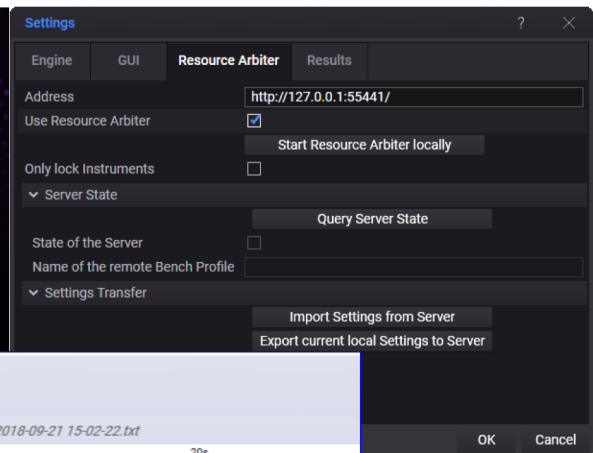


# Keysight Resource Arbiter

## Installation Guide

The image shows a screenshot of the Keysight Timing Analyzer application. It displays a "Time View" for a file named "Keysight.Tap.Plugins.ResourceManager 2018-09-21 15-02-22.txt". The table shows the time active for various sources, including DUT A, DUT B, DUT C, DUT D, Inst 1, and Inst 2, along with their respective percentages and detailed timing breakdowns for each instrument and DUT.

| Source | (Time Active, %) | 20s             |                 |                 |
|--------|------------------|-----------------|-----------------|-----------------|
| DUT A  | 15.0 s ( 28.3%)  |                 |                 |                 |
| DUT B  | 15.1 s ( 28.5%)  | Inst 1 [4.09 s] | Inst 2 [9.01 s] |                 |
| DUT C  | 15.0 s ( 28.3%)  |                 |                 | Inst 1 [4.01 s] |
| DUT D  | 15.0 s ( 28.3%)  |                 | Inst 1 [4.01 s] |                 |
| Inst 1 | 24.2 s ( 45.6%)  | DUT B [4.09 s]  | DUT D [4.01 s]  | DUT C [4.00 s]  |
| Inst 2 | 36.0 s ( 68%)    |                 | DUT B [9.01 s]  |                 |

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# Notices

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For support, go to the [PathWave Test Automation Web page](#) and click Contact an Expert.

# Introduction

This document provides an overview of the Resource Arbiter PathWave Test Automation package followed by instructions for getting started. Describing the functionality and recommended workflows of the Resource Arbiter PathWave Test Automation plugin in entirety is not within the scope of this document. For detailed information, it is highly recommended to refer to the *Resource Arbiter User Guide*.

## Resource Arbiter Overview

The Resource Arbiter is a service that enables the sharing of instruments between participating DUTs without forcing the DUTs to know about each other, while also guaranteeing that they do not interfere with each other in their use of the instruments.

