

# Keysight PW9112EDU PathWave Lab Operations for Remote Learning Solution

Getting  
Started Guide

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- Worldwide contact information for repair and service
  - [www.keysight.com/find/assist](http://www.keysight.com/find/assist)

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## Overview

Online learning has been a part of many educational institutions since the spread of the Internet. Now, new norms such as physical distancing and limits on face-to-face interaction is dramatically accelerating the shift from traditional in-building learning to virtual classes offered remotely on digital platforms. The availability of online courses opens opportunities to international and distance learning students, and remote learning offers students the flexibility of learning anytime, anywhere. With these benefits, online learning is expanding exponentially, and educational institutes must rapidly transform to keep pace with this megatrend.

Keysight's industry-ready remote access lab solution offers you a convenient way to make the switch to online learning. This end-to-end solution is designed for complete remote setup of your basic instrument lab and covers your needs from web-based lab management and scheduling administration to instrument control and remote access for measurement and analysis. And since your students continue working with industry-grade test and measurement instruments and software, they will gain the similar practical skills and application knowledge as industry engineers conducting their work in the lab today.

## Intended Use of Getting Started Guide

The Getting Started Guide is intended for use by students, lecturers, and University Teaching Lab Manager as a guide for set up the PathWave Lab Operations for Remote Learning application.

The features that you can access in this software may vary depending on the roles assigned to your account. Upon registration, new accounts will be assigned with the Student access. Please consult your Lab Manager to assign new roles.

Here are the three access levels or roles that you can assign to the accounts:

### **Student**

- Schedule Remote Lab Session (only invite other users with the Student role)
- See and Connect to Scheduled Sessions.
- Connect to Test Bench (via scheduled session).

### **Lecturer**

- Schedule Remote Lab Session (only invite other users with the Lecturer and Student role)
- View and Connect to Scheduled Sessions
- Connect to Test Bench (via scheduled session)

### **Administrator**

- Install the Remote Agent
- Add A New Bench
- Manage Scheduled Sessions
- Manage Remote Benches
- User Management

## Characteristics and Specifications

For the characteristics and specifications of the Remote Lab Access Management Software, refer to the Data Sheet at <https://www.keysight.com/us/en/assets/3121-1016/data-sheets/PathWave-Lab-Operations-for-Remote-Learning-PW9112EDU.pdf>.

## First-Time Setup

Before you use the PathWave Lab Operations for Remote Learning application for the first time, take note of the following items:

- Ensure that your PC meets the software prerequisites listed below and that the instruments are set up on your bench.
- For security purposes, it is recommended to change the password of the Account Console for security purposes. Go to [Keycloak Administration Console](#) for the instructions.
- By default, the **User registration** setting is set as **OFF**. This is the recommended setting to prevent other users from registering an account using the link. For more information, go to [Add User](#).

## Software Prerequisites

### PC Operating System

- 1 Windows 10 Enterprise (32-bit or 64-bit) with Internet access

### Software Required

- 1 Google Chrome or Firefox web browser
- 2 Remote Agent (provided by Keysight personnel)
- 3 (Optional) VPN access to range of IPs

# User Interface Tour

## Home View

This view displays a summary of the lab benches scheduled and the lab sessions that you are invited to join. Subject to the roles assigned to your account, you may see the following tabs on your home page:

- Bench Management (accessible by Admin and Lecturer access levels)
- Schedule Remote Lab Session (accessible by Admin, Lecturer and Student access levels)
- Session Management (accessible by Admin access level only)

PathWave Lab Operations for Remote Learning (1.0.6) January 18, 2021 9:42 AM labadmin1

Home Bench Management Schedule Remote Lab Session Session Management

Welcome, labadmin1!  
Manage scheduled lab sessions.

Scheduled by Me

Active/Upcoming Sessions

No.	Bench Name	Bench Status	Date ^	Time Slot	Other Users	Session Status
1	TestBench03 ⓘ	Online	2021-01-18	09:00 AM - 10:00 AM (Ready)		Approved <span>Cancel Session</span> <span>Connect</span>
2	Bench removed ⓘ	Bench removed by admin	2021-01-26	11:00 AM - 02:00 PM		Cancelled

Items per page: 5 1 - 2 of 2 |< < > >|

Scheduled by Others

Active/Upcoming Sessions

No.	Bench Name	Bench Status	Date ^	Time Slot	Scheduled By	Other Users	Session Status
No sessions found.							

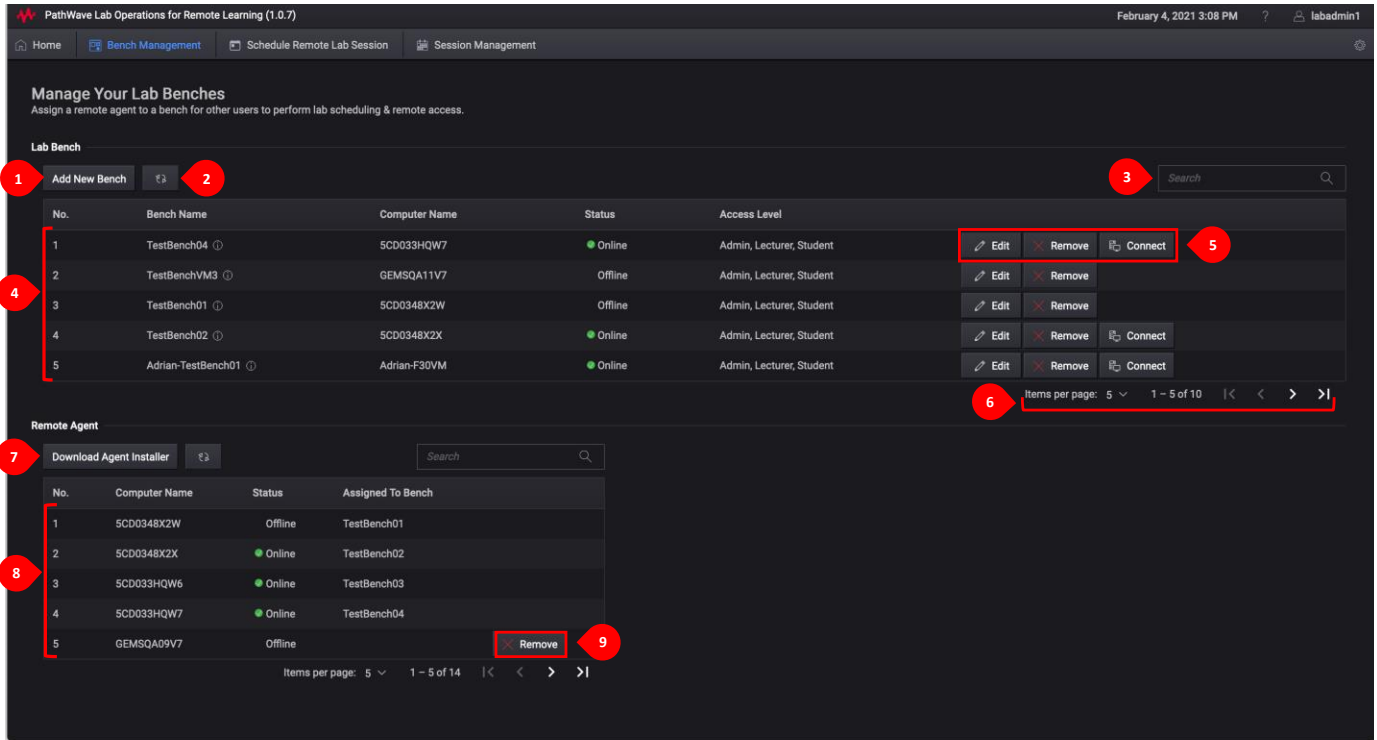
Items per page: 5 0 of 0 |< < > >|



# Bench Management View

For this page, Admin accounts can manage the bench while the lecturer and student accounts can only view and connect to the bench.

