

Report regarding problem with KA-Lite on RACHEL Plus bogging down when multiple students access exercises simultaneously

Leon Amstutz, Ambassador Enterprises. November 11, 2015

PERFORMANCE TESTING OF RACHEL Plus with KA-Lite

We are continuing to get reports from Liberia that the original labs equipped with RACHEL PI-2 servers are bogging down when more than 6 students attempt KA-Lite quiz exercises. However, we've seen over 20 devices connect and actively use other RACHEL content, and even view KA-Lite videos. It seems the KA-Lite exercises are what cause the slow down.

In preparation for our next trip in January, we procured one of the new **RACHEL Plus** servers based on the Intel Content Access Platform. We did preliminary testing by our IEI staff and found it appears to be much more responsive and faster loading videos and other KA-Lite material. But since we only had a limited number of devices (and hands), we arranged for a larger scale test to simulate what we might find in Liberia in a lab with potentially 30-40 student devices connected concurrently (the specs say the RACHEL Plus supports 'up to 50' connections).

Test Procedure:

1. New RACHEL Plus server, configured as received from World Possible except for change of IP address to 10.10.10.1.
2. After a company-wide meeting on November 2, 2015, we solicited over 45 Ambassador employees with various wireless devices to participate in a test by connecting to the RACHEL Plus that was running in the meeting room. (Of these, I was able to verify that 45 connected successfully according to the administrative dashboard on the RACHEL+19.) The breakdown of devices was as follows:
29 Android smartphones
10 iPhones
6 other devices (Linux laptop, Amazon Kindle tablets, Windows laptop)
3. Those that successfully connected opened browsers and pointed to 10.10.10.1 (AP's address) and as far as we know, all but 1 were able to view the RACHEL home page with index.
4. Next we asked them to click on "Khan Academy by KA-Lite", and the directed them to click on LEARN - Math -Arithmetic - Addition and Subtraction -Intro to addition and subtraction, and finally on the exercise "Addition within 5".

Results: *(these numbers for various cases are based on "show of hands" and personal contacts by our staff. Refer to screen shots of some problem devices.)*

1. At least 1 person connected to the RACHEL+19 server but her browser never loaded the 10.10.10.1 main index page from RACHEL
2. At least 2 people were stuck on the KA-Lite first menu [10.10.10.1:8008] after clicking on it from RACHEL menu. One person on iPhone reported that he was "hung" using Chrome browser, but when he switched to Safari, he was able to get all the way to the quiz exercise but then it stuck.

3. More than 10 were able to click on LEARN and MATH, but then were stuck “loading . . .” and never got to select sub-categories of KA-Lite.
4. More than 10 were able to get through the math menus and clicked on the quiz exercise, but then were stuck “loading . . .” indefinitely.
5. At least 9 people (apparently the “early birds” who connected faster) successfully accessed and completed the math exercise. However, as other people logged in, they reported it took increasingly long time to move from one question to the next.
6. We were not able to collect data for the remainder of the test participants, but anecdotal evidence suggests most were not able to get past KA-Lite main menu. However, after the test, a few of them tried again and were able to get into the exercises when only 6 users were active.

Please refer to the screenshots for these cases at the end of this document.

OBSERVATIONS and ANALYSIS:

- It seems that the RACHEL Plus server performs adequately for the RACHEL content (Wikipedia, Textbooks, etc. for a large number of connections, probably close to 50).
- KA-Lite server seems to work for a more limited number of devices. If no one is accessing quizzes, even videos seem to stream satisfactorily to a fairly large number of users.
- KA-Lite quiz exercises appear to over-tax the capabilities of the RACHEL Plus, just as we experienced with the older RACHEL P12 models, although with a few more concurrent connections.

I am just theorizing now, but it seems to me that the KA-Lite issue is not a hardware or network problem since basic RACHEL features seem to work acceptably, so I wonder if it could be something in the KA-Lite Django web service that is not configured optimally for KA-Lite exercises? Is there something that can be done to “tweak” the KA-Lite server settings?

The success of our pilot study in 8 Liberian schools this year (5 already installed, and 3 more school labs scheduled to be set up on our January trip) will be crucial in demonstrating the concept that KA-Lite is able to help these Liberian students who are scoring several grade levels behind in math abilities make significant improvement, and enabling our program to continue. But unless we are able to find a solution so that a whole class of students using at least 20 devices can access the KA-Lite exercises simultaneously, we are afraid the teachers and students will become so frustrated that they will give up using RACHEL and KA-Lite.

Does anyone have anecdotal evidence from other similar uses in third-world country schools where there is no Internet available to see if anyone else is using KA-Lite quiz exercises in this manner?

