移动互联时代的软件测试技术新动态

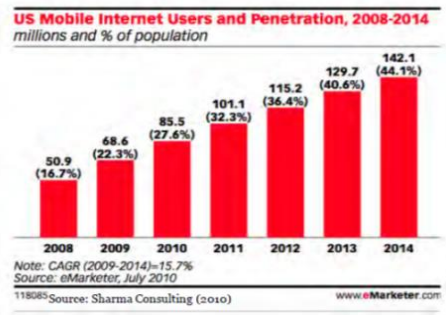
欧阳磊

资深技术顾问
惠普软件集团

目录

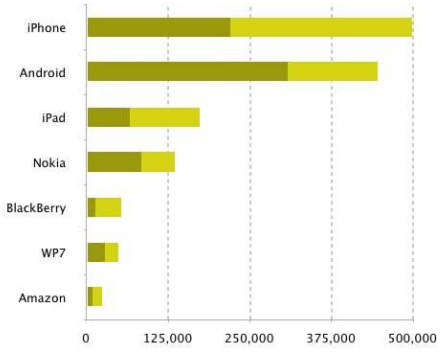
移动应用爆炸式增长

Mobile Web On the Rise



Android OS

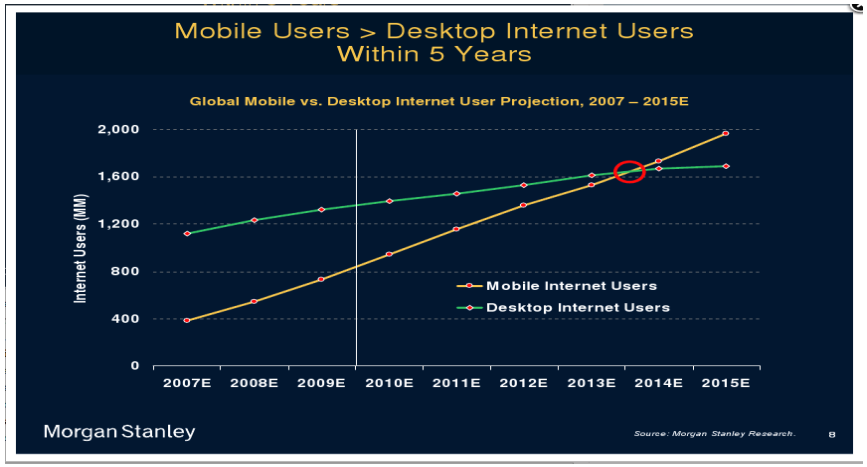
Apple OS



M·Dot Association http://mmaglobal.com/

Free
Paid-for

Sources: Sharma Consulting (2010)



US mobile web query growth in 2010-2011

4 X

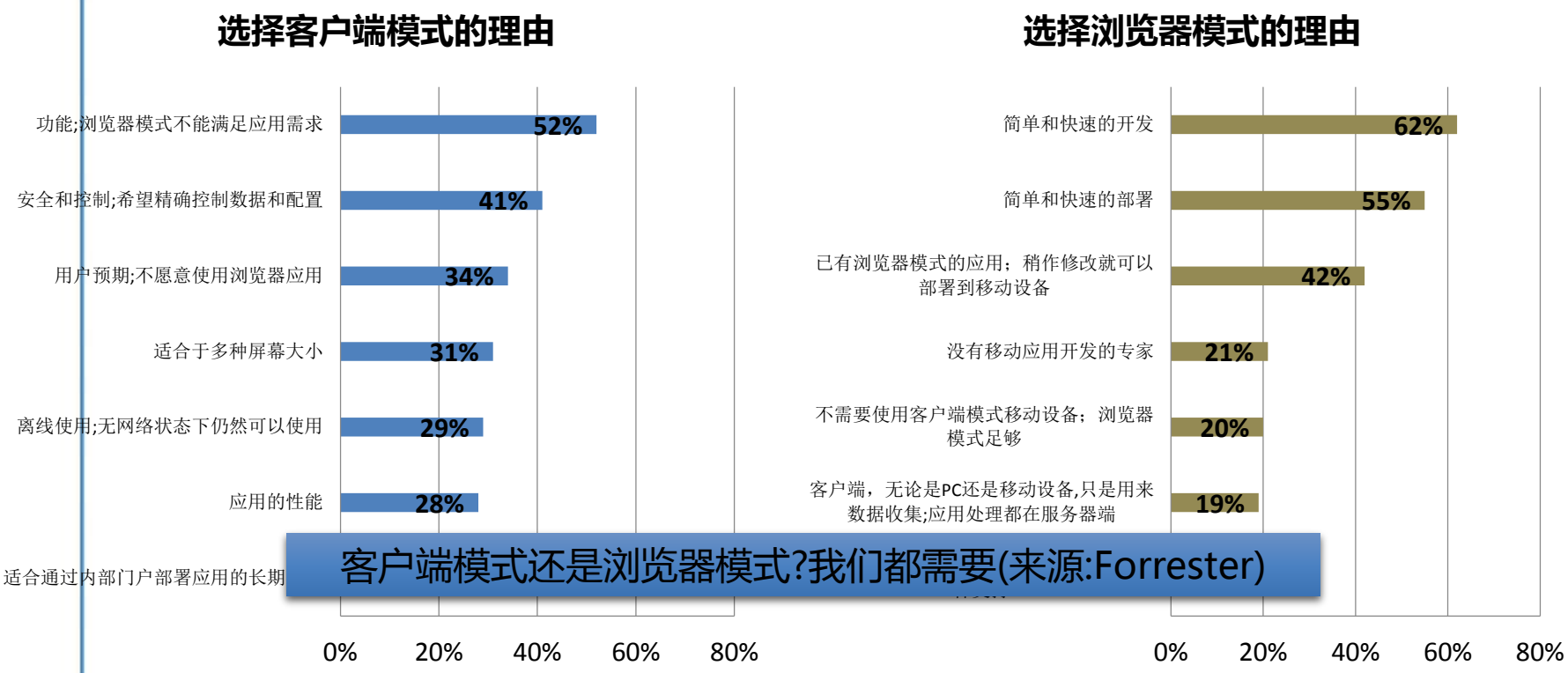
source: Google Mobile 2011

Mobile YouTube Playbacks

200 M per DAY!

source: Google Mobile 2011

移动应用的两种架构



客户端模式还是浏览器模式?我们都需要(来源:Forrester)

来源: 信息周刊2012 移动应用开发调查, July 2012 n=350

移动应用测试的挑战

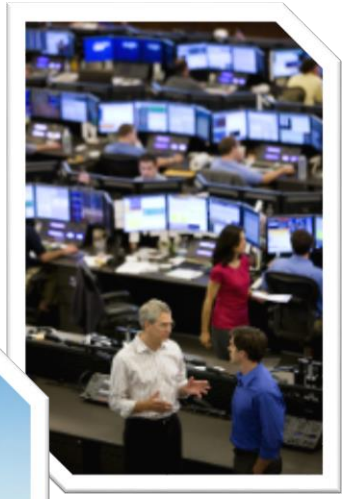
- 移动终端设备厂商众多
- 移动设备平台更新速度快
- 需要支持真实的设备测试
- 测试平台的运营管理(设备管理,复杂度,成本,风险)
- 同现有的质量管理体系的整合(工具,流程,策略,人员)

移动应用测试需要考虑的问题

真实设备	模拟	测试设备管理	应用生命周期集成
真实的智能手机	与设备无关	集中化	企业范围内可见性
真实的手持终端	灵活性和健壮性	共享	学习周期短
真实的移动网络			

