



Installation Guide

CloudShell 7.1 GA

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Overview

The CloudShell Suite 7.1 GA Installation Guide provides the installation requirements, hardware and software specifications, and the procedures for installing or upgrading to CloudShell 7.1 GA.

This guide leads you through the installation wizard and directs you to the configuration options that need to be modified for your particular installation. It includes the following main topics:

[Quick Installation](#): describes the steps required for a quick installation with default values.

[Upgrade Procedure](#): describes the steps required for upgrade.

[Complete Installation](#): describes the steps required for complete installation.

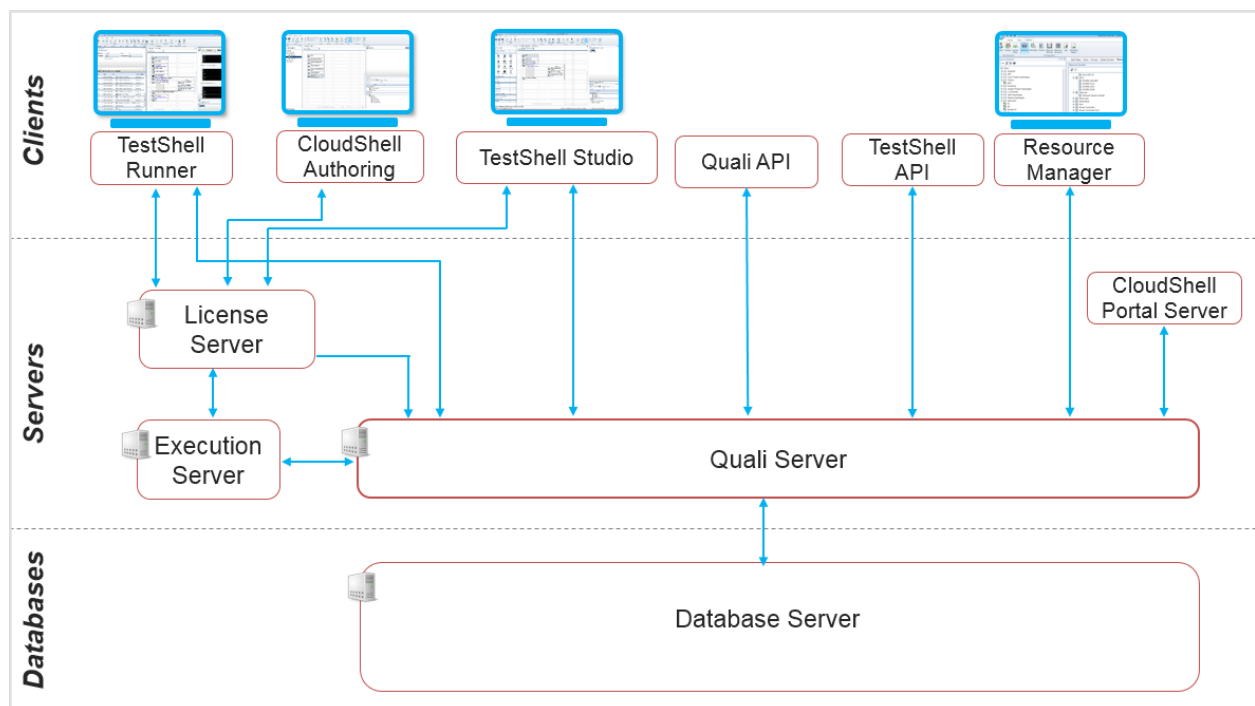
[Configure CloudShell Products](#): describes the steps required for post-installation product configurations.

What's Included with CloudShell 7.1 GA

This section describes the various CloudShell components, servers, databases and utilities. The actual items that are installed depend on your selection during the installation procedure.

CloudShell Components

The CloudShell components are depicted in the following diagram.



The CloudShell components are described in the following table:

Component	Description
Quali Server	Runs the CloudShell framework and manages CloudShell data.
CloudShell Portal	<p>A self-service web client that enables you to manage your Resources, create and manage Environments and Reservations, as well as manage and schedule your automated testing.</p> <p>You can leverage CloudShell’s extensive automation capabilities to run Environment and Resource commands as well as automate business use cases within Reservations.</p>
TestShell Execution Server	<p>Runs commands and manages execution of tests from the Job Scheduling dashboard. The TestShell Execution Server also manages commands, such as, resource, service, environment, and power from CloudShell Portal.</p> <p>This component adds to CloudShell Portal's total execution capacity.</p>
CloudShell Authoring	Code-free hardware interface editor for quick driver development for any environment, supporting full equipment interchangeability and automatic documentation for easy collaboration.
CloudShell Resource Management Client	Use CloudShell Resource Manager to manage resources and usage. For an example of using this component, see Import User Definitions from an Active Directory (Optional) .
CloudShell Remote Runner	Executes CloudShell-specific automation steps or complete scenarios on remote stations, enabling the launch of any script or protocol on a remote machine, without requiring complex infrastructure.
TestShell Studio	Desktop applications for GUI based test authoring and execution. (Studio and Runner are automatically installed with TestShell Studio.)
CloudShell License Server	Manages network license distribution. The License Server can be installed on any machine, and should be installed before installing client components.
CloudShell Runtime	Supports the execution of CloudShell flows and drivers.
Quali API	The Quali API library provides access to job scheduling operations from outside of the Job Scheduling dashboard, as well as functions related to reservations, for example, Attach file to reservation and import and export of

Component	Description
	environments.
TestShell API	The TestShell API library comprises functions for interacting with Quali Server. For example, you can use API functions to create and configure resources, environments, routes, and reservations. This API library also provides a set of lab management batch operation functions.
CloudShell Sandbox API	The CloudShell Sandbox API allows to use CloudShell via software interfaces, for example, to develop and automate Continuous Integration/DevOps processes. For example, you can use API functions to view details about environments (blueprints) and reservations (sandboxes) related to a particular user domain and user permissions, and the available actions that can be performed on the environments (blueprints) and reservations (sandboxes)). The CloudShell Sandbox API service can be installed as a custom installation or as a standalone installation together with Resource Manager, and can be installed either on the same machine on which CloudShell Portal/Quali Server is installed, or on a different machine (see Install CloudShell Sandbox API).
Database Server	CloudShell is supported with SQL database. For more information, see Database Prerequisites .

Utilities and Drivers

CloudShell 7.1 GA also installs/upgrades the utilities and drivers described in [Utilities and Layer 1 Drivers](#).

Remote Connections (Telnet, SSH, RDP) to CloudShell Resources

To support creating remote connections (Telnet, SSH, RDP) to resources in your CloudShell reservation (sandbox) directly from within the Internet browser, QualiX is available from the Quali's Download Center from this [link](#). Go to the Quali Latest Release section, and make sure to download and install the latest QualiX release version.

High Availability

A failover cluster is a group of independent servers (nodes) that work together to increase the availability and scalability of clustered nodes. The clustered nodes are connected by physical cables and by software. If a disaster occurs and the active cluster node goes down, the clustering solution

changes the active node automatically to the standby server and the Quali Server starts on the new active node.

To support the installation, configuration and deployment of high availability solutions in CloudShell, the following documents are available from [Quali's Download Center](#):

High Availability Installation and Configuration Guide

This document describes the installation and configuration of CloudShell in a High Availability (HA) environment.

High Availability Deployment Guide

This document presents the recommended architecture for implementing CloudShell in a High Availability (HA) environment.

System Requirements

This section describes the system requirements for the CloudShell components.

The requirements listed are those for a typical small installation with up to three active environments. For system requirements for other installation sizes, contact your Quali Technical Account Manager.

Note: Due to Microsoft's limitations on the number of concurrent sessions, in order to use CloudShell in a production environment, it must be installed on a Windows Server machine.

Servers

Quali Server requirements

Requirements	Description
Software	
Windows	<p>Any one of the following (including all variants):</p> <ul style="list-style-type: none">• 7 32 bit or 64 bit• Server 2008 R2 64 bit (Service Pack 1 is required for CloudShell 7.1 GA Patch 2 and above)• Server 2012 64 bit• Server 2012 R2 64 bit• 8.0 and 8.1• 10 <hr/> <p>Note: Windows Server 2012 Standard and Datacenter edition (and above) support High Availability (HA) solutions.</p>
SQL Server	<p>Any one of the following:</p> <ul style="list-style-type: none">• SQL Server 2008 R2 SP2• SQL Server 2012 Standard edition• SQL Server 2014 Standard edition• SQL Server 2016 Standard edition <hr/> <p>Note: SQL Server 2012 Enterprise, SQL Server 2014 Enterprise or SQL</p>

Requirements	Description
	Server 2016 Standard Edition support High Availability (HA) solutions.
Hardware	
CPU	4 quad cores
RAM	A minimum of 8 GB
Hard Drive	An SSD drive is recommended for the database server Consult Quali support about the amount of required storage.
Network cards	1/10 GB, according to network load

TestShell Execution Server minimum requirements

Requirements	Description
Software	
Windows	Any one of the following: <ul style="list-style-type: none">• 7 32 bit or 64 bit• Server 2008 R2 64 bit• Server 2012 64 bit• Server 2012 R2 64 bit• 8.0 and 8.1• 10
Hardware	
CPU	4 quad cores
RAM	2 GB
Hard Drive	Minimum of 60GB for execution server only. HDD with a page-file capacity of 200 MB

Note: TestShell Execution Server requirements vary according to the required usage. For example, in a scenario where 16 CPU intensive tests are run at any given time, an optimal environment would be a machine with 32 CPU cores, with capacity set to 16, or 2 machines with 16 CPU cores, with capacity set to 8 for each

machine. In another scenario where 8 memory intensive tests are run at any given time, an optimal environment would be a machine with 16GB RAM, with capacity set to 8.

Client Applications

This section lists the requirements for the following client applications.

CloudShell Authoring

Requirements	Description
Operating System	Any one of the following: <ul style="list-style-type: none">• Windows 7 (32/64 bit)• Windows Server 2008 R2• Windows Server 2012 R2 64 bit• Windows 8.0 and 8.1• Windows 10
Hardware	<ul style="list-style-type: none">• CPU – dual core minimum• RAM – at least 4 GB

CloudShell Resource Management Client

Requirements	Description
Operating System	Any one of the following: <ul style="list-style-type: none">• Windows 7 (32/64 bit)• Windows Server 2008 R2• Windows Server 2012 R2 64 bit• Windows 8.0 and 8.1• Windows 10
Hardware	<ul style="list-style-type: none">• CPU – dual core minimum• RAM – at least 4 GB

Automation clients

Requirements	Description
Operating System	Any one of the following: <ul style="list-style-type: none">• Windows 7 (32/64 bit)• Windows Server 2008 R2• Windows Server 2012 R2 64 bit• Windows 8.0 and 8.1• Windows 10
Hardware	<ul style="list-style-type: none">• CPU – dual core minimum• RAM – at least 4 GB

CloudShell Remote Runner

Requirements	Description
Operating System	Any one of the following: <ul style="list-style-type: none">• Windows Vista• Windows 7 (32/64 bit)• Windows Server 2003• Windows Server 2008 R2• Windows Server 2012 R2• Windows 8.0 and 8.1• Windows 10• Red Hat Enterprise• Linux 5.x (32-bit)• Fedora 7-9• Ubuntu 6.06-8.04
Hardware	No special requirements

CloudShell Required Ports

This section describes the ports that are required by CloudShell.

The following table describes the required ports for each server or machine on which the port needs to be made available.

Server/Machine	Protocol/Port	Description
SQL Server	TCP/1433	Used by Quali server to request the store and retrieve information. For more info: https://msdn.microsoft.com/en-us/library/cc646023.aspx .
Licensing Server	UDP/5093	Used by Quali Server, CloudShell Resource Management Client, CloudShell Authoring, TestShell Studio, TestShell Runner, TestShell Execution Server
Quali Server	TCP/8028	Used by all CloudShell components to communicate with the Quali Server.
	TCP/8029 TCP/9000	Used by API clients to communicate with the Quali Server.
	HTTP/8034	Used by the Sandbox API Web server (internal)
	TCP/8031 TCP/8029	Used by Execution Servers to communicate with the Quali Server.
	HTTP/8030 TCP/8023	Used by Studio and Runner
CloudShell Portal	HTTP – TCP/80	Used by browsers to access the CloudShell Portal
Sandbox API Web Server	HTTP/82 HTTPS/3443	Used by the API clients to connect and communicate with the API
Remote Runner	TCP/8101	Used by Studio to request test execution.

3rd Party Software

This section describes the 3rd Party software that is required, optional, and supported by CloudShell.

Note: Administrator-level permission is necessary when installing 3rd Party software that is required by CloudShell.

Required

- IIS Express v8.0 (Required for using CloudShell Portal)
- Microsoft .NET Framework 4.0-4.5.2
- Microsoft Visual C++ Runtime 9.0
- Microsoft Visual C++ Runtime 10.0
- Microsoft Windows Installer 4.5
- Python 2.7
- VCTools++ (For all users. Required for compiling Python dependencies)

If any of the above 3rd Party components are missing from your computer, the CloudShell installation wizard installs them before installing the CloudShell application.

Optional

- Studio, Driver Builder: LabView runtime and LabView tools are available as a separate installation.
- Insight: CloudShell 7.1 GA Insight is available as a separate installation.
- Microsoft PowerShell version 2: Install this when using the command shell tool.
- Ranorex version 5.1.3: Install this when using the GUI Automator.

Note: When using Ranorex with certain browsers, you might have to install a plugin. For example, the Ranorex plugin for Chrome is available at this [link](#).

Supported

- Virtualization: VMware vCenter. The supported ESXi version is 5.5-6.0.
- Source control: CloudShell 7.0 has been tested with TortoiseSVN Version 1.7/1.7.9
- BI tools: Sisense 6.2.2 (supported for this version of CloudShell and only on 64-bit operating systems)
- Quality control:
 - HP Quality Center QC10. For deployment information, see CloudShell knowledge base > Automation execution > Integration with Quality Center > QC 10 > Integrating CloudShell with QC10.
 - HP Quality Center QC11. For deployment information, see CloudShell knowledge base > Automation execution > Integration with Quality Center > QC 11 > Installing the CloudShell plugin.

Database Prerequisites

CloudShell applications can work with SQL database.

SQL database user permissions

Provide Windows users with the following SQL server roles:

- bulkadmin
- dbcreator
- processadmin
- public
- setupadmin

In addition, also provide a specific permission to "Connect to SQL" that is granted manually in the "Securables" section of the user's login properties.

For a detailed list of SQL server roles, see [Fixed server roles](#).

Installation requirements for SQL databases

The required components must be installed in the following order:

Component	Installation instructions
Standard edition of one of the following: <ul style="list-style-type: none">• SQL Server 2008• SQL Server 2012• SQL Server 2014-or-• SQL Server 2008 Express• SQL Server 2012 Express	<ul style="list-style-type: none">• Where there is an existing SQL server installed on the organization's network, it is recommended that this is used• For a standalone installation, if the CloudShell installer cannot find Microsoft SQL Server or Microsoft SQL Server Express on the destination environment, Microsoft SQL Server Express is installed automatically as part of the installation procedure. <p>Note: There is a limitation of the maximum database size, per database, of 4 GB for SQL Server 2008 Express and 10 GB in SQL Server 2012. For further information, see SQL Server Express Overview and FILESTREAM Compatibility with Other SQL Server Features.</p>

Component	Installation instructions
Quali Server	<ul style="list-style-type: none"> The Quali Server can be located anywhere on the organization's network. For a standalone installation, the Quali Server is installed on the same machine as the clients and the database.
CloudShell applications	Quali Server, SQL server or SQL Express, and the CloudShell applications can be installed on the same machine, or on separate machines in the same network.

Software and Utilities Recommendations

For working with the automation applications

The 64-bit version of CloudShell is recommended (requires a 64-bit version of Windows).

For working with elastic search

The 64-bit version of Java is required when using a 64-bit version of Windows.

For the SNMP manager tool

An external MIB browser is recommended.

For working with the traffic libraries

Appropriate traffic generator applications must be installed.

For working with CloudShell Portal

Browser	Minimum	Maximum
Microsoft Edge	20.10240.16384.0	20.10240.16384.0
Microsoft IE	10.0.8400	11.0.19
Chrome	43.02357.81	48.0.2564.116
Firefox	38.05	44.0.2
Safari	5.1.7	5.1.7

Network Recommendations

Switches/Routers/LANS	A 1GB connection is highly recommended.
WAN	Network bandwidth with high quality of service is required for VPN connectivity and multi-site implementations.

Security Recommendations

User permissions	Administrator access is required for all test stations/servers.
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Performance Considerations

CPU usage	CPU usage by external applications may impact CloudShell performance.
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Quick Installation

Use this quick procedure to guide you to install CloudShell as a standalone installation with a Microsoft SQL Server 2008 Express R2 database.

Note: This procedure is suitable if this is first time that CloudShell is being installed on your machine. Otherwise, follow the upgrade procedure, see [Upgrade Procedure](#).

Before You Begin

Ensure that your machine has the minimum system requirements, as listed in the following tables. The requirements listed are those for a typical small installation with up to three active environments.

Operating system

Windows	Any one of the following:
	<ul style="list-style-type: none">• 7 32 bit and 64 bit• Server 2008 R2 64 bit• Server 2012 64 bit• Server 2012 R2 64 bit• 8.0 and 8.1• 10

Hardware

CPU	4 quad cores
RAM	A minimum of 8 GB

Install CloudShell in a Quick Procedure

The Installation wizard checks for missing prerequisite components and installs them as part of the installation process.

To install CloudShell in a quick procedure:

1. Download the installation package for CloudShell 7.1 GA from [Quali's Download Center](#) and save it to a temporary directory.
2. Navigate to the temporary directory and from the installation package, double-click [setup.exe](#).
3. If prerequisite components are not installed, you are prompted to install them. Click **OK**.
4. In the **Welcome** window, click **Next**.
5. Accept the license agreement and click **Next**.
To apply a license using an activation code, see [Get a license file](#).
6. In the **Type of Installation** window, specify the **Standalone** installation type and click **Next**.
7. In the **Component selection** window, select all the components and click **Next**.
8. In the **Destination folder** window, accept the default or modify it, as required. Click **Next**.
9. In the **IIS configuration** window, select the **Set IIS Express** option. You can accept the default port value or specify a port. Click **Next**.
10. Follow the prompts of the installation wizard, accepting the default values.
The CloudShell Configuration Wizard launches automatically when the respective CloudShell applications have been installed. Follow the prompts of the CloudShell Configuration Wizard to configure, in succession, each selected CloudShell application.

Upgrade Procedure

This section describes the required steps to upgrade to the latest version of CloudShell.

Note: A new license is needed for every upgrade to a major CloudShell version.

Upgrading to version 7.1 GA EA is supported from the following versions:

- 7.0 GA (and patches)
- 6.4 GA (and patches)
- 6.3 GA (and patches)

When upgrading from versions earlier than 6.3 GA, you must first upgrade to one of the above versions and then to 7.1 GA EA.

Note: Patches must be installed on GA versions only. Installing a patch on a non-GA version will result in unexpected behavior which may corrupt the database.

Before running the installer, uninstall the CloudShell Resource Management Client from any non-admin machines.

Note: Stop the service to avoid data change.

Upgrade Preparation

Back Up and Restore CloudShell

To backup and restore CloudShell:

1. Make sure all the users are logged off and that the CloudShell applications are not running.
2. Shut down CloudShell services in the Production environment, including the IIS Service and any web service connection to the databases.
3. Perform a backup of the schemas.
4. Restart CloudShell services, IIS and web services in the production environment (CloudShell Service first and then the rest).
5. Copy the backup files to the Development environment.

6. Shut down CloudShell services in the Development environment including the IIS Service and any web service connection to the databases.
7. Restore the backup files into the existing schemas.
8. Restart CloudShell services in the Development environment (first restart the CloudShell Service and then the remainder).

Proceed to [Upgrade the Validation Environment](#).

Upgrade the Validation Environment

The purpose of installing the CloudShell upgrade on a standalone environment is to ensure that the new version functions correctly under your organization-specific environment.

Note: Quali recommends that you validate the organization-specific environment before upgrading CloudShell.

The validation stage checks for:

- Environment-specific installation errors
- Environment-specific compatibility issues

What you need for this stage

- [CloudShell installation files](#)
- [3rd party installation files](#)
- [Database management application](#)
- [Standalone environment for validation](#)
- [Temporary license](#)

CloudShell installation files

You need the installation package for the CloudShell implementation, and the installation package for the current implementation.

You can get the latest CloudShell version from your ftp account at <ftp.qualisystems.com>.

Contact Quali Customer Support through the [Quali Support Center](#) if you need to download older installation files.

3rd party installation files

Get the installation files of the 3rd party tools being used with CloudShell on your production environment, for example:

- Traffic Generator GUI application (Ixia, Spirent, and so on)
- Ranorex 5.1.3 - Older versions of Ranorex must be upgraded to continue using the GUI tools.

Database management application

For example:

- SQLPlus
- SQL Management Studio

Standalone environment for validation

Ideally, the validation environment is identical to your production environment.

Some guidelines:

- Consider using virtual machines and/or terminal server if your production is a virtualized one.
- Aim to use the same hardware sets, same OS versions, same database brand and version, and so on. The purpose is to be able to find all environment-related issues using this environment. You need at least two machines: one for the Quali Server and one for the client applications.
- Make sure that the different devices that are being used by CloudShell are available for your validation stage. That includes traffic generators, L1 switches, other switches, and so on.

Note: If a device is being used by the production environment, it cannot be used in the standalone environment at the same time – this is extremely important when dealing with L1 switches.