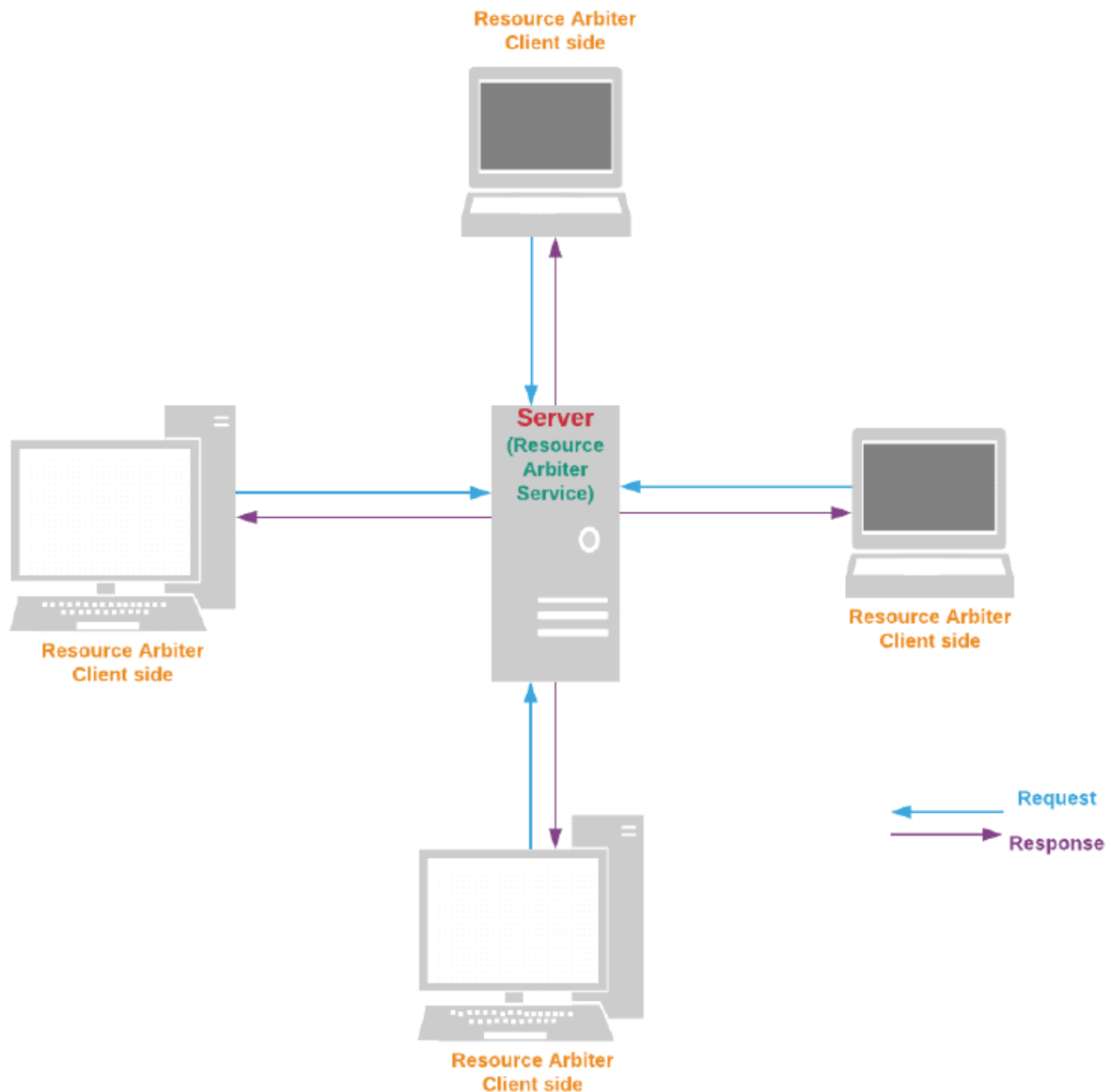
The Resource Arbiter Server has the following functions and characteristics:

- Lock/Allocate an instrument based on:
  - Instrument class (e.g. "Any DCA") or a specific instrument
  - Available routes
  - Cost of switching
- REST API for use from any client. An example that explains the API and its use has been provided.
- Switch Operation:
  - Easily integrate any Switch by implementing a simple `ISwitch` interface for the Switch Instrument driver
  - Routes for DUT <-> locked instruments automatically set
- Visualize resource usage history with PathWave Test Automation Timing Analyzer
- Statistical data via API:
  - Insight into the current usage state of the instruments as well as the pending requests to lock them
  - Enables analysis of the overall utilization of your instruments
- Robust in times of Client failures (crashes)
- Special support for Instrument Service and Cloud Computing
- Internally uses PathWave Test Automation and PathWave Test Automation related data structures

Resource Arbiter client integration for Test plans running on PathWave Test Automation ("Client") offers the following capabilities:

- configure, enable/disable interaction with Resource Arbiter
- automatically inject communication to Resource Arbiter
- push/pull instrument/DUT configuration changes

The Resource Arbiter comprises of two components – the server-side PathWave Test Automation packages and the client-side PathWave Test Automation packages.