惠普移动应用测试

- 移动应用自动化功能测试
- 移动应用自动化性能测试
- 移动应用自动化安全测试



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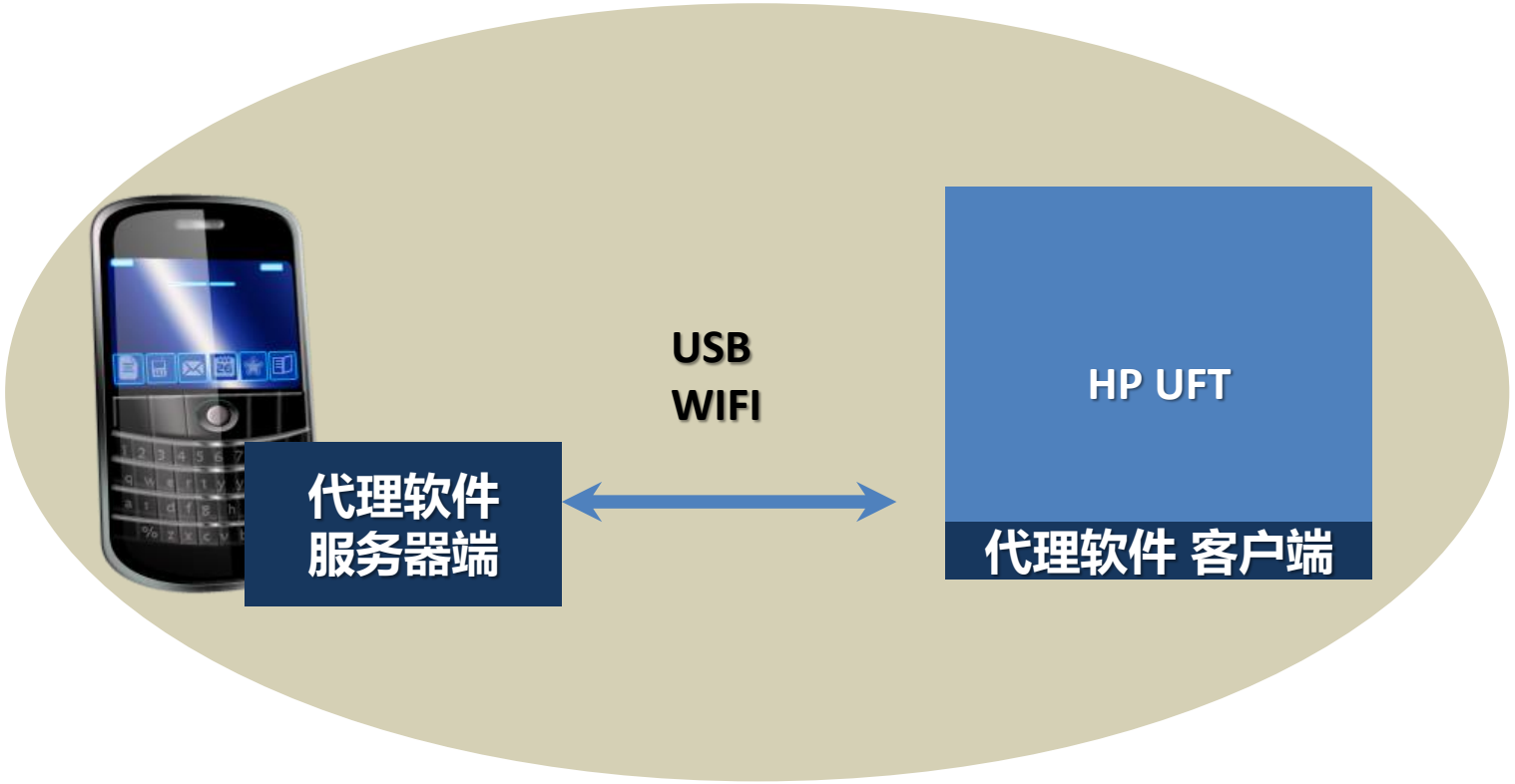
移动应用功能测试 – HP UFT

基于真实设备的测试

图形化界面

一个测试，多个平台

方案1 – 轻量级功能测试



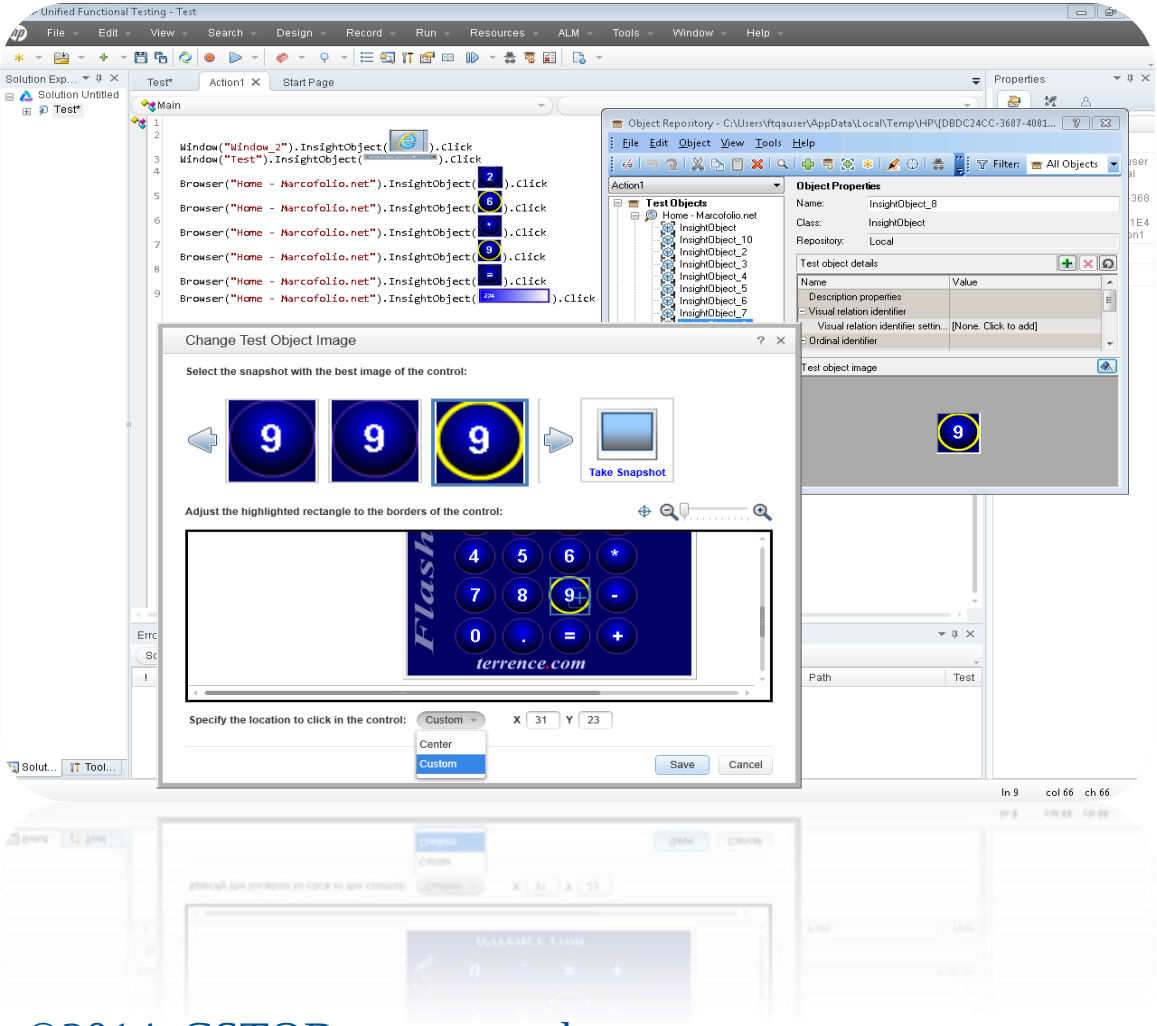
核心技术 – Insight Object

特点:

- 通过图像特征获得控制对象
- 用户可用录制和回放屏幕上的任何图像，而无需考虑应用是采用何种技术实现的

收益:

