performance of the game across devices.

In addition to the right devices, the Indium game testing team comes with the required experience, passion and qualifications needed to understand the various ways in which a game can be played. This enables testing various possibilities on all relevant devices, thus improving the quality and experience on the game. This is also one of the reasons why Indium is more than just a game testing partner for game developers.

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