### Resource Arbiter in a Distributed Environment

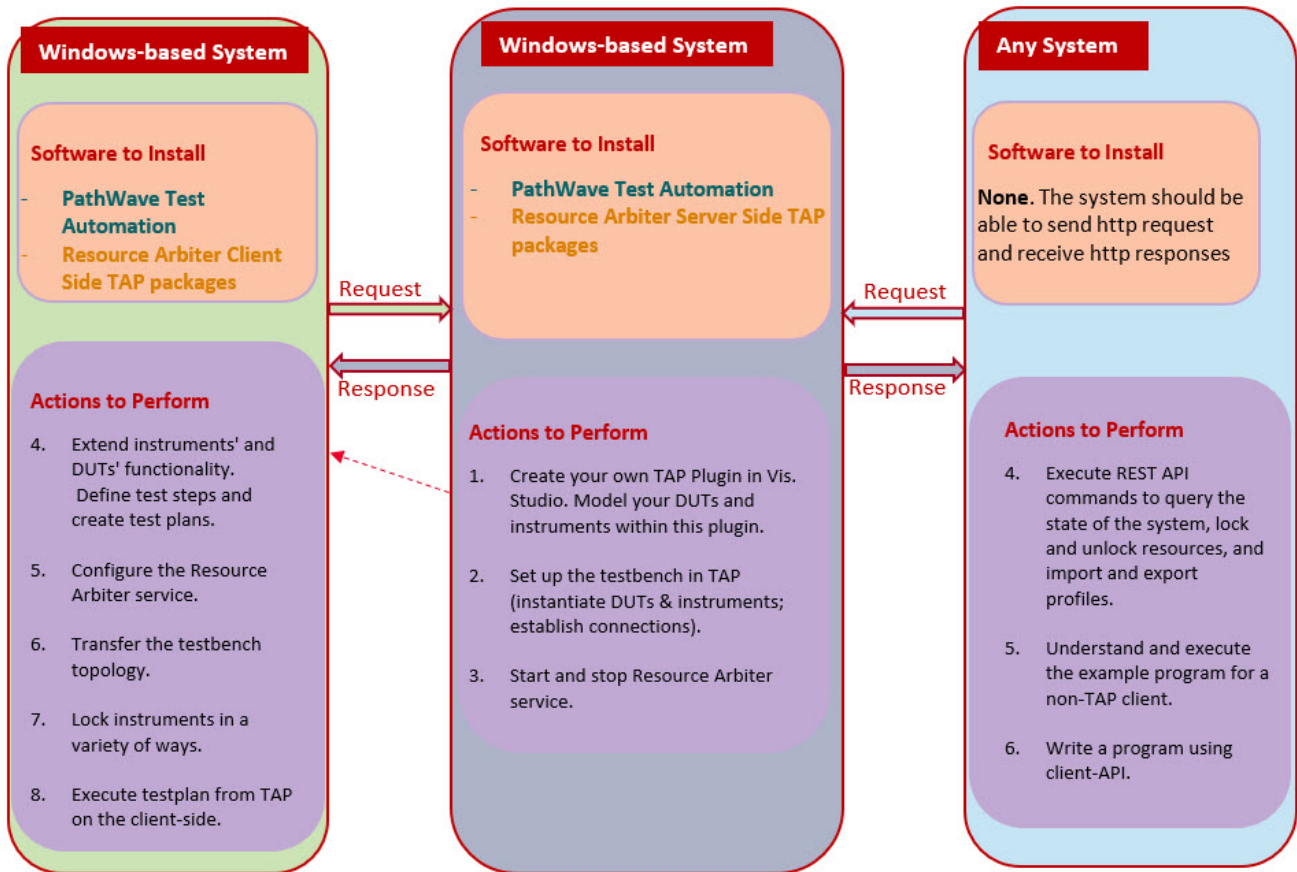
For illustration the picture shows a maximally distributed system. The actual mapping to physical (or virtual) machines might combine some of the machines used, or in the extreme case let all Resource Arbiter clients and the Resource Arbiter Server run on a single machine.

You can also install the standalone Resource Arbiter GUI package, which installs the PathWave Test Automation and Resource Arbiter server and enables you to access the Resource Arbiter GUI from your machine. For more information, see [Installing and Accessing the Resource Arbiter GUI](#) .

# Getting Started with Resource Arbiter

Perform the following steps to get started with the Resource Arbiter plugin.