Temporary license

1. To activate CloudShell on the validation environment, you need a license.
2. Run the CloudShell installer or the fingerprint application and get the fingerprint information of your machines.
3. Send a license request with this information to Quali Customer Support through the [Quali Support Center](#).

Validation Environment Upgrade Procedure

Perform a full backup of CloudShell's database from the Production environment and save the backup files for later use.

The files are used to copy the production database information to the standalone environment as a backup for the production database in case a rollback is required.

In a virtualized environment, consider creating an image of the Quali Server and client machines for a quick and easy rollback in case it is needed.

In the validation environment:

1. Follow the Installation Guide and install the same CloudShell version that is currently installed on your production environment.
2. Install the 3rd party applications (Traffic Generator GUI applications, Ranorex, and so on).
3. Install a database management application.
4. Restore the production environment database files.
5. Activate CloudShell and verify that all applications are functional.
6. In Resource Manager, perform the following steps:
 - a. Verify that all resources exist in the Resource Explorer.
 - b. Verify that you can create, edit, and delete reservations and activate environments.
 - c. Verify that resources can launch commands and applications.

Note: Make sure your validation environment is ready before continuing to the next step.

7. If you are using an L1 switch in your environment, stop usage of any L1 switches that are shared with the production environment.

An L1 switch can be controlled only by a single Quali Server at any time. Since the L1 switch is usually a shared resource between the production and validation environments, it is required to stop the usage of the L1 switch on the production environment, before using it in the validation environment. That includes closing all Resource Manager Client applications and any driver projects that use the TestShell API library.

8. Run the `setup.exe` file to perform the upgrade.

Proceed to [Upgrade the Production Environment](#).

Upgrade the Production Environment

When upgrading the production environment, the working procedures from the validation upgrade are repeated, see [Upgrade the Validation Environment](#).

What you need for this stage

CloudShell installation files

Use the files from the validation step, see [Validation Environment Upgrade Procedure](#).

Prepare the production environment

All users should be logged off from the production machine, and the work on this machine should be suspended until the procedure is completed.

Acquire a permanent license

To activate CloudShell on the validation environment, you need a license. For more information, see [Select a CloudShell License](#).

To acquire a permanent license:

1. Run the CloudShell installer or the fingerprint application and get the fingerprint information of your machines.
2. Send a license request with this information to Quali Customer Support through the [Quali Support Center](#).

Production environment upgrade procedure

Follow the upgrade procedure that was used to upgrade the validation environment. For more information, see [Validation Environment Upgrade Procedure](#).

Rolling Back to Earlier Versions of CloudShell

Upgrading the CloudShell version makes irreversible changes in the database, therefore with any change to the installation it is recommended to back up your databases. In order to reinstall an earlier version of CloudShell, you need to restore the database that is compatible with this version.

To install an earlier version of CloudShell

1. Back up your current files and databases.
For more information about backing up CloudShell, see [Back Up and Restore CloudShell](#).
2. Uninstall your current CloudShell version.
3. Install an earlier version of CloudShell.
For instructions on how to install earlier versions of CloudShell, see their respective Installation Guides.
4. Restore the backed-up database that corresponds with the CloudShell version you wish to install.
5. Run **CloudShell Configuration** and connect CloudShell to the restored database.

Complete Installation

This section describes the complete CloudShell installation procedure.

For information about upgrades, see [Upgrade Procedure](#).

Note: Installation of CloudShell requires administrator-level permissions.

Installation Checklist

The list below describes the complete installation and configuration procedure. It is recommended to follow the steps described in the list to ensure a complete and correct installation.

#	For information about:	See this section:
	Read the Installation known issues topic	Known Installation Issues
	Review the hardware/software requirements	System Requirements
	Review the prerequisites for running CloudShell with SQL server	Installation requirements for SQL databases
	Review the supported and required 3rd party software	Required and Supported 3rd Party Software
	Follow the backup recommendations	Back Up and Restore CloudShell
	Download the installation files	Download CloudShell 7.1 GA Installation Files
	Install the system	Install CloudShell 7.1 GA
	Configure the system	Configure CloudShell Products
	Validate and verify the installation	Installation Validation Procedure

Download CloudShell 7.1 GA Installation Files

The installation packages for CloudShell 7.1 GA are available from the [Quali's Download Center](#).

For each file you can find the associated .md5 checksum which enables you to verify its authenticity.

Note: Registration to the [Quali Support Center](#) is required. If you have not registered, click this link to register [New registration](#).

Install CloudShell 7.1 GA

You can perform the full installation of the CloudShell Suite or, optionally, while running the installation procedure, you can choose to install one or more of the CloudShell Suite components.

The Installation wizard checks for missing prerequisite components as part of the installation process. For example, the installation wizard prompts you to install .NET Framework 4.0-4.5.2 and Microsoft Visual C++ 2010 Runtime if they are not already installed.

Install CloudShell

To install CloudShell 7.1 GA:

1. From the installation package, double-click the [setup.exe](#) file.
2. If .NET Framework 4.0-4.5.2 is not installed on your machine, the installation procedure prompts you to install it.
3. Click **OK** to install .NET Framework 4.0-4.5.2.

When the .NET Framework is installed, the CloudShell Installation wizard starts.



4. In the CloudShell Installation wizard, click **Next** to open the CloudShell_InstallationTypeLicense Agreement.
5. In the **CloudShell License Agreement** window, select the **I accept the terms of the license agreement** check box.
6. Click **Next** to choose the type of installation and proceed to [Select an Installation Option](#).

Select an Installation Option

1. In the **Type of Installation** window, specify which installation to run and click **Next** to choose which components to install.

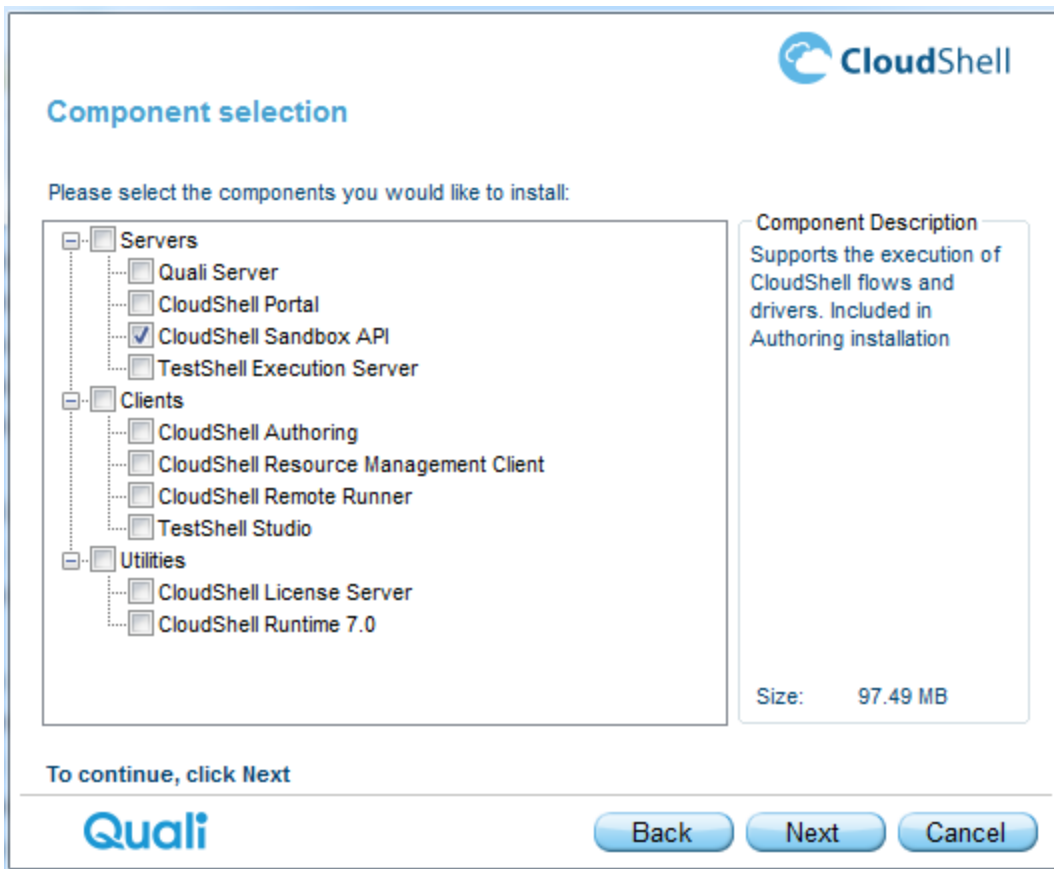


The CloudShell installation types are listed in the following table. For the purposes of this procedure, Standalone is selected.

Installation type	Description
Standalone	<p>Choose Standalone to install the client and server applications on a single machine.</p> <p>During the Standalone installation, SQL Express Server 2008 or 2012 is installed in a separate instance and all required databases are created automatically on that server.</p>
Client	<p>Choose Client installation if the Quali Server has been centrally installed on your network. This enables you to customize your installation and install the necessary local components.</p> <p>The Client installation installs one or more selected clients on a local machine.</p>
Server	<p>Choose Server installation to install the server applications.</p>

Installation type	Description
	You can choose to install the Quali Server and the CloudShell Portal on separate machines.
Custom	Choose Custom installation to manually select installation components. For more information about the available installation components, see CloudShell components.

For example, if **Custom** is chosen, select the components that you need to install, as required.



For example, see [Install CloudShell Sandbox API](#) which describes how to install the CloudShell Sandbox API, which can be installed either via Standalone or Custom installation.

2. After you have specified which installation type to run, click **Next** and proceed to [Specify which CloudShell Components to Install](#).

Install CloudShell Sandbox API

You need to install the CloudShell Sandbox API service in order to be able to use the CloudShell Sandbox API to use CloudShell via software interfaces, for example, to develop and automate Continuous Integration/DevOps processes.

To install the CloudShell Sandbox API service:

1. In the **Type of Installation** window, specify the installation type.
2. For a custom installation, select **Custom**, click **Next**, and in the **Component selection** window, select the **CloudShell API** option.

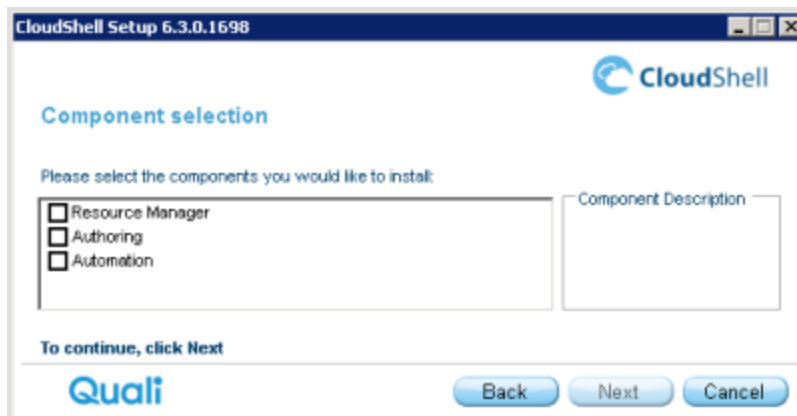
-or-

For a standalone installation, select **Standalone**, click **Next**, and select **Resource Manager**. The CloudShell Sandbox API is automatically installed together with the Resource Manager.

Note: You can install the CloudShell Sandbox API service either on the same machine on which CloudShell Portal/Quali Server is installed, or on a different machine, and you can install several instances of this service on several machines. For configuration details, see [Configure CloudShell Sandbox API](#).

Specify which CloudShell Components to Install

1. In the **Component selection** window, specify which components to install.



The available components are listed in the following table.

Installation type	Description
Resource Manager	Choose Resource Manager to install the CloudShell Resource Management Client.

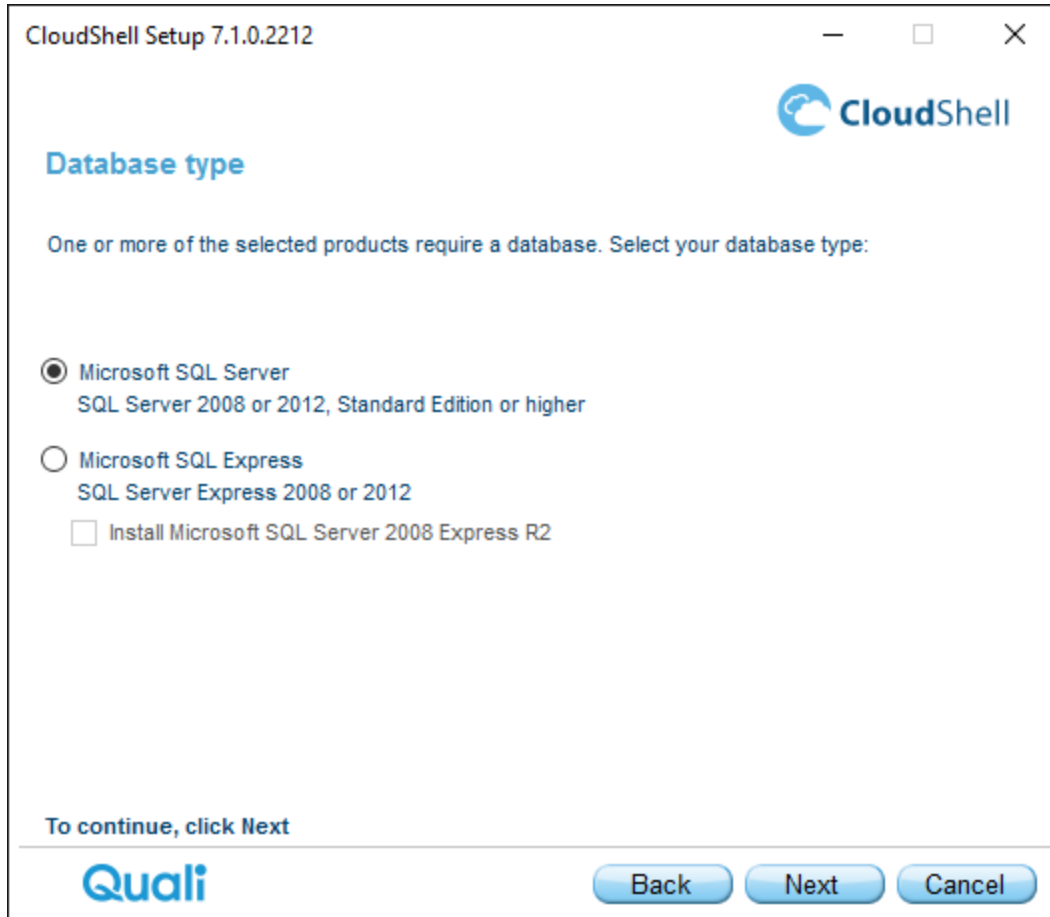
Installation type	Description
Authoring	Choose Authoring installation to provide a code-free hardware interface editor for quick driver development for any environment, supporting full equipment interchangeability and automatic documentation for easy collaboration.
Automation	Choose Automation installation to install all required components for running TestShell Studio locally on this machine. If an SQL server is not already installed, the installation includes SQL Server 2008 Express R2.

For the purposes of this sample procedure, all the components are selected.

2. Click **Next** and proceed to [Specify the Database Type](#).

Specify the Database Type

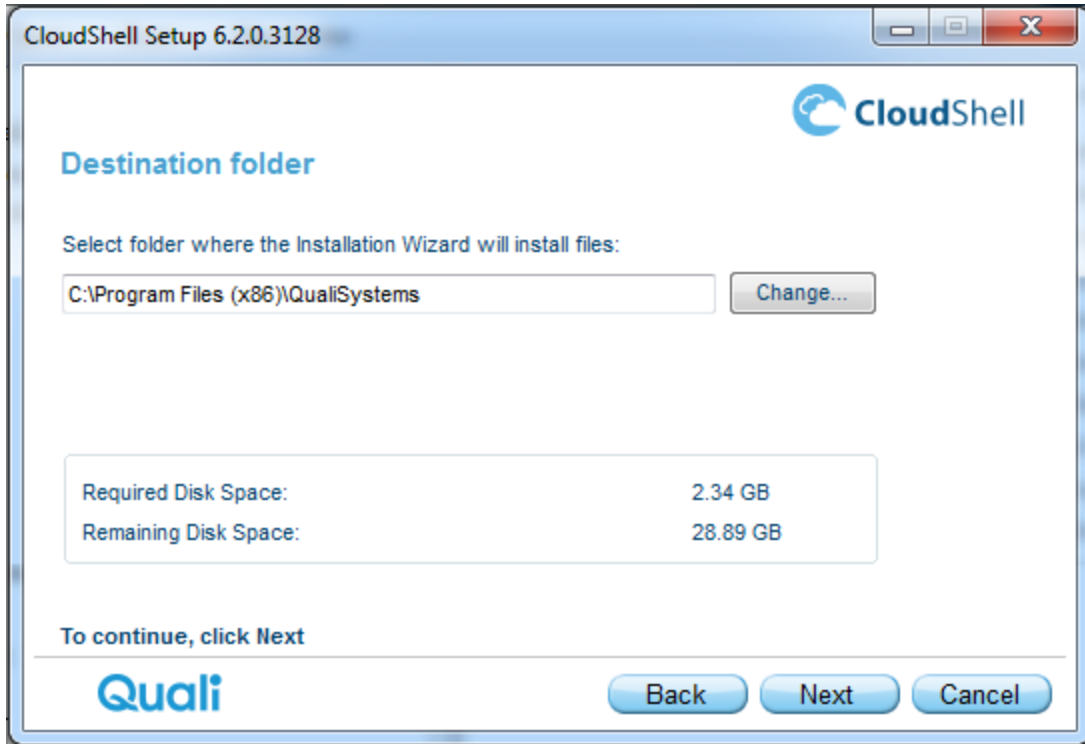
1. In the **Database Type** window, specify which database to use with CloudShell and click **Next** to specify the destination folder. For detailed instructions, see [Configure the Database Connection](#).



2. If no database server is installed or is not available from a remote machine, select the **Microsoft SQL Express** option and then select **Install Microsoft SQL Server 2008 Express R2** to allow CloudShell to install an express database.
3. Click **Next** and proceed to [Select Where to Install CloudShell](#).

Select Where to Install CloudShell

1. In the **Destination Folder** window, specify where to install the CloudShell applications and click **Next** to start the status check for required components.



2. Specify the default path and folder to which CloudShell is installed. The following paths are used for this procedure:

`C:\Program Files\QualiSystems` (for 32-bit systems)

`C:\Program Files(x86)\QualiSystems` (for 64-bit systems)

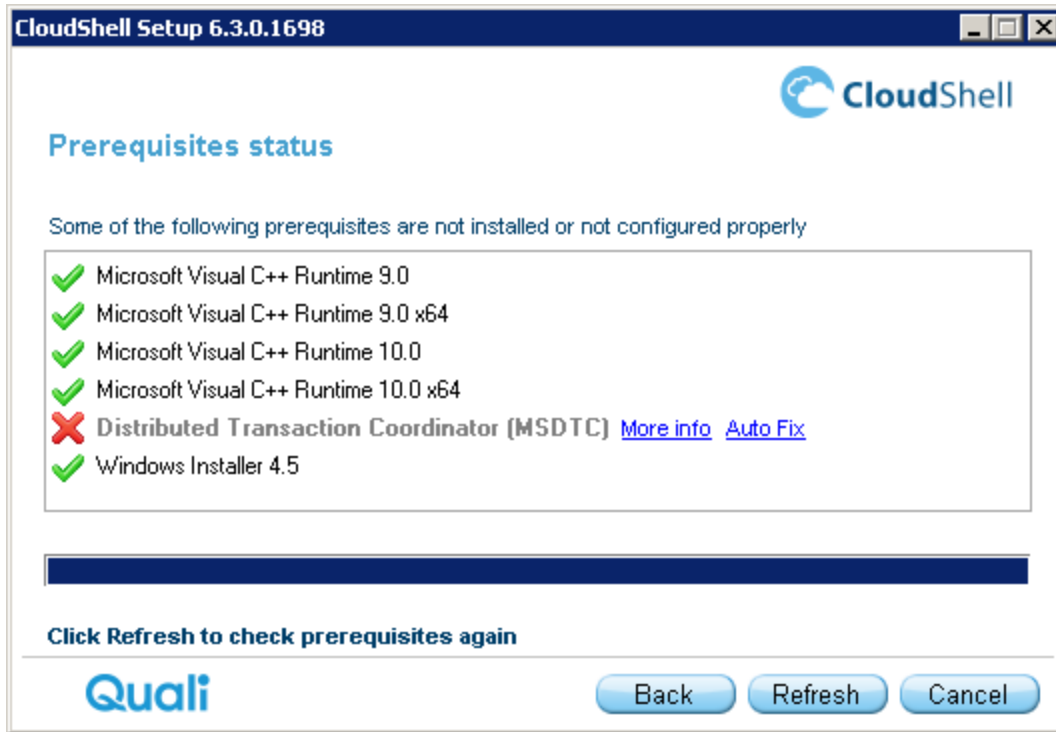
If you need to install to a different installation path and folder, click **Change**.