- 自动化测试的技术无关性
- 后台技术发生变化时无需更改脚本



方案2 – 重量级功能测试

HP UFT

Add-in

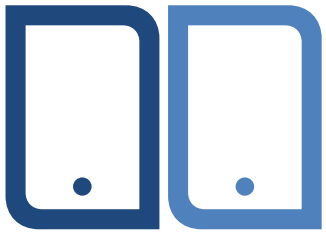
USB 连接测试

安全使用基于私有环境中的真实设备

- **测试人员可以从UFT中选择和快速使用各种移动设备.**

核心技术 - MCE

+



Your own devices

惠普移动应用功能测试特点

灵活性和可扩展性

- 基于真实设备
- 基于代理机制
- 基于私有环境

敏捷性和快速

- 自动化保证测试覆盖率
- 与设备无关的脚本。编写一次，可以在多种设备上使用
- 快速重新测试应用

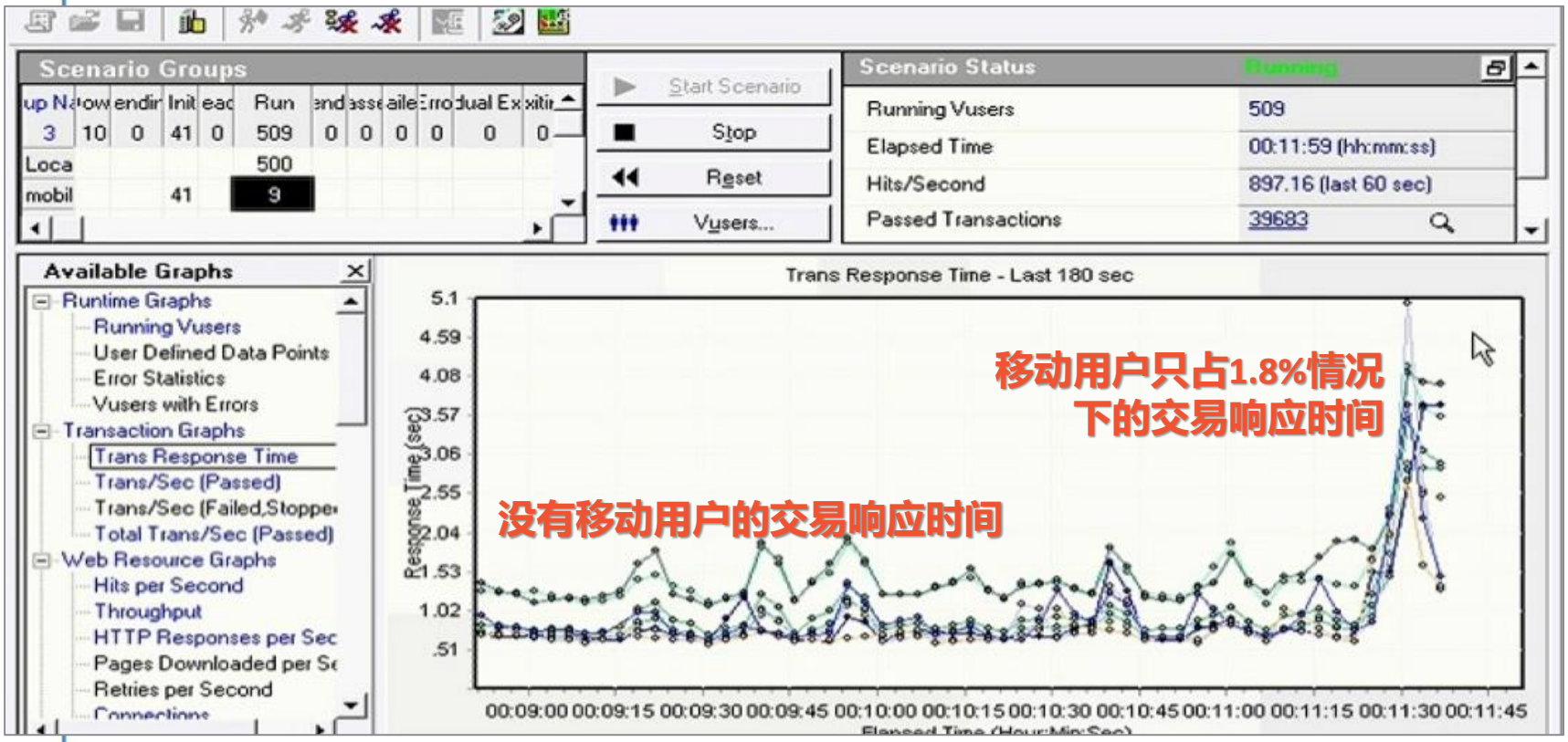
同HP ALM集成

- 需求
- 测试计划
- 缺陷管理

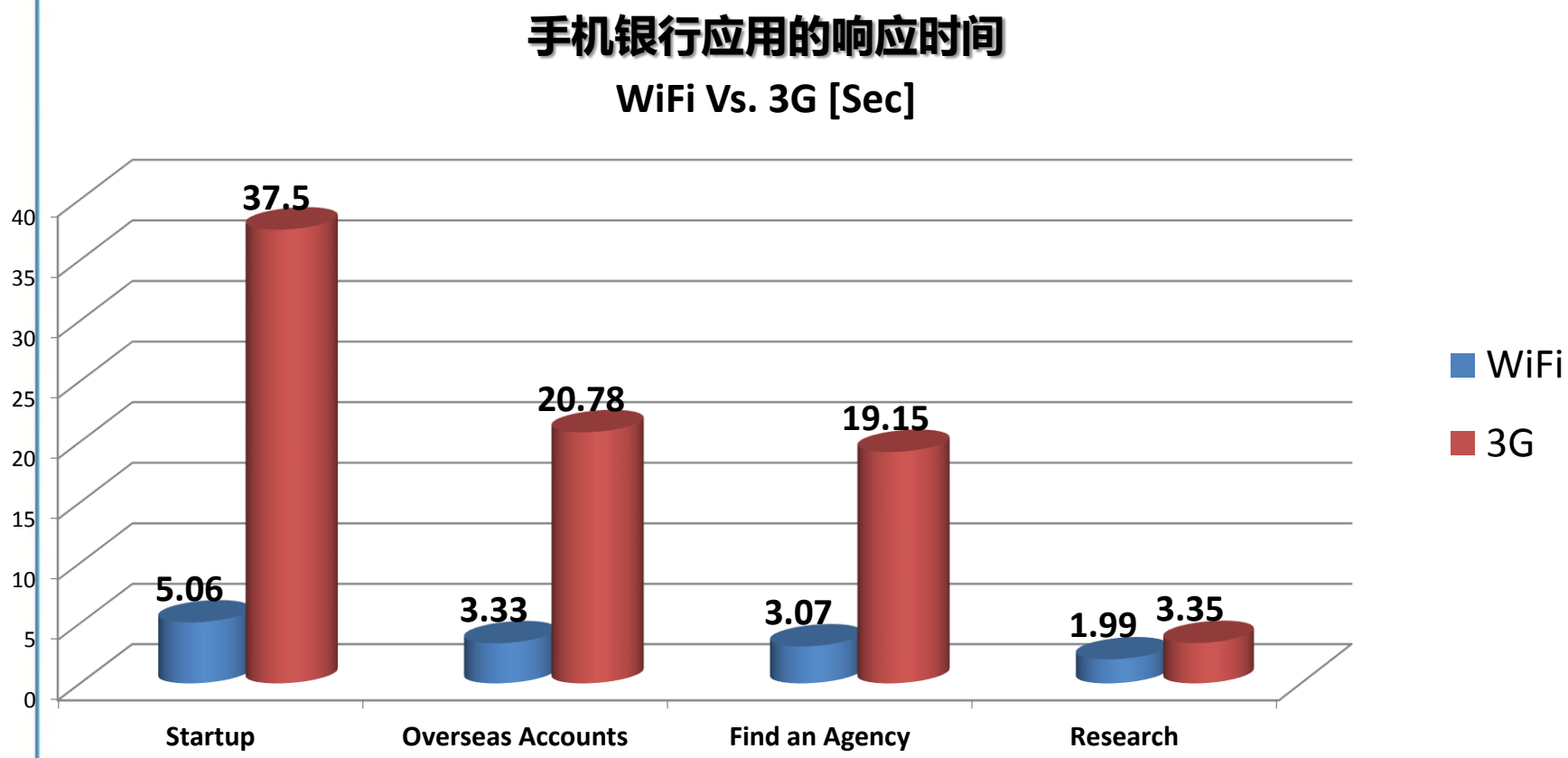
目录

- 为什么需要移动应用质量管理
- 惠普移动应用自动化功能测试
- 惠普移动应用自动化性能测试
- 惠普移动应用自动化安全测试
- 小结

移动用户对应用性能的影响

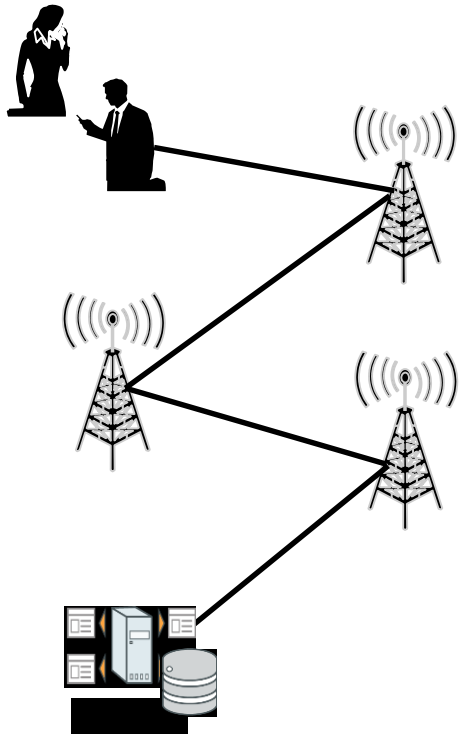


不同网络下应用性能的对比



移动应用性能测试考虑的问题

- 服务器能同时支持的用户数?
- 不同的网络状况(网络速度,延迟等)?
- 不同的网络设备?
- 端对端的性能?