1. Install PathWave Test Automation. Refer to [Install PathWave Test Automation](#) .
2. Install the Resource Arbiter Server PathWave Test Automation packages. Refer to [Installing the Resource Arbiter Server-Side Package](#) .
  - a. Review the prerequisites.
  - b. Install the .TapPackages file.
  - c. Install the required licenses.
  - d. Test the installations.
  - e. Start the service.
3. Install the Resource Arbiter Client PathWave Test Automation packages. Refer to [Installing the Resource Arbiter Client-Side Package](#) .
  - a. Review the prerequisites.
  - b. Install the .TapPackages file.
  - c. Install the required licenses.
  - d. Test the installations.
4. On the Resource Arbiter server, perform the following steps: (Refer to the [Resource Arbiter User Guide](#) for detailed instructions)
  - a. Create your own PathWave Test Automation plugin in Visual Studio. Model your DUTs and instruments within this plugin.
  - b. Set up the testbench in PathWave Test Automation by instantiating DUTs and instruments and establishing connections.
  - c. Start the Resource Arbiter service.
5. On the client-side, if you have PathWave Test Automation installed, perform the following steps: (Refer to the [Resource Arbiter User Guide](#) for detailed instructions)
  - a. Extend instruments' and DUTs' functionality. Define test steps and create test plans.
  - b. Configure the Resource Arbiter service.
  - c. Transfer the testbench topology, if required.
  - d. Execute testplan from PathWave Test Automation on the client-side.
6. On the client-side, if you do not have PathWave Test Automation installed, perform the following steps: (Refer to the [Resource Arbiter User Guide](#) for detailed instructions)
  - a. Execute REST API commands to query the state of the system, lock and unlock resources, and import and export profiles.
  - b. Understand and execute the example program for a non-PathWave Test Automation client.
  - c. Write a program using client-API.



Resource Arbiter plugin workflows

Alternatively, access the Resource Arbiter GUI for adding resources in your system and automatic allocation of these resources for performing disaggregated measurements in compliance applications. Please note that this is currently working with resources of type ResourceNode only, as used by disaggregated compliance applications.

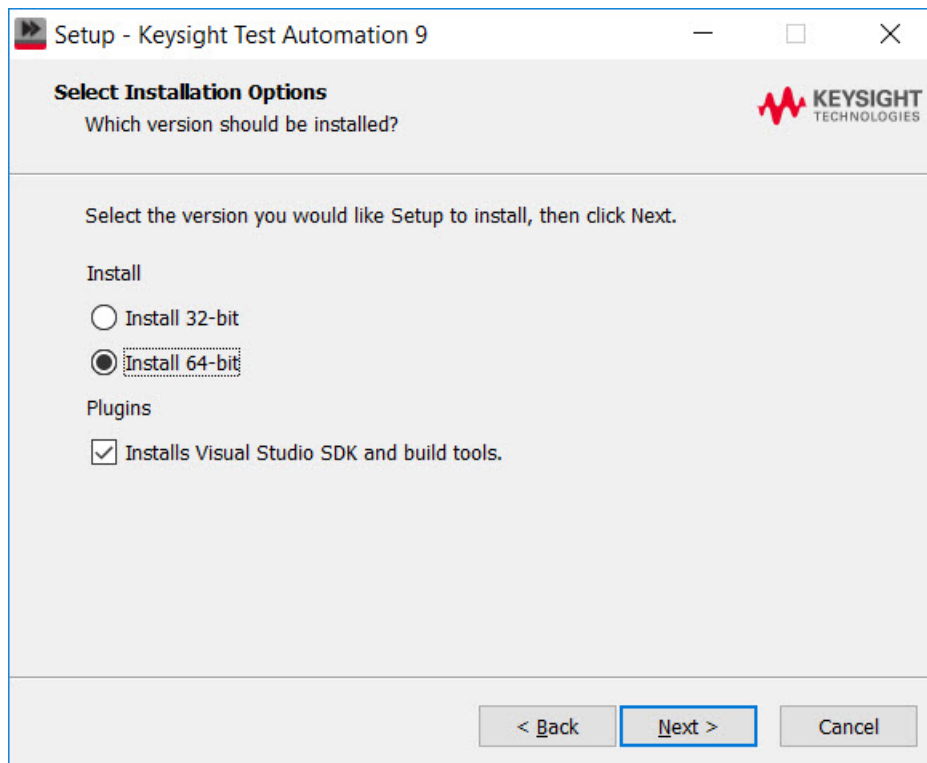
# Install PathWave Test Automation

**Note:** Users of measurement disaggregation are not required to install PathWave Test Automation explicitly. They are advised to skip to the [Installing and Accessing the Resource Arbiter GUI](#) section for instructions on installation from the KS8108A Resource Arbiter Server Bundle Installer.

