



LOCAL CACHING
SERVER (LCS)

LCS Guide

September 2017



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Chapter 1: Welcome to LCS

The Kansas Interactive Testing Engine (KITE®) is used to deliver standardized tests via testing machines like desktop, laptop, and tablet computers. A Local Caching Server (LCS) can be installed to facilitate transmission of test questions and student responses between your local network and the main KITE servers (at AAI).

Note: The LCS is not compatible with DLM® alternate assessment. If your site is participating in DLM assessments, please do not use an LCS.

This manual is designed for the technical contact within a school system who either manages or maintains the local network and who will be installing and monitoring the LCS. For more information about the KITE system, refer to the other manuals.

- KITE Client Software Installation Guides – each guide provides instructions on installing KITE Client software on a particular type of machine or operating system.
- Educator’s Guide to KITE Client Software – an overview of the KITE Client software, including how to navigate through a test and descriptions of tools available during testing.
- Educator Portal User Manual – an explanation of the features available in Educator Portal for setting up tests, administering tests, and reporting on test results.

Introduction to Local Caching Servers

A Local Caching Server (LCS) is a specially configured machine that resides on your local network and communicates between the testing machines at your location and the main testing servers at AAI. During testing, each test machine submits and requests data as the student proceeds through the test. Depending upon the number of students testing at one time, the traffic on your local network, and the speed and quality of your Internet connection, the amount of data being sent or requested at any one time can be large.

An LCS helps reduce these potential network issues during live testing. The LCS does this by caching content during the request phase and collecting responses for streaming to the central testing system as bandwidth allows. The LCS can be deployed in a classroom or in a lab, and the LCS can be installed on a regular desktop-class device or on server-class equipment at a district level to be used by multiple buildings.

Note: While in use, the LCS will contain tests and student responses. Physical and remote access to the LCS should be managed in the same fashion as any other repositories of personally identifiable information (PII) in compliance with FERPA and all relevant state and federal laws.

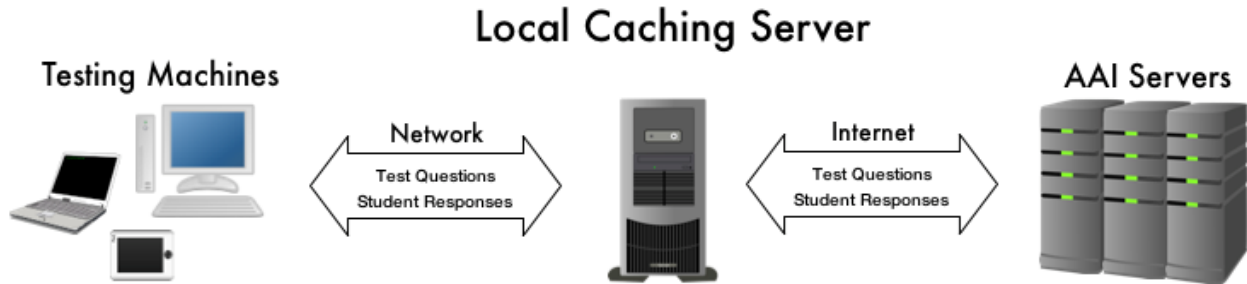
While operating, the LCS stores testing data in an internal database; therefore, if the upstream network connection becomes unreliable (or variable) during testing, then students can still continue testing and their responses will be transmitted to the KITE servers as bandwidth allows.

Note: Once a student starts a test using an LCS they must complete the test on the same LCS. Changing servers during the test may cause errors during testing.

Depending on the needs of your location, an LCS can be used in either semi-offline or fully offline mode.

Semi-Offline Mode

Semi-offline mode is the default setting for LCS. In semi-offline mode, the LCS submits and receives data to and from the AAI servers while the students are taking tests. If the Internet connection becomes unreliable (or too slow to transmit all of the data), the LCS will cache (temporarily store) test questions and student responses and send them when bandwidth becomes available. Semi-offline mode works best if your location has a fairly robust Internet connection with only occasional fluctuation in bandwidth.