3. Click **Next** and proceed to [Check for CloudShell Required Components](#).

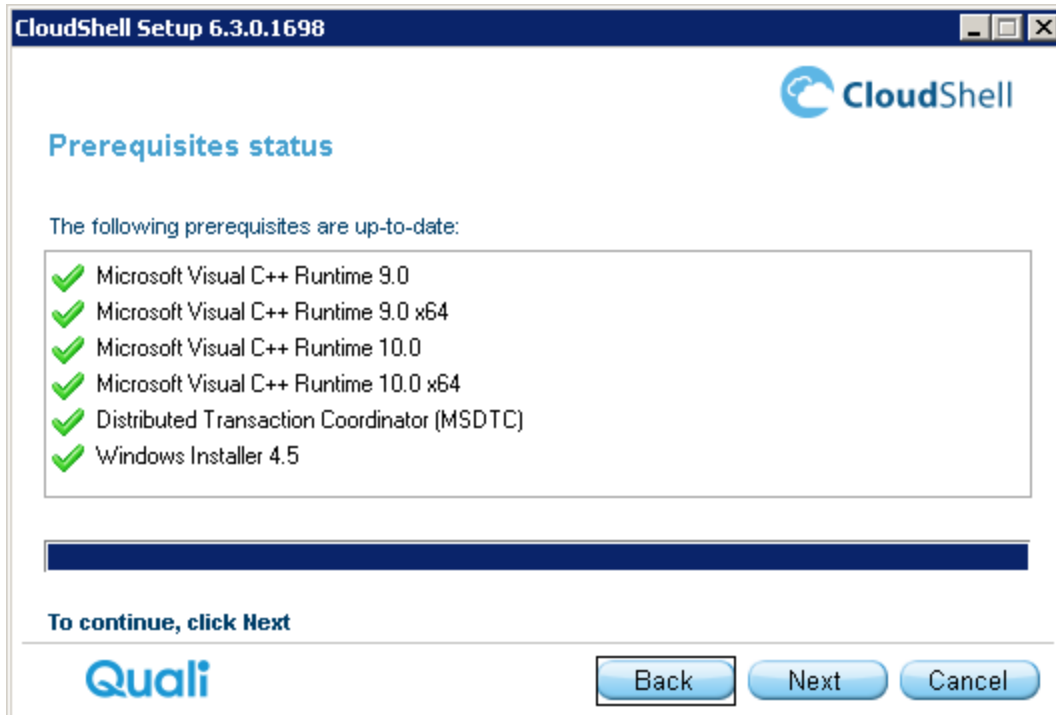
Check for CloudShell Required Components

1. In the **Prerequisites Status** window, the installation wizard lists the status of all required CloudShell components.
2. If a specific prerequisite is not configured correctly, **✖** sign appears near its row.
 - Click **More info** to see additional information about the problem.

- Click **Auto Fix** to allow the Installer to fix the problem.



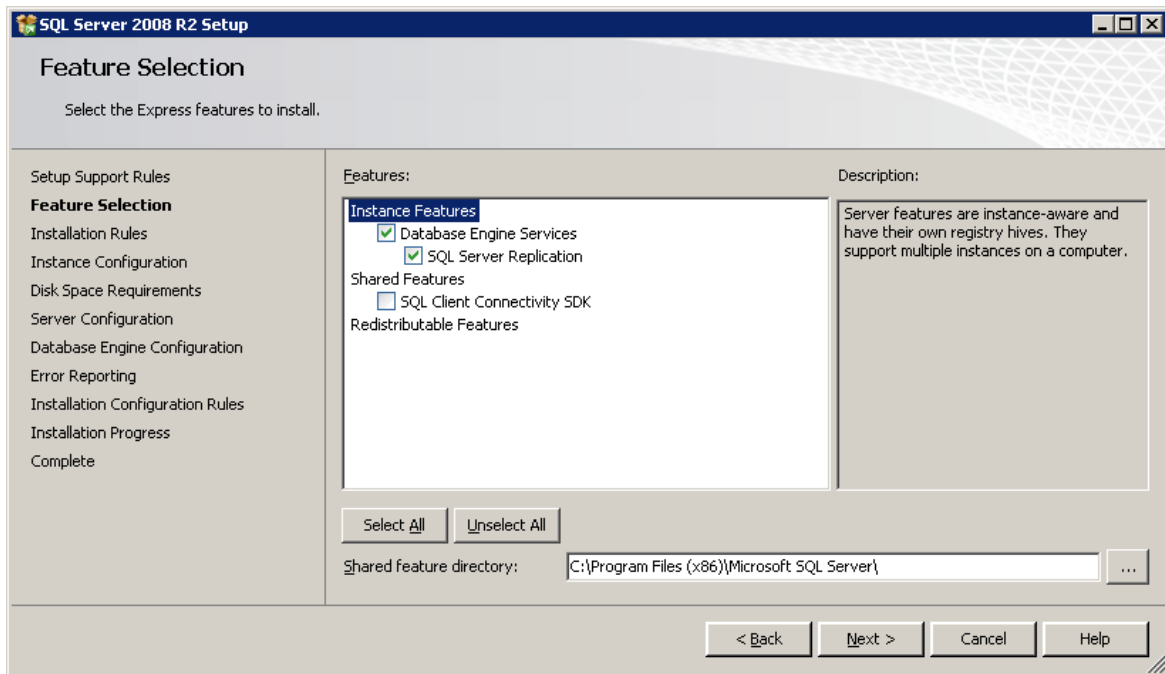
3. To ensure that all the corrections are attended to, click **Refresh**.



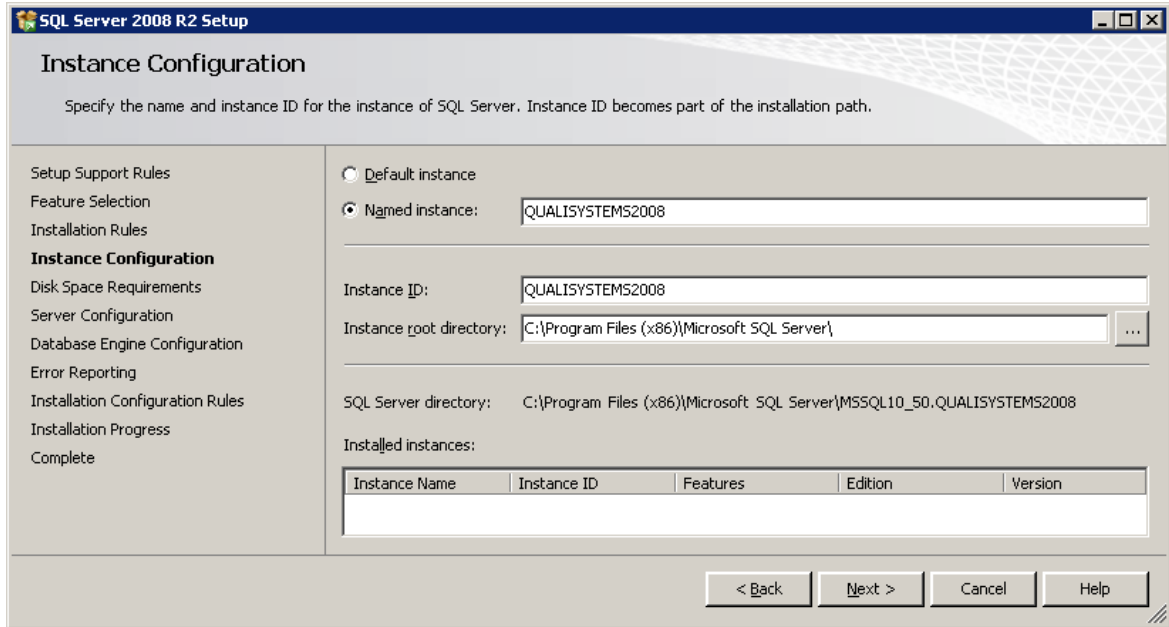
4. Click **Next**.



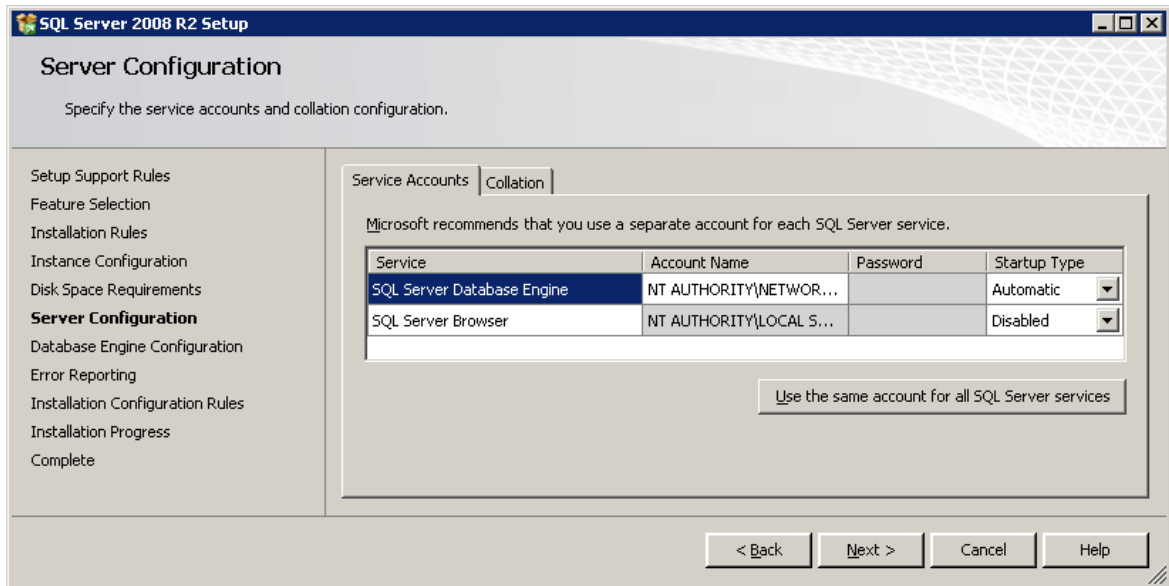
5. Click **Install**. The installation procedure commences with the database installation.



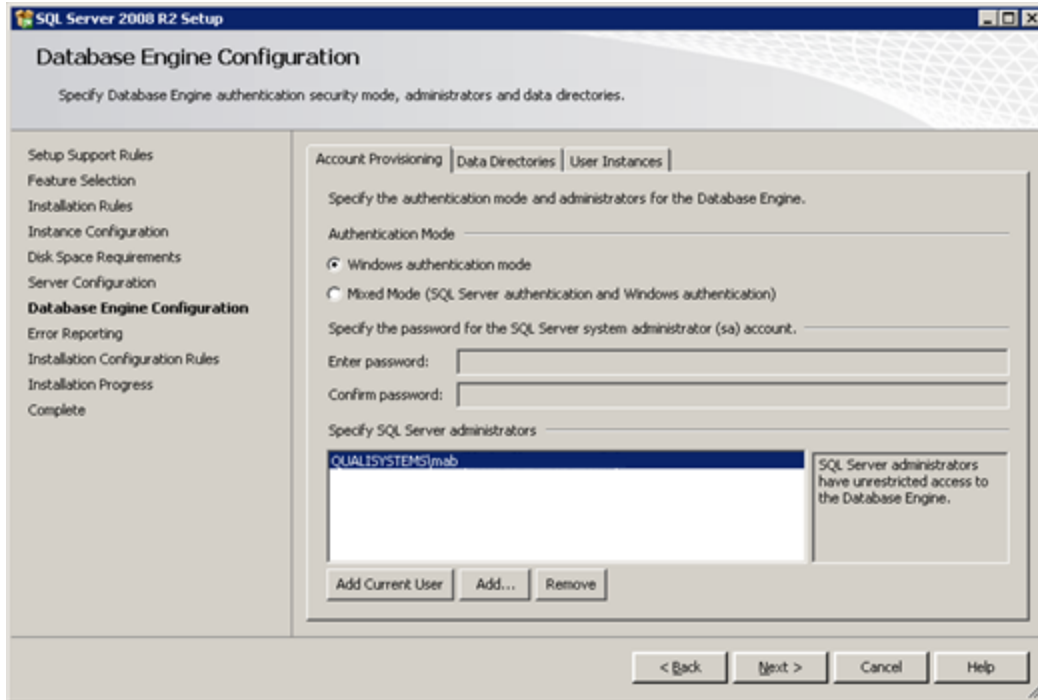
6. Click **Next**.
7. When installing the SQL Express database that is provided together with CloudShell, verify that localhost\qualisystems2008 is displayed in the Server Name list box.



8. Click **Next**.

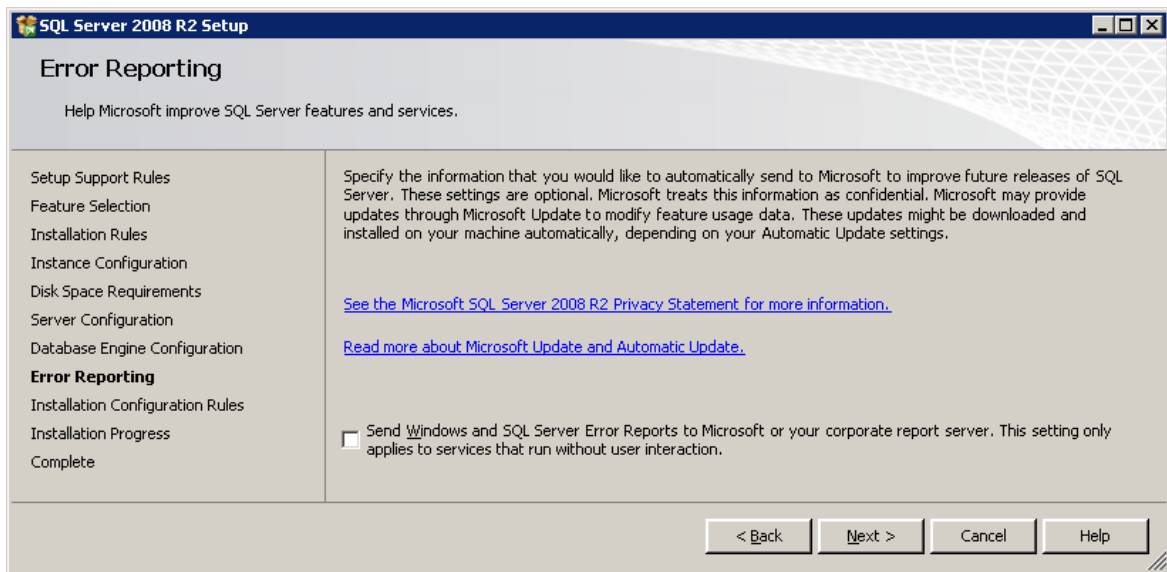


9. Click **Next**.

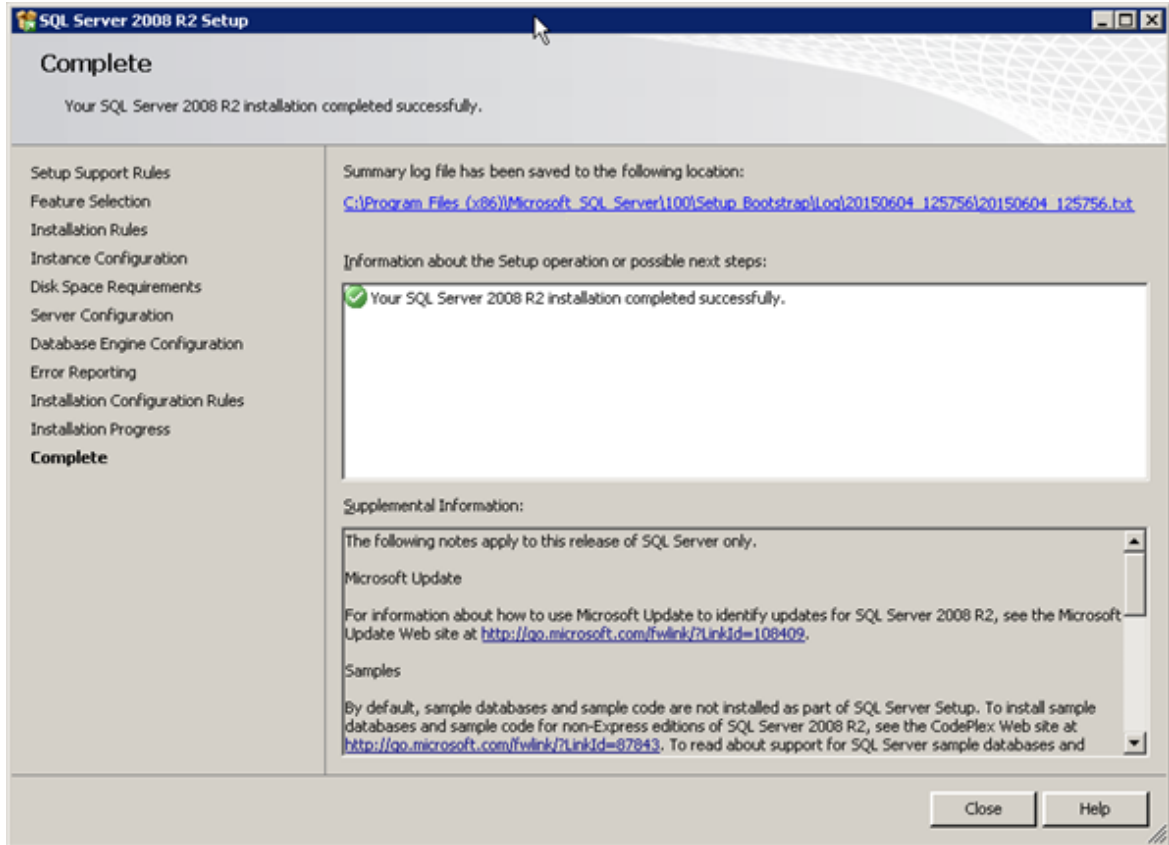


10. Click **Add Current User** and specify the required details.

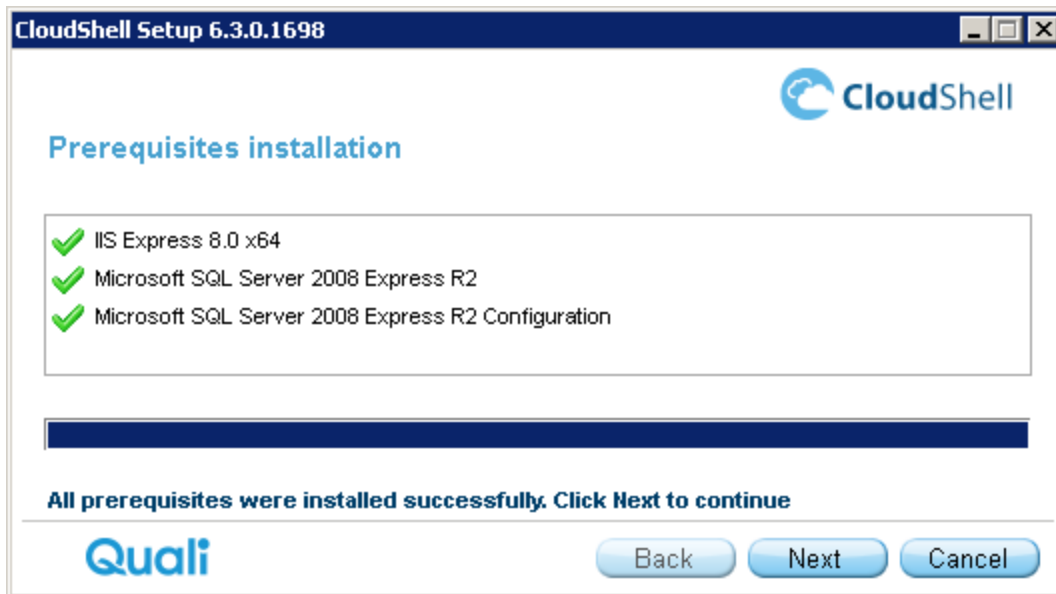
11. Click **Next**.



12. Click **Next**. The SQL database installation proceeds.



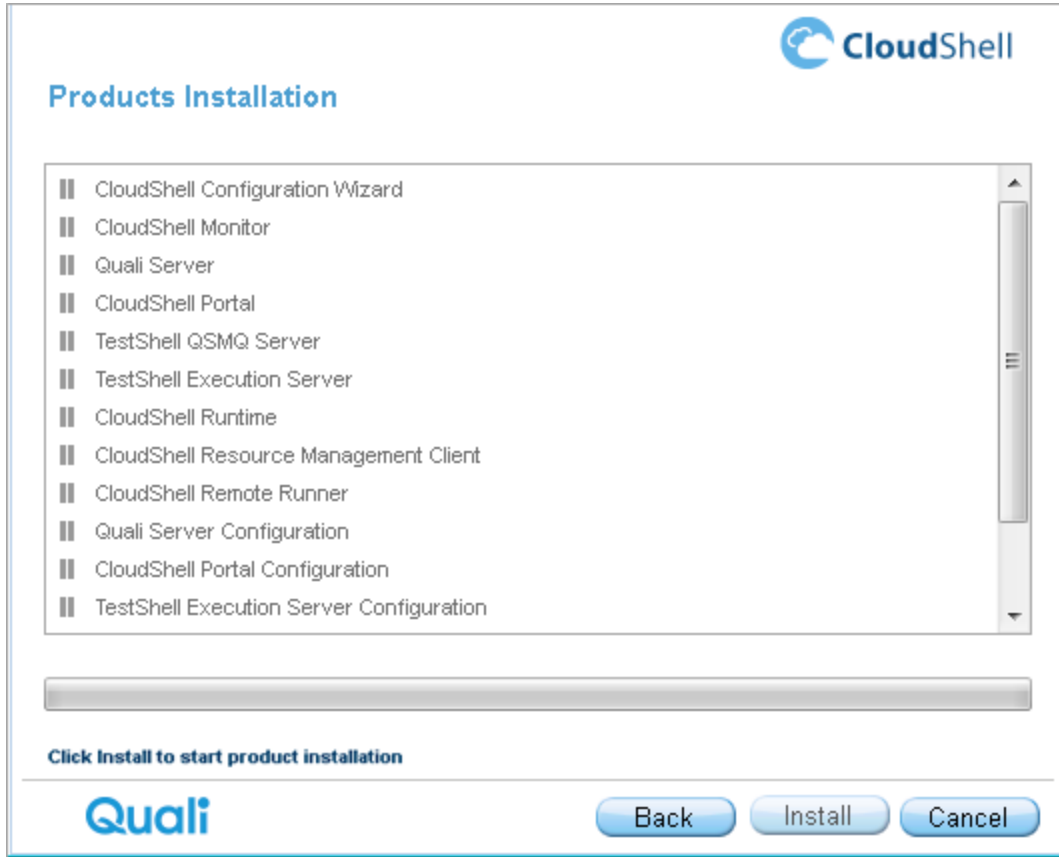
13. Click **Close**.