HP LoadRunner - 两种协议

Web Applications

Mobile TruClient

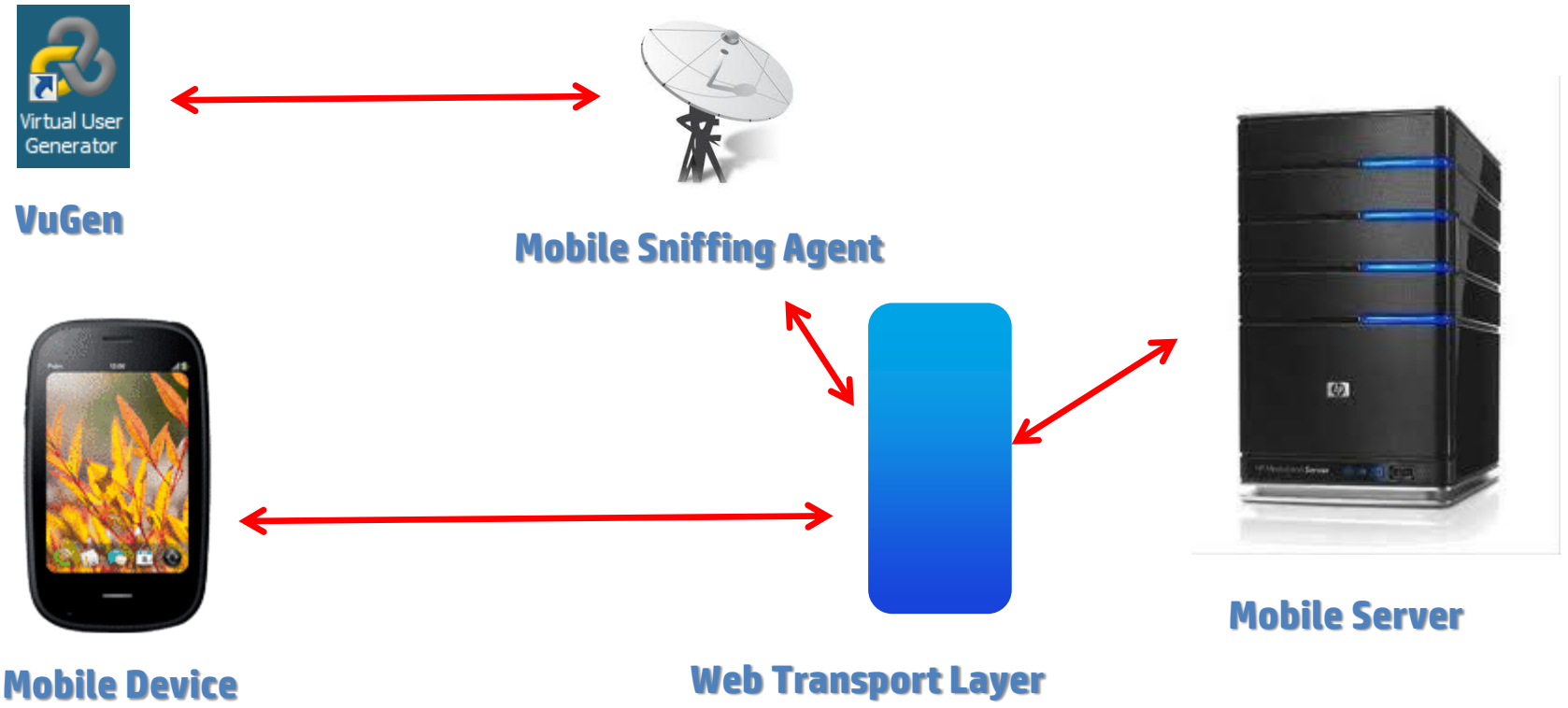
- 针对基于浏览器的应用
- 基于惠普TruClient 技术
- 基于浏览器录制
- 在业务交流流程层面捕获通讯包

Native Applications

Mobile Applications

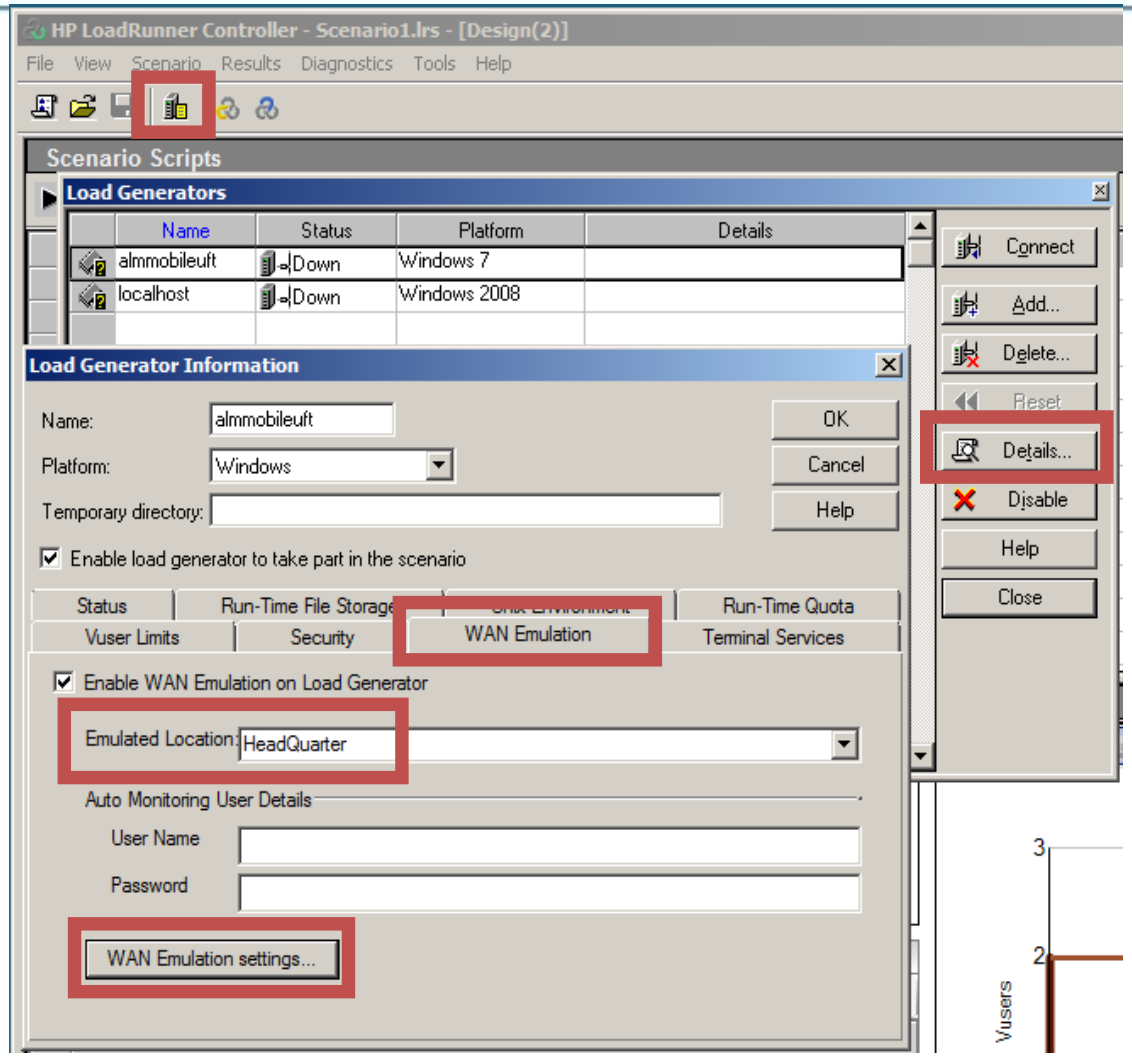
- 基于native 和浏览器的应用
- 基于Web (http/html) 脚本
- 基于模拟器和移动设备录制
- 分析网络通讯包

