Introduction to Mobile Performance Testing

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DT3338 at Noon, June 13, 2013
HOL330 in Sands 305
Why performance test mobile apps?

Mobile apps are now:

• how customers **locate** stores and information
• how brands get **exposure** many times a day
• the “**face**” of the organization
Slow app = Slow product?

★ ★ ★ ★ ★ Said
I don't know what's taking so long to update the transaction details. It sucks, and even in the web version, it is updated. Pls, fix your internal systems before publishing any updates to this application!!!! :(  

★ ★ ★ ★ ★ Great ui, great functionalities but...
Why does it have to be sooo slow? It takes 5 to 10 seconds for every screen to load = irritating! If you can fix it, I'll rate it 5 stars again

★ ★ ★ ★ ★ 😞
This service seems more & more often *temp unavailable *
Baseline vs. impact of network latency, etc.

Response Time for a Mobile Banking Application
WiFi Vs. 3G [Sec]

- Startup: WiFi 37.5, 3G 5.06
- Overseas Accounts: WiFi 20.78, 3G 3.33
- Find an Agency: WiFi 19.15, 3G 3.07
- Research: WiFi 1.99, 3G 3.35

from HP Network Virtualization by Shunra [P01]
Possible points of risk in landscape

- mDev: Data Caching
- Network: Latency & Loss
- Network: Encrypt, Compress
- Network: Load Bal. Algorithm
- Dev: Resource Usage
- SysAdmin: Server Config.
- Back-end: Pooling & Threading
- DBA: DB Indexes & Logs

Platforms & Versions

Device Features

Internet Browsers

Screen Sizes

Carriers

LANs

CDNs & CoLo.

ISPs

Load Balancers

Web Servers

App Servers

DB Servers

Storage

Firewalls

VPNs
HP LoadRunner components and workflow

1. Author Scripts
2. Collaborate
3. Plan and Execute Tests
4. Virtualize Services
5. Virtualize Network
6. Generate Load
7. Measure Impact
8. Analyze, Compare, Report

End User -> Client(s) -> Internet/WAN -> Application Server(s) -> Database

HP Live Network

Test Scenario
Scan for more information
http://www.hp.com/go/...
Mobile technology terms

Windows PC
- internet explorer
- URL
- ft.com
- HTML4

“feature phones”
- minimal browser
- URL
- m.ft.com
- mobile site

Android
- Chrome browser
- URL
- ft.com
- HTML5
- responsive design
- ft.com/ws
- web services
- Hybrid app
- Native app

Play. google.com
Create a New Script, Mobile Category
Multiple Approaches Available

Browser or hybrid app:
- Ajax? > TruClient Ajax Mobile scripting protocol using User Agent spoofing in Firefox
- Simple > Mobile HTTP/HTML scripting protocol

Native app: > Mobile HTTP/HTML scripting protocol
- Android:
  - No device > Record Emulator using Android Virtual Device (AVD)
  - Have rooted device > Mobile Recorder generate lrpcap to Analyze

iOS & others:
- > LoadRunner Proxy on same subnet/Wi-Fi hub (the newest technique)
- > Record & Analyze WinPcap capture on the mobile app server

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Recording Method TruClient Ajax
TruClient recording
Devices with User Agent strings

Count: 27
User Agent string example

Sample User Agent for Samsung Galaxy S3

Mozilla/5.0 (Linux; U; Android 4.0; xx-xx; GT-I9300 Build/IMM76D)
 AppleWebKit/534.30 (KHTML, like Gecko)
 Version/4.0 Mobile
 Safari/534.30

More at http://www.useragentstring.com/
# Android Versions

<table>
<thead>
<tr>
<th>Version</th>
<th>Codename</th>
<th>API</th>
<th>Distribution</th>
</tr>
</thead>
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<td>Donut</td>
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<td>2.1</td>
<td>Eclair</td>
<td>7</td>
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<td>2.2</td>
<td>Froyo</td>
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<tr>
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<tr>
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<td>Ice Cream Sandwich</td>
<td>15</td>
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<td>4.1.x</td>
<td>Jelly Bean</td>
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<tr>
<td>4.2.x</td>
<td></td>
<td>17</td>
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</tr>
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</table>

Data collected during a 14-day period ending on June 3, 2013. Any versions with less than 0.1% distribution are not shown.
Mobile Device Manager Tool in VuGen
VuGen Scripting Process

1. Configure recording settings
2. Consider run-time settings
3. Object identification using script levels
4. Specify Transaction Names
5. Specify Completion End Events Logic
6. Insert flow control
7. Run-time logic
8. Vary data based on parameters
9. Using C script functions in a library

from HP Virtual User Generator User Guide 11.52 page 73
Random Think-time in TruClient

Arguments:

Math.floor( 11 * Math.random()+5 );

http://www.perftesting.co.uk/ajax-truclient-tips-and-tricks-part-ii/2012/05/02/
TruClient Toolbox drag and drop

Arguments:

```javascript
var randWait = Math.floor(11 * Math.random() + 5);

window.alert("randWait=" + randWait);
```

[http://www.perftesting.co.uk/ajax-truclient-tips-and-tricks-part-ii/2012/05/02/]
HTTP/HTML Mobile Recording
Mobile HTTP vs. HTML

*mode=“HTTP”*

For use with web services calls.
Does not parse for resource requests.