Note: Fully Offline mode for the LCS is no longer supported.

Structure of LCS Manual

A version of the LCS manual exists for Macintosh, Windows, and Linux. In each manual, you will find the following information:

- Chapter 1: Welcome to LCS
- Chapter 2: Installing and Configuring the LCS
- Chapter 3: Administering the LCS

A Note about Graphics

Every effort was made to assure the graphics in this manual match what the users will see when using the LCS. Expect some slight differences depending on the operating systems used to access the LCS and KITE Client software.

Version Information

This manual provides documentation for the KITE system release of August 2017.

Disclaimer

The Kansas Interactive Testing Engine[®], KITE[®], the KITE logo, Dynamic Learning Maps[®], DLM[®], the DLM logo, cPass[®], and the cPass logo are trademarks of The University of Kansas. All other trademarks referenced in this guide belong to their respective owners.

Using the LCS

Getting Help

Common tasks are described in this manual, but if you need additional help, call or email the Service Desk.

Hint: Check your organization's website for a toll-free number for the Service Desk.

Phone: **785-864-3537**

Email: **kite-support@ku.edu**

Changes to the Manual

The following table lists the changes made to this chapter since the last major release of the documentation.

Note: The Page column indicates the page number of the current manual where the change appears.

Change Logged	Page	Description of Change
9/1/2017	All	Updated trademark registration.
9/1/2017	2.5	Updated download process.

Chapter 2: Installing the LCS on a Linux Computer

This chapter explains how to install and configure an LCS on a Linux® computer.

System Requirements

Your machine must meet or exceed the requirements in the table below.

Note: The specifications are the minimums that must be available for the LCS to use. These are NOT overall machine specifications.

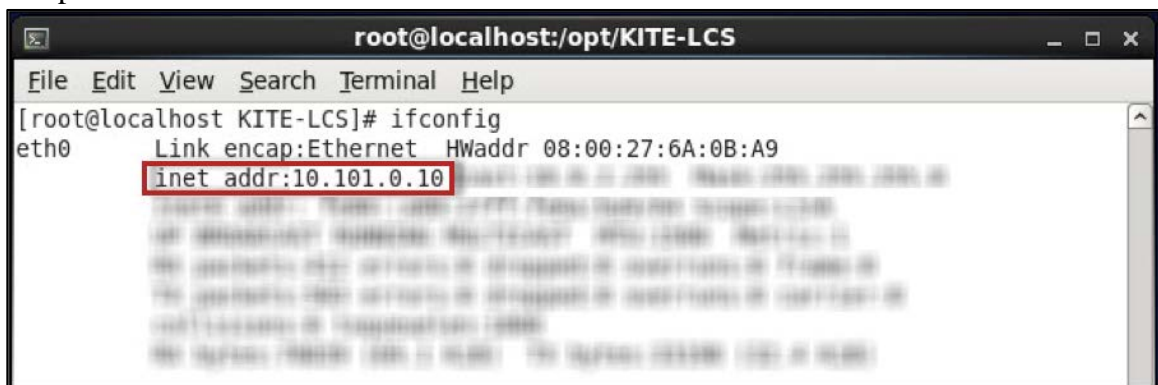
Minimum Processor	Minimum RAM	Disk Space Available for LCS
1 GHz	2 GB	4 GB

To ensure that your machine can run an LCS, check the system properties.

Finding the IP Address

When you install and configure the LCS, you will need to know the IP address of the machine that will run the LCS. If you do not know the computer's IP address, perform the following steps.

1. Launch the Terminal.
2. Enter the following command:
ifconfig
3. Information about your Local Area Connection will fill the box, including your computer's IP address in the inet addr area.



```

root@localhost:/opt/KITE-LCS
File Edit View Search Terminal Help
[root@localhost KITE-LCS]# ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:6A:0B:A9
          inet addr:10.101.0.10  Bcast:10.101.0.255  Mask:255.255.255.0
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 overruns:0 on interface:0 bytes:0
          TX packets:0 errors:0 overruns:0 on interface:0 bytes:0
          Interrupt:0x0
          Memory:0
  
```

4. Make a note of your machine's IP address.

Note: We recommend assigning a static IP address to your machine.