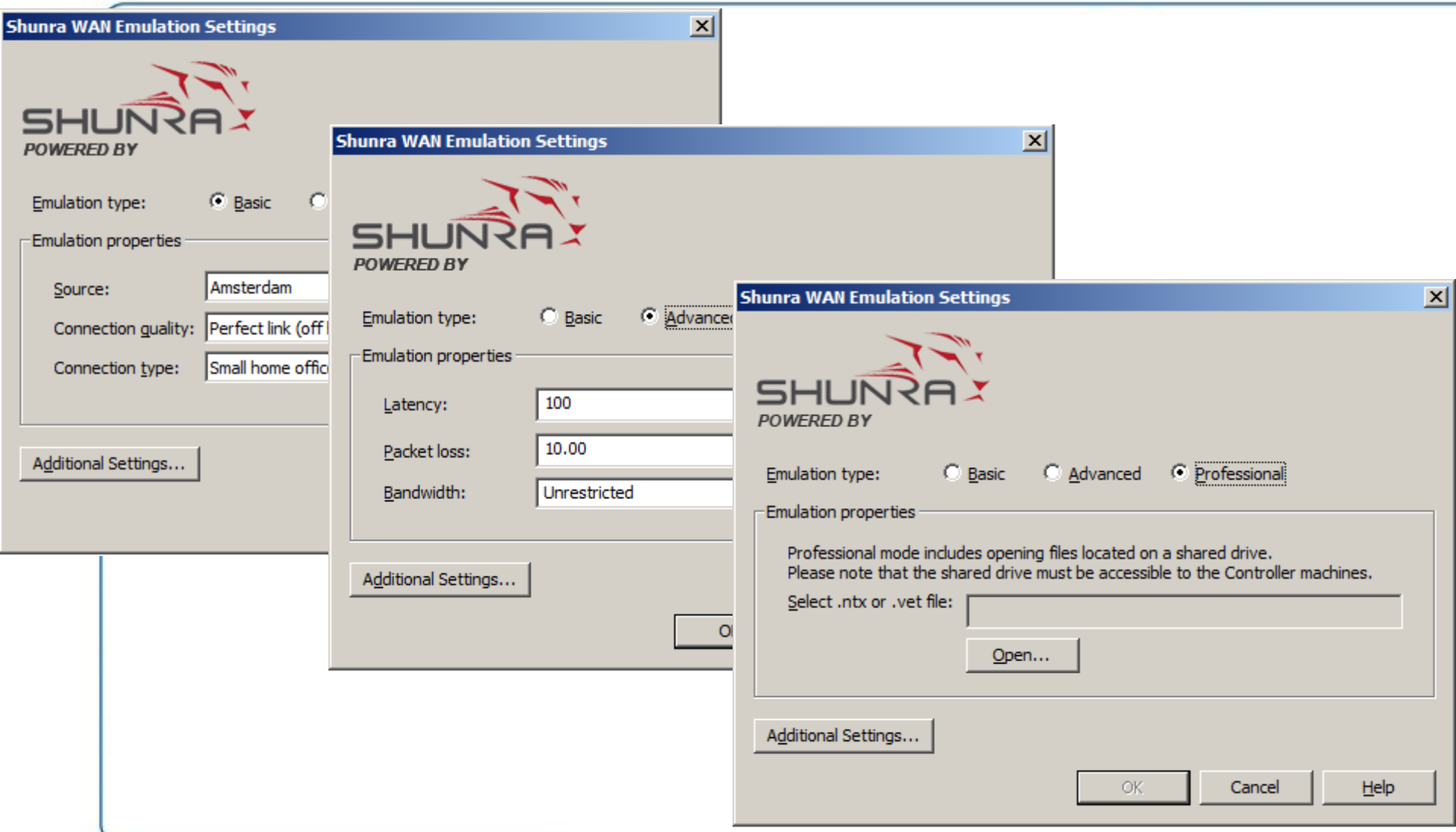
核心技术


Virtual User Generator
VuGen
Mobile Sniffing Agent
Mobile Server
Mobile Device
Web Transport Layer