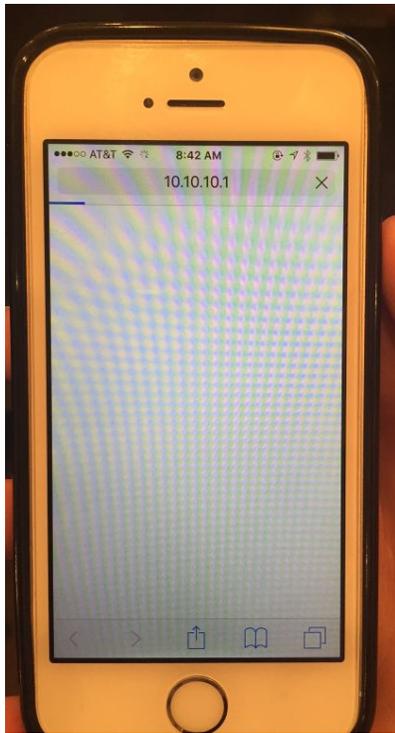
Can the broader community of RACHEL and KA-Lite experts reproduce our results and determine just where the bottleneck lies?

We are hopeful that together we can find a solution (hopefully just a simple tweak of some setting 😊) so that we can successfully deploy these marvelous devices and curriculum in Liberia and other nations.

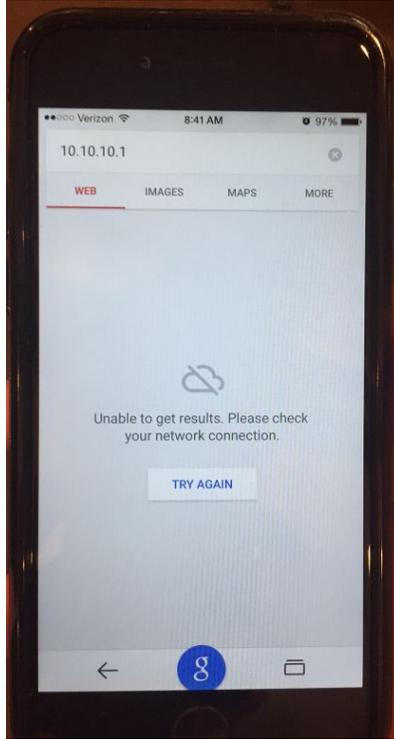
Thank you in advance for considering this issue.

Leon Amstutz,
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Ambassador Enterprises.