LCS Software

After verifying that your computer can run the LCS software, you need to download the file before installing the server. Make a note of where you save the LCS software so that you can find it when you perform the other steps in this manual.

Note: In this manual, the screen shots show the KITE-LCS folder installed in the recommended area for the particular operating system.

LCS software is available from your program's website. On the website, check the page with links to the KITE™ Client software to locate a link for Local Caching Server.

Downloading the LCS Software

The LCS software is available on your program's LCS page. Select the appropriate link for your platform.

KITE® Local Caching Server

The KITE Local Caching Server (LCS) allows your computer to act as a dedicated network server for KITE testing, which gives students and staff local access to KITE content. By using temporary storage, or a cache, the server is able to access data more quickly while reducing demand on the KITE servers.

You can set up a Local Caching Server on a computer running OS X, Windows, or Linux.

Download LCS for Windows	Installation instructions
<i>Windows 7 (64-bit), 8, 10, 2008 R2 server, 2012 server supported</i> <i>Requires 2 GHz processor, 4 GB RAM, 3 GB disk space</i>	
Download LCS for Mac	Installation instructions
<i>OS X 10.10–10.12 supported</i> <i>Requires 1 GHz processor, 2 GB RAM, 3 GB disk space</i>	
Download LCS for Linux	Installation instructions
<i>Cent OS, Fedora, Redhat, and Ubuntu supported</i> <i>Requires 1 GHz processor, 2 GB RAM, 4 GB disk space</i>	

Installing the Software

To install the software, perform the following steps.

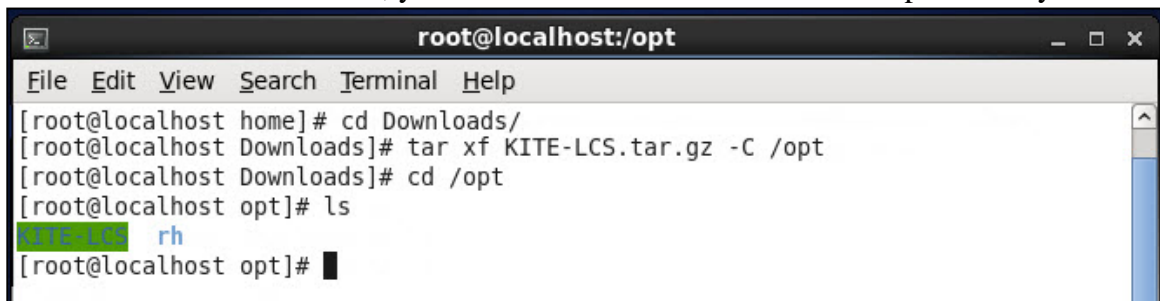
1. Follow the link to download the LCS.
2. Log in to Linux as a root or sudo user.
3. Launch the Terminal.
4. Change the directory to where you downloaded the KITE LCS software.
5. If you are the root user, type:

```
tar xf KITE-LCS.tar.gz -C /opt
```

6. If you are the sudo user, type:

```
sudo tar xf KITE-LCS.tar.gz -C /opt
```

7. When the command succeeds, you will see the KITE-LCS file in the opt directory.

A terminal window titled "root@localhost:/opt" showing the installation process. The user navigates from the home directory to Downloads, then runs the tar command to extract the software to /opt. After changing to the /opt directory, the user runs 'ls' and the output shows "KITE-LCS" and "rh".

```
root@localhost:/opt
File Edit View Search Terminal Help
[root@localhost home]# cd Downloads/
[root@localhost Downloads]# tar xf KITE-LCS.tar.gz -C /opt
[root@localhost Downloads]# cd /opt
[root@localhost opt]# ls
KITE-LCS  rh
[root@localhost opt]#
```

Configuring the Properties File

After you have copied the files for the LCS, you need to configure a properties file to include the IP address for the LCS machine. To configure the properties file, perform the following steps.