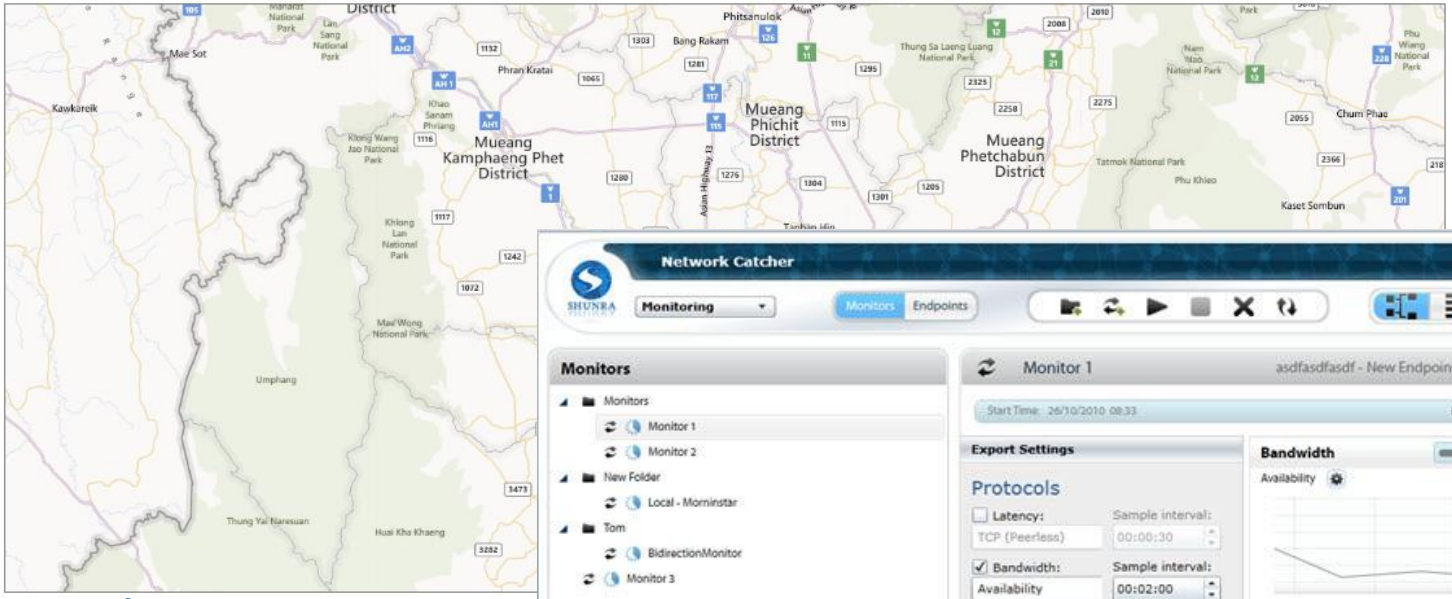
网络模拟

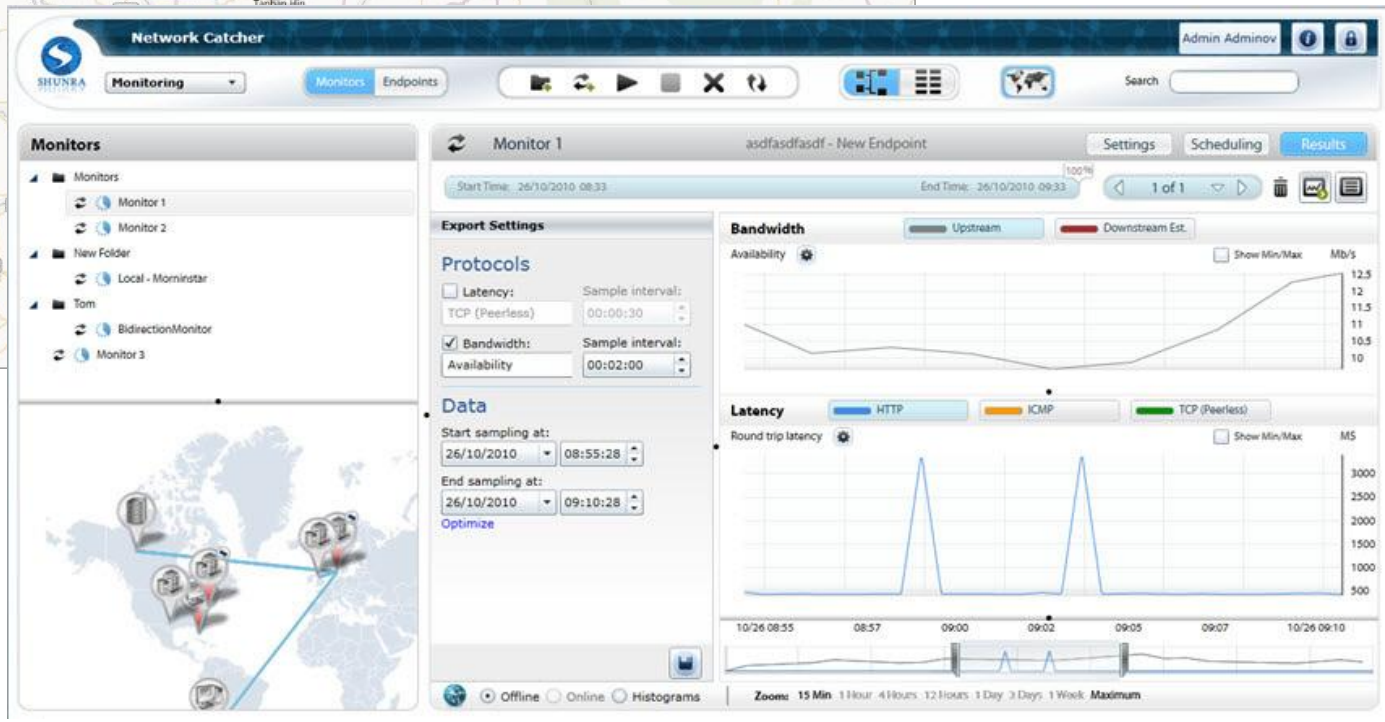
- 可以模拟各类网络状况:
  - 延迟
  - 丢包
  - 错包
  - 链路故障
  - 拥塞

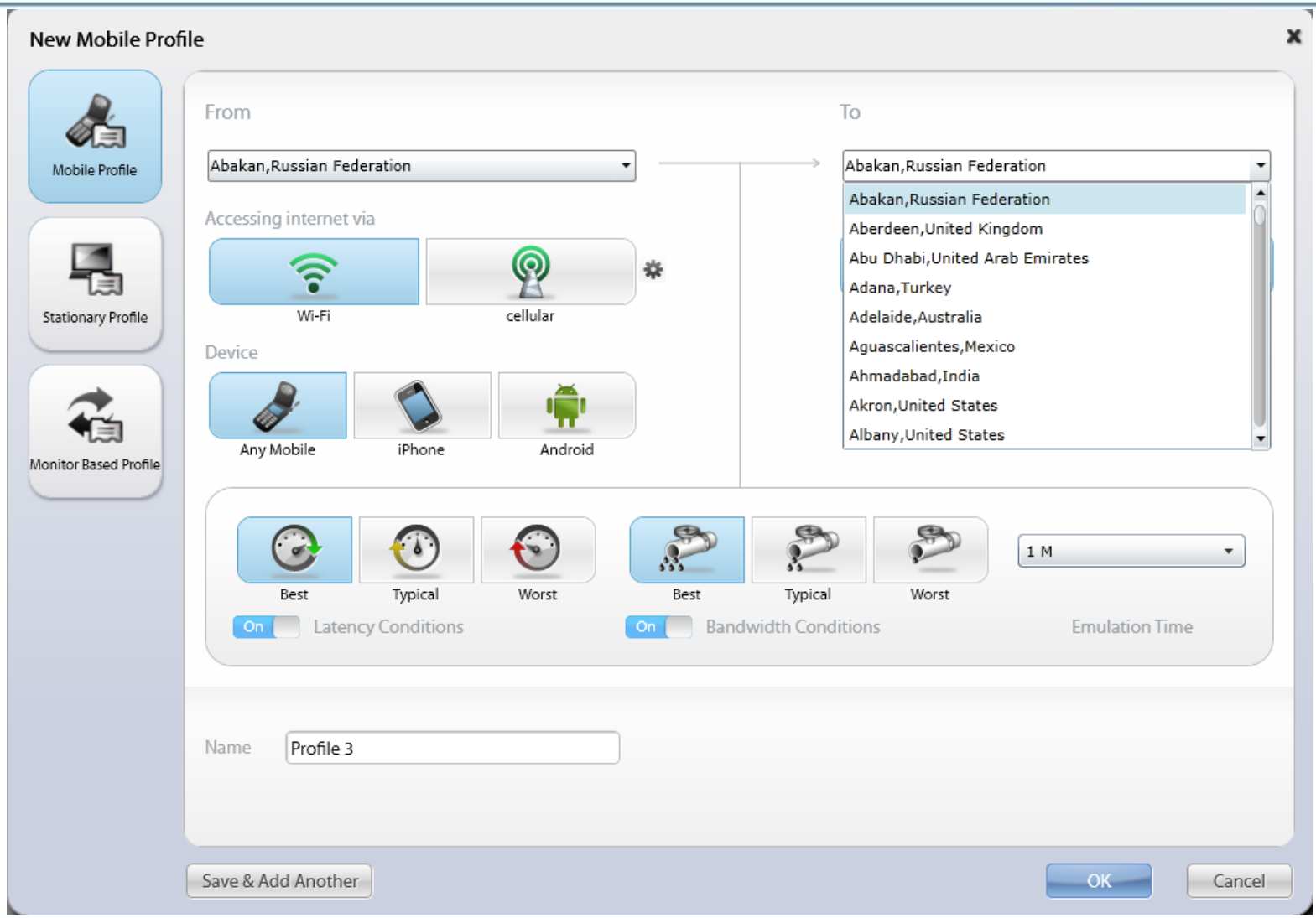

HP LoadRunner Controller - Scenario1.lrs - [Design(2)]
File View Scenario Results Diagnostics Tools Help
Scenario Scripts
Load Generators
Name Status Platform Details
almmobileuft Down Windows 7
localhost Down Windows 2008
Connect
Add...
Delete...
Reset
Details...
Disable
Help
Close
Load Generator Information
Name: almmobileuft
Platform: Windows
Temporary directory:
OK
Cancel
Help
Enable load generator to take part in the scenario
Status
Run-Time File Storage
Run-Time Quota
Vuser Limits
Security
WAN Emulation
Terminal Services
Enable WAN Emulation on Load Generator
Emulated Location: HeadQuarter
Auto Monitoring User Details
User Name
Password
WAN Emulation settings...
3
2
Vusers