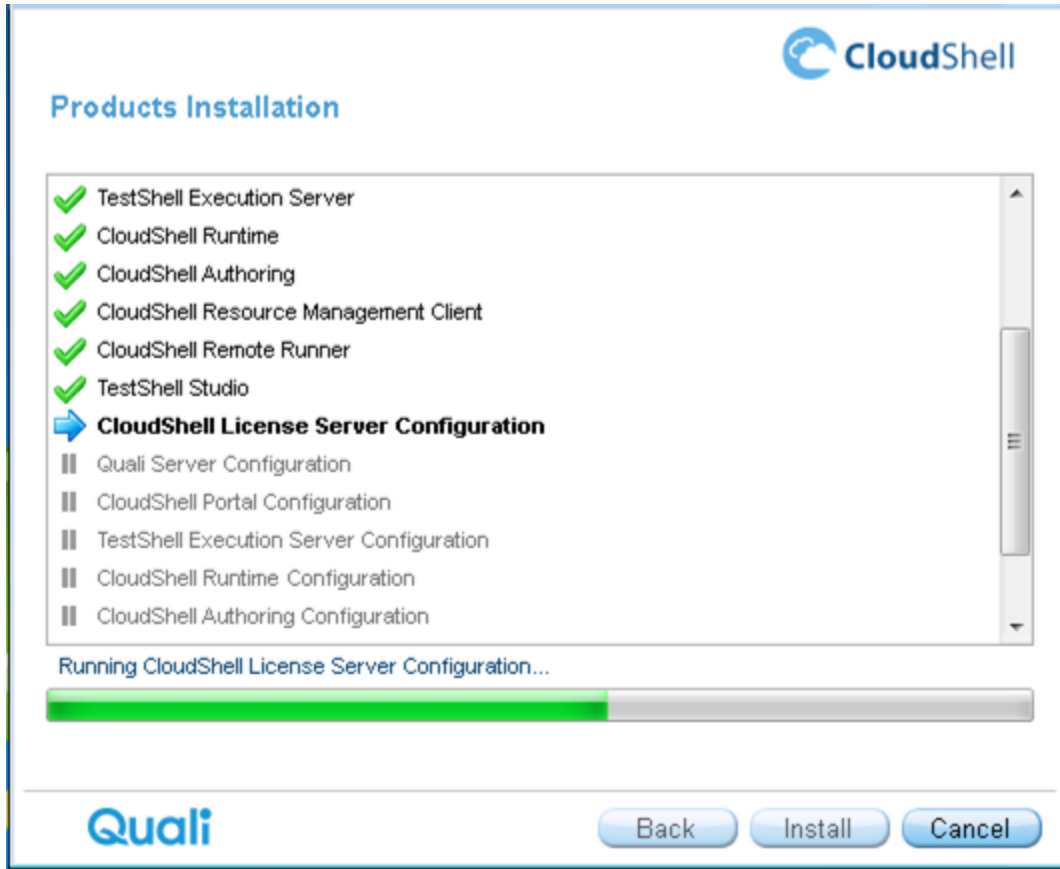


14. The prerequisites are installed.
15. Click **Next** and proceed to [Install Products](#).

Install Products

1. In the **Products Installation** window, click **Install** to start the CloudShell product installation. Some supporting applications may be included in the list of applications to be installed.





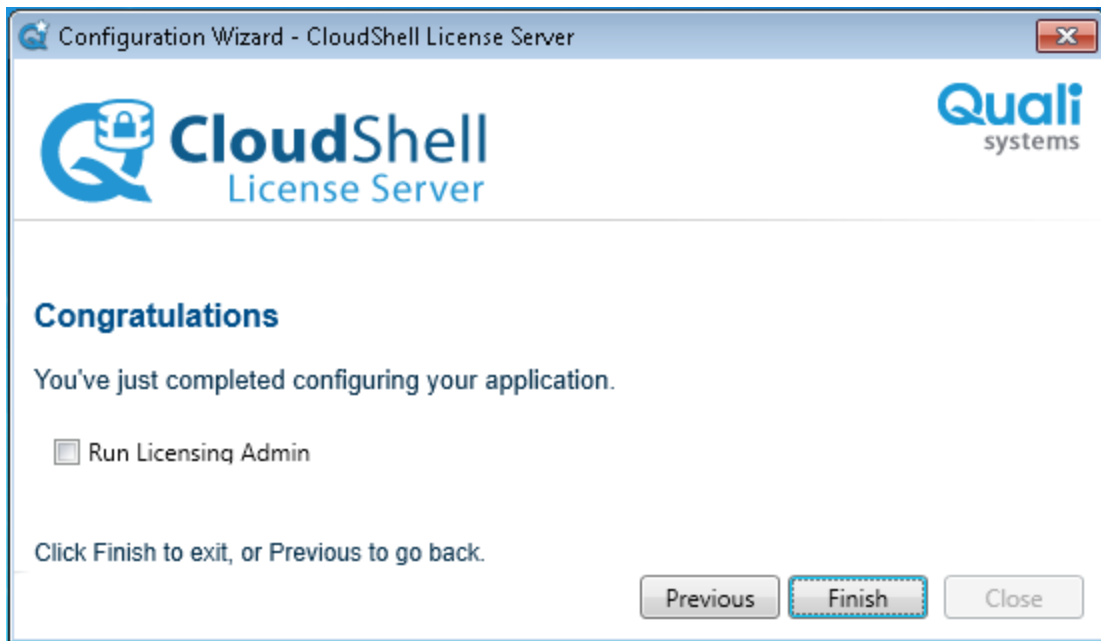
After completing the installation of the CloudShell License Server component, the installation wizard pauses.

A separate configuration window opens, relevant to the CloudShell License Server that has just been installed.

2. Complete the configuration steps and then continue with the installation wizard.

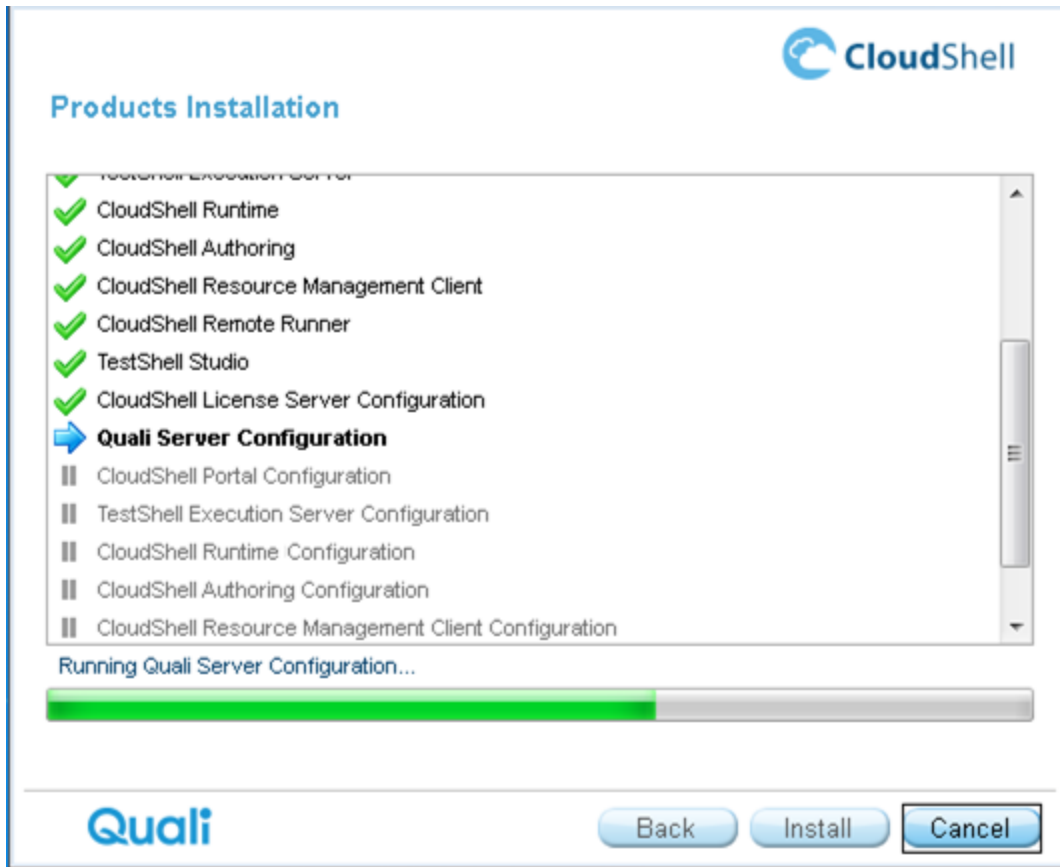


3. Complete the configuration settings for each installed application to achieve a successful installation.
4. Complete each step of the CloudShell License Server Configuration Wizard. For more information about configuring CloudShell, see [Configure CloudShell Products](#).

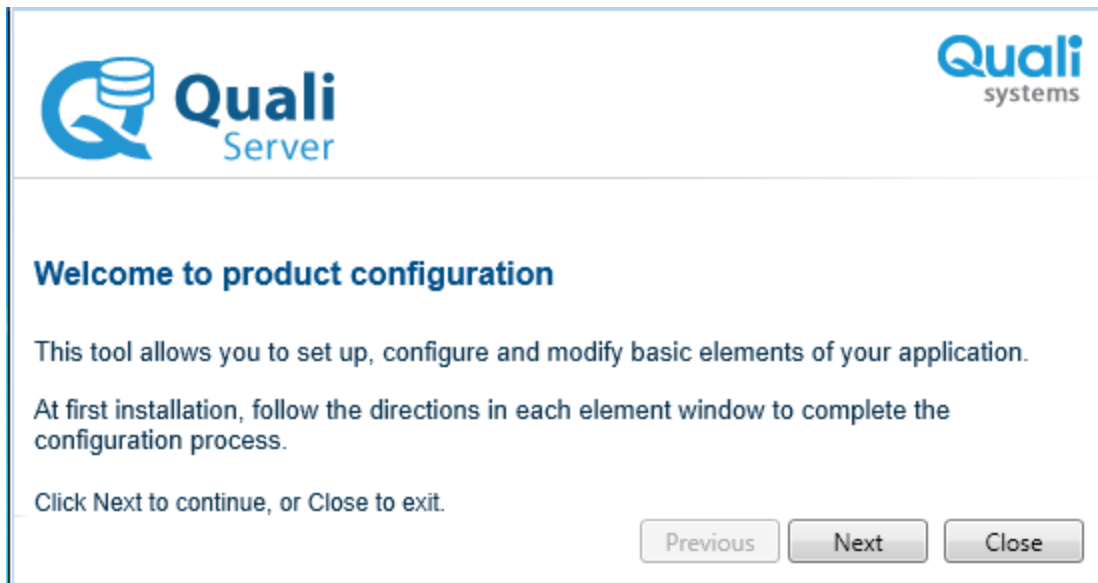


5. At the final step of the CloudShell License Server Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.

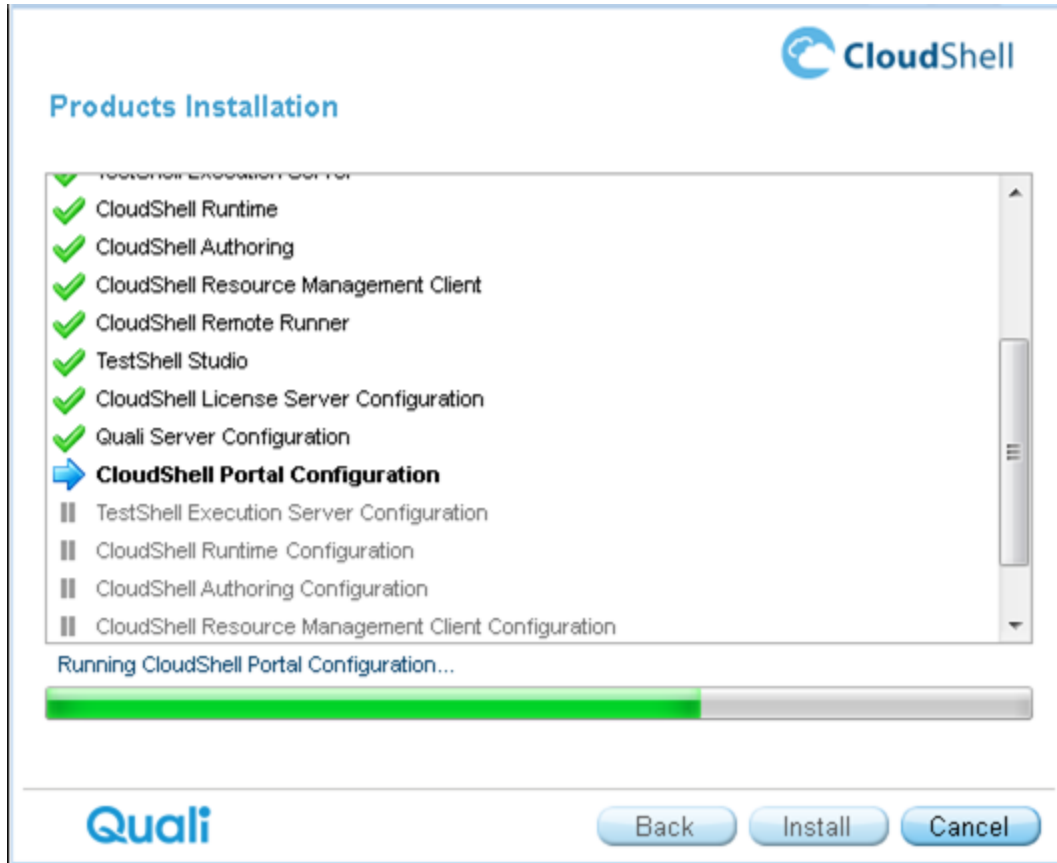


6. After completing the installation of the Quali Server component, the installation wizard pauses and the Quali Server Configuration Wizard opens.



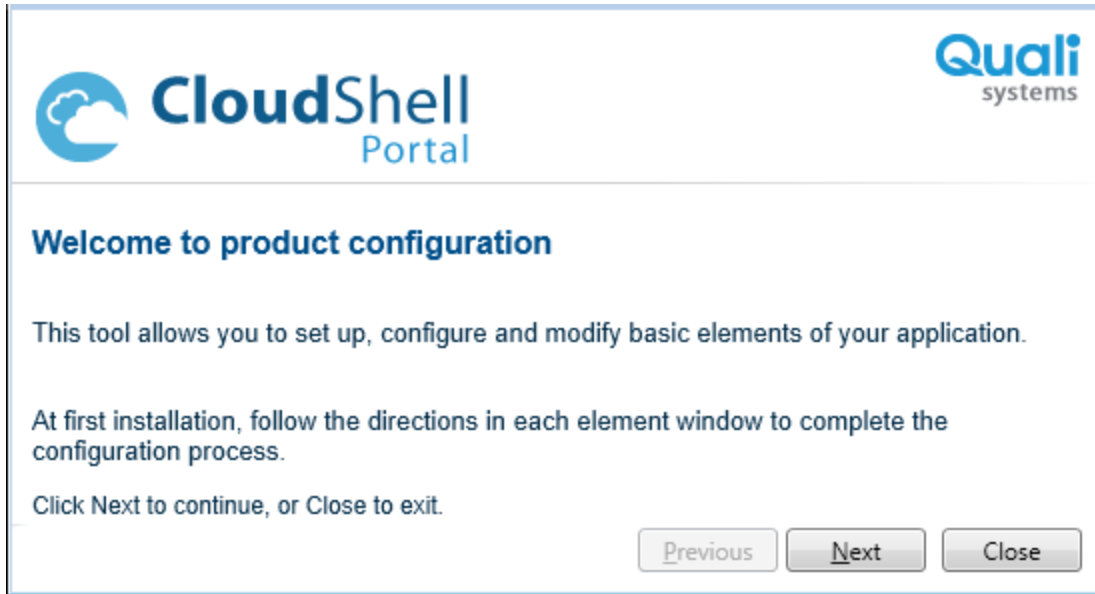
7. Complete each step of the Quali Server Configuration Wizard.
8. At the final step of the Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.

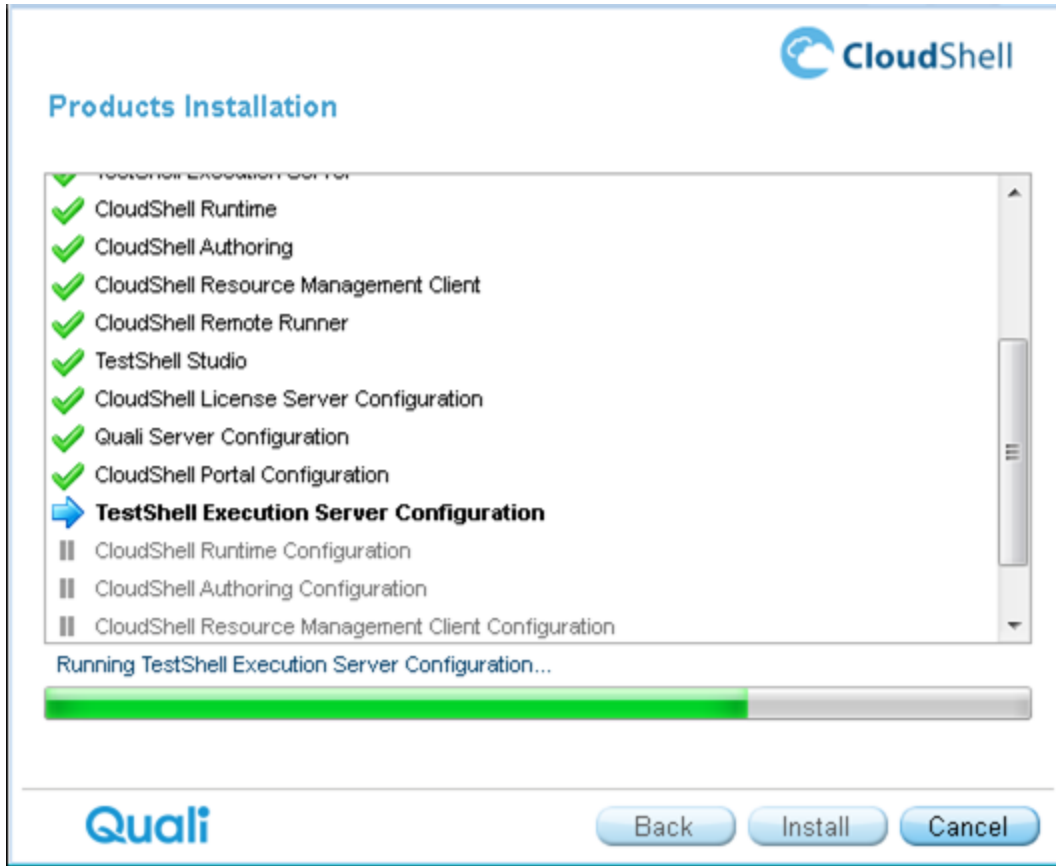


9. After completing the installation of the CloudShell Portal component, the installation wizard pauses.

The CloudShell Portal Configuration Wizard opens.



10. Complete each step of the CloudShell Portal Configuration Wizard.
11. At the final step of the component Configuration Wizard, click **Finish**.
The installation wizard continues with the installation procedure and installs the next component.



Note: Before installing the Execution Server, make sure VCTools++ is installed for all users so that the Execution Server can use it to compile Python dependencies, when needed. Alternatively, uninstall VCTools++ to have CloudShell install it for you.

Note: When installing your execution server on a computer that is not a Windows Server machine, make sure to configure the machine's Power Options to prevent it from automatically going into sleep mode.

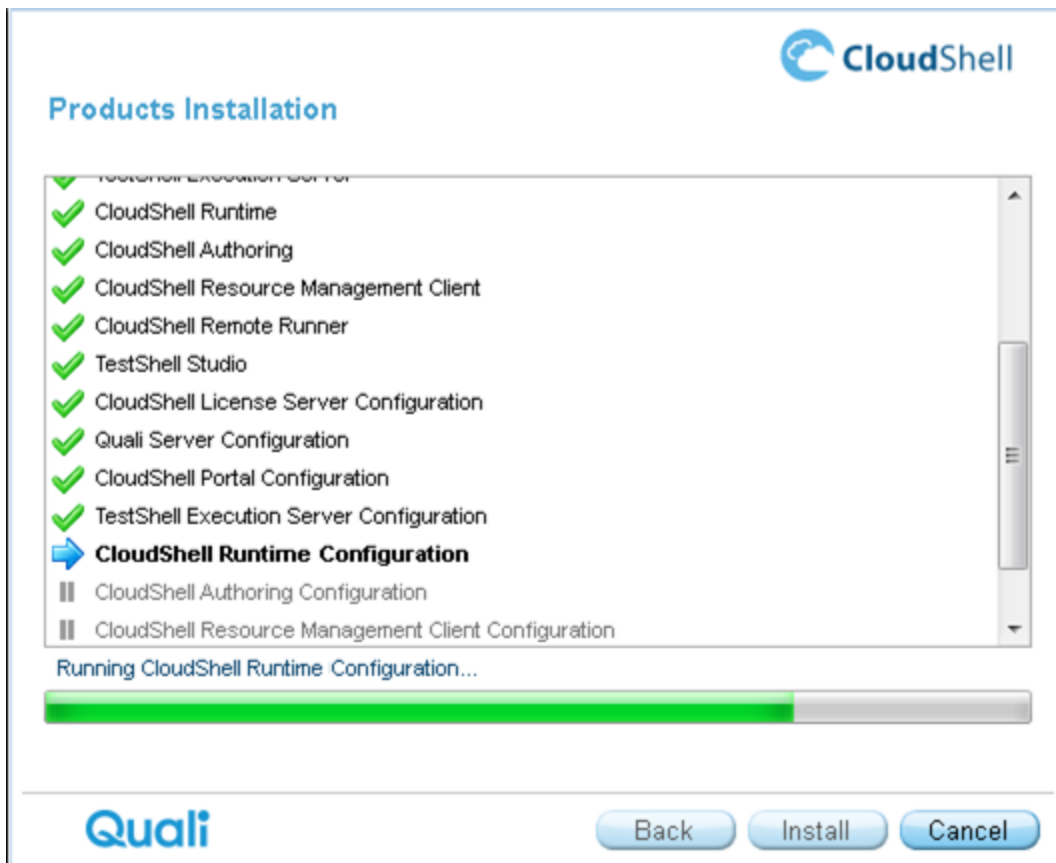
12. After completing the installation of the TestShell Execution Server component, the installation wizard pauses. The TestShell Execution Server Configuration Wizard opens.