1. Open the Terminal as a root or sudo user.
2. Change to the following directory:
`/opt/KITE-LCS/TDELocalCache/config`
3. Open the `kitelcs.properties` file in an editor.

Hint: `vi kitelcs.properties`

4. Change the `lcsHostServer` to the IP address for your LCS.

```
{  
    "nodejsport" : 3000,  
    "lcsHostServer" : "x.x.x.x"  
}
```

Hint: Replace the x symbols above with the IP address. Directions for finding your machine's IP address are in the previous section, Finding the IP Address.

Note: If you are using a port other than 3000, change the `nodejsport` to the correct port.

5. Save the file.
6. Close the editor.

Firewall Access

To allow test takers to access the LCS, you will need to alter your Firewall settings.

Note: Your location may use additional firewall securities; contact your local system administrator with the information that needs to be added to the Firewall if this is the case.

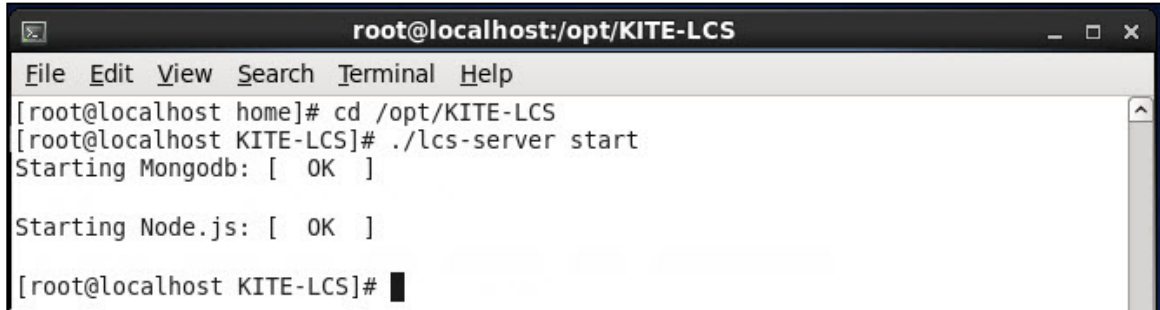
You will need to open the port you configured (or the default port) in your Firewall. If you do not know how to do this, refer to the help pages below for assistance with specific Linux distributions.

Linux Distribution	Documentation on the Web
CentOS	http://www.centos.org/docs/5/html/Deployment_Guide-en-US/ch-fw.html
Redhat	https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/3/html/System_Administration_Guide/ch-basic-firewall.html
Fedora	http://fedoraproject.org/wiki/SystemConfig/firewall
Ubuntu	https://wiki.ubuntu.com/UncomplicatedFirewall

Starting the LCS

To start the LCS, perform the following steps.

1. Open the Terminal as a root or sudo user.
2. Change the directory to the KITE-LCS directory:
cd /opt/KITE-LCS
3. To start the LCS, use the following command:
./lcs-server start



```
root@localhost:/opt/KITE-LCS
File Edit View Search Terminal Help
[root@localhost home]# cd /opt/KITE-LCS
[root@localhost KITE-LCS]# ./lcs-server start
Starting MongoDB: [ OK ]

Starting Node.js: [ OK ]

[root@localhost KITE-LCS]#
```

Note: If the computer is shut down or restarted, you must restart the LCS.

Verify the LCS is Running – on the LCS Machine

The LCS runs as a process in the background. To verify that the LCS is running, perform the following steps:

1. On the LCS machine, open the Terminal as a root or sudo user.
2. Change the directory to the KITE-LCS directory:
cd /opt/KITE-LCS
3. Type:
./lcs-server display
4. In the table, check the App name column to see that at least one instance of “kite-lcs” is online.

Hint: Depending upon the machine that is running the LCS, you may see between one and eight instances of kite-lcs in the table.