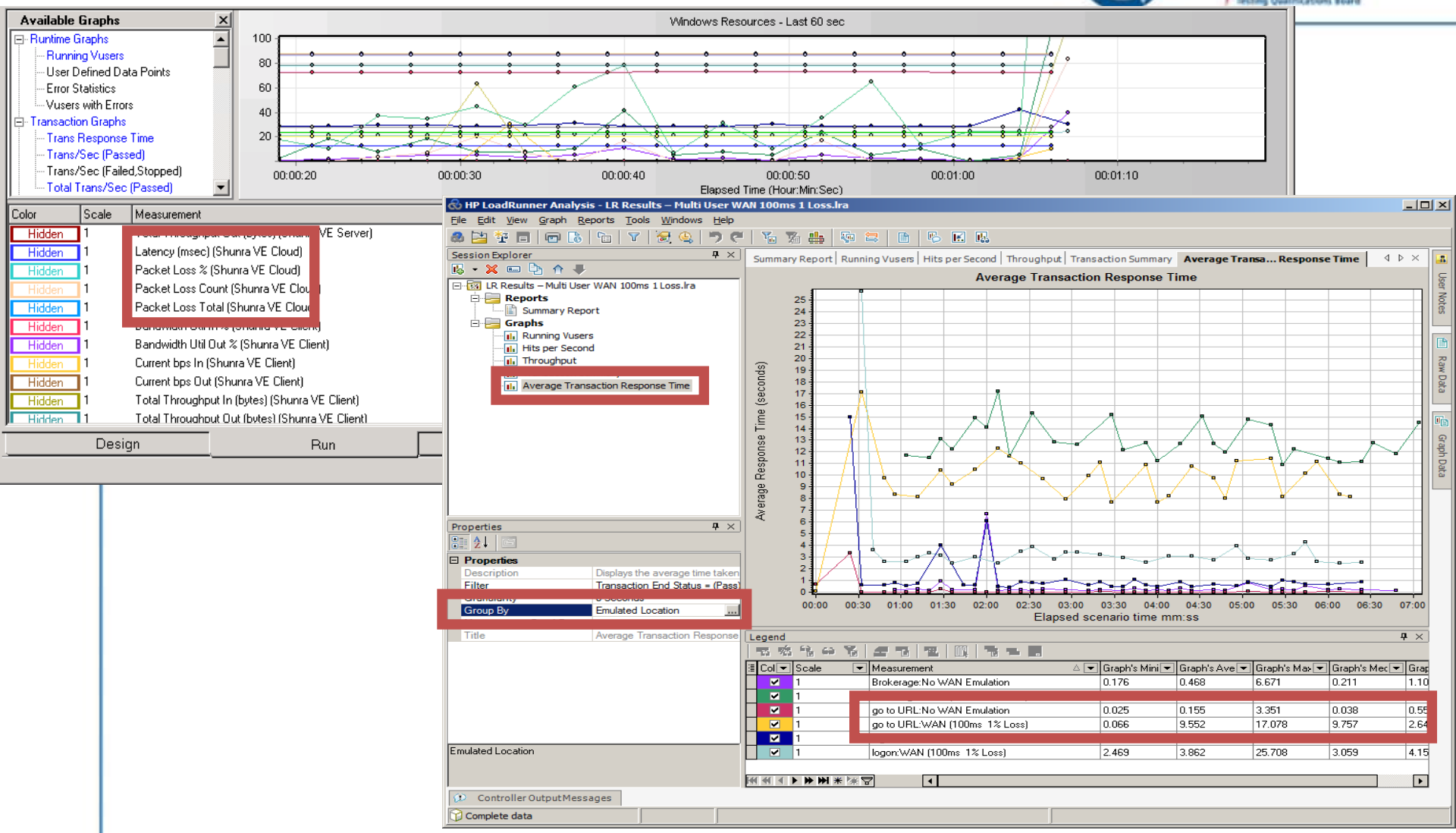

Shunra WAN Emulation Settings
SHUNRA
POWERED BY
Emulation type:
Basic
Emulation properties
Source:
Amsterdam
Connection quality:
Perfect link (off
Connection type:
Small home offic
Additional Settings...
Shunra WAN Emulation Settings
SHUNRA
POWERED BY
Emulation type:
Basic
Advanced
Emulation properties
Latency:
100
Packet loss:
10.00
Bandwidth:
Unrestricted
Additional Settings...
Shunra WAN Emulation Settings
SHUNRA
POWERED BY
Emulation type:
Basic
Advanced
Professional
Emulation properties
Professional mode includes opening files located on a shared drive.
Please note that the shared drive must be accessible to the Controller machines.
Select .ntx or .vet file:
Open...
Additional Settings...
OK
Cancel
Help

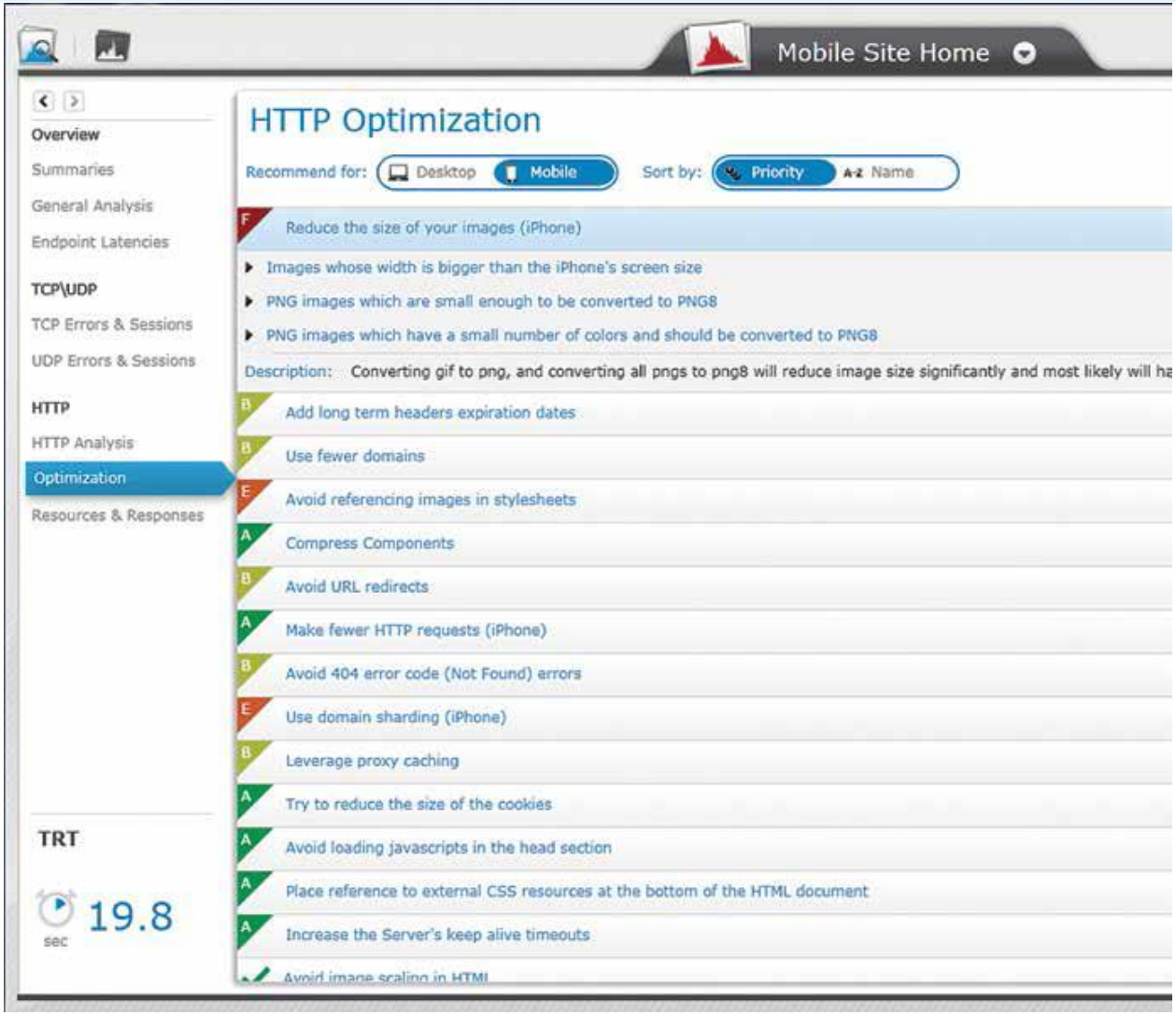
Location Pak Nam Pho Mueang Nakh Close Map





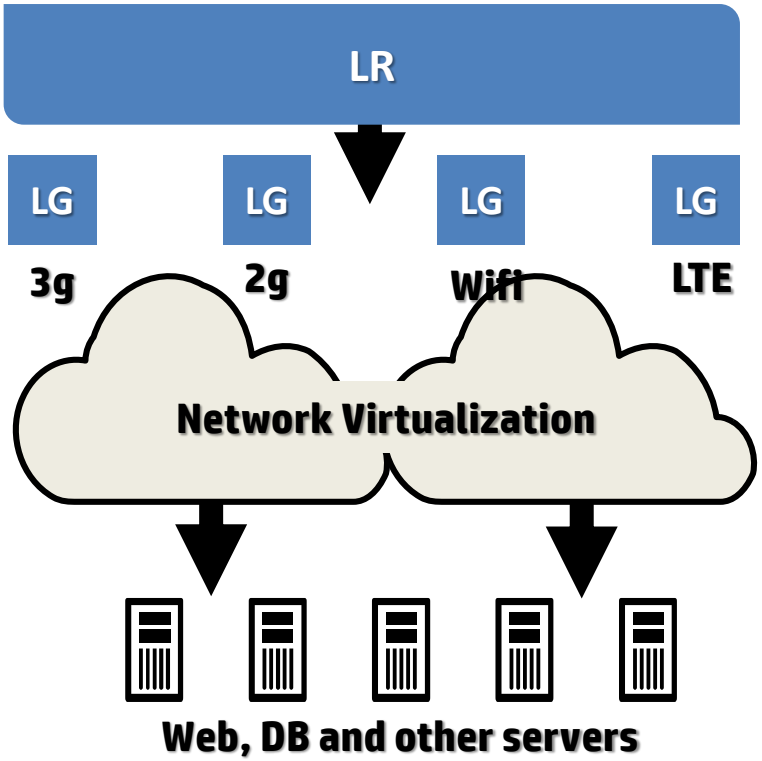

New Mobile Profile
Mobile Profile
Stationary Profile
Monitor Based Profile
From
Abakan,Russian Federation
To
Abakan,Russian Federation
Abakan,Russian Federation
Aberdeen,United Kingdom
Abu Dhabi,United Arab Emirates
Adana,Turkey
Adelaide,Australia
Aguascalientes,Mexico
Ahmadabad,India
Akron,United States
Albany,United States
Accessing internet via
Wi-Fi
cellular
Device
Any Mobile
iPhone
Android
Best
Typical
Worst
Best
Typical
Worst
1 M
On
Latency Conditions
On
Bandwidth Conditions
Emulation Time
Name
Profile 3
Save & Add Another
OK
Cancel


