



OptoFidelity

User experience and product-level
performance testing in mobile devices

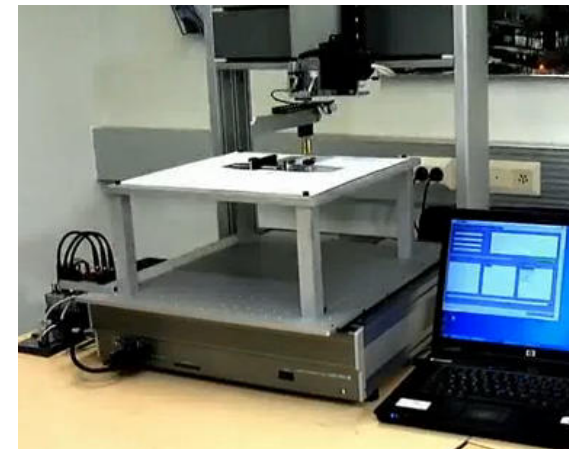
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Presentation Topics

- OptoFidelity in brief
- How to test embedded products
- Why product-level testing matters
- How to be successful in product-level R&D test automation
- How to quantify user experience
- Performance testing
- OptoFidelity testing tools

OptoFidelity Oy

- Strongly growing expert engineering company
- Business areas
 - Test- and Measurement Automation
 - Engineering Services
 - Machine vision systems
- Multitalented team
 - Machine Vision & Digital Imaging
 - Software & Electronics Engineering
 - Industrial & Robot Automation
 - Test & Measurement Systems
- Patented technologies
 - Measuring visual image quality from display
 - User experience testing



Deloitte.

Technology Fast 50
Finland 2010


OptoFidelity

Global Project Deliveries

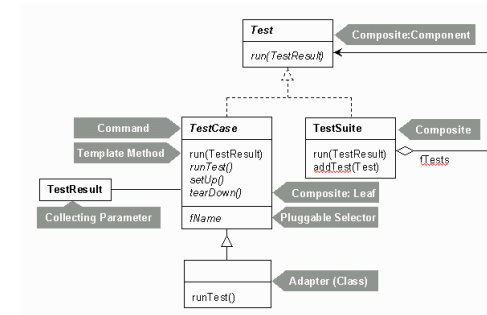


Product-level testing in R&D

The background is a solid blue gradient that transitions from a darker blue at the top to a lighter blue at the bottom. In the lower-left and lower-right areas, there are several overlapping, wavy, semi-transparent lines. These lines are primarily white and light blue, but some have a rainbow-like color gradient, transitioning from red to orange, yellow, and green.

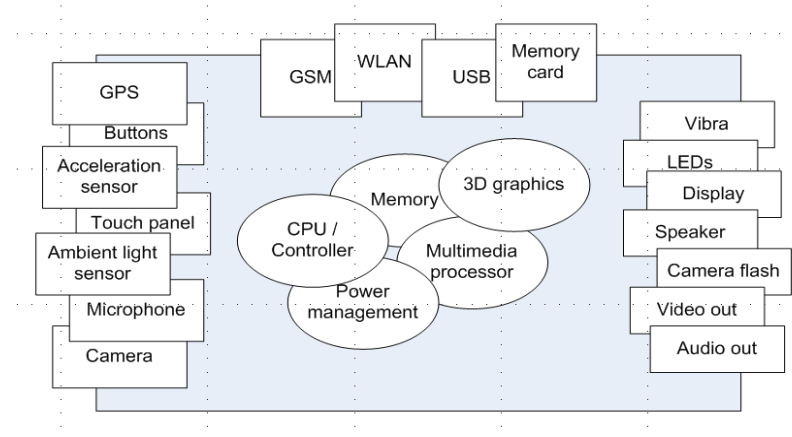
How to test embedded devices

- SW unit testing
 - Well established practice, several tools available
 - Specific to development environment
 - Test infrastructure investment low
- SW device emulator testing
 - SW application development
 - Mainly for feature-level testing
 - Low-cost test infrastructure, if emulator is available
- Debug SW testing in HW
 - Gives typically good test coverage
 - Sensitive to quality of the debug and tracing features
 - Needs prototype HW
- Production SW testing in real HW
 - Test coverage easy to understand
 - Test infrastructure investment higher
 - Typically manual testing
 - Part of system testing
 - Regulations and conformance