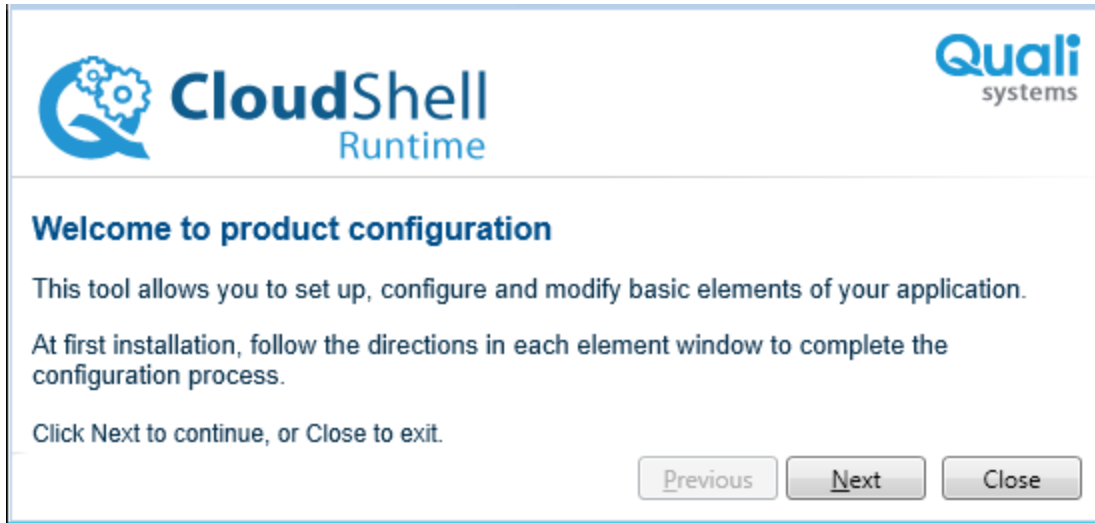
13. Complete each step of the TestShell Execution Server Configuration Wizard.

14. At the final step of the component Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.

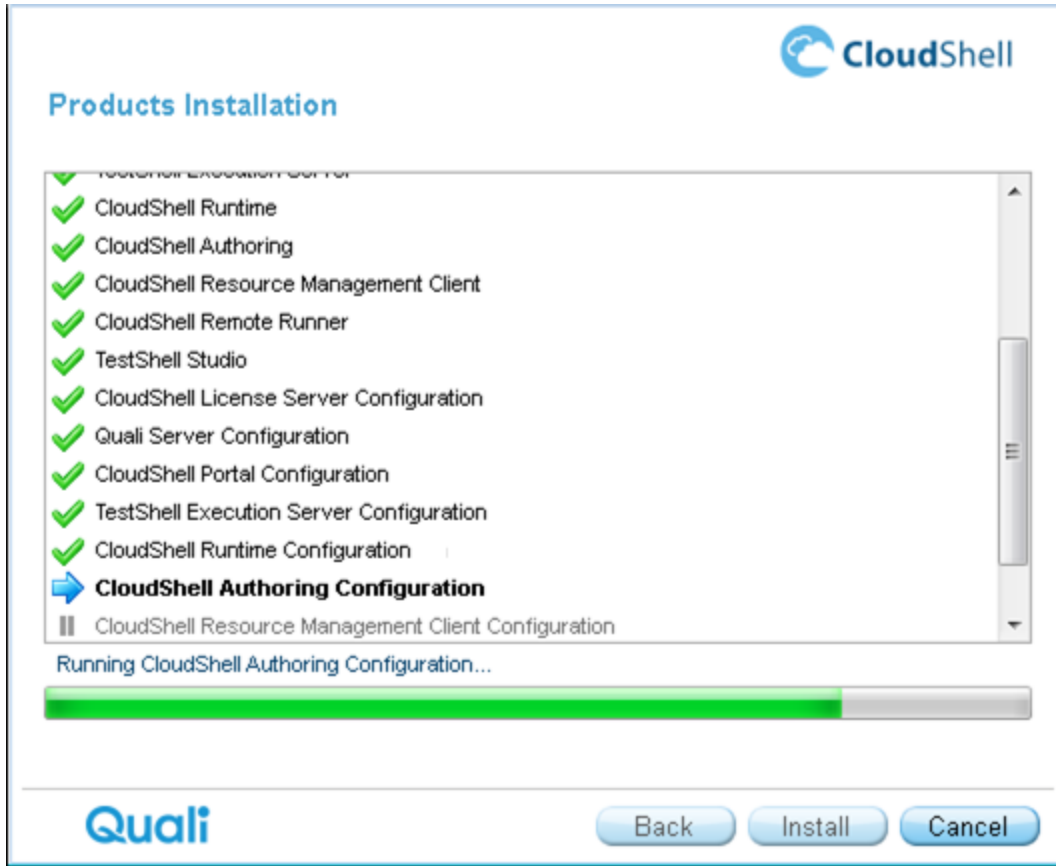


After completing the installation of the CloudShell Runtime component, the installation wizard pauses.

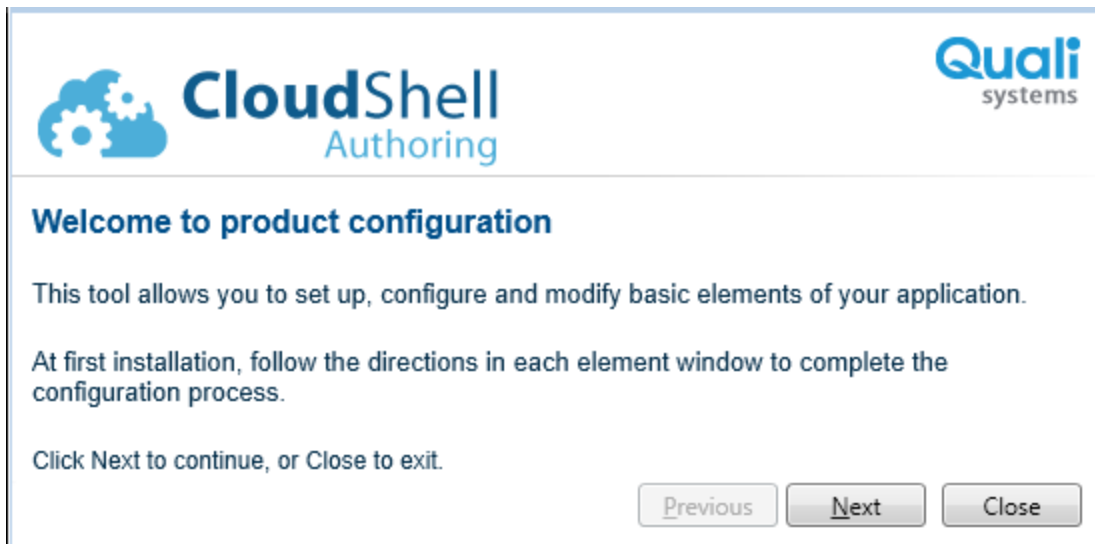


15. Complete each step of the CloudShell Runtime Configuration Wizard.
16. At the final step of the component Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.

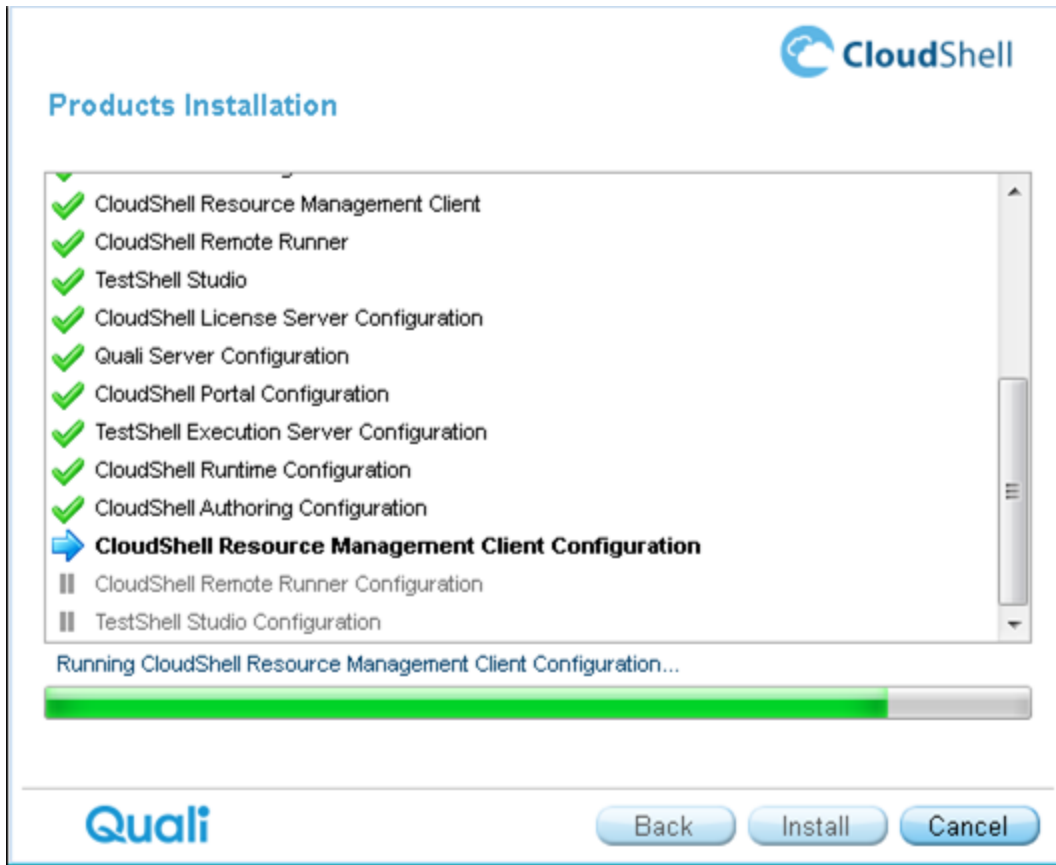


After completing the installation of the CloudShell Authoring component, the installation wizard pauses. The CloudShell Authoring Configuration Wizard opens.



17. Complete each step of the CloudShell Authoring Configuration Wizard.
18. At the final step of the component Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.



19. After completing the installation of the CloudShell Resource Management Client component, the installation wizard pauses.

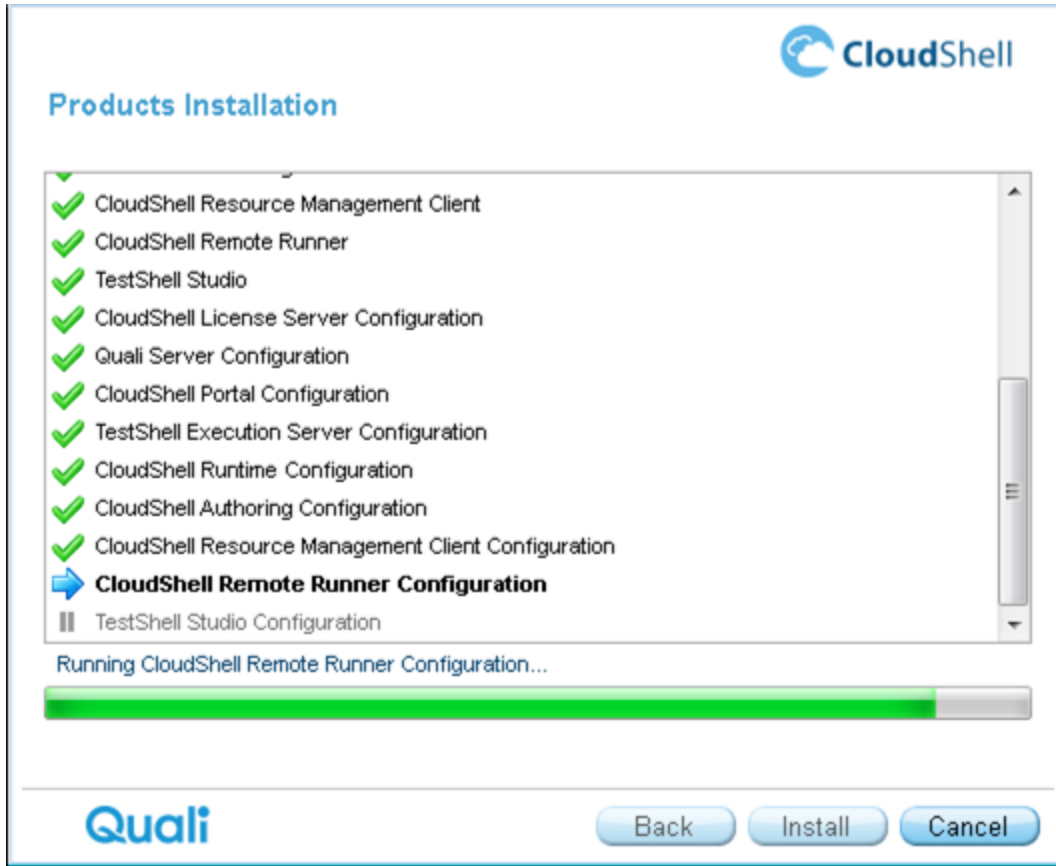
The CloudShell Resource Management Client Configuration Wizard opens.



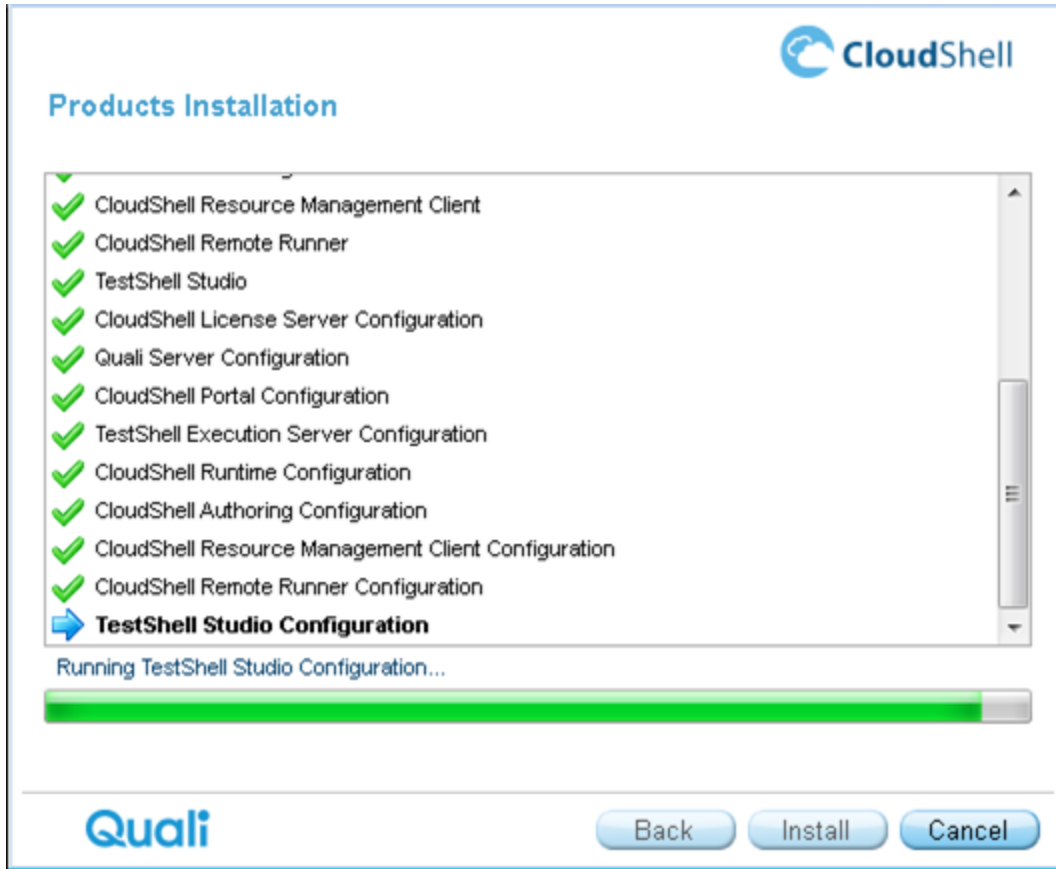
20. Complete each step of the CloudShell Resource Management Client Configuration Wizard.

21. At the final step of the component Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.



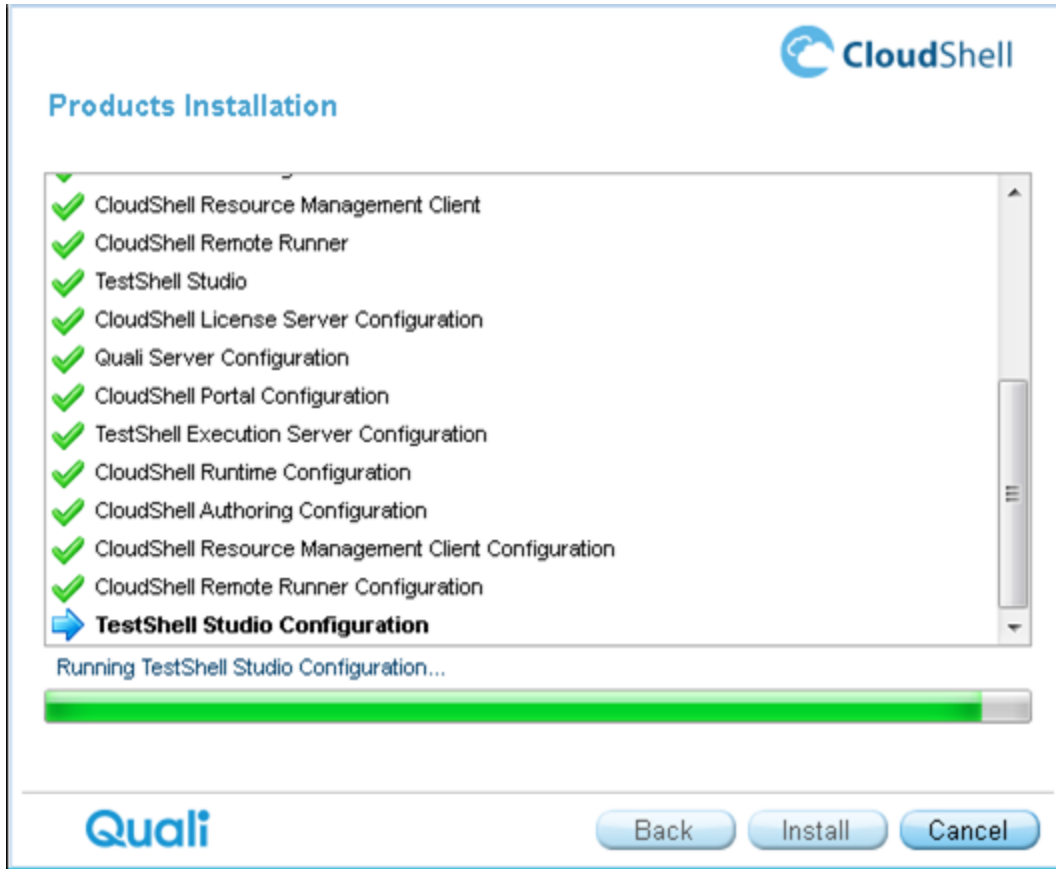
After completing the installation of the CloudShell Remote Runner component, the installation wizard pauses. The CloudShell Remote Runner Configuration Wizard opens.



