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Telefinica



Telefonica Vivo Play POC Report

Proof of Concept - The Where, When and Why?

- To measure KPIs, the QoE matrix and functionality of the Vivo Play app in two cities in Brazil
- Testing period: June 15, 2018 to June 26, 2018
- Current user reviews of Vivo Play are unfavorable, at best



Reviews and opinions



0 ratings

Does not work ★☆☆☆☆ August 22, 2017 Deninho1984

Even though I have My Live signup, he does not recognize it. Too bad!

POC Test Environment

- Location Sao Paulo, Brazil and Rio de Janeiro, Brazil
- App under test Vivo Play
 - Android <u>https://play.google.com/store/apps/details?id=com.tid.enjoy&hl=pt-br</u>
 - iOS <u>https://itunes.apple.com/br/app/vivo-play/id589412933?mt=8</u>
- Tests run continuously 24x7, every 5 minutes on one iOS and one Android device
- Android device
 - Motorola E2, Android OS 5.0.2 with Vivo SIM
- iOS Device
 - iPhone 7, iOS 11.2.1 with Vivo SIM

Vivo Play App KPIs and Metrics

• Play Time

• Time taken to play video content after Play Video is clicked

• Pause Play Time

• Time taken to play video content after Pause is clicked and Play Video is clicked

• Switch Play Time

• Time taken to play video content after Network is switched from 3G to 2G

• Advance Play Time

• Time taken to play video after progression bar is swiped and video content starts

Buffer Count

• Spinner count during video playback

Video Quality of Experience Metrics

- Using PEVQ Standard Perceptual Evaluation of Video Quality
- MOS Score and DMOS Score
- Frame Freeze %
 - Temporal artefacts occurring in video transmissions caused by e.g. overloaded networks
- Jerkiness
 - The perception of individual still images in a motion picture
- Blur
 - A distortion characterized by reduced sharpness of contour edges and spatial detail
- Blockiness
 - Caused by low bit rate coding for motion estimation of the matching of image blocks
- PSNR Y, Cb and Cr
 - A coarse analysis of distortions in different domains

Audio Quality of Experience Metrics

- Using POLQA standard Perceptual Objective Listening Quality Analysis
- MOS-LQ0
- R-Factor
- Level Reference (dBov)
- Level Degraded (dBov)
- Active Speech Level Reference (dBov)
- Active Speech Level Degraded (dBov)
- SNR Reference (dB)
- SNR Degraded (dB)

Results

• Raw KPI data stored in MySql database (AWS)

CREATE TABLE `vivoplay_app_kpi_metrics` (`iteration_number` bigint(20) unsigned NOT NULL AUTO_INCREMENT, `play_time` bigint(20) DEFAULT NULL, `pause_play_time` bigint(20) DEFAULT NULL, `buffer count` bigint(20) DEFAULT NULL, `switch_play_time` bigint(20) DEFAULT NULL, `advance play time` bigint(20) DEFAULT NULL, `location` varchar(50) DEFAULT NULL, `udid` varchar(50) DEFAULT NULL, `network_type` varchar(50) DEFAULT NULL, `timestamp` timestamp NOT NULL DEFAULT CURRENT TIMESTAMP, `device os version` varchar(50) DEFAULT NULL, `device model` varchar(50) DEFAULT NULL, `status of run` varchar(20) DEFAULT NULL, `city` varchar(50) DEFAULT NULL, `os type` varchar(50) DEFAULT 'Android', `reference_key` bigint(20) DEFAULT NULL, `session id` varchar(200) DEFAULT NULL, PRIMARY KEY (`iteration number`)) ENGINE=InnoDB AUTO INCREMENT=1129 DEFAULT CHARSET=latin1

Results

- KPI Monitoring Dashboard
 - <u>https://datastudio.google.com/u/0/reporting/1nwl6LuuO4aSdV2ozEqxy1kggMpl6-ruj/page/</u> <u>E2tT</u>
- Performance Test Session for Mobile app
 - https://ui-dev.headspin.io/sessions/be3bf0e0-762e-11e8-911c-02d35219cb5a/waterfall
- Performance Test Session for the Mobile website
 - <u>https://ui-dev.headspin.io/sessions/0963f82a-762e-11e8-911c-02d35219cb5a/waterfall</u>
- Video and Audio Quality of Experience Metrics
 - <u>https://docs.google.com/spreadsheets/d/1Y3nf3pAKb6B0BAsImH-CWbESQMmHT_dqqVND</u> <u>I3IOwCg/edit?usp=sharing</u>

Key Findings

- Failure rate of 12.2% classified as follows
 - Switch Play Time Failure 6.1%
 - Advanced Play Time Failure 4.8%
 - App Launch Failure 0.1%





App Launch time ~ 10 seconds!

Slow API Server, > 50% of the time spent in creating new TCP+TLS connections

Performance Issues



- Once the concurrent connection limit is hit, the network library will close the older connections.
- The maximum limit for the concurrent connections is 5.
- Currently, the client sets no limit, i.e. unbounded
- We recommend setting the concurrency limit to 5, this will help with two aspects
 - Connection reuse
 - Eliminate duplicate downloads

The "spotlight.cdn.telefonica.com" server has hit the concurrent connection limit.

Examples of App Failures Fatal Errors and Freezes

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Examples of Video Quality Issues

Blur, Blockiness and Frame freeze







*The data is typically available in RAW format (SQL), API and Tableau dashboards.

Next Steps

- Run Telefonica app tests across multiple devices, networks and locations.
 - Example Peru and Colombia
- Compare performance of the Telefonica app with Facebook Video and YouTube.
- Continuously and proactively monitor QoE metrics and KPIs from multiple locations
- Trigger alerts and notifications
- Test and measure on high coverage devices to ensure quality and performance in all markets.



Thank you

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