Download and install the [PathWave Test Automation Platform - TAP](#) .

KS8000A is sufficient for executing Resource Arbiter Service and for executing existing test plans on a command line.

However, KS8400A is needed on a developer machine and to set up Resource Arbiter on a server or a client. So, at least one KS8400A instance is needed. Make sure to select the **Installs Visual Studio SDK and build tools** check box during installation.



Selecting Visual Studio SDK and Build Tools

**Note:** The above step requires that Visual Studio is already installed on your computer.

Follow your company's procedure to obtain a license for KS8000A or KS8400A. Install the license using Keysight License Manager.



# Installing the Resource Arbiter Server-Side Package

This section covers the prerequisites, installation steps, license information, and starting/stopping the service information for the Resource Arbiter Server-Side Package.

## Prerequisites

The following are the prerequisites for the Resource Arbiter server-side package:

- PathWave Test Automation version 9.10. KS8400A is recommended. KS8000A is sufficient after initial setup. See [Install PathWave Test Automation](#) for installation instructions.
- .NET Framework 4.6.2 (comes packaged with PathWave Test Automation)

## Installation Steps

Perform the following steps to install the Resource Arbiter server-side packages:

- Download `Resource Arbiter Server.TapPackages`.
- When you have PathWave Test Automation KS8400A installed and licensed, you can download the following Resource Arbiter packages from the OpenTAP Package repository <http://packages.opentap.io> and install simply via double clicking the TapPackage files in the following order:
  - Resource Placeholders TapPackage
  - Resource Arbiter Shared TapPackage
  - Resource Arbiter Server TapPackage Alternatively, to install via the `.TapPackages` file, use the technique described in the next step.
- When you have PathWave Test Automation KS8000A installed and licensed, you can install using the following commands on the command line:

```
cd %TAP_PATH%
tap package install ["yourpathtothepackage"]
```

## Installing the Licenses

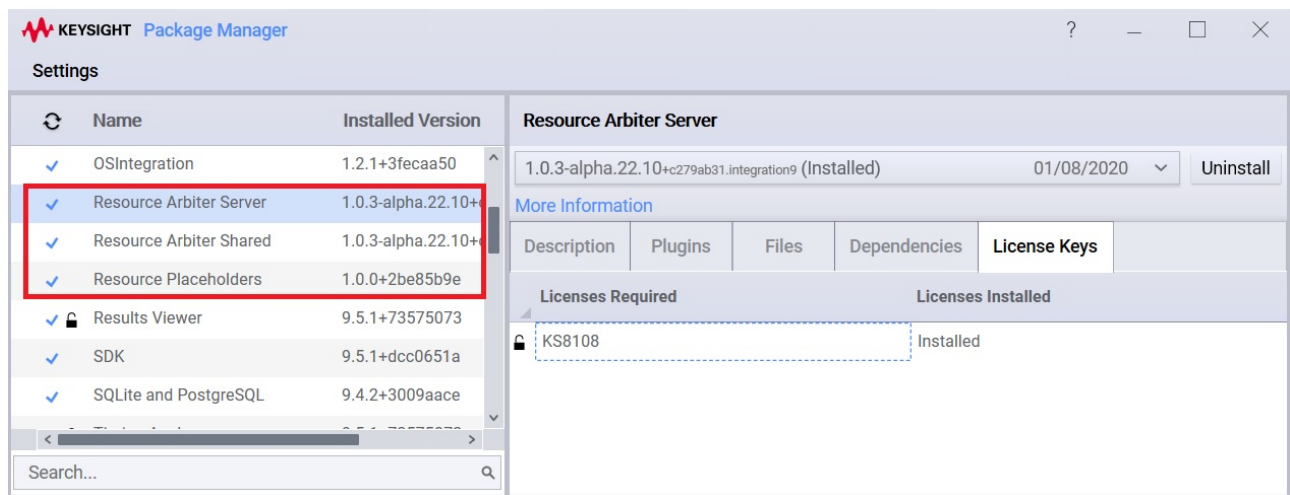
Perform the following steps:

- Install the KS8108A license for Resource Arbiter server-side package using Keysight License Manager.