22. Complete each step of the CloudShell Remote Runner Configuration Wizard.

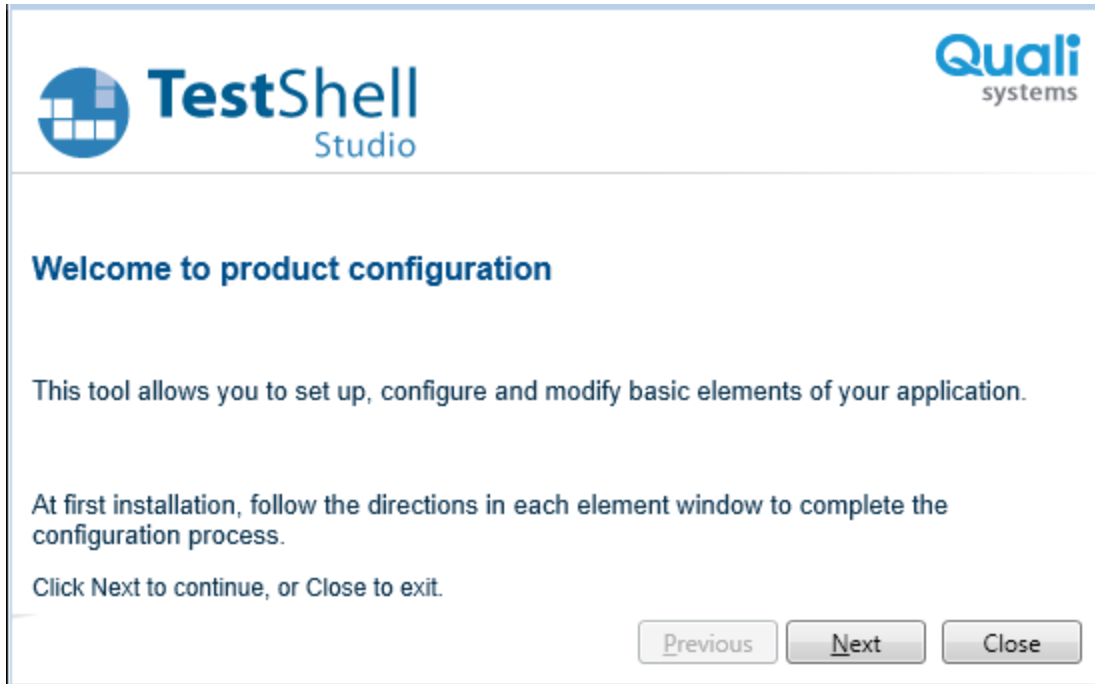
23. At the final step of the component Configuration Wizard, click **Finish**.

The installation wizard continues with the installation procedure and installs the next component.

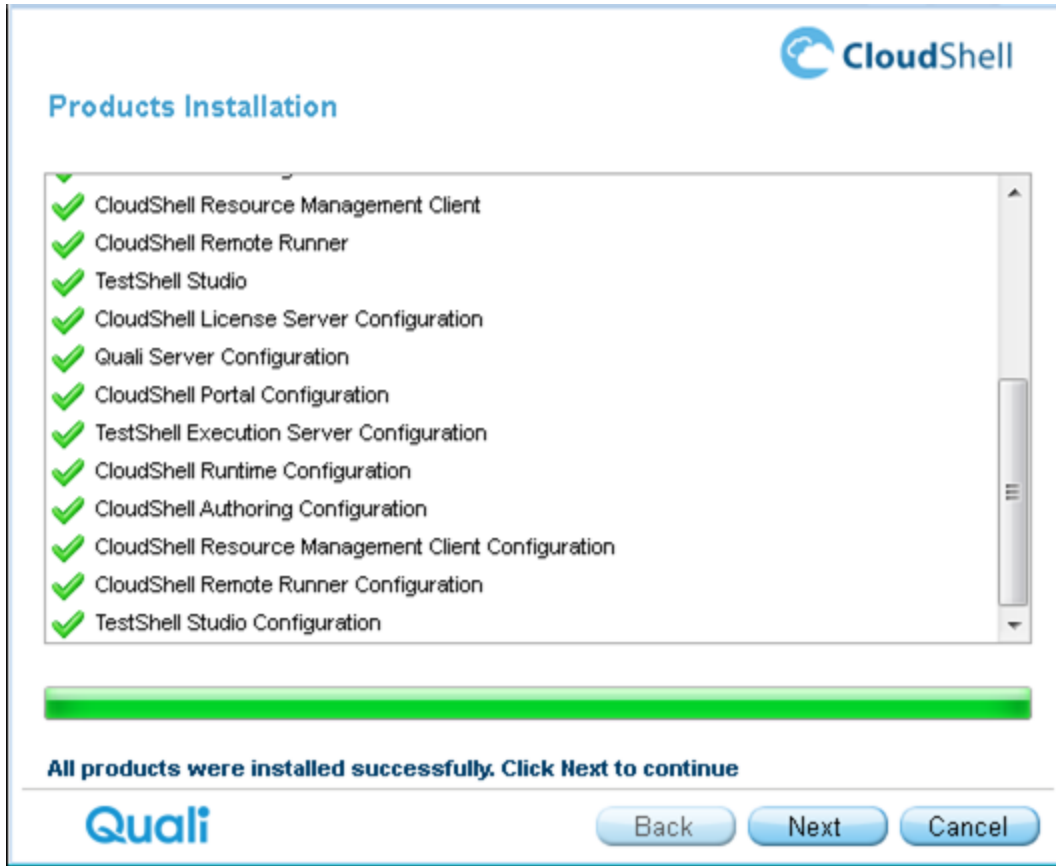


After completing the installation of the TestShell Studio component, the installation wizard pauses.

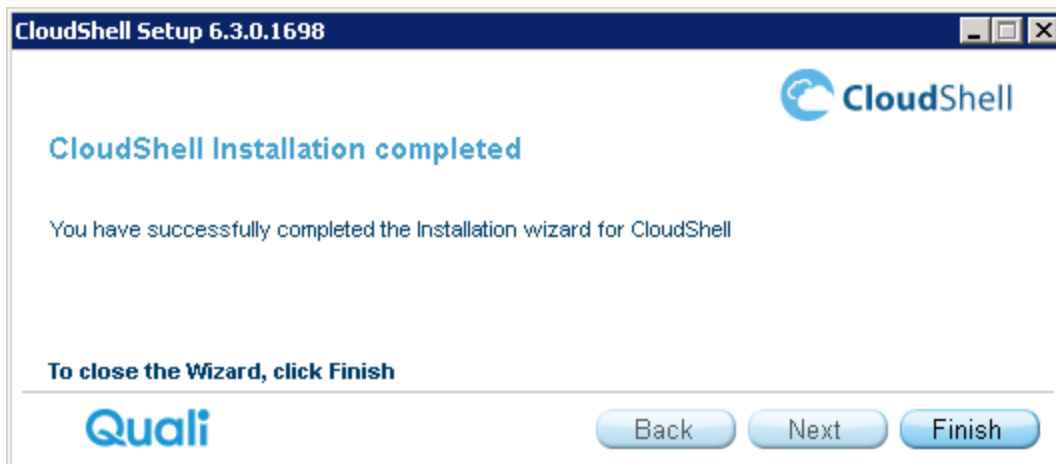
The TestShell Studio Configuration Wizard opens.



24. Complete each step of the TestShell Studio Configuration Wizard.
25. At the final step of the component Configuration Wizard, click **Finish**.
The installation wizard continues with the installation procedure and installs the next component.

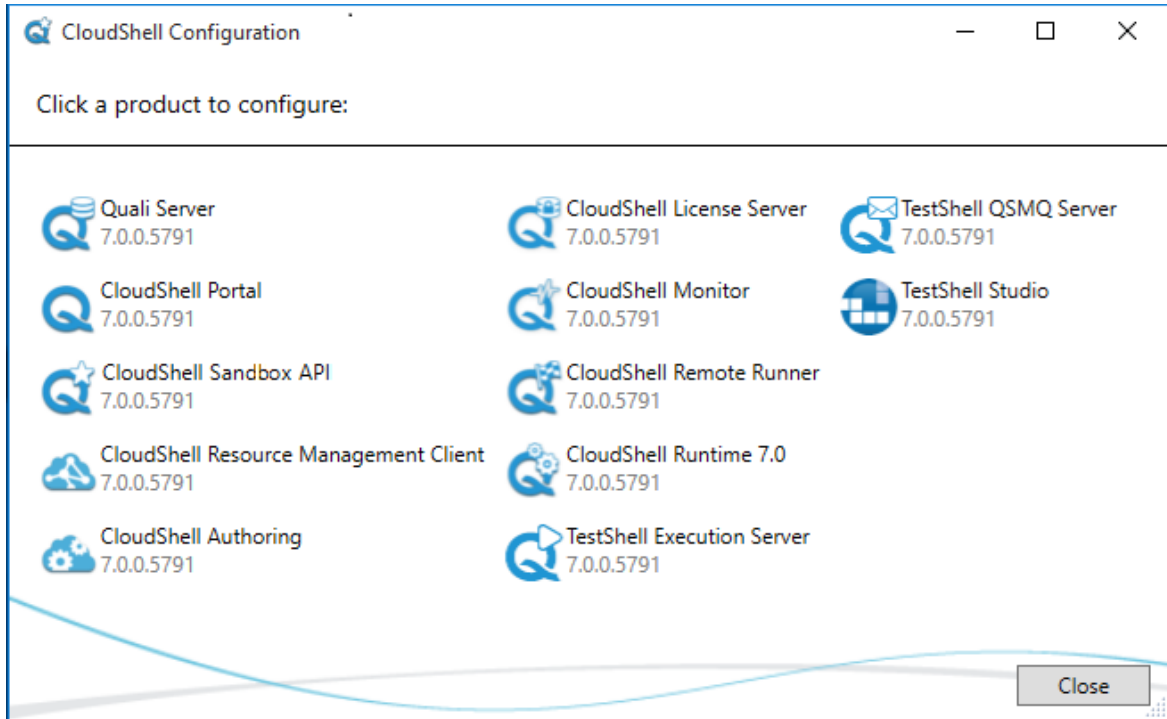


26. Click **Next** to complete the installation procedure.



27. Click **Finish**.

You can run the CloudShell Configuration Wizard for any installed CloudShell application, as required.



For more information about the CloudShell Configuration Wizard procedure, see [Configure CloudShell Products](#).

Proceed to [Import User Definitions from an Active Directory \(Optional\)](#).

Import User Definitions from an Active Directory (Optional)

This section describes how to import user definitions from an active directory. Perform these steps after completing the CloudShell installation.

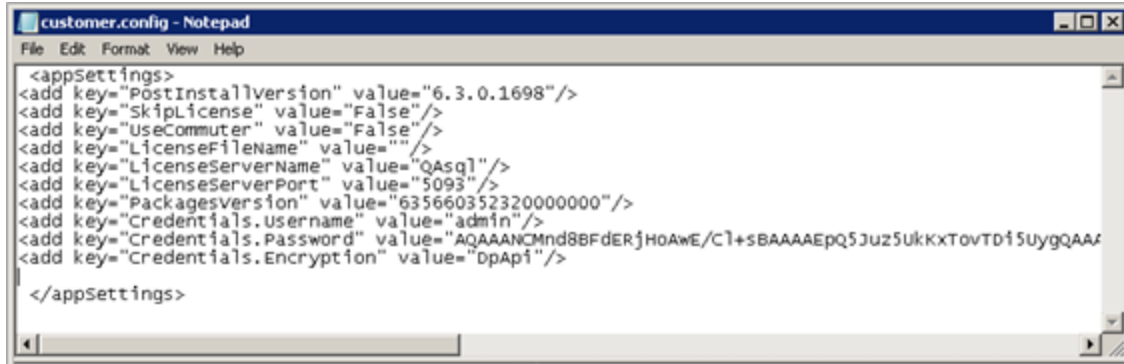
Add a key to the customer.config file

Use the following steps to add the required key to the `customer.config` file and modify it to the required domain name.

Note: Before importing user definitions from the active directory, ensure that the logon user of the server is in the same domain as the Active Directory.

To add the required key to the customer.config file and then modify the key:

1. In the machine where CloudShell is installed, navigate to CloudShell installation folder, for example:
`C:\Program Files (x86)\QualiSystems\CloudShell\Server`
2. Open the `customer.config` file in a text editor.



```
<appSettings>
<add key="PostInstallVersion" value="6.3.0.1698"/>
<add key="SkipLicense" value="False"/>
<add key="UseCommuter" value="False"/>
<add key="LicenseFileName" value=""/>
<add key="LicenseServerName" value="QAsq1"/>
<add key="LicenseServerPort" value="5093"/>
<add key="PackagesVersion" value="635660352320000000"/>
<add key="Credentials.Username" value="admin"/>
<add key="Credentials.Password" value="AQAAANCMnd8BFdERjHOAwE/C1+sBAAAAPQ5Ju25ukKXTovTD15uygQAA/
<add key="Credentials.Encryption" value="dpApi"/>
</appSettings>
```

3. Add the following line to the `customer.config` file.

```
<add key="ActiveDirectory.Domain" value="QUALISYSTEMS"/>
```

4. Modify the new key by changing the value field from "QUALISYSTEMS" to that of your domain, for example:

```
value="MYDOMAIN"
```

5. Save the modified `customer.config` file.
6. Restart the service.

Import new users into CloudShell

The definition of users is done through CloudShell Resource Management Client.

Note: Before importing user definitions from the active directory, the logon user of the server must be in the same domain as the Active Directory.

To import new users into CloudShell:

1. Open the CloudShell Resource Management Client.
2. From the **Help** menu, select **CloudShell knowledge base > Admin guide > User management > CloudShell users and groups**.
3. Follow the steps described in the "Importing new users into CloudShell" topic in the Admin Guide.

Configure CloudShell Products

This section describes the configuration settings for the CloudShell products.

Configure Application Settings

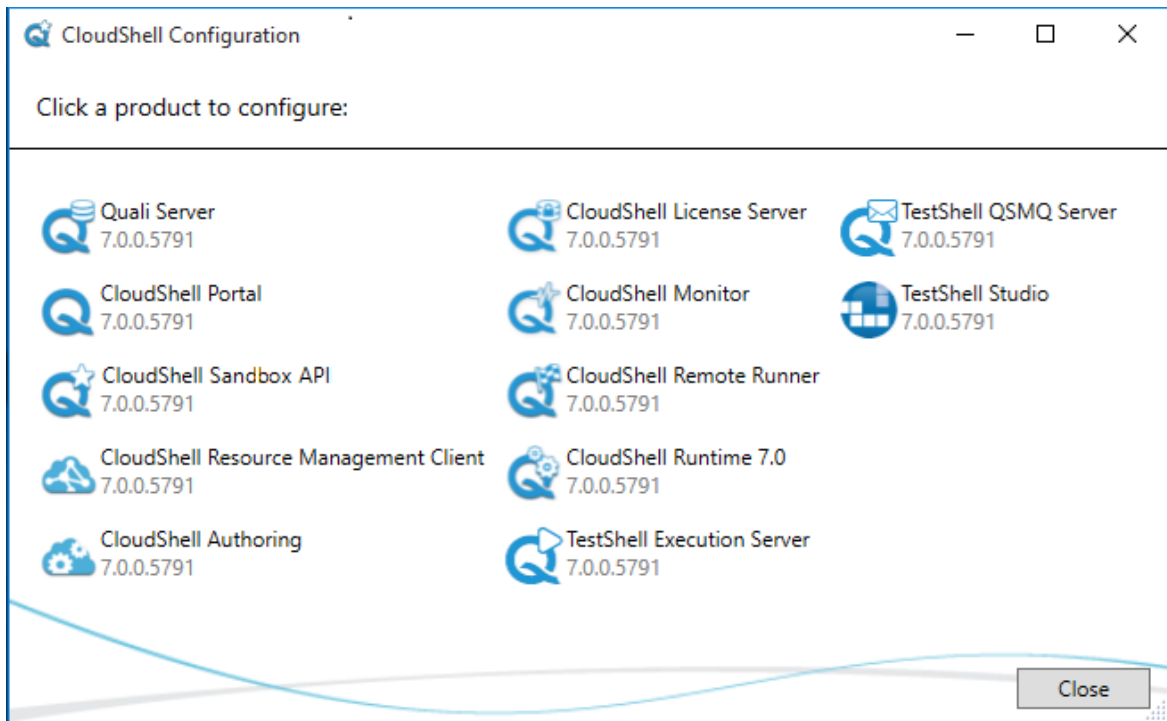
While the available configuration settings vary for each component, the configuration options are the same within each configuration utility. For example, for any product where you need to select a license, the **Select a license** screen works the same way for every configuration utility. Instead of walking through each in a linear fashion and repeating the information multiple times, the process of selecting a license is explained once, see [Select a CloudShell License](#).

You need to complete or close the configuration settings for each installed application for a successful installation.

If you choose to close, rather than complete a product installation, make sure to run the product's configuration utility prior to launching it for the first time.

To launch the CloudShell Configuration:

1. Select **Start > All Programs > QualiSystems > Tools > CloudShell Configuration**.



2. Select a product to configure and follow the prompts of the configuration utility. (Configuration details are provided in the following related topics.)

Configure the TestShell Execution Server

To configure the TestShell Execution Server:

1. In the **Server connectivity** window, specify the execution server settings:



The screenshot shows the 'TestShell Execution Server' configuration window. At the top left is the TestShell logo, and at the top right is the Quali logo. The main heading is 'Server connectivity'. Below this, there are three input fields: 'Enter the server name or IP address:' with the value 'qs-il-steveg', 'Enter a server username and password (administrative rights required):' with 'Username:' set to 'admin' and 'Password:' set to '*****'. At the bottom, there are three buttons: 'Previous' (disabled), 'Next', and 'Close'. A decorative blue wave graphic is at the bottom of the window.

Parameter	Description
server name or IP address	Specify the host name or IP address of the Execution Server machine.
Username	Specify a CloudShell system administrator to use for the Execution Server configuration process.

Parameter	Description
Password	Specify the CloudShell system administrator's password.

2. Click **Next**.
3. In the **Execution server configuration** window, specify the execution server settings:

Parameter	Description
Server name	Specify a name for the server. By default, the computer name is used as the execution server name.
Server description	Enter a short description of the server. This description helps portal users when selecting which execution server to use in a job template.
Job slot capacity	Specify the permitted number of concurrent jobs.
Command slot Capacity	Specify the permitted number of commands. You can specify 0 or any required number of command slots. The value of this field is not dependent on a license.

Parameter	Description
-----------	-------------

Note: Do not leave this field blank. Specify either 0 or the required number of command slots.

4. Click **Next**.

5. In the **Select a license** window, specify the license to use.

You can browse for the location of the license, specify the network address where the license resides, or use a Commuter license to temporarily use a network license for CloudShell on a computer that is not connected to the network.

6. Click **Next**.

Note: When installing your execution server on a computer that is not a Windows Server machine, make sure to configure the machine's Power Options to prevent it from automatically going into sleep mode.

7. When configuration completes, click **Finish**.

8. Configure any required Python dependencies on the execution server:

- If you have Python scripts that have dependencies, install them on the execution server. See the [online help](#)'s *Integrating Python Scripts with CloudShell*, the *Script dependencies* section.
- If the execution server is installed on a machine with no internet access, make sure to configure offline Python dependencies. See the [online help](#)'s *Configuring Python Virtual Environments* article, the *Manual offline mode* section.

9. To enable the execution of tests that run GUI automation (Ranorex), write to Excel using the Filesystem library, use libraries that run GUI elements, or use the **Capture Image** TestShell Studio function, [Configure the TestShell Execution Server to Run as a Process by Default](#).

Configure the TestShell Execution Server to Run as a Process by Default

By default, the TestShell Execution Server currently runs as a service, which may be convenient in many cases. However, there are some technical limitations when running the Execution Server as a service, for example, the following features cannot be used:

- GUI automation (Ranorex)
- Writing to Excel through the Filesystem library prior to Library version 5.1.1

- Libraries that must launch a GUI, for example: IxNetwork
- Studio Function - Capture Image

In contrast, there may be instances where it is preferred to run the Execution Server as a process. However, running the TES as a process requires a user to be logged in to the machine. The machine can be locked but an active user session must be in progress.

The following procedure explains the steps required to convert the default TestShell Execution Server service to a process.

To run the TestShell Execution Server as a process by default:

1. Click **Start** and then run `Services.msc`
2. Stop the **TestShell Execution Server** service.
3. Run **CMD** (as administrator).
4. Delete the existing service by running the following command:

```
sc delete "TestShell Execution Server"
```
5. Create a text file containing the following command, with the quotation marks:

```
"C:\Program Files (x86)\QualiSystems\TestShell\ExecutionServer\QsExecutionServer.exe" tray
```
6. Save the file as a batch file named `TestShell Execution Server.bat`.
7. To have any Windows user on the machine configure the Execution Server as a process at login, add the batch file to the Windows Startup folder:

```
C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Startup
```

Alternatively, you can designate a Windows user to log in for the TES and save the batch file to that user's Startup folder:

```
%appdata%\Microsoft\Windows\Start Menu\Programs\Startup
```

Windows will launch the script automatically whenever the Windows user.

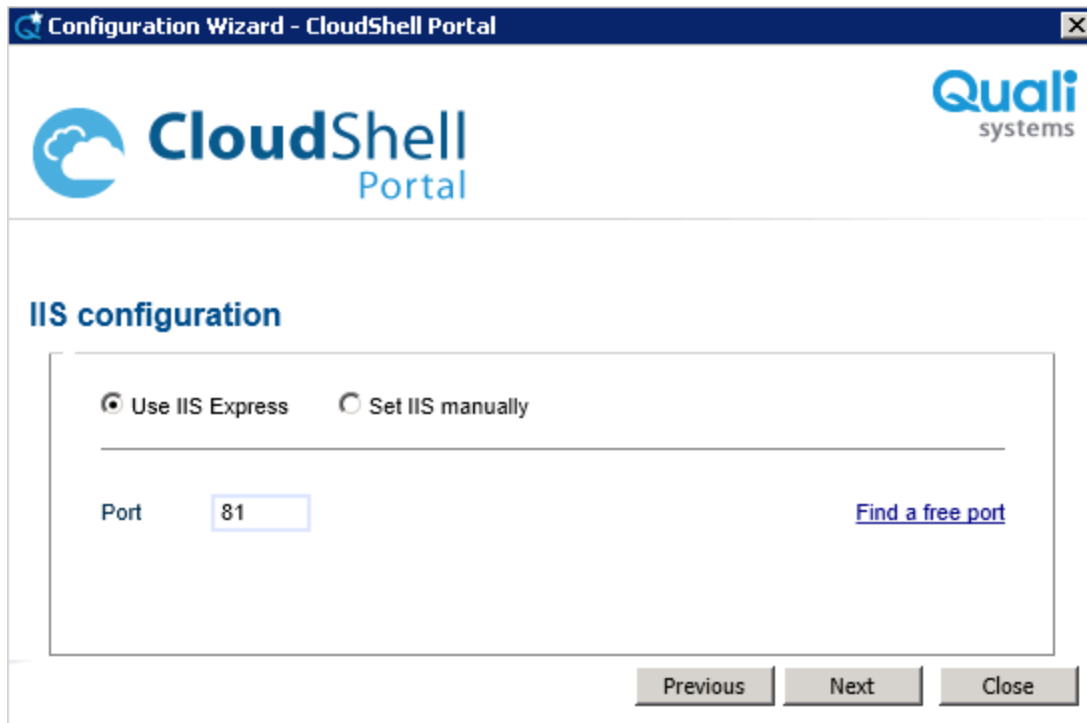
Configure the Self-Service Portal

CloudShell Portal is a self-service web client. This section describes how to configure the CloudShell Portal.