Available Graphs
Runtime Graphs
Running Vusers
User Defined Data Points
Error Statistics
Vusers with Errors
Transaction Graphs
Trans Response Time
Trans/Sec (Passed)
Trans/Sec (Failed,Stopped)
Total Trans/Sec (Passed)
Windows Resources - Last 60 sec
Elapsed Time (Hour:Min:Sec)
Color
Scale
Measurement
Hidden
Latency (msec) (Shunra VE Cloud)
Packet Loss % (Shunra VE Cloud)
Packet Loss Count (Shunra VE Clou
Packet Loss Total (Shunra VE Clou
Bandwidth Util Out % (Shunra VE Client)
Current bps In (Shunra VE Client)
Current bps Out (Shunra VE Client)
Total Throughput In (bytes) (Shunra VE Client)
Design
Run
HP LoadRunner Analysis - LR Results – Multi User WAN 100ms 1 Loss.lra
File Edit View Graph Reports Tools Windows Help
Session Explorer
LR Results – Multi User WAN 100ms 1 Loss.lra
Reports
Summary Report
Graphs
Running Vusers
Hits per Second
Throughput
Average Transaction Response Time
Summary Report
Running Vusers
Hits per Second
Throughput
Transaction Summary
Average Transa... Response Time
Average Transaction Response Time
Average Response Time (seconds)
Elapsed scenario time mm:ss
Properties
Description
Displays the average time taken
Filter
Transaction End Status = (Pass)
Group By
Emulated Location
Title
Average Transaction Response
Legend
Col
Scale
Measurement
Graph's Mini
Graph's Ave
Graph's Max
Graph's Mec
Brokerage:No WAN Emulation
go to URL:No WAN Emulation
go to URL:WAN (100ms 1% Loss)
logon:WAN (100ms 1% Loss)
Controller Output Messages
Complete data


Mobile Site Home
Overview
Summaries
General Analysis
Endpoint Latencies
TCP\UDP
TCP Errors & Sessions
UDP Errors & Sessions
HTTP
HTTP Analysis
Optimization
Resources & Responses
TRT
19.8
sec
HTTP Optimization
Recommend for: Desktop Mobile
Sort by: Priority A-Z Name
F Reduce the size of your images (iPhone)
Images whose width is bigger than the iPhone's screen size
PNG images which are small enough to be converted to PNG8
PNG images which have a small number of colors and should be converted to PNG8
Description: Converting gif to png, and converting all pngs to png8 will reduce image size significantly and most likely will ha
B Add long term headers expiration dates
B Use fewer domains
E Avoid referencing images in stylesheets
A Compress Components
B Avoid URL redirects
A Make fewer HTTP requests (iPhone)
B Avoid 404 error code (Not Found) errors
E Use domain sharding (iPhone)
B Leverage proxy caching
A Try to reduce the size of the cookies
A Avoid loading javascripts in the head section
A Place reference to external CSS resources at the bottom of the HTML document
A Increase the Server's keep alive timeouts
Avoid image scaling in HTML

惠普移动应用性能测试+网络模拟

- 压力测试，监控和分析
- 模拟真实网络状况
- 动态变化的网络，创建真实有效的移动性能测试结果



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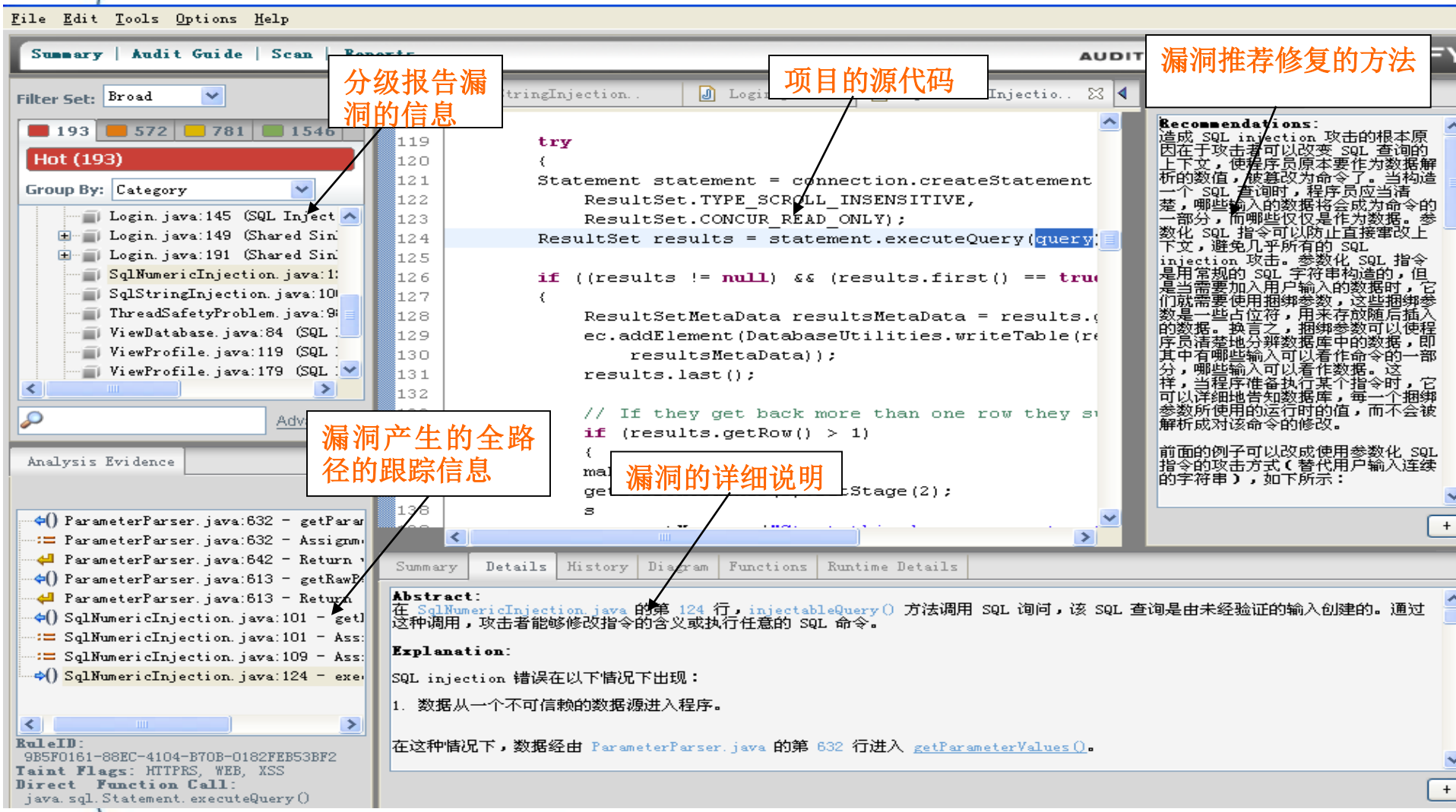
HP Fortify SCA



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- 小结

惠普期待与您双赢!

惠普移动测试解决方案

- 战略角度高端
- 覆盖范围广泛
- 涉及功能领先

•新挑战，我们准备好了！

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中国测试平台网：www.chinatesting.cn

惠普软件官方网站: www.hp.com.cn/software

支持电话：4006706101

电子邮箱：info.hpsoftware.cn@hp.com

Thank you

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