Testing the LCS Settings Using a Browser

After you have installed and started the LCS, you should test to see that the LCS is configured correctly. To do so, you will point a browser at the LCS Admin Dashboard.

To test the LCS settings, perform the following steps.

Note: The example below uses the IP Address 10.101.0.10 and the Port Number 3000. Your server may have a different IP address and port number.

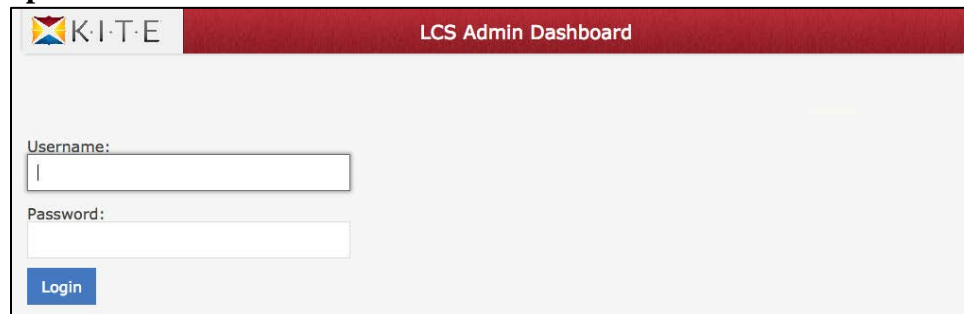
1. Open Firefox.
2. In the address bar, type:

[IP Address]:[port number]/TDE/admin/index.htm

Hint: Using the IP Address 10.101.0.10 and Port 0000, you would type:

```
10.101.0.10:3000/TDE/admin/index.htm
```

Note: When the LCS Admin Dashboard screen appears, you have successfully set up the LCS.



The screenshot shows the KITE LCS Admin Dashboard login interface. At the top left is the KITE logo, and at the top right is the text "LCS Admin Dashboard". Below this is a login form with two input fields: "Username:" and "Password:". The "Username:" field contains a single character "l". Below the password field is a blue "Login" button.

Note: At this time, you can access the LCS, but you must still configure each machine that will run the KITE Client software.

Configuring KITE Client Software

After you have installed and configured the LCS, you must configure every testing machine to use the LCS. The KITE Client software is available for testing on Macintosh and Windows computers, Chromebooks, and iPad tablets.

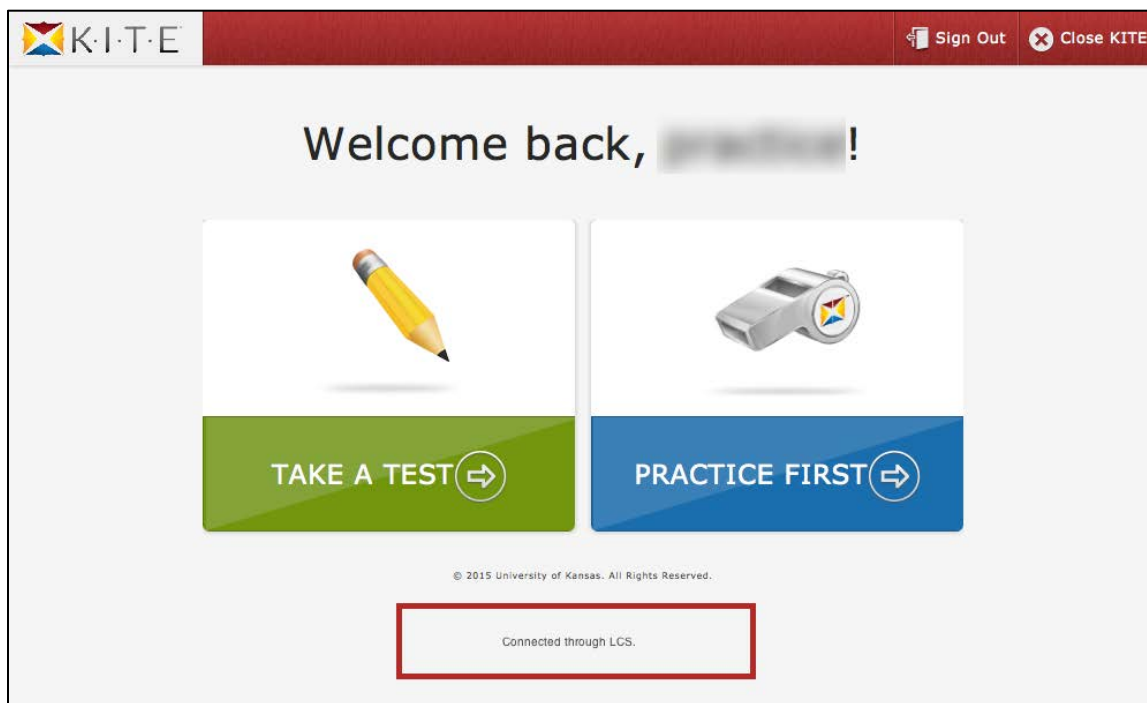
Note: Each device that will be used for testing must be configured to use the LCS.