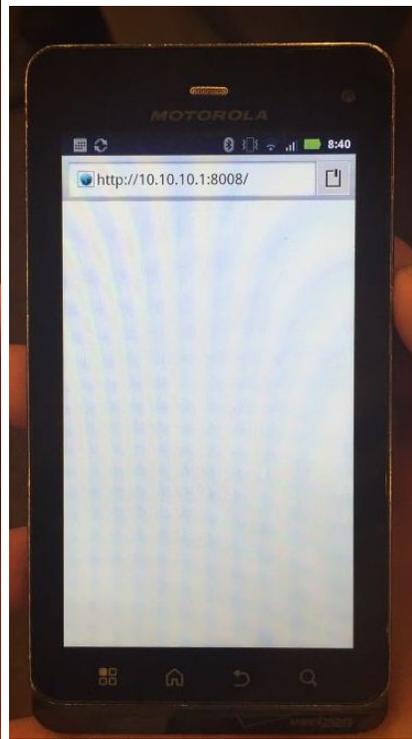
leon.amstutz@ambassador-enterprises.com



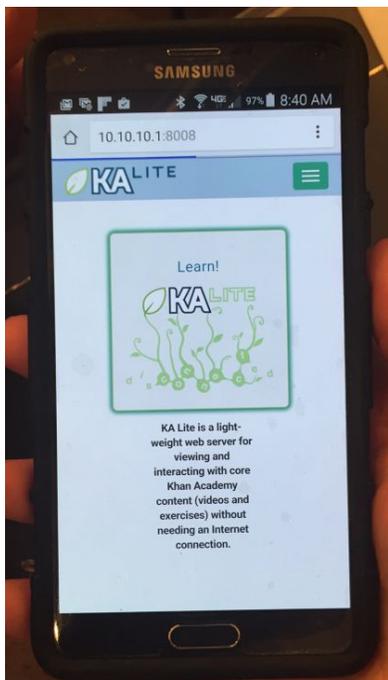
Case #1 connecting Lite



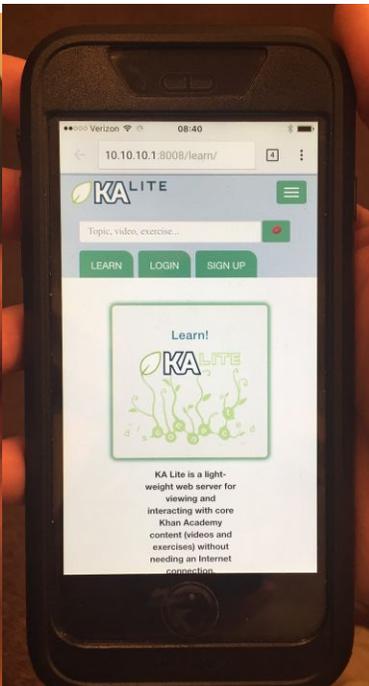
Case #1 connecting



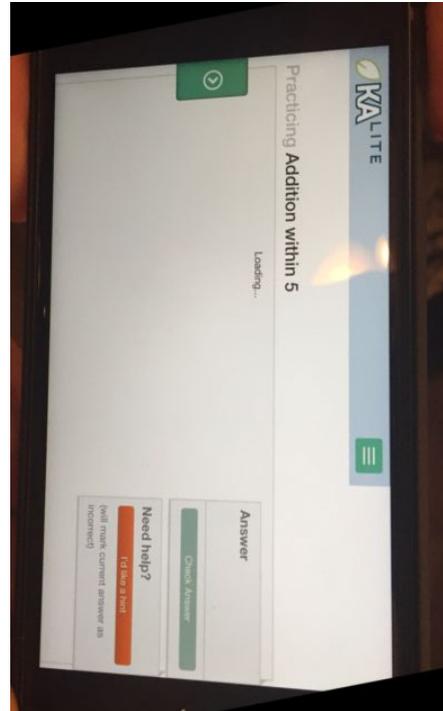
Case #2 selected KA-



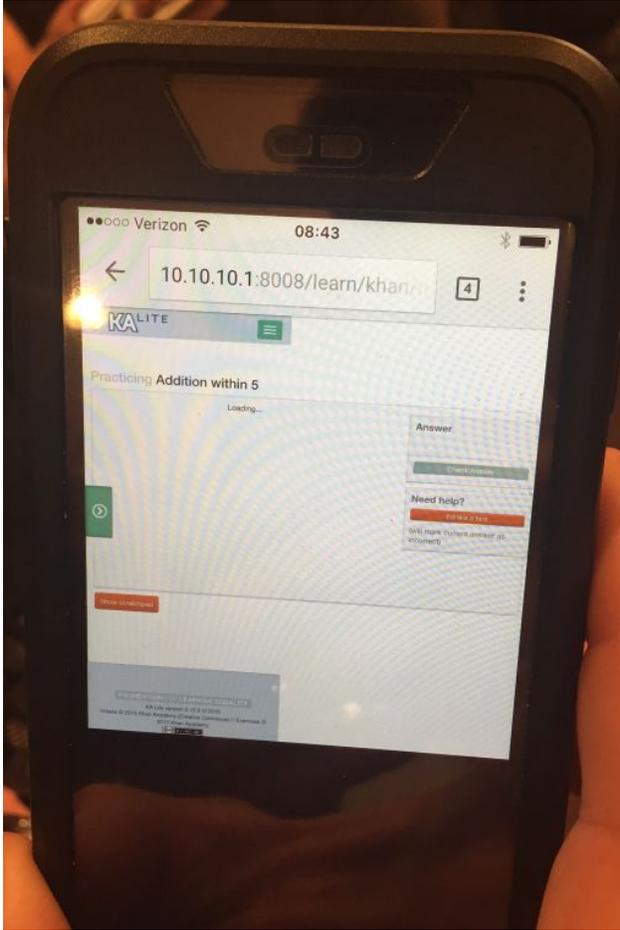
Case #3 KA-Lite menu



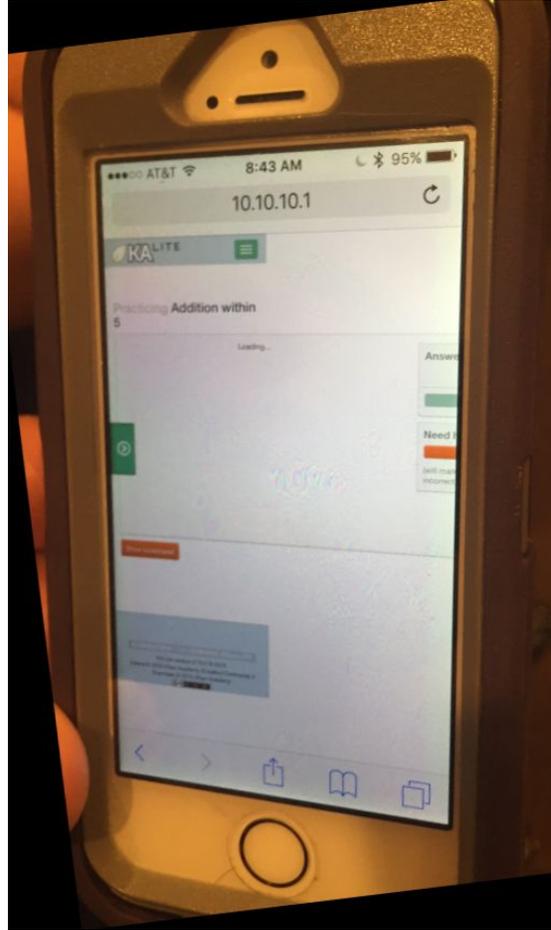
Case #3 menu-Learn



Case #4 loading exercise



Case #4 loading exercise



Case #4 loading exercise