## Lab Bench and Remote Agent



No.	Function	Description
1	Add New Bench	<ul style="list-style-type: none"> <li>- Bench Name: Name the bench</li> <li>- Bench Description: Describe the usage of this bench</li> <li>- Bench Location: State the physical location of this bench</li> <li>- Bench Instruments: Lists the instruments available to this bench</li> <li>- Agent: Assign a Remote agent to this bench</li> <li>- Access Level: Select the type of accounts allowed to access this bench</li> </ul>
2	Refresh button	Refresh the list of benches available or assigned
3	Search bar	Enter the keywords here to filter the list of benches available
4	List of Lab Bench	Click any of the header to sort the list according to Bench Name, Computer Name, Status or Access Level
5	Lab Bench Controls	<p>Manage the settings for the respective Lab Bench:</p> <ul style="list-style-type: none"> <li>- Edit: Modify the details of selected Lab Bench or change the assigned Remote Agent. The list will only show the unassigned agents that you can use (even it is offline).</li> <li>- Remove: Remove the bench from the list. This will also remove the Remote Agent assigned to the bench (when applicable).</li> <li>- Connect: Connect to the bench remotely and begin the remote lab session. A countdown timer will appear when it is 15 minutes before the scheduled session. You will not be able to connect to the bench when the status is 'Offline'.</li> </ul>

No.	Function	Description
6	View	Set the number of items to view in the table per page
7	Download Agent Installer	Download the Remote Agent installation package to add a new PC to PathWave Lab Operations for Remote Learning application server.
8	List of Remote Agents	Lists the remote agents available in the server for management purposes and display the status of each remote agent and assigned bench.
9	Remove Agent	Remove the agent from your PC and server. Ensure that it is not assigned to any bench.

## Schedule Remote Lab Session View

This page is accessible across all access levels.

No.	Function	Description
1	Date	Set the date and month of your lab session. Click the Calendar icon to show the dates of each month
2	List of Bench	List of benches available for the remote lab session
3	Filter	Filter the benches according to the keywords or desired time slots
4	Schedule or Invite	<p>There are two options to schedule a remote lab session:</p> <ul style="list-style-type: none"> <li>Select the 'Schedule on behalf of others, I will not join the session' check box to submit a request for booking. For this case, you will be able to invite up to five participants to access this test bench at the selected booking timeframe.</li> <li>Use the 'Invite Others' field to invite four other participants (maximum) in the same session.</li> </ul> <p>* You may only invite the participants with the same access level as you are. Only those with the Admin roles can invite participants of all access roles.</p>
5	Note (Optional)	Enter the information of the session here
6	Legend	The visual representation of the indicator on the chart when identifying the time slots available.

## Students and Lecturers Roles

This section covers the commonly used functions that you will need to navigate around the Keysight Remote Laboratory application. First time users will need to go through the following sections.

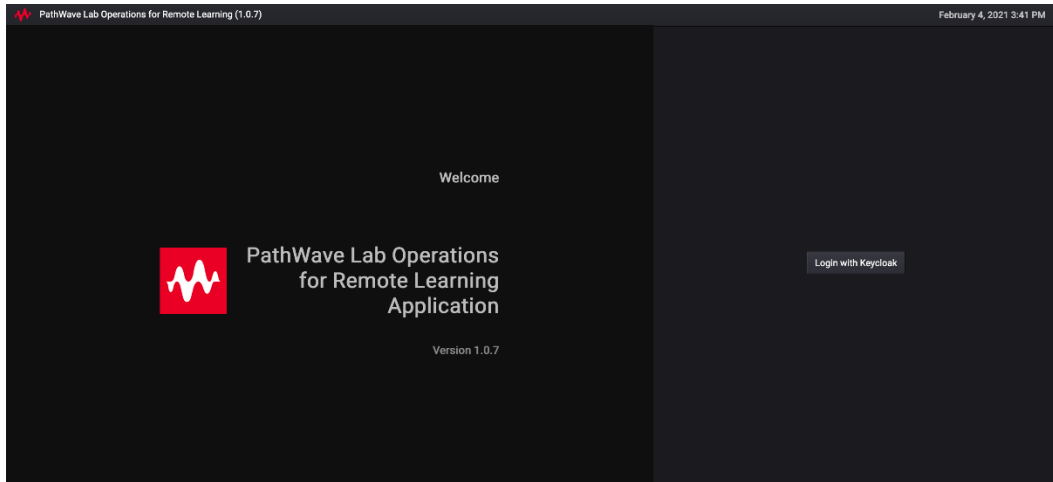
### NOTE

- Before you begin, ensure that PC is connected to the Internet.
- By default, the **User registration** setting is set as **OFF**. This setting will only allow accounts with Administrator roles to register new users and set the appropriate roles and access. To change this setting to ON, go to [Add User](#).

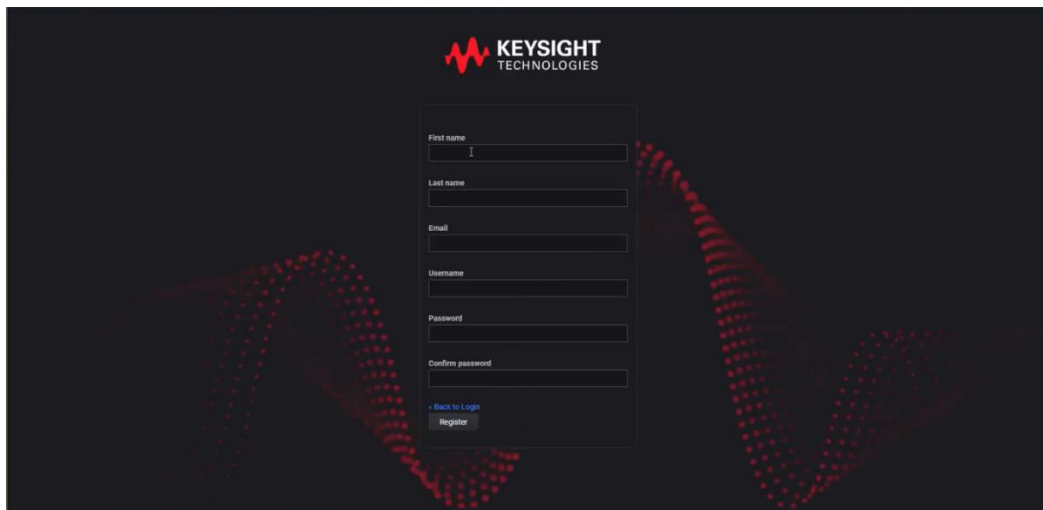
## Registration and Login

New users will need to register and create a new account. Go to **Step 4** to log in with your existing account.

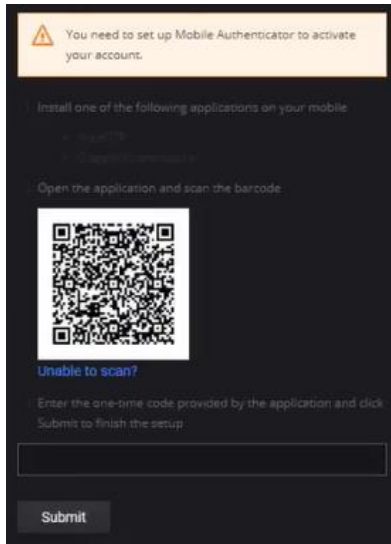
- 1 Launch your web browser and enter the link provided (subject to the hostname) in the address bar to launch the Keysight Remote Lab Application. First time users will need to click **Register** and create a new account.