Refer to the installation guides for the platforms you are using for testing machines (i.e., Windows, Macintosh, Chromebooks, iPad) for help configuring the KITE Client software.

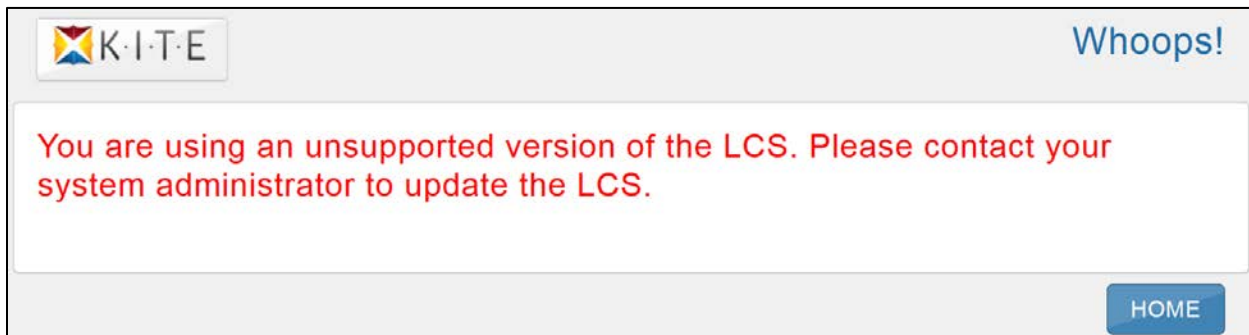
Note: The KITE Client Software Installation Guide for Macintosh Computers includes instructions for creating a customized KITE Client.app with the LCS settings for your location. This customized application could be used to install the client on multiple testing machines.

After the KITE Client software is installed on each testing machine and configured to use the LCS, you are ready to begin testing at your site.

During testing using an LCS, the KITE Client software will display the message “Connected through LCS” after login.



If an older version of the LCS is being used, students will encounter a message indicating that the LCS is an unsupported version.



Sending Log Files to the Service Desk

If you are unable to set up the LCS, you can send program log files via email to the KITE Service Desk. Service Desk uses the log files to troubleshoot your installation. To locate and send the LCS log files, perform the following steps.

1. Open the KITE-LCS folder.
2. Open the Logs folder.
3. Locate the log file.

Hint: Look for tdelcs.log or tdelcs.txt.

Note: This file can be large, so compress (or zip) the file before sending it to the service desk.

4. Attach the log file to an email to kite-support@ku.edu.
-

Note: Use the subject “TDE-LCS Log File”

Chapter 3: Administering the LCS

After you have installed and configured a Local Caching Server (LCS) on your network, you can use the information in this chapter to administer the LCS.

Logging in to the LCS

The LCS Admin Dashboard allows you to perform various functions related to tests and student responses.