## Testing the Installation

After you have installed the Resource Arbiter server-side package, you will notice the following:

- Entries in the PathWave Test Automation Package Manager.



### Resource Arbiter .NET framework package

**Note:** The version of the plugins displayed in your PathWave Test Automation Package Manager might vary based on the version you have installed.

- In %TAP\_PATH%\Packages\Resource Arbiter Server:  
Keysight.Tap.Plugins.ResourceArbiter.exe
- Following example programs in %TAP\_PATH%\Packages\Resource Arbiter\Resource Arbiter Examples:  
Non-Tap Client\Resource Arbiter Client\ResourceArbiterClient.csproj  
Without Switch Manager\ResourceArbiterExampleWithoutSwitchManager.TapSettings

For more information on using these examples, refer to the [Resource Arbiter Online Help](#).

## Starting and Stopping the Service

Once you have ensured that the server package has been installed successfully, perform the following steps to start the service:

- Open up a command prompt and enter the following commands:  

```
cd %TAP_PATH%
tap resourcearbiter
```
- For more verbose output use -v; additionally, use -c for selective coloring:  

```
tap resourcearbiter -v -c
```
- To stop the service, press Ctrl + C in the command window in which the service has been started.

# Installing the Resource Arbiter Client-Side Package

This section covers the prerequisites, installation steps, licensing and usage information for the Resource Arbiter Client-Side Package.

## Prerequisites

The following are the prerequisites for the Resource Arbiter client-side package:

- PathWave Test Automation version 9.10. KS8400A is recommended. KS8000A is sufficient after initial setup. See [Install PathWave Test Automation](#) for installation instructions.
- .NET Framework 4.6.2 (comes packaged with PathWave Test Automation)

## Installation Steps

**Note:** This procedure is only necessary if you plan on using PathWave Test Automation as the client for the Resource Arbiter. There is a scenario involving the use of REST API at the client-side that requires a server-side installation of the Resource Arbiter. In this scenario, it is not mandatory to install PathWave Test Automation or the Resource Arbiter client-side package on the client machine.

Perform the following steps to install the Resource Arbiter client-side component.

- Install Microsoft Visual Studio to write your own test steps and define your own DUTs and instruments. **Note:** Ideally, this step must be performed before the PathWave Test Automation KS8400A is installed. Refer to [Installing PathWave Test Automation](#).
- Download `Resource Arbiter Client.TapPackages` package.
- When you have PathWave Test Automation KS8400A installed and licensed, you can download the following Resource Arbiter packages from the OpenTAP Package repository <http://packages.opentap.io> and install simply via double clicking the TapPackage files in the following order:
  - Resource Placeholders TapPackage
  - Resource Arbiter Shared TapPackage
  - Resource Arbiter Client TapPackage Alternatively, to install via the .TapPackages file, use the technique described in the next step.
- When you have PathWave Test Automation KS8000A installed and licensed, you can install using the following commands on the command line:

```
cd %TAP_PATH%
tap package install ["yourpathtothepackage"]
```

After installation, you are able to customize the Resource Arbiter to fit the topology of your own test station.