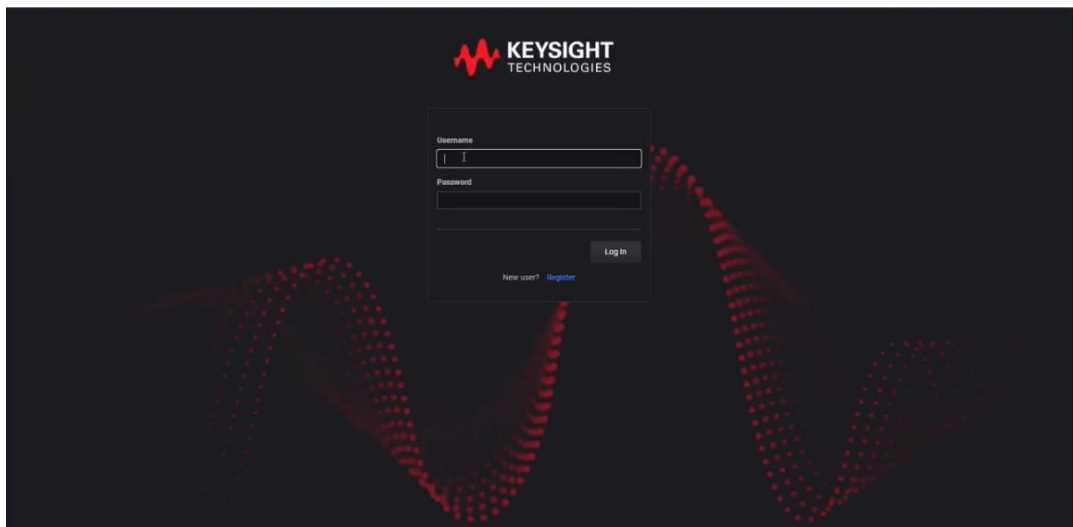
- 2 Enter the required details to set up your account. By default, new accounts are assigned with the Student role. To change the roles assigned, consult your lecturer or lab managers.



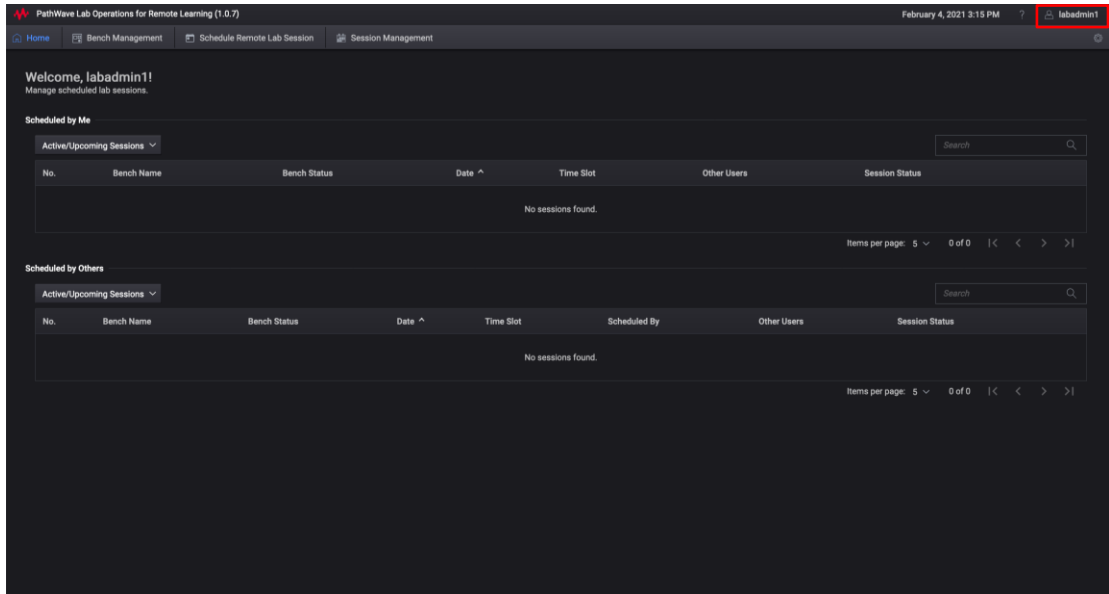
- 3 When prompted, set up a Mobile Authenticator to activate your account. It is recommended to set up either FreeOTP or Google Authenticator to secure your account with a one-time password.



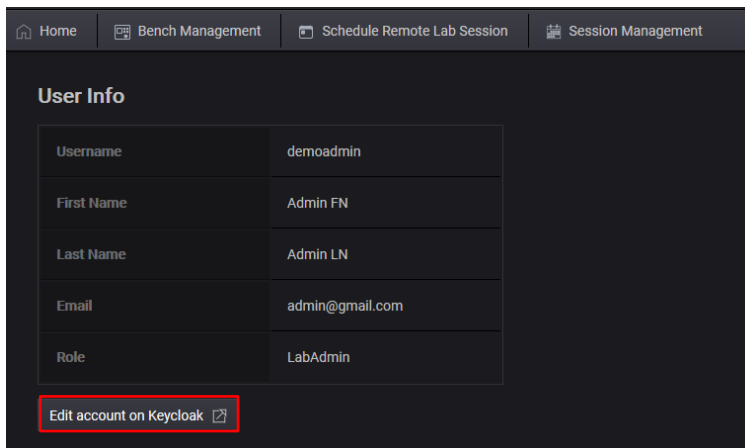
- 4 Log in with your details when you are shown this page.



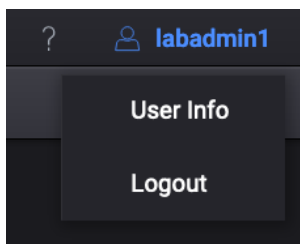
- 5 Once you are logged in, you should see the Home View. Click your username at the top-right corner to access information about your profile and account.



- 6 In User Info, click **Edit account on Keycloak** to modify your account details and password in a separate window.

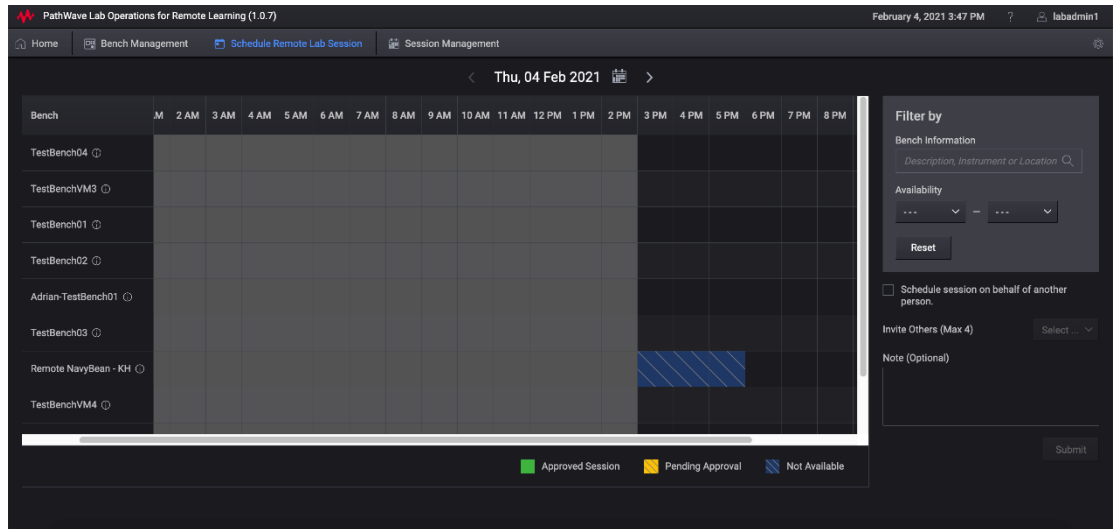


- 7 At the end of your session, click your account name (top-right corner) and click **Logout**.

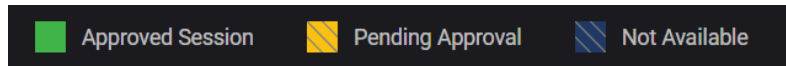


## Schedule Remote Lab Session

- 1 Click the **Schedule Remote Lab Session** page. It will show the available test benches at the hourly interval according to the time of your PC.



- 2 Use the forward (>) and back (<) button to switch between the days or click the calendar icon to see the monthly view. You can schedule bookings up to 30 days.
- 3 Select one or more time slots for your session. Refer to the legend to identify the time slots available.