Note: To access the LCS administration features, the LCS must be running.

To log into the LCS, perform the following steps.

Note: The example below uses the IP Address 10.101.0.10 and the Port Number 3000. Your server may have a different IP address and port number.

1. Open Firefox.
2. In the address bar, type:

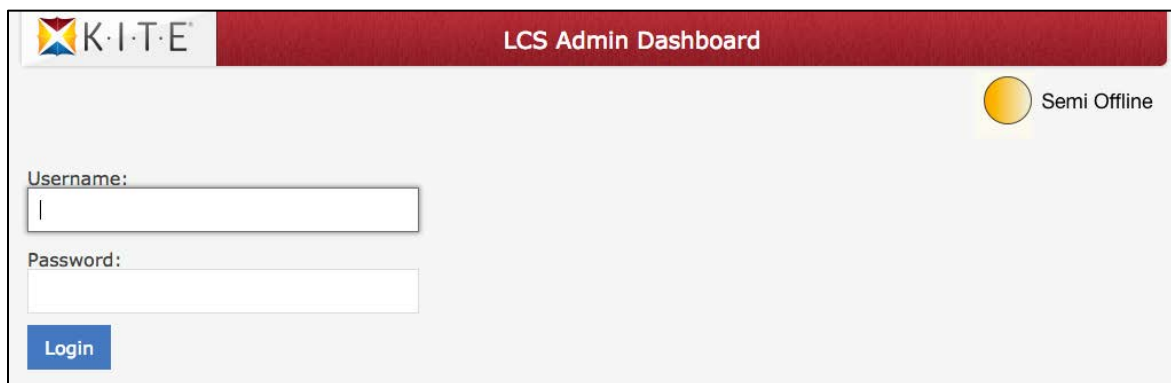
[IP Address]:[port number]/TDE/admin/index.htm

Hint: Using the IP Address 10.101.0.10 and Port 0000, you would type:


10.101.0.10:3000/TDE/admin/index.htm

3. Press Enter.
4. Type your username in the Username field.
5. Type your password in the Password field.

Hint: Check the email you received from the service desk for the username and password.



Note: If you are using the LCS in fully offline mode, the screen will display the

fully offline icon. 

6. Click Login.

Semi-Offline Dashboard

At the top of the LCS Admin Dashboard is the LCS ID, a string of numbers important if technical support is required.

In the center of the screen, you will see a green table heading. If the table contains numbered lines (as shown below), then you have student data that needs to be uploaded to the AAI servers.

At the bottom of the screen, you will see three buttons.

Note: Avoid using the Clear Cached Templates and Clear Cached Tests buttons. These buttons delete stored content including test data. If you click one of these buttons, the information will be deleted immediately.

- Retry Upload – use to resend information to AAI servers. See the procedure later in this chapter.
- Update LCS – this option will be available for the latest version of the LCS. If an older version is being used, that option will not be available nor will the LCS version be displayed.

The screenshot shows the LCS Admin Dashboard interface. At the top left is the KITE logo. The title bar reads "LCS Admin Dashboard" and includes a "Sign Out" button. A yellow circle icon indicates "Semi Offline" status. The main content area displays the following information:

LCS ID : [blurred]

LCS Version : 3 (LCS version is up-to-date.)

Students Test Status

No	Student Test Id	Status
1>	[blurred]	Giving Exam...
2>	[blurred]	Giving Exam...
3>	[blurred]	Giving Exam...

The monitoring tool helps you to track the daily activity in the LCS

At the bottom, there are four buttons: "Clear Cached Templates", "Clear Cached Tests", "Retry Upload", and "Update LCS". Below the buttons, it states "LCS version is up-to-date."