Install the required IIS version

CloudShell Portal requires a compatible IIS site. You can install and configure the IIS site manually or select the **Use IIS Express** option to have CloudShell do it automatically.

- Use the `IIS configuration` window to install the required IIS version.



The portal is installed in the QualiSystems Program Files folder:

- For 32 bit OS: `C:\Program Files\Qualisystems\CloudShell\Portal`
- For 64 bit OS: `C:\Program Files (x86)\Qualisystems\CloudShell\Portal`

Configure the session timeout interval

1. Go to the `<Installation drive>\Program Files (x86)\QualiSystems\CloudShell\Portal\Web.config` file.
2. Set the CloudShell Portal timeout interval using the “timeout” attribute in the “sessionState” element.

The value that is specified for the “timeout” attribute determines the CloudShell Portal session timeout interval in minutes.

In the `Web.config` file, the following XML lines contain the “timeout” attribute:

```
<system.web>  
  <sessionState timeout="120">  
  </sessionState>
```

This default setting means that the CloudShell Portal timeout interval is set for 120 minutes.

An alert message is issued shortly before the timeout, so if you do modify the timeout interval, do not use a setting that is six minutes or less.

3. After modifying the `Web.config` file, save it, restart the IIS, and clear the browser cache.

Note: Any modification that you make to the `Web.config` file is overwritten during an upgrade of the CloudShell application.

IIS configuration with IIS Express

When the **Set IIS Express** option is selected, setup installs IIS Express if it does not already exist on the server machine:

- On Windows 7 and Windows Server 2008, IIS Express version 8.0 is installed, either 32-bit or 64-bit, according to the OS platform.
- Earlier versions of IIS Express are uninstalled from your machine.

The default configuration uses port 80 as the port number and localhost as the address. You can configure these settings during the installation, or modify them later by launching the Quali Server configuration utility.

To load the portal:

1. Open a browser and enter the `localhost:Port# address` for a local machine, or the `IP:port/DNS:port address` for remote access.
2. In the **Administrative Tasks** window (see [Admin Configuration Settings](#)), set the admin password, email, and SMTP settings, assign users to groups and domains, and update data.
3. Optionally, designate the port manually by entering an available port number in the `Port` field text box. The installer notifies you if the port that you specified is unavailable.

IIS configuration using the IIS manual option

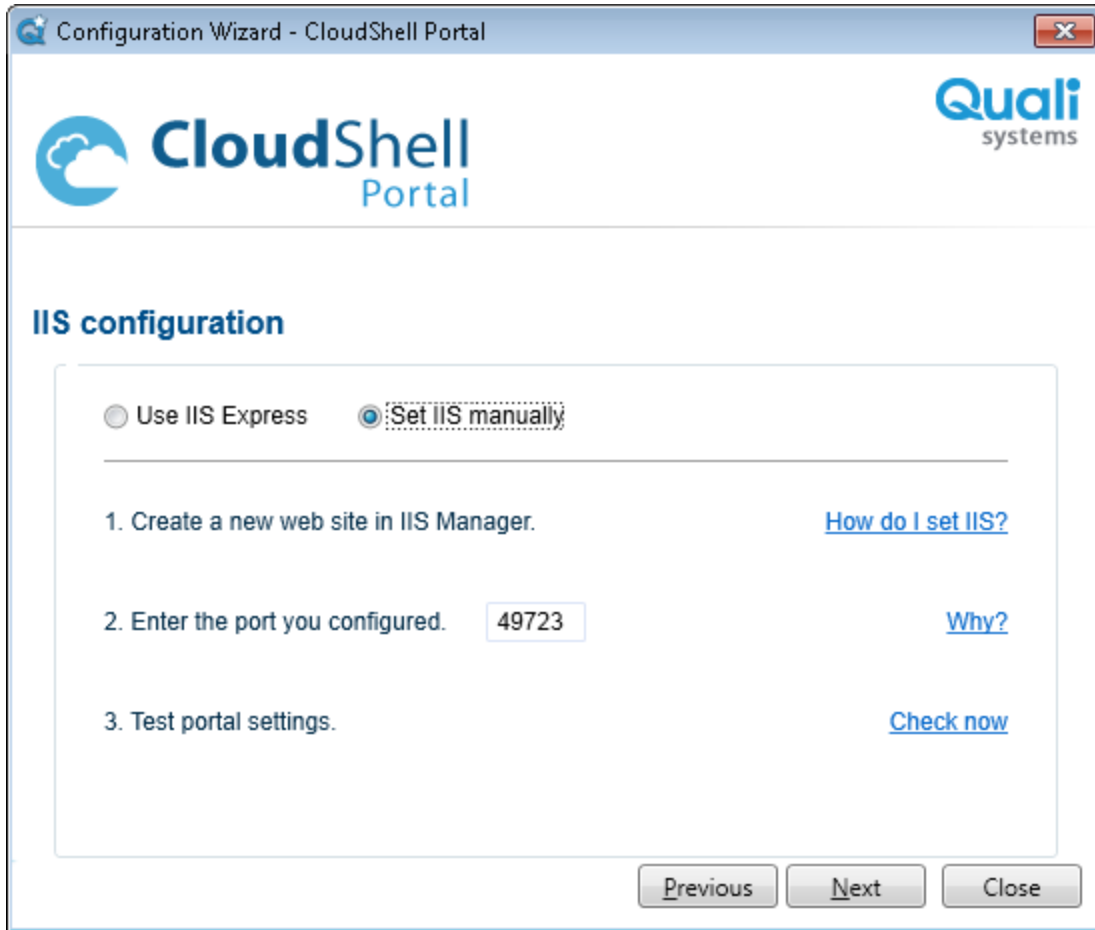
If you are using Windows Server 2012, first you need to install IIS 8.0.

To install IIS 8.0 on Windows Server 2012:

Visit the [Microsoft TechNet](#) site for more information.

To configure IIS

1. When the **Set IIS manually** option is selected, the IIS configuration window is displayed:



2. Proceed with the configurations described in the following topics:
 - a. [Create a new website in IIS Manager.](#)
 - b. [Enter the port you configured.](#)
 - c. [Test portal settings.](#)

Create a new website in IIS Manager

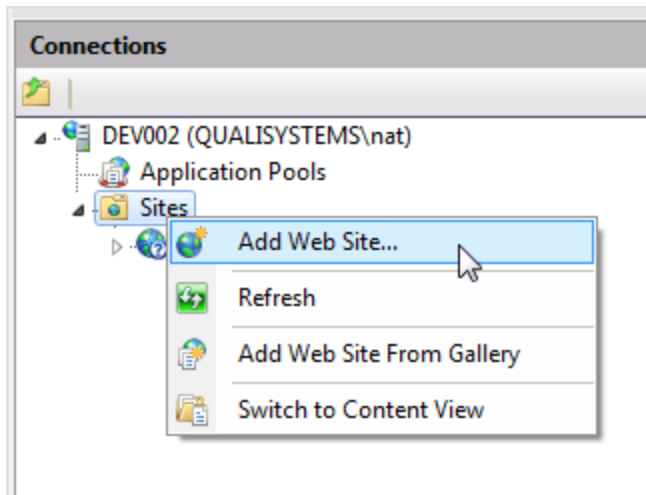
This procedure assumes that CloudShell Portal and Quali Server are installed on the same machine.

To create a new website in IIS Manager:

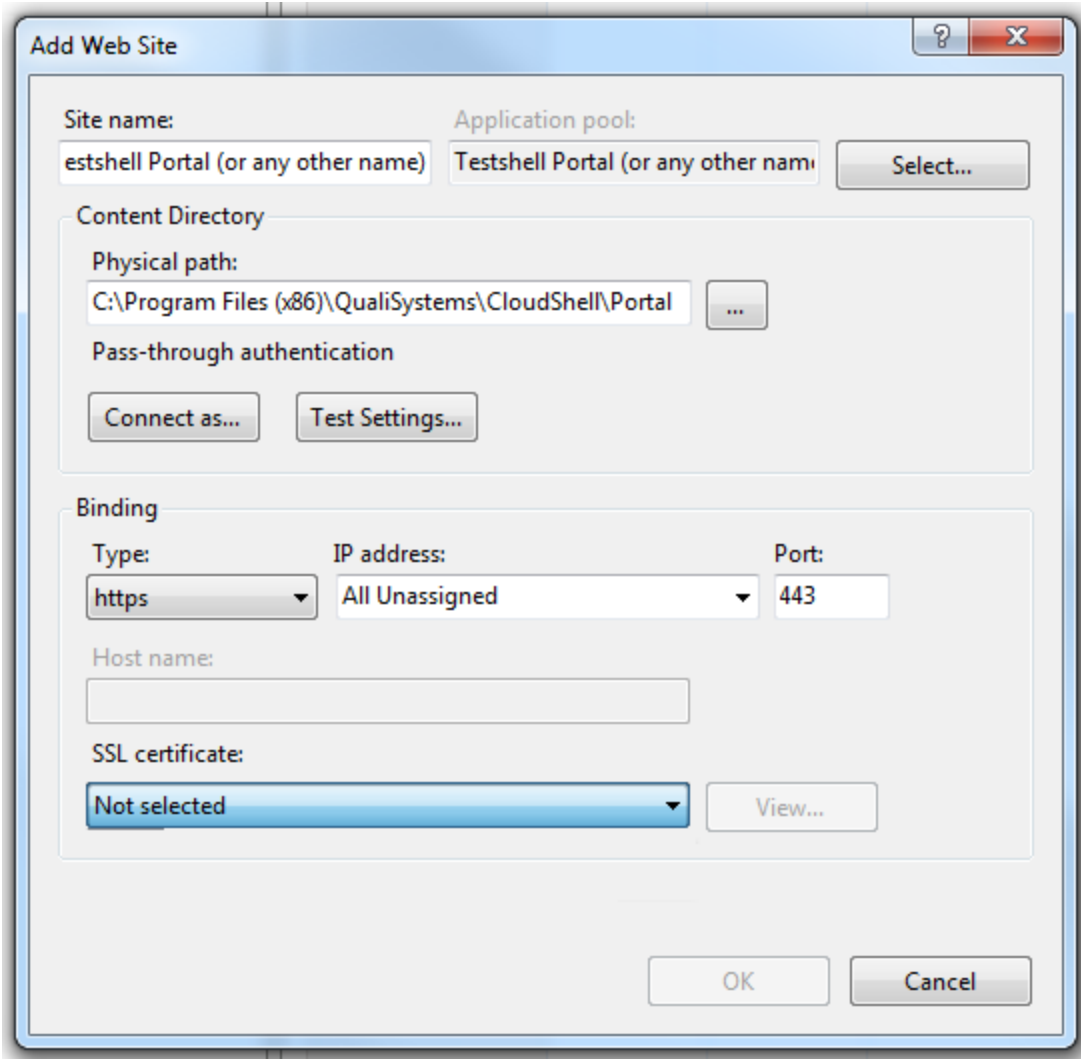
1. After installing CloudShell Portal and Quali Server, open the IIS Manager by running the following command at the command prompt:

```
inetmgr.msc
```

2. In the **Connections** window, right-click **Sites**.

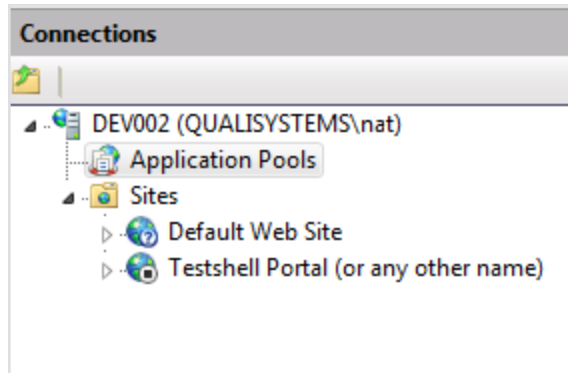


3. In the context menu, select **Add Web Site**.

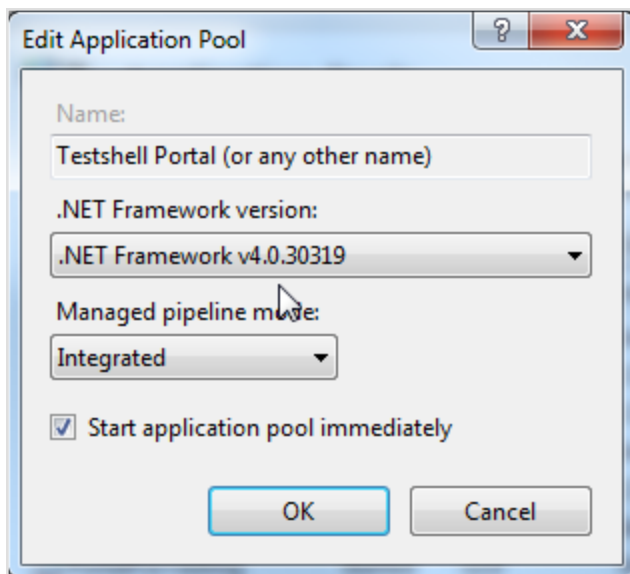


4. Define the web site settings as follows:
 - a. In the **Site name** field, specify a name for the site.
 - b. In the **Content Directory** field, specify a **Physical Path**, pointing to the portal folder.
 - c. (For HTTPS only) Set the **Binding Type** to **https**.
 - d. (For HTTPS only) Set the **SSL certificate** to the certificate provided by the client.

- e. Click **OK** to submit the changes.



5. In the **Connections** window, right-click **Application Pools**.



6. In the **Edit Application Pool** window, edit the application pool that was created for your website. Modify the **.NET Framework version** to **4.0-4.5.2** and click **OK**.

7. Go to the `$\Qualisystems\Cloudshell\Server\QsTeamServer.exe.config` file and change the value `LoadIISExpress` to `False` in the following key:

```
<add key="Portal.LoadIISExpress" value="False" />
```

8. Go to the `$\Qualisystems\Cloudshell\Portal\customer.config` file and change the value for `UseIisExpress` to `False` in the following key:

```
<add key="UseIisExpress" value="False"/>
```

9. In IIS Manager, start the website.
10. Restart the Quali Server.
11. Browse to the website and test it.

Note: Skype and perhaps other applications might block certain ports. For example, Skype blocks the default HTTPS port 443.

12. If error message HTTP Error 500.19 is issued, do the following:
 - a. Open the control panel's **Windows Features** dialog box, and add **Internet Information Services > World Wide Web Services > Application Development Features > ASP.NET 4.6** (If ASP.NET 4.6 is missing, select the latest available version).
 - b. Click **OK**.
13. If you are using IIS 8 with Windows Server 2012 or Windows Server 2012 R2, make sure to install the 'Web Server' role within the server manager.
14. After selecting the web server role, click **Next** and in the **Role Services** section, under **Application Development**, select **ASP.NET 4.5**.

This sub-role enables IIS to use ASP.NET 4.5 for running the CloudShell Portal.
15. Proceed to [Enter the port you configured](#).

Enter the port you configured

In order to test connectivity, the CloudShell Configuration Wizard requires the port number.

To specify the IIS website port:

- In the **IIS configuration** window, in the **Enter the port you configured** field, specify the port that you entered in the **Add Web Site** window.

Test portal settings

To test the portal settings:

1. In the **IIS configuration** window, click **Check Now**.
2. Click **Next**.
3. If a "CloudShell Portal could not be contacted." error is displayed, perform the steps in [Manual IIS installation error: "CloudShell Portal could not be contacted."](#)

IIS configuration changes when browsing to CloudShell Portal

When using Windows Server to run CloudShell Portal using IIS version 7.0 and above, you must modify the `Web.config` files in order for CloudShell Portal to work properly.

To modify the Web.config file:

1. Go to the `<Installation Drive>\QualiSystems\CloudShell\Portal\Web.config` file and locate the following XML element:

```
<configuration>
  <system.webServer>
    <modules>
```

2. Add the following element under it:

```
<remove name="WebDAVModule" />
```

3. Locate the following XML Element:

```
<configuration>
  <system.webServer>
    <handlers>
```

4. Add the following element under it:

```
<remove name="WebDAV" />
```

5. Save the `Web.config` file.
6. Restart CloudShell Portal.

Configure CloudShell Sandbox API

The CloudShell Sandbox API service is installed by selecting the **CloudShell Sandbox API** option in the **Component selection** window (as described in [Install CloudShell Sandbox API](#)). The CloudShell Sandbox API can be installed either on the same machine as the CloudShell Portal/Quali Server or on a different machine, and you can install several instances of this service on several machines (and can configure the settings accordingly).

Note: The default port for the CloudShell Sandbox API in the Quali Server is 82. You can customize this port number, as required.

To customize the port settings for accessing the CloudShell Sandbox API:

1. In the CloudShell Configuration Wizard, click **CloudShell Sandbox API** to open a web page, where you can customize the **Port Number** for accessing the API to suit your needs.

2. When the CloudShell Sandbox API is installed on a different machine than the CloudShell Portal, in the **Quali Server Address** field, you can specify the host name or IP address of the Quali Server.
3. Click **Save** to save the settings. (If you wish to revert the settings, click **Revert**.)

Select a CloudShell License

The **Select a license** window enables you to license your CloudShell applications.

You can configure a mix of license settings, using different types of files for each application. For some applications, you can specify more than one type of license. For example, you could run CloudShell Authoring with a seat license (from the license file) and CloudShell Resource Manager with a floating license (from the license server).

Select a license

To select a license:

1. The **Select a license** window, select the license type.
2. Since the license status does not update automatically, click **Refresh** to update the license information that you entered.
3. Verify that the **License Status** is now "All Valid".

Select a floating license

1. Select **License Server** to use a floating license from your organization's License server.



Configuration Wizard - CloudShell Server

Quali systems

Select a license.

Get License File

License File (select the location of your license file)

License Server (enter your license server address)

Address (computer name or IP): Port:

Commuter license

License Status: **All Valid** [Details](#)

* [Refresh](#) the license status (this may take a few moments)

Previous Next Close

2. Enter the name or IP **Address** of the machine where the License Server is installed.
3. Leave the **Port** field value with the default (5093).

Select an installed license file

1. For a single station ("seat") license, you can either specify an installed license, or request a license based on your computer's ID.
2. If you already have a license installed, click **Browse** to search for and select the license file. The path to the selected license file is displayed in the **Select the location of your license**

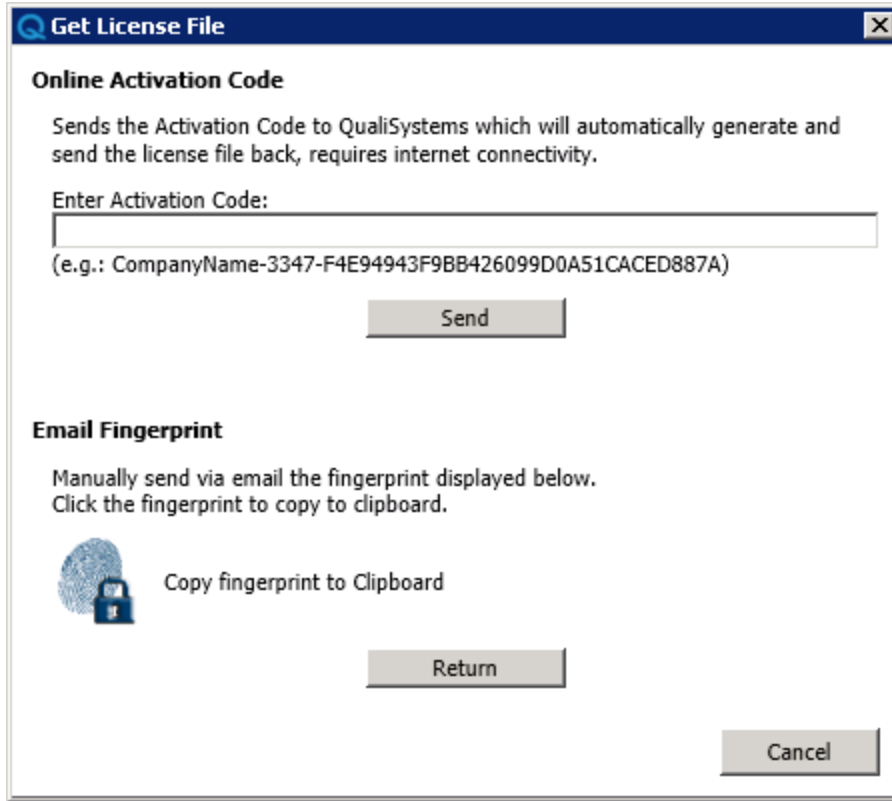
file box.



Get a license file

To get a license file:

1. Click the **Get License File** button.
The **Get License File** dialog box is displayed.



2. In the **Online Activation Code** section, click the **Send** button to automatically generate an activation code from your computer's fingerprint.