- 4 You can also enter keywords in the Filter by bar or set the desired time slots to only show the available benches. For more information about the session, move your mouse over the info icon.
- 5 Select the '**Schedule on behalf of another person**' check box to submit a request for booking. If you are hosting the remote session, you can invite four other participants to join the lab session.

### NOTE

You can only schedule a session on behalf of another person if you have the Lecturer or Administrator roles assigned to your account.

- 6 Before you click **Submit**, you may add notes about this session which will be visible to the attendees and those with Administrator roles. The bookings submitted will then be approved by those with Administrator roles.

## Connect to Scheduled Session

- 1 When it is 15 minutes before the session, you will see a timer counting down to the scheduled session. The **Connect** button will only appear when it is time to start the scheduled session or when the host or participant has started the session.

No.	Bench Name	Bench Status	Date ^	Time Slot	Other Users	Session Status
1	TestBenchAfeeq-Temp	Online	2020-11-27	04:00 PM - 05:00 PM		Session Started <b>Connect</b>
2	TestBenchAfeeq-Temp	Online	2020-11-27	05:00 PM - 06:00 PM (Start in 14:54 minutes)		Approved <b>Cancel Booking</b>

### NOTE


When you click **Connect** on a Lab Bench that is currently online, you will not see a timer. You will return to the Bench Management page upon exit.

- 2 Follow the on-screen instructions. As the host, click the **Start Remote Access** button in the Remote Access page.

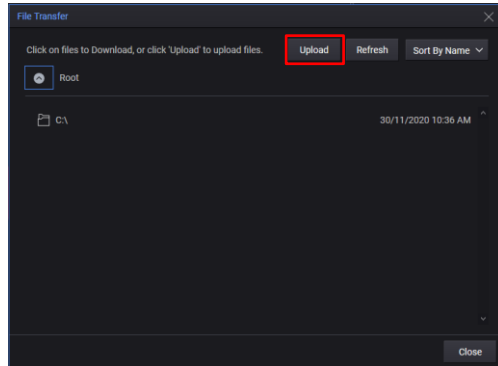



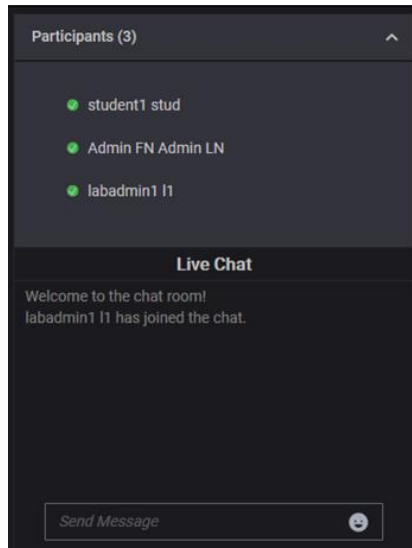

- 3 A successful connection to the remote agent will show the screen of PC. Click the **Request Control** button to take control the PC.




- 4 When you are currently controlling the remote desktop, this icon (  ) will appear next to your username. Other participants in the session can click the **Request Control** button and it will send a notification to the current presenter to Allow or Deny the request.

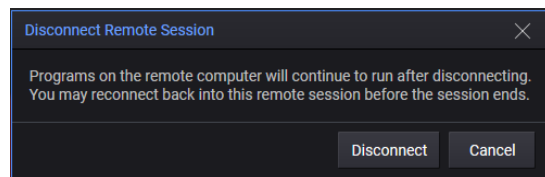
5 Here are a few other controls that you can access during the Remote Lab Session.


- Open File (

- Chat (

- Full Screen Mode (

6 To disconnect from the Remote Lab Session, click **Stop Remote Access**.



7 Click the **Close** () button to exit the session and return to the **Bench Management** page.



## Administrator's Roles

This section covers the additional functions available for Administrator roles to manage users, benches, and sessions scheduled in the Keysight Remote Laboratory application.

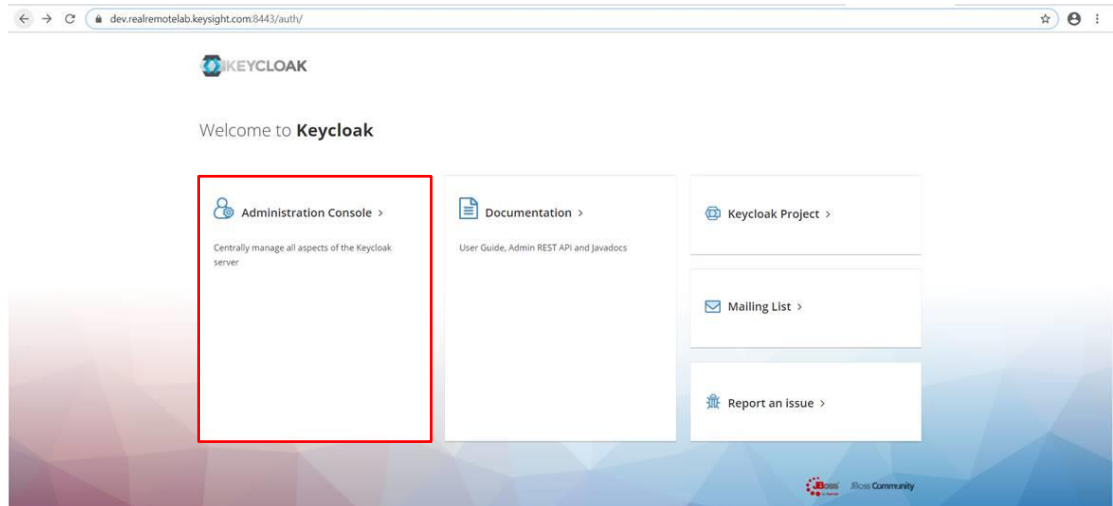
### Keycloak Administration Console

To access the Keycloak Administration Console, you will need to use the default credentials as below:

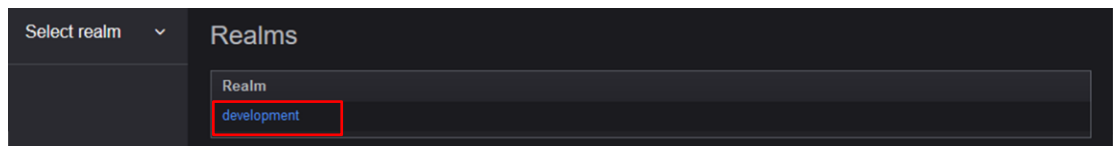
- Username: admin
- Password: admin

It is recommended to change the password before you begin to use the PathWave Lab Operations for Remote Learning application.

- 1 On a web browser, copy the link provided by Keysight Technologies (in the URL Notification Sheet) and add port “:8443” at the end of the link. For example, the link will be <https://dev.realremotelab.keysight.com:8443/>. When you see the page below, click **Administration Console** and log in with details above.



- 2 Go to the **development** realm as shown below.



- 3 Go to **Users** on the left panel and click **View All Users**. For the account “admin”, click **Edit**.
- 4 Go to the **Credentials** tab and under **Manage Password**, enter a new secure password and disable **Temporary** option. Click **Reset Password**.

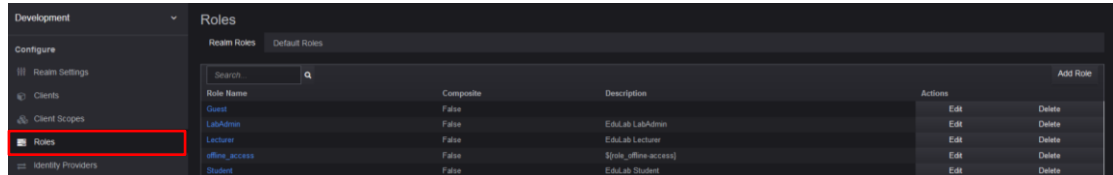
Once you have access to the development realm, you can perform the following tasks:

- **Configure Roles**  
This section describes the steps to create or configure the types of roles that you could later assign to the accounts.
- **Add User**  
This is an optional step provided you have the User registration setting as Off (default). Follow the step-by-step instructions in this section to manually add users.
- **Manage User**  
Perform the steps in this section to assign the types of roles to the registered accounts.
- **Email Settings**  
Perform the steps in this section to turn on the ‘Forgot Password’ feature.
- **Set Up Single Sign-On (SSO)**  
This is an optional step to set up the social signin for your application.