*mode=“HTML”*

Parse HTML to automatically identify additional resources to download

- CSS
- JavaScript
Record Mobile HTTP/HTML
HTTP/HTML Recording Methods Wizard

- **Record & Analyze Traffic**
  - **Record and Analyze Traffic**
    - Create a script by recording server traffic and converting the resulting capture file to a Vuser script.
  - **Analyze Traffic**
    - Create a script by converting an existing capture file to a Vuser script.
  - **Record Emulator**
    - Create a Vuser script by recording events with a device emulator installed on the VuGen machine.
  - **Proxy Recording**
    - Create a Vuser script by recording a client application via the LoadRunner proxy.
Proxy Recording
Same subnet via Wi-Fi router

HTTP/HTML

Demo web service

VuGen Proxy

192.168.2.101
Demo Web Services

Proxy Recording

Ethemet cables

Wi-Fi router on private LAN

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Proxy Recording

HTTP/HTML

Proxy Recording

HP LoadRunner VuGen11.52
Proxy Recording Setup on iOS

1. 
   ![Settings](image)
   - Airplane Mode: Off
   - Wi-Fi: Eleanor
   - Personal Hotspot: Off
   - Location Services: On
   - Carrier: [Redacted]
   - Password: ncjm-q3ey-t1dd

2. 
   ![Wi-Fi Networks](image)
   - Wi-Fi: ON
   - Choose a Network: Eleanor
   - Ask to Join Networks: OFF
   - Subnet Mask: 255.255.255.0
   - Router: 192.168.1.2
   - DNS: 192.168.1.1
   - Search Domains: [Redacted]
   - Client ID: [Redacted]

3. Scroll down
   - HTTP Proxy
     - Server: 192.168.1.3
     - Port: 8080
     - Authentication: OFF

Source: http://www.amsys.co.uk/2012/blog/how-to-setup-proxy-servers-in-ios/
Proxy Recording Setup on Android Galaxy S3 (4.1.2)

1. Long press

2. Long press

3. Show advanced options

4. Show advanced options
Record Emulator
Record Emulator Requirements

1. USB cable to device
2. USB driver for device
3. Android app APK file for Android app under test
4. Android file download manager app to extract APK file from device
5. JDK (Java Development Kit)
6. ADT (Android Development Toolkit) plug-in for Eclipse
7. AVD (Android Virtual Device) within Eclipse for device under test
8. JAVA_HOME and PATH Windows environment variables
9. HP LoadRunner 11.50 and SP2 patch to upgrade to 11.52
Record & Analyze Traffic

HTTP/HTML

Android

IPv6

Network sniffer

Ad hoc network

iOS

IPA

App web server

HP LoadRunner VuGen11.5x

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Analyze Traffic

https://connections.houston.hp.com/docs/DOC-15086
Analyze Traffic

HTTP/HTML

Android 4.1+ (rooted)

APK

Mobile Recorder

.lrpcap

App web server

HP LoadRunner VuGen11.52
Android Mobile Recorder

1. Start Recording

2. Perform user steps.

3. Stop and send email
Android Mobile Recorder Settings

Advanced Settings

Email Settings
- Send automatically after recording
- Delete files automatically after sending

Working Directory
Capture files are saved to this location
/storage/sdcard0/Android/data/com.hp.mobileRecorder/cache
Recording Methods Recap

**HTTP/HTML**
- **Record & Analyze Traffic**
  - `.cap, .pcap`
  - network sniffer
- **Analyze Traffic**
- **Record Emulator**
  - APK
  - device emulator
  - @device ADT file
- **Proxy Recording**
  - LoadRunner Proxy
  - User Agent in Firefox

**Mobile Recorder**
- Android 4.1+ (rooted)
  - APK
  - Mobile Recorder
- .lrpcap

**App web server**
- iOS IPA
- Play. Google .com

**Ad hoc network**
- iOS IPA
- Proxy
  - Port 8080
  - Port 80/443

**TruClient Ajax**
- HP LoadRunner VuGen11.52
How can we help?

- **Analytics**
  - Executive Scorecard
  - Performance Center

- **Development**
  - Agile Manager
  - App. Lifecycle Intelligence

- **Execute automated build**
  - (Jenkins)

- **Test results**
  - ALM Analysis

- **Tear down environment**
  - Continuous Delivery Automation (CDA)

- **Application Security Assessment**
  - WebInspect

- **Monitoring & Diagnostics**
  - Business Service Management
  - ALM Lab Management

- **Run test cases**
  - UFT / BPT
  - LoadRunner

- **Security Code Scan**
  - Fortify Source Code Analysis

- **Provision & deploy environment**
  - Continuous Delivery Automation (CDA)

- **Service Virtualization**
  - Network Virtualization

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Interconnected component services

Shopping process

Search  Buy  Pay  Ship  Track

Product  Customer profiles  Payment  Shipping  Track package

Composite  Managed cloud  Traditional  Public cloud  Private cloud

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Concurrency and rendezvous

- High Bandwidth / Low Latency (Impact of Local Users)
- Lower Bandwidth / Higher Latency (Impact of Relocated, Remote, or Mobile Users)

Illustrative data
Key take-aways

• For mobile **browser apps** (jQuery Mobile, Sencha, PhoneGap, etc.), little scripting is needed using User Agent spoofing via Firefox **TruClient Mobile**
  • JavaScript executes against a DOM for each virtual user
• Traffic captured between **native apps** and server are converted to VuGen scripts
  • **Android** native app traffic on **rooted** devices can be recorded **on device** using **LoadRunner Mobile Recorder**
  • iPhone and iPad (iOS) -- all non-rooted apps -- can be recorded using **LoadRunner Proxy**
• Monitor and Diagnose using HP Business Service Management
• Consider HP Network Virtualization and Services Virtualization
Thank you