If you don't have a computer fingerprint, perform the following:

- a. Open the `C:\Program Files (x86)\QualiSystems\Licenses\` folder and make sure the `ActivatedLicense_<version#>.lsn` file doesn't exist. If it exists, rename it.

- b. In the **Online Activation Code** section, in the **Enter Activation Code** field, enter the activation code you received from Quali and click **Send**.

A new `ActivatedLicense_<version#>.lsn` file is created in the `QualiSystems\Licenses` folder, listing all of your seat's features.

- c. If Quali Server and CloudShell License Server are installed on the same machine and you have two activation codes, one for Quali Server and one for the clients, rename the newly created `ActivatedLicense_<version#>.lsn` file.

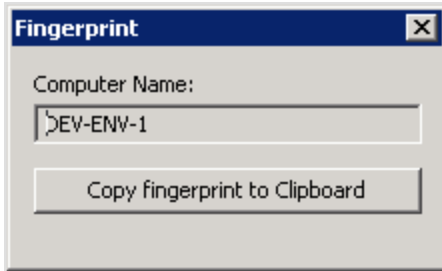
3. In the **Email Fingerprint** section, click **Copy fingerprint to Clipboard** to generate a fingerprint manually that you can send to QualiSystems, and have Quali send you the license file by email.
4. Copy the license file to your computer.
5. Click the **Browse** button next to the **License File** field to specify the location of the license file.

You can also use the fingerprint utility to generate a fingerprint.

To acquire the machine's fingerprint:

1. Open the `Utilities\Licensing\Fingerprint Viewer` folder from the installation package.
2. Double-click `Fingerprint.exe` to run the **Fingerprint** utility.

The **Fingerprint** window opens with PC name and unique ID:

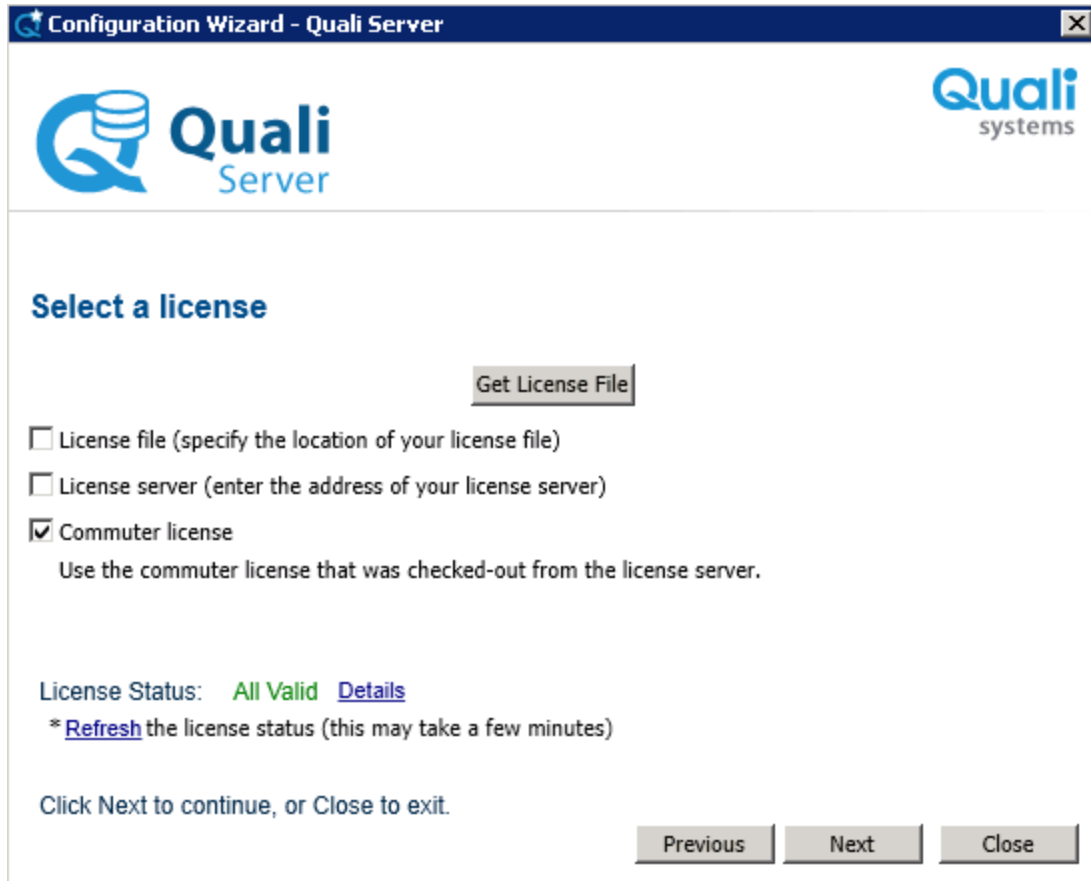


3. Click **Copy fingerprint to Clipboard**.
4. Paste the text to a file.
5. Send this copied information to Quali headquarters. In response, an email message which includes the license file is sent to your email address.

Note: Make sure that your version of the `Fingerprint.exe` file matches the CloudShell installation version.

Run a commuter license

- Select **Commuter License** to enable continuous use of a floating license from your organization's License Server.



Configure the Database Connection

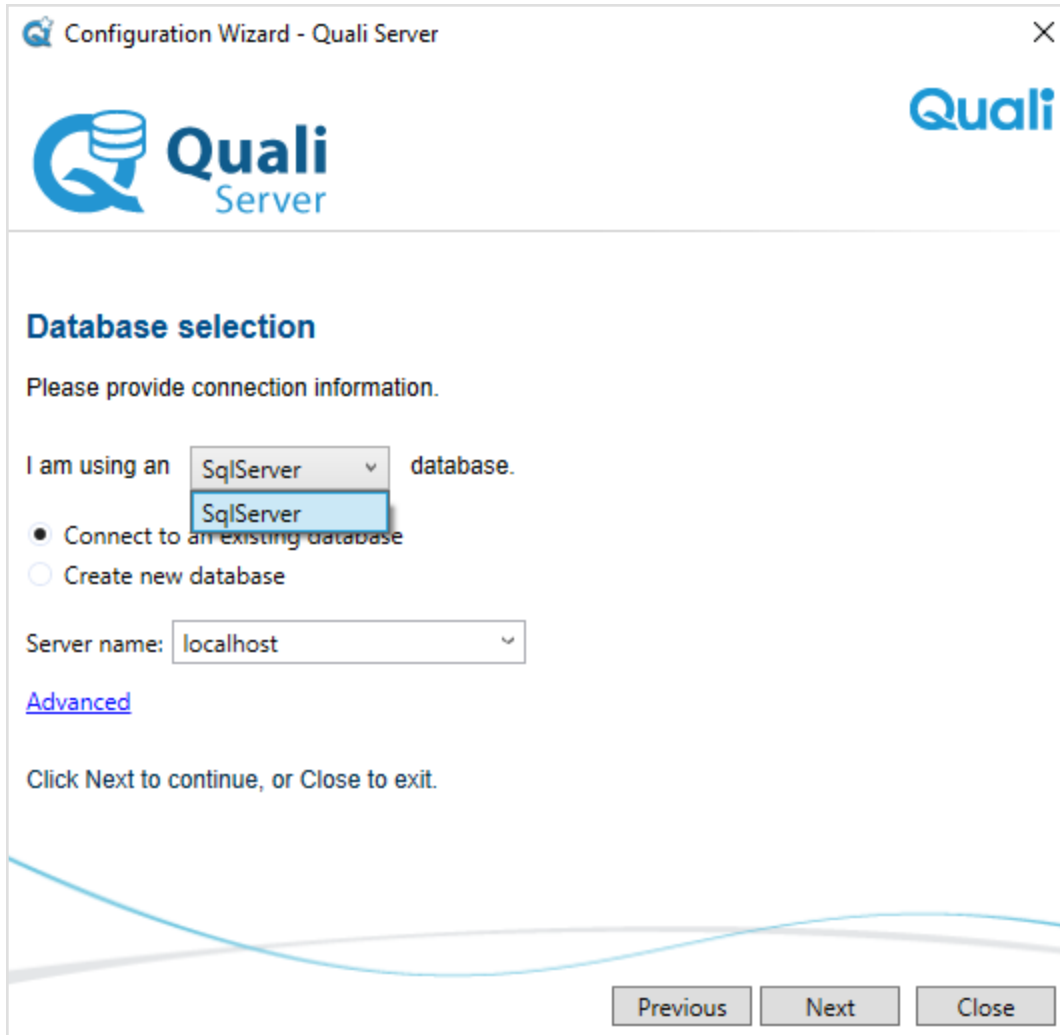
This section describes the database definition process in the database selection step. This procedure is the same for all server configuration tools.

Configure access to an SQL database

To configure access to an SQL database:

1. Specify Sql as the database type:

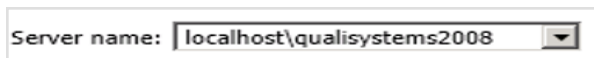
In the **I am using an... database** field, select **SqlServer** from the dropdown list.



2. Specify whether to connect to an existing database or to create a new database.
 - If you are performing an update of the product and databases are already defined, select **Connect to an existing database**.
 - Otherwise, select **Create new database**.

3. Specify the database name.

While using the built in SQL Express installation, verify that localhost\qualisystems2008 is displayed in the Server Name list box



Otherwise, select the SQL server instance from the **Server Name** dropdown list.

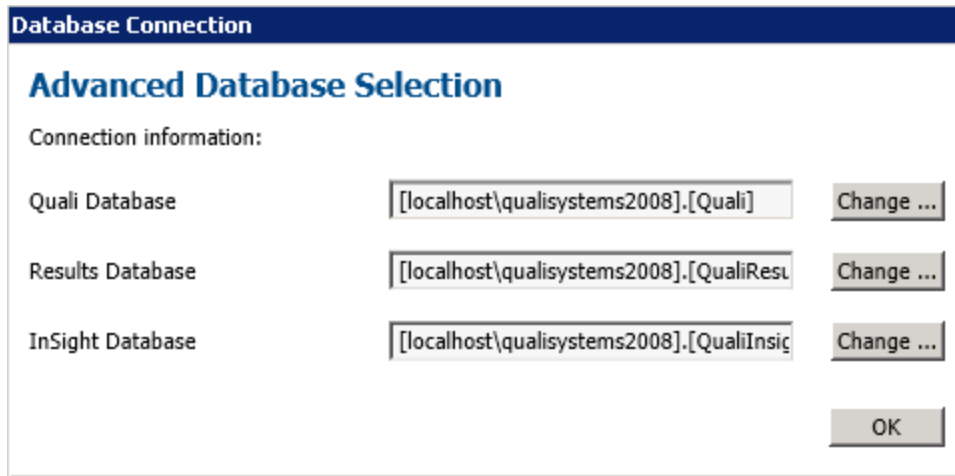
4. Enter a name for the new database and click **OK**.

5. Configure the databases manually and click **OK** to return to the CloudShell Configuration Wizard.
6. Select the **Connect to existing database** option and click **Next** to continue.

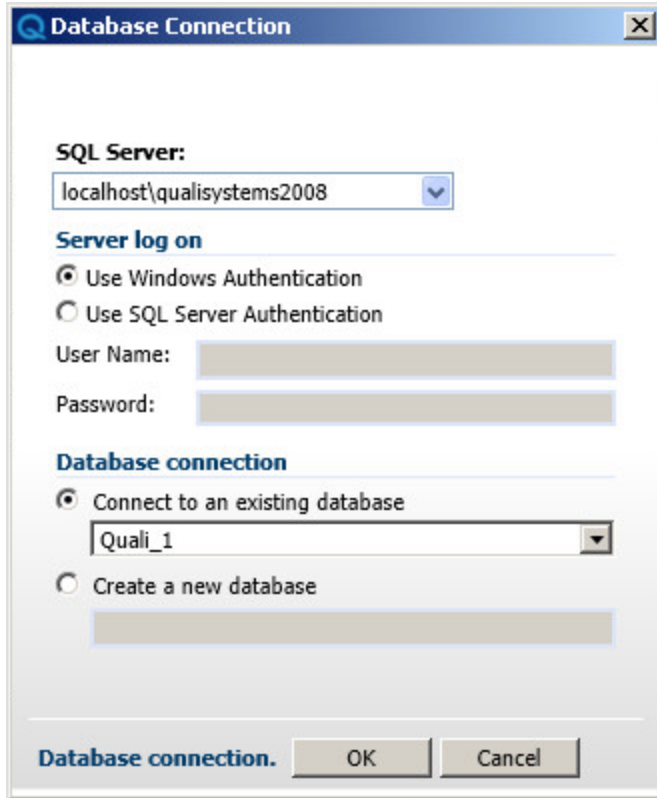
When selecting the **Create new database** option, the installer creates databases with default names.

To configure the database connections manually:

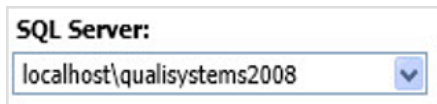
1. Click the **Advanced** link to open the **Advanced Database Selection** window.



2. Click **Change** next to the required database field to open the **Database Connection** window.



3. In the **SQL Server** field, verify that the location of the SQL server is correct.



While using the built in SQL Express installation, the **SQL Server** field should display `localhost\qualisystems2008`. Otherwise, select the SQL instance path from the drop-down list.

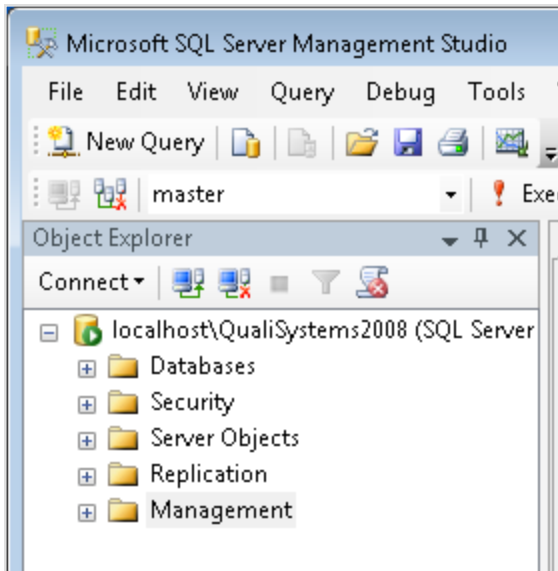
4. Click **OK**.

Move SQL Server default instance's folders

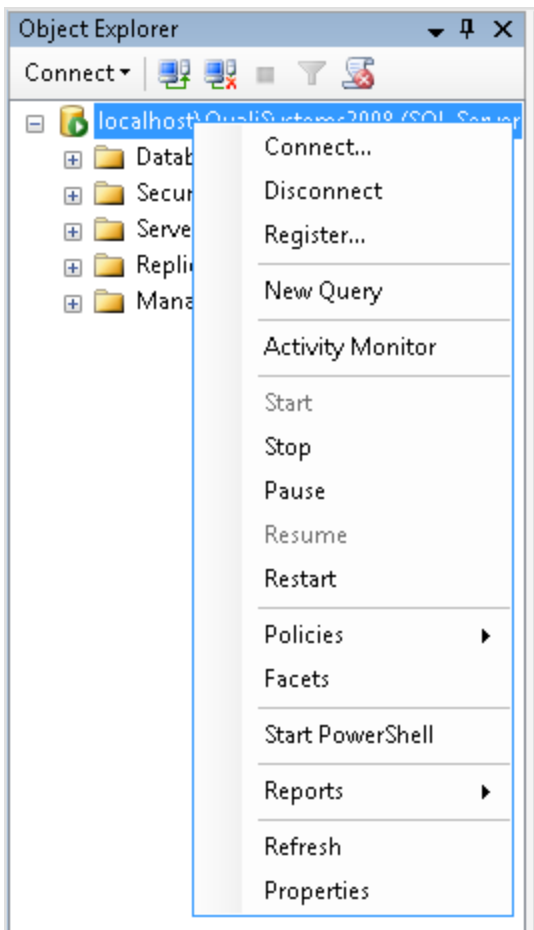
In certain cases, you might consider moving the database instance to another drive, for example, due to the restricted size of the current drive. If the SQL Server default instance's folders must be moved to a different path on the same server, follow the steps in the following procedure.

To move the SQL Server default instances' folders to a different path:

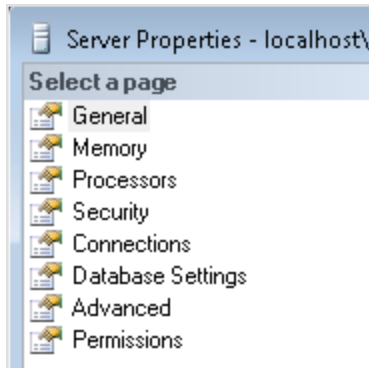
1. Open SQL Server Management Studio.



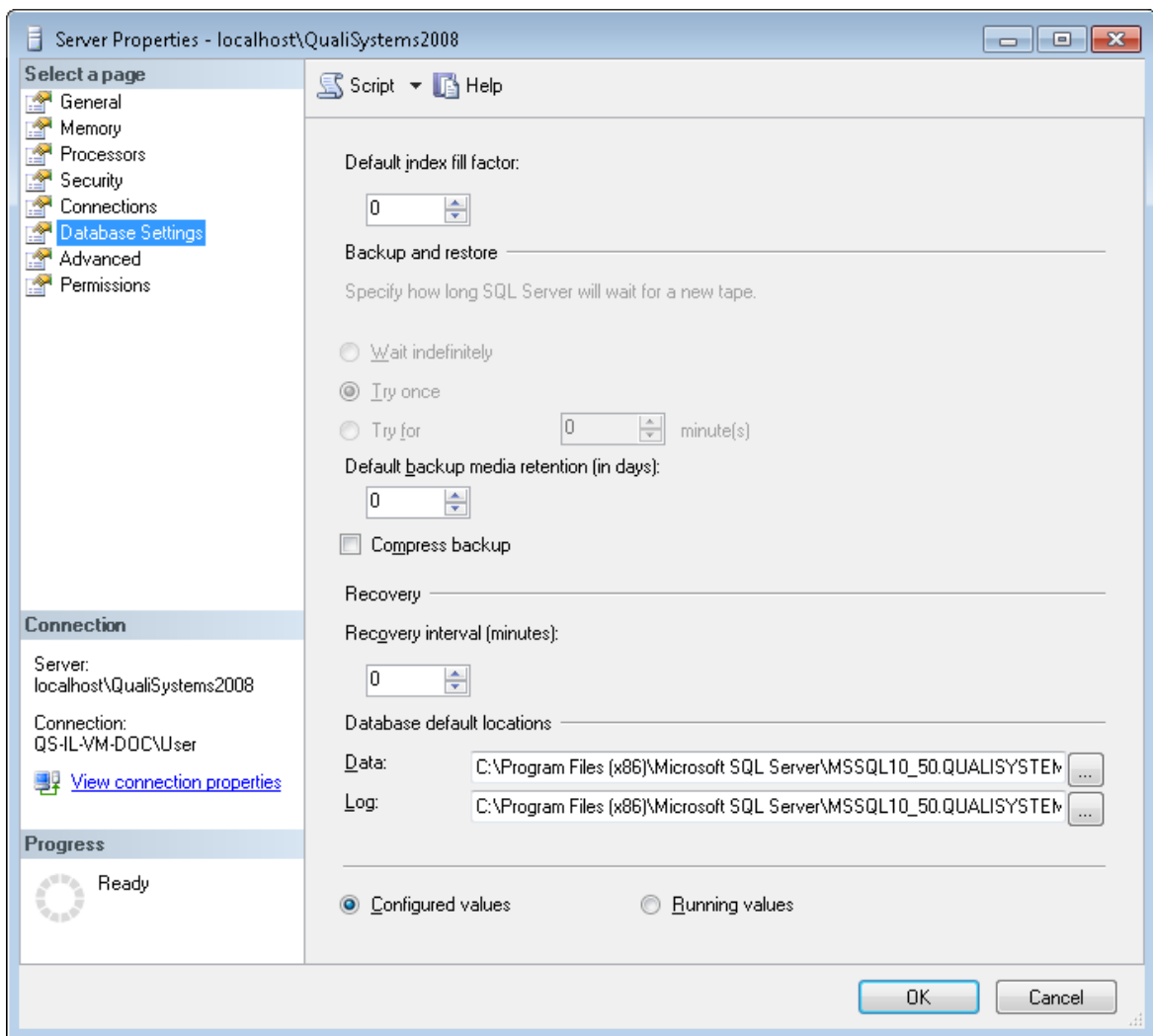
2. In Object Explorer, right-click the required server.



3. In the context menu, click **Properties**.



4. In the **Select a page** pane, click **Database Settings**.



5. Enter the new default pathnames in the **Data** or **Log** fields, or click the **Browse** button to navigate to the path.

For information on how move a system database, click this [link](#).

Server Connectivity Settings

To configure server connectivity settings:

1. In the **Server Connectivity** window, specify the hostname or IP address of the Quali Server and your login settings.



The screenshot shows a window titled "Configuration Wizard - CloudShell Portal" with the Quali systems logo in the top right. The main content area is titled "Server connectivity" and contains the following fields and instructions:

- Instruction: "Enter the server name or IP address:"
- Text input field containing "localhost"
- Instruction: "Enter a server username and password (administrative rights required):"
- Label "Username:" followed by a text input field containing "admin"
- Label "Password:" followed by a password input field containing "*****"
- Text: "Click Next to continue, or Close to exit."
- Navigation buttons: "Previous", "Next", and "Close"

2. Specify the connection credentials to use for connecting to the application server.
3. Enter the name or IP of the computer where Quali Server is installed. If the server is installed locally, use localhost as the server name.

The default login settings are:

Username: admin

Password: admin

For details how to change the username and/or the password, see [Admin password](#).

Admin Configuration Settings