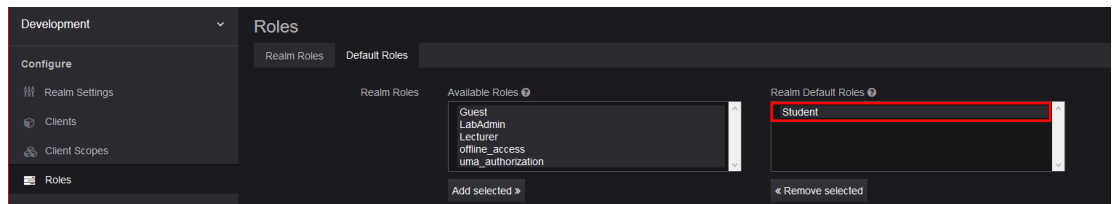
## Configure Roles

This section describes the steps to set and assign the roles to an account. The types of roles assigned will determine the access level to the application. With the Administrator's role, you can set the default role to assign to new accounts and assign specific roles to each account.

- 1 Go to the **Roles > Realm Roles** to view the type of roles available. These are the roles that you can assign to an account.



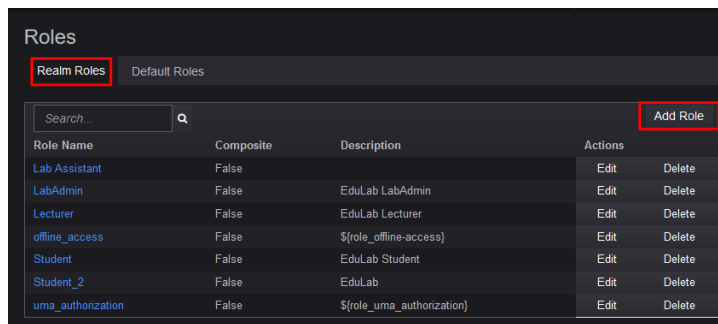
- 2 Go to the **Default Roles** tab to view or modify the default roles assigned to new accounts. By default, new accounts are assigned with Student role during registration.



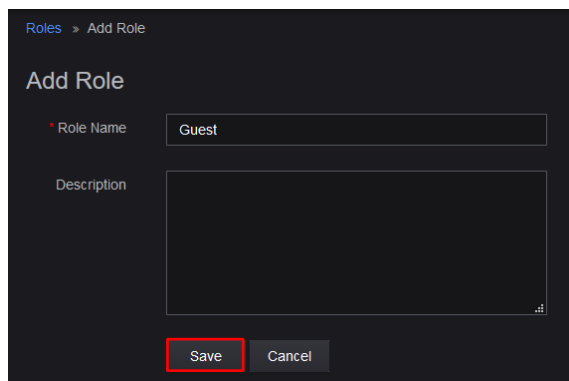
### NOTE

You can only add or remove one role at a time. To change the default role, you must first select the Student role and click **Remove Selected** button. Then, select the desired role and click **Add Selected** to set it as the Realm Default Role.

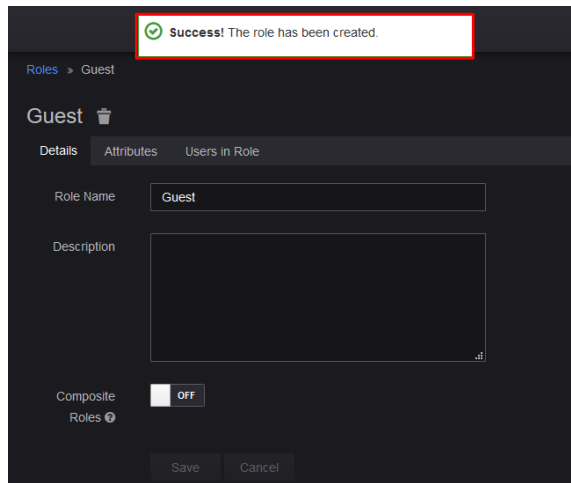
- 3 To add a new role, return to **Realm Roles** tab and click the **Add Role** button.



- 4 Enter the name and click the **Save** button. The example below will create a Guest role.



- 5 Successful creation of the role will prompt the following message. You should now see the new role listed in the Realm Roles tab.

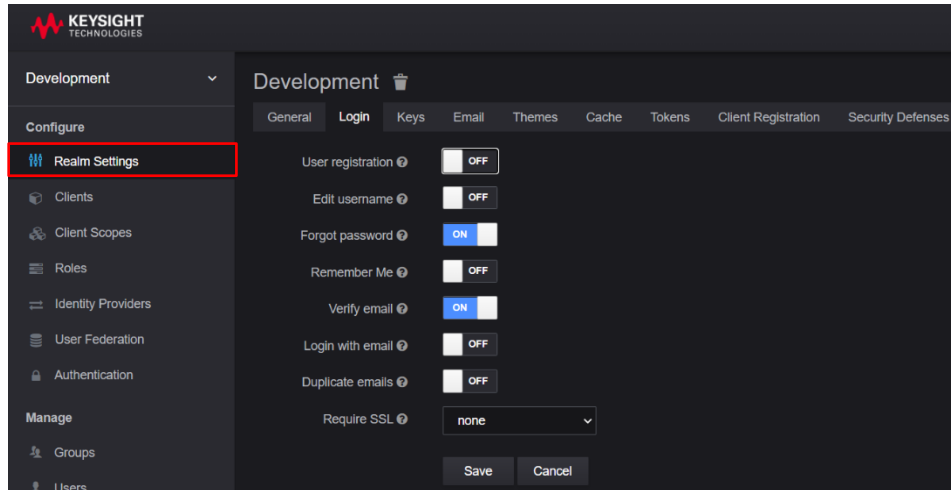


## Add User

### NOTE

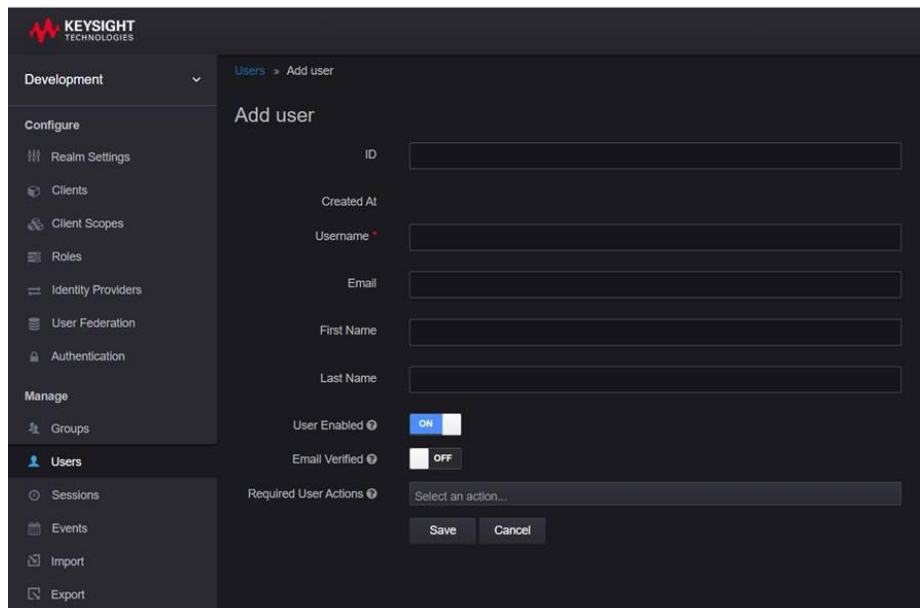
By default, the **User registration** setting is set as **OFF**. This is the recommended setting to prevent other users from registering an account using the link to the application.