## Installing the Licenses

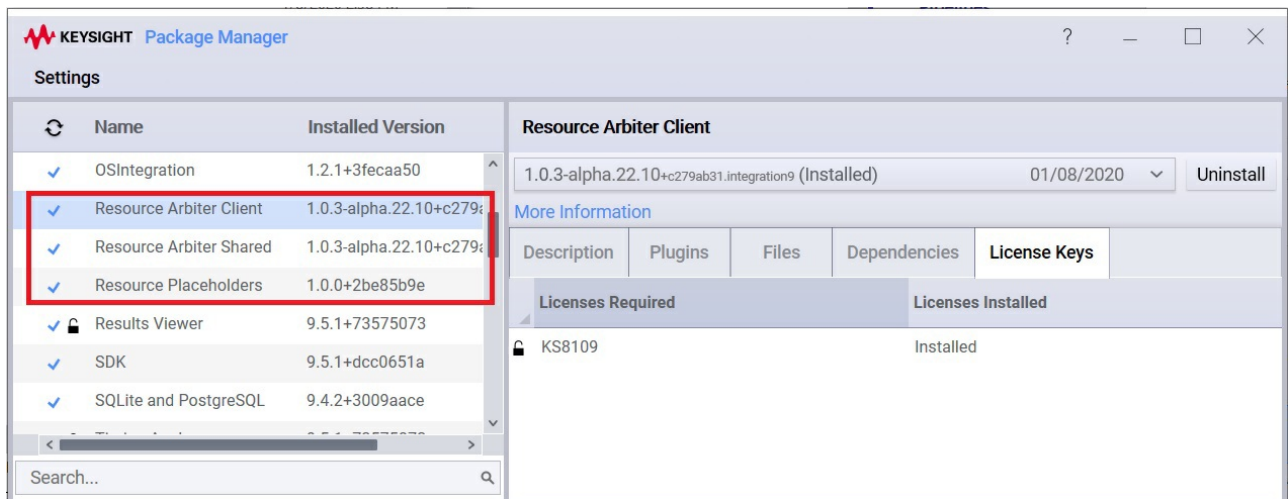
Perform the following steps:

- Install the KS8109A license for Resource Arbiter client package using Keysight License Manager.

## Testing the Installation

After you have installed the Resource Arbiter client-side package, you will notice the following:

- Entries in the PathWave Test Automation Package Manager.



### Resource Arbiter Client-side package

**Note:** The version of the plugin displayed in your PathWave Test Automation Package Manager might vary based on the version you have installed.

- Following example programs in %TAP\_PATH%\Packages\Resource Arbiter\Resource Arbiter Examples:
  - Example Classes
  - Without Switch Manager
  - Without Switch Manager2
  - Without Switch Manager Advanced

For more information on using these examples, refer to the [Resource Arbiter Online Help](#).

## Using the Resource Arbiter Client Package

After you have installed the Resource Arbiter client package, you can write classes for DUTs, Instruments, and Test Steps that you can access from inside PathWave Test Automation.

# Installing and Accessing the Resource Arbiter GUI

The Resource Arbiter GUI can be installed by running the KS8108A Resource Arbiter Server Bundle Installer (a .exe file) available on keysight.com. There is no prerequisite for installing the PathWave Test Automation, in this case.

When installing the Resource Arbiter GUI from the .exe file, it is strongly recommended to install the application on a machine with no prior PathWave Test Automation installation. Existing PathWave Test Automation users intending to make use of the Resource Arbiter web GUI are strongly recommended to install Resource Arbiter server version 1.1 from the .TapPackages file and follow the steps for accessing the web GUI.

Before you can access the Resource Arbiter GUI, install the KS8108A license using Keysight License Manager, on the machine that has the Resource Arbiter installed.

## Accessing the Resource Arbiter GUI

You can access the Resource Arbiter GUI by performing the following steps:

1. Start the Resource Arbiter server using ANY of the following techniques:
  - Use the ResourceArbiter.bat shortcut in the Start Menu: Start > Keysight Test Automation > Keysight Resource Arbiter
  - Start the ResourceArbiter.bat batch file from your Keysight Test Automation installation folder. The default location for this batch file is C:/Program Files/Keysight/Test Automation
  - Start the Resource Arbiter service by entering the following commands on a command line:

```
cd %TAP_PATH%  
tap resourcearbiter
```