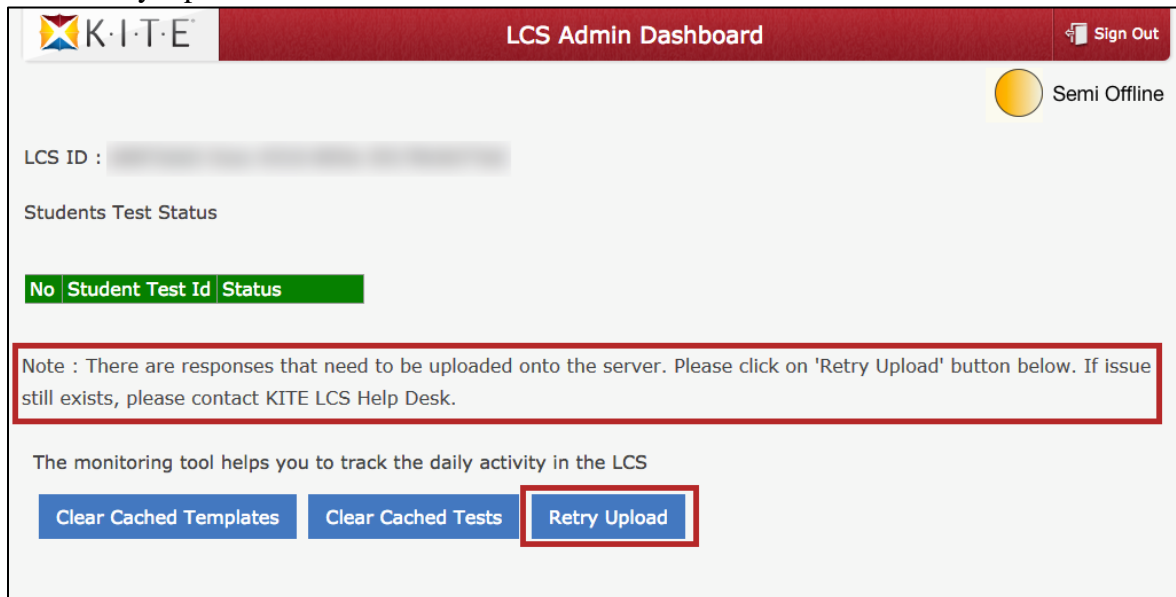
Note: A new option for “Update LCS” will be added to the dashboard for users with the latest LCS. Users with an older version of the LCS will not see that button and not see the version number of the LCS they are using in Semi Offline mode.

Retrying an Upload

Note: If the LCS contains student responses that need to be resent to AAI, a message will be displayed on the LCS Admin Dashboard.

To resend information from the LCS, perform the following steps.

1. Log in to the LCS Admin Dashboard.
2. Click Retry Upload.



The screenshot shows the KITE LCS Admin Dashboard. At the top left is the KITE logo. The top right has a 'Sign Out' button and a 'Semi Offline' status indicator. Below the header, there is a section for 'LCS ID' and 'Students Test Status'. A table with columns 'No', 'Student Test Id', and 'Status' is shown, but it is empty. A red-bordered box contains a note: 'Note : There are responses that need to be uploaded onto the server. Please click on 'Retry Upload' button below. If issue still exists, please contact KITE LCS Help Desk.' At the bottom, there are three buttons: 'Clear Cached Templates', 'Clear Cached Tests', and 'Retry Upload', with the 'Retry Upload' button highlighted by a red box.

Shutting Down the LCS

When testing has finished, you should shut down the LCS.

Note: Depending upon which operating system the LCS uses, the steps are slightly different. Refer to the procedure designed for your LCS.

Note: When the LCS server shuts down, no one will be able to use it for testing until the LCS is restarted.

To shut down the LCS, perform the following steps.

1. On the LCS machine, open the Terminal as a root or sudo user.
2. Type:

```
cd /opt/KITE-LCS
```

3. Type:

```
./lcs-server stop
```



```
root@localhost:/opt/KITE-LCS
File Edit View Search Terminal Help
[root@localhost ~]# cd /opt/KITE-LCS/
[root@localhost KITE-LCS]# ./lcs-server stop
Stopping Node.js: [ OK ]
Stopping MongoDB: [ OK ]
[root@localhost KITE-LCS]#
```