Go to **Realm settings > Login tab** to view this setting.

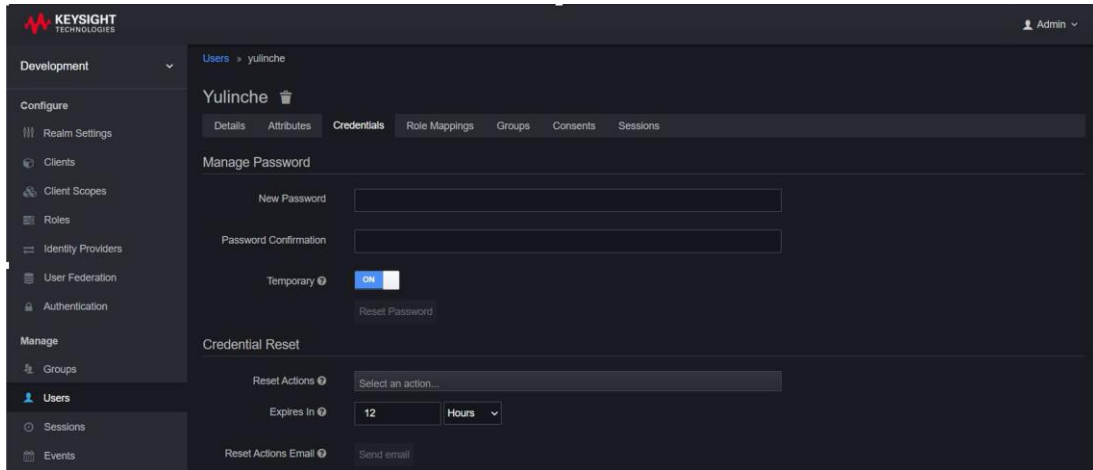


- When the User registration setting is set as **OFF**, only accounts with Administrator roles assigned will be able to register new users and set the appropriate roles and access.
- When the User Registration is set to **ON**, any users with the link to the application will be able to register on their own with the default Student role.

- 1 From the side panel, click **Users** to view the **Add user** page as shown below. At minimum, you will need to enter the desired Username. Click **Save** when you have completed the form.



- 2 You will be redirected to the **Credentials** tab where you will need to perform the following steps:



- a In the Manage Password section, enter the desired password as shown above.
- b Enable the **Temporary** option to create a temporary password.

**NOTE**

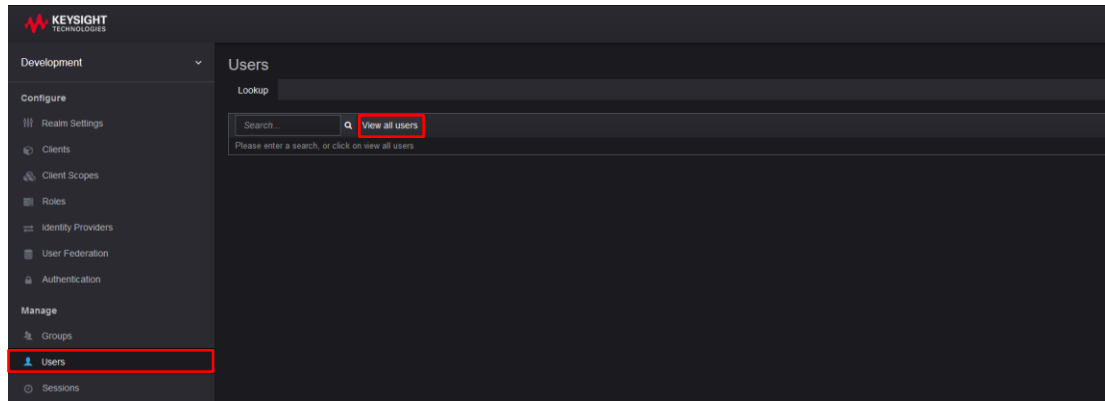
When the Temporary option is enabled, users are required to change the password when they first log in to the application. You may turn off the Temporary option if you prefer to create a permanent password for the user.

- c In the Credential Reset section, select the appropriate Reset Actions from the drop-down list. The recommended options are:
  - i Verify Email: This option will send an email to the user to verify their email address.
  - ii Update Password: You will be prompted to enter a new password when you first log in to the application.
  - iii Expires in: This is the duration set before the link expires. You will need to request for another link to verify your account.
- 3 Click **Change Password** to update the password to the newly created account. Click **Reset Password** to activate the new password.
- 4 Click **Send email** to send out the email as per the settings above. When the user has verified the account, the Verified switch will change to 'ON'.

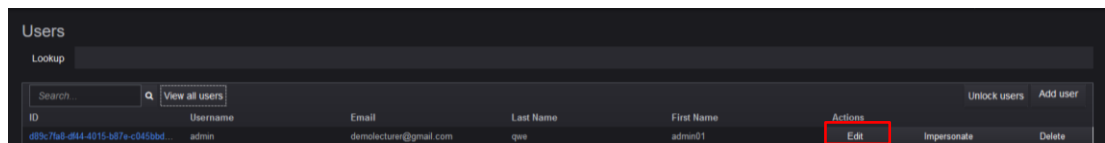
## Manage User

Perform the following steps to assign the types of roles to the registered accounts.

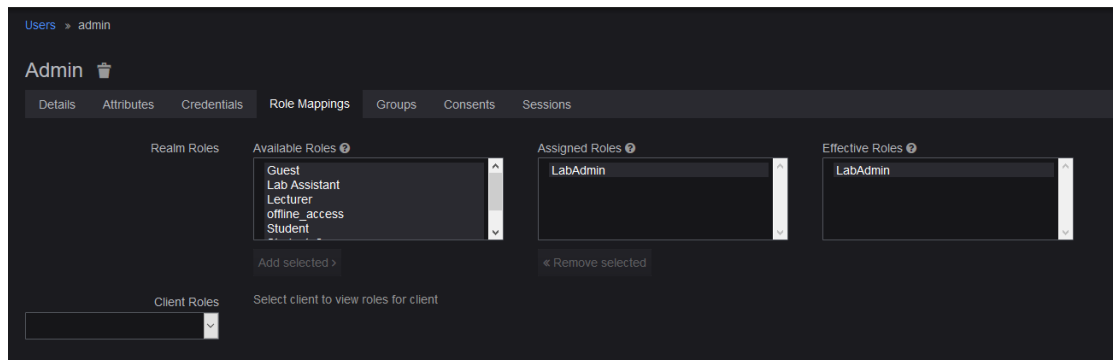
- 1 To modify the assigned roles for an account, go to **Manage > Users** and click **View all users**.



- 2 You should now see a list of users and their registered accounts. Click **Edit** in the Action column.



- 3 Go to the **Role Mappings** tab to view the role assigned. Similar to step 4 earlier, you must first remove the assigned role (if any) before you can assign a new role to an account. The changes will take effective immediately.



## Email Settings

### NOTE

In order to turn on the 'Forgot Password' feature, you will need to complete the Email Settings. Go to [https://wjw465150.gitbooks.io/keycloak-documentation/content/server\\_admin/topics/realms/email.html](https://wjw465150.gitbooks.io/keycloak-documentation/content/server_admin/topics/realms/email.html) for instructions on how to enable Email Settings in Keycloak.

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Keycloak sends emails to users to verify their email address, when they forget their passwords, or when an admin needs to receive notifications about a server event. To enable Keycloak to send emails, you need to provide Keycloak with your SMTP server settings. This is configured per realm. Go to the Realm Settings left menu item and click the Email tab.

## Set Up Single Sign-On (SSO)

An identity provider is usually based on a specific protocol that is used to authenticate and communicate authentication and authorization information to their users. It can be a social provider or cloud-based identity service that you want to integrate with PathWave Lab Operations for Remote Learning Solution.

Once you have set up an identity provider, you may sign in to the PathWave Lab Operations for Remote Learning Solution application using any of the social provider such as Facebook, Google or Twitter.