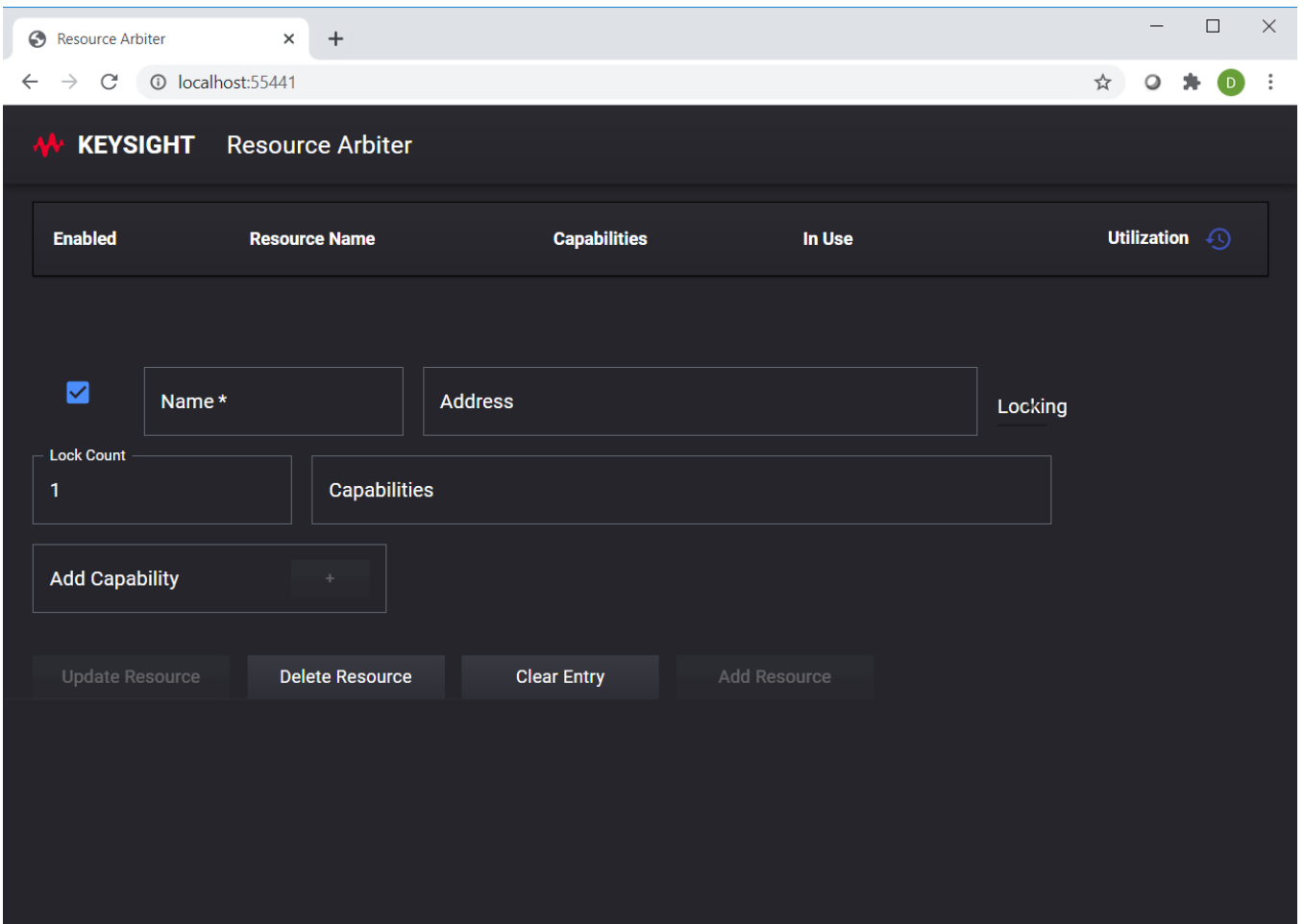
2. Access the following url from your web browser:

[http://<serverIP\\_or\\_hostname>:55441/](http://<serverIP_or_hostname>:55441/)

**Note:** The Internet Explorer web browser is not recommended for accessing the Resource Arbiter GUI.

If you are accessing the Resource Arbiter GUI from the same machine on which you started the Resource Arbiter service, access the GUI from the following url: <http://localhost:55441/>

The Resource Arbiter GUI is displayed:



Resource Arbiter GUI

For more information on the basic usage steps for the Resource Arbiter GUI, refer to the *ResourceArbiterHelp* available in both PDF and CHM formats. If the Resource Arbiter is already installed, it can be found in (%TAP\_PATH%\Packages\Resource Arbiter).

## Related Documentation

For more information related to concepts surrounding Resource Arbiter and basic usage steps, refer to the *ResourceArbiterHelp* available in both PDF and CHM formats. If the Resource Arbiter is already installed, it can be found in (%TAP\_PATH%\Packages\Resource Arbiter).