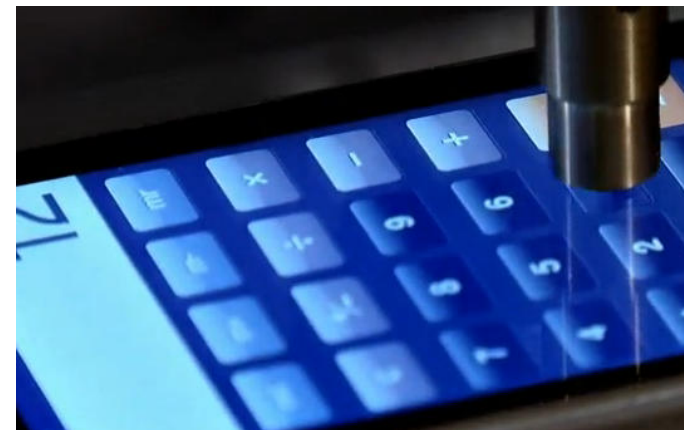
Why product-level testing matters

- Device complexity increases
 - hard to simulate reliably
- HW modularity increases
 - large number of interfaces to simulate
- Complex interactions
 - SW+HW behaviour is unpredictable
- Application IOP testing
 - Users have pre-loaded apps (e.g. social media clients, media players, ...)
 - 3rd party apps problematic in simulation
- Device as part of service
 - Big part of processing moves to client devices (flash, java, silverlight ...)
 - Services rely on device features (e.g. GPS, NFC, gyro, ...)



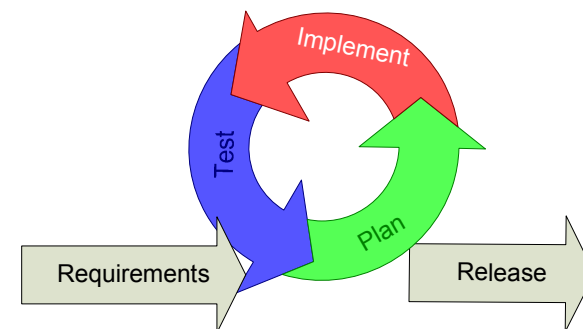
Why R&D test automation matters

- Testing volume increases
 - Agile development methods in use
 - Quick release cycle
- Results are reliable and repeatable
- Long-running test setups easy to arrange
- Results are available immediately
- Large amount of test data can be obtained
- Test capability scales well



How to be successful in product-level R&D test automation

- Determine the goals and objectives
- Categorize and limit your test cases:
 - frequently used functionality
 - resource-intensive features
 - business-critical operations
- Integrate test automation into development cycle.
 - Test early, test often..
- Store test data in consistent format from the beginning
- Minimize, but don't totally abandon manual testing



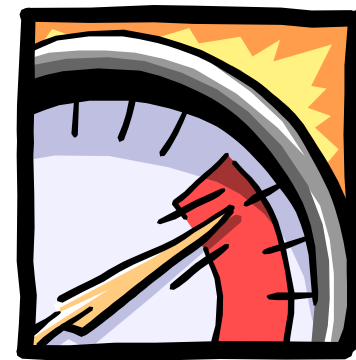
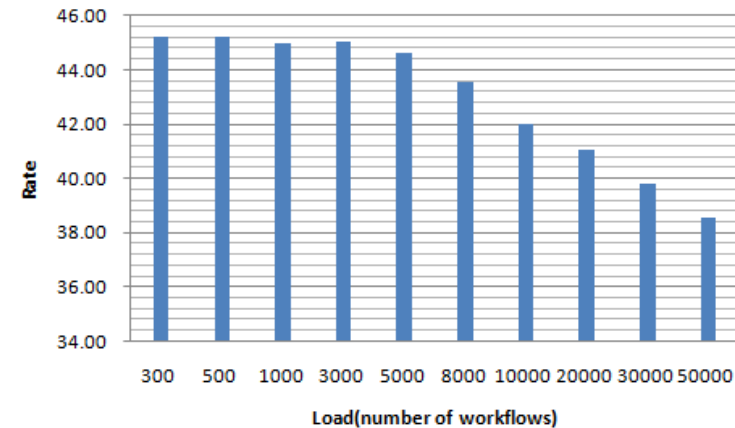
Quantifying User Experience (UX)

- UX consist of roughly the following:
 - branding
 - usability
 - functionality
 - content
- All areas ultimately need to be covered by user studies
- Objective measurement data should be used in addition



Why test for device performance

- Test for User Experience
- Catch problems before they escalate
- Get objective, business critical data:
 - Speed
 - Scalability
 - Stability
- Know your limits



OptoFidelity Offerings

Solutions for product-level testing

OptoFidelity UX measurement tools

- OptoFidelity WatchDog
 - UI performance latencies (visual, electrical)
 - UI feedback detection (haptics, audio)
- OptoFidelity Frame Rate Meter
 - Video playback quality measurement
 - Easy setup and connectivity
- OptoFidelity Video Quality Testing
 - Capturing directly from display
 - Perceived Video Quality measurement



OptoFidelity test automation tools

- OptoFidelity robotics platform
 - Several robot models
 - Easy robot setup interface
 - Several product activation methods (keypads, touch screens, 2-finger)



- OptoFidelity HAT Hardware
Accessory for Testing
 - Automating SW upload
 - USB and power switching
 - Ready sensors for testing functionality
 - current, audio, optical, haptics, temperature



OptoFidelity engineering services

- Test system integration
 - HIL systems
 - Model-based testing
 - Integrating with customer's own test solutions

- Test services
 - Device-level or component-level
 - Using OptoFidelity test automation tools



Thank you!

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Check out the demos:

OptoFidelity HAT device with sensors

Lipsync measurement with HAT