Refer to the [https://www.keycloak.org/docs/latest/server\\_admin/#\\_identity\\_broker](https://www.keycloak.org/docs/latest/server_admin/#_identity_broker) for specific instructions to set up the Identity Brokering.

Here are a few examples:

- OpenID Connect v1.0 Identity Providers.

OpenID Connect (OIDC) is an authentication protocol that is an extension of OAuth 2.0. While OAuth 2.0 is only a framework for building authorization protocols and is mainly incomplete, OIDC is a full-fledged authentication and authorization protocol.

Go to [https://www.keycloak.org/docs/latest/server\\_admin/#\\_identity\\_broker\\_oidc](https://www.keycloak.org/docs/latest/server_admin/#_identity_broker_oidc)

- SAML v2.0 Identity Providers

Security Assertion Markup Language (SAML) is an open standard that allows identity providers (IdP) to pass authorization credentials to service providers.

Go to [https://www.keycloak.org/docs/latest/server\\_admin/#saml-v2-0-identity-providers](https://www.keycloak.org/docs/latest/server_admin/#saml-v2-0-identity-providers)

### NOTE

The authentication and authorization process uses Keycloak solution which is designed following standard security protocols to provide dynamic single sign-on solution. University IT can configure PathWave Lab Operations for Remote Learning Solution to access the university's active directory. This addresses security concerns, helps eliminate tedious registration process and streamlines the authentication and authorization process.

Keycloak's documentation: [https://www.keycloak.org/docs/latest/server\\_admin/](https://www.keycloak.org/docs/latest/server_admin/)

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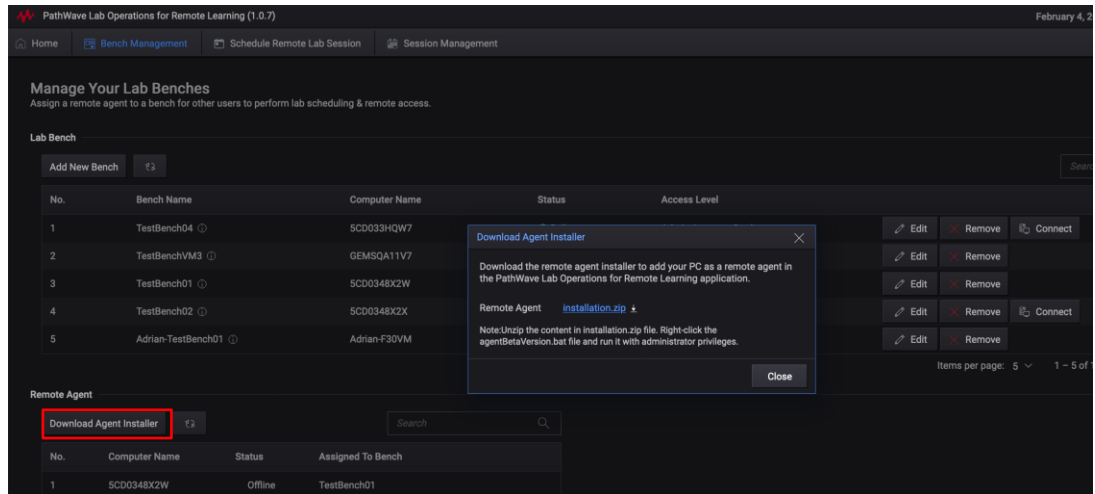


# Install the Remote Agent

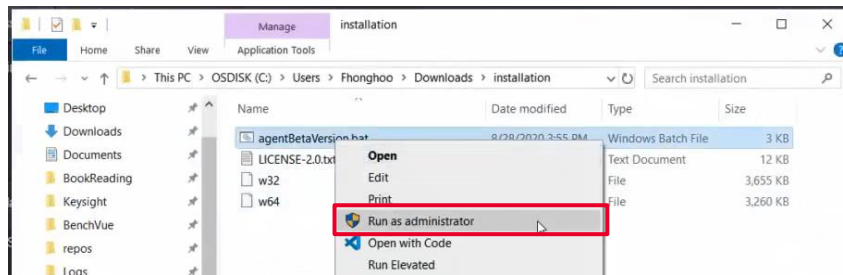
A remote agent is a .exe installation file that you will need run and install in the PC at the benches.

Before you can use the PC as a remote agent, you must perform the following steps to download and run the Remote Agent installation package to add it as an agent in the server.

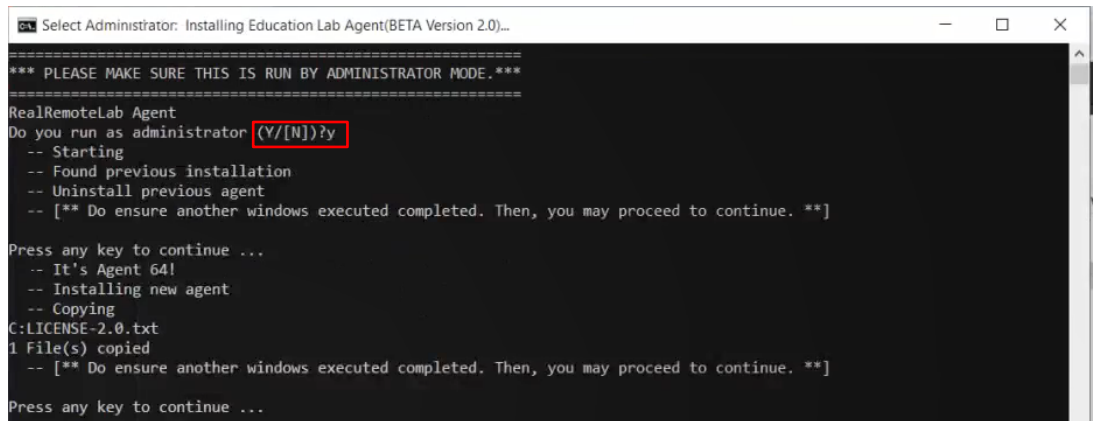
- 1 Click the **Download Agent Installer** button to see the pop-up window below. Click the installation.zip link.



- 2 Unzip the content in installation.zip file to the PC that acts as the remote agent. Right-click the **agentBetaVersion.bat** file and run it with administrator privileges.



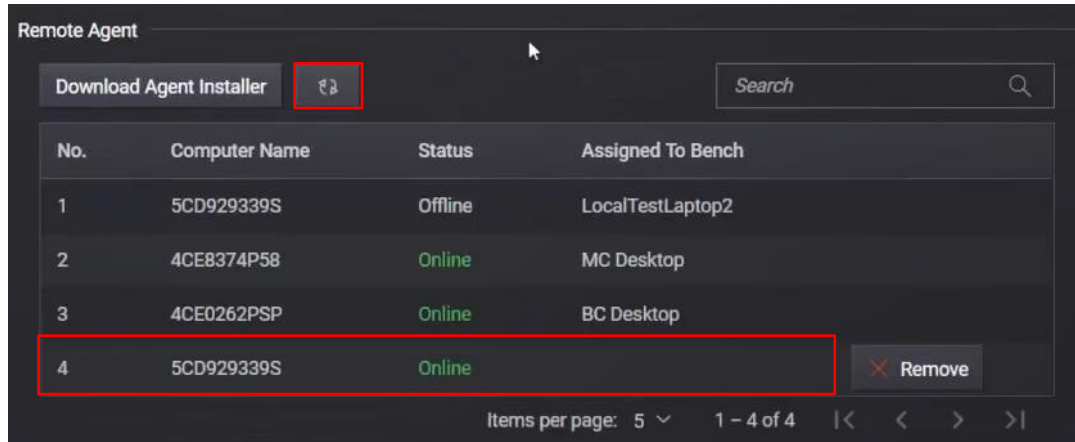
- 3 You should see a Command Prompt window where you will need to enter **Y** to initiate the installation process. Close this window when the installation has completed.



**NOTE**

If you have previously installed an older version of the Agent in the same PC, running the batch file will uninstall the existing version before installing the latest version.

- Return to the Home view and click **Refresh** to update the list of Remote Agent. You should now see the newly added Agent in the list.



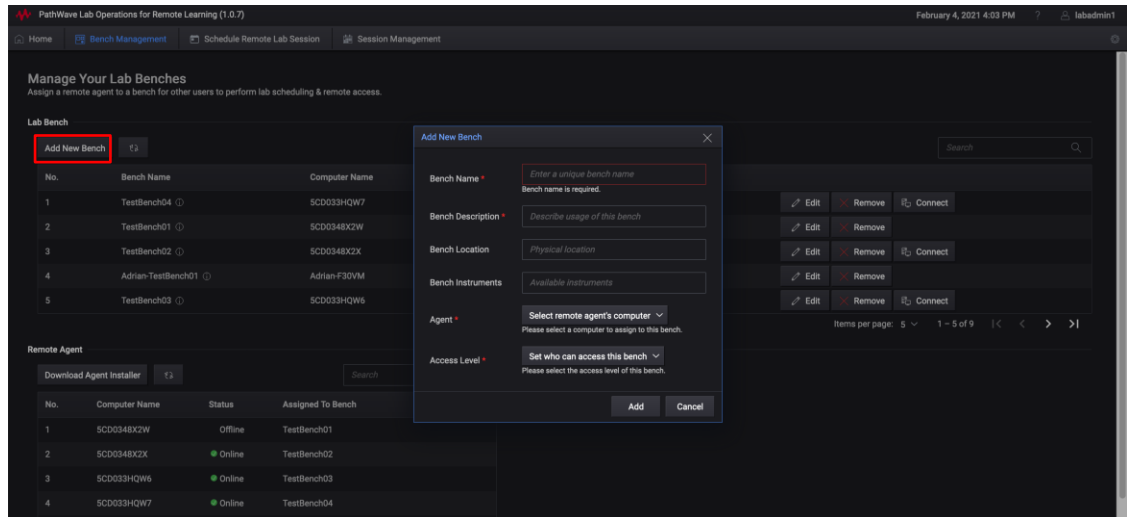
- Repeat **Step 1** to **4** to set up a new Remote Agent in another PC.

Proceed to the next section to assign a bench to the newly added agent.

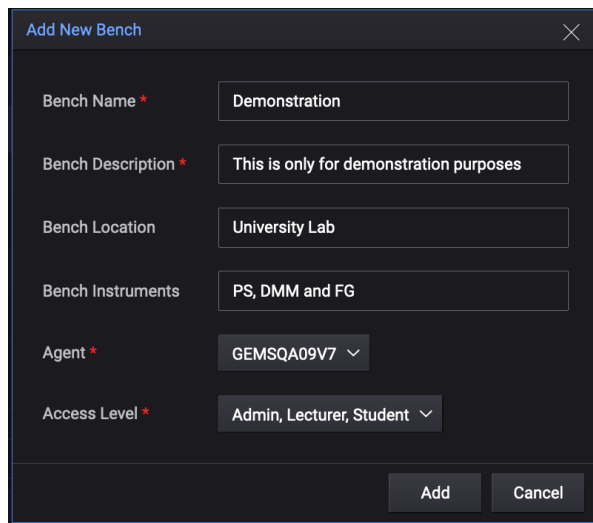
## Add A New Bench

A bench is a location where you have set up the hardware connections and which the PC assigned as the remote agent will interact with.

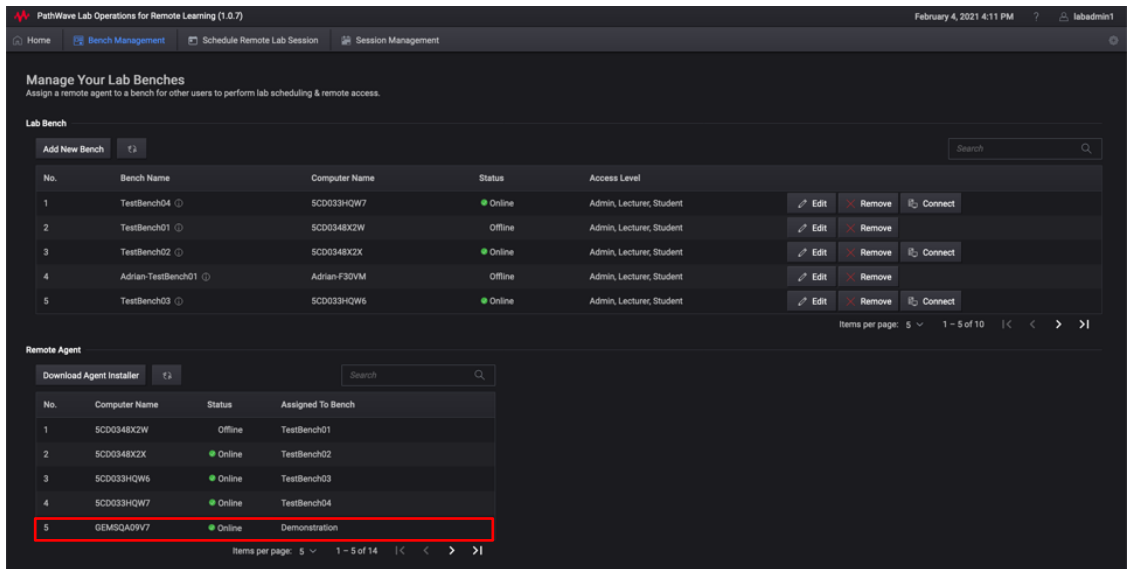
- 1 Click the **Add New Bench** button and enter the required details in the pop-up window below.



- 2 The example below assigns the Agent GEMSA09V7 and the Admin, Lecturer, Student Access Level. Accounts with Admin, Lecturer, Student roles will be able to see this bench. Click **Add** when you have completed the form.



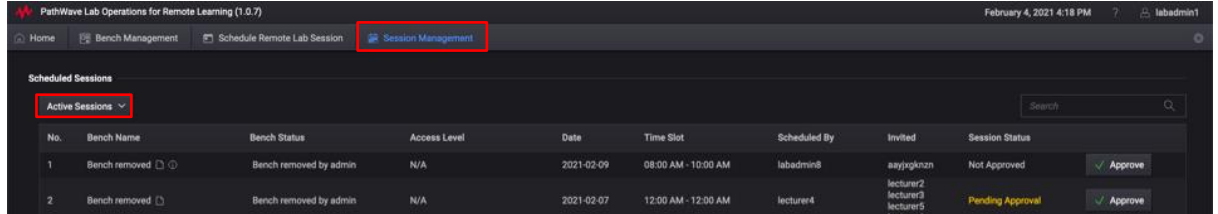
- 3 Upon successful setup, you should see the newly assigned remote agent to the respective bench.



- 4 Unzip the content in installation.zip file to the PC that acts as the remote agent.

## Manage Scheduled Sessions

Click the **Session Management** button to view the status and manage the scheduled sessions. Use the drop-down list to only view either Active Sessions or Past Sessions in the table. Similarly, you can enter the keywords in the Search bar to filter and show only the sessions with the keywords.



The sessions submitted will be approved by those with the Administrator roles.

## Manage Remote Benches

Click the **Bench Management** button to view a list of test benches that you can sort according to their names, status, or access levels.

For each of the test benches, you have the option to Edit or Remove it from the table. The Connect button will only appear when the specific test bench is Online.



## General Troubleshooting

### Seeing a Blank Screen

A stable internet connection is required when using this application.

- 1 Check your internet connection
- 2 Restart your remote PC at the bench

### Application Ceases to Respond or Bench Freeze

This could happen when the participants are downloading large files simultaneously in a session. The application supports a maximum of two users to perform downloads at the same time.

#### NOTE

To optimize the use of this application, it is not recommended to stream videos on the remote bench PC.

- 
- 1 All participants in the session are recommended to exit and rejoin the session.
  - 2 Restart the web browser that you are using to access the application.

This information is subject to change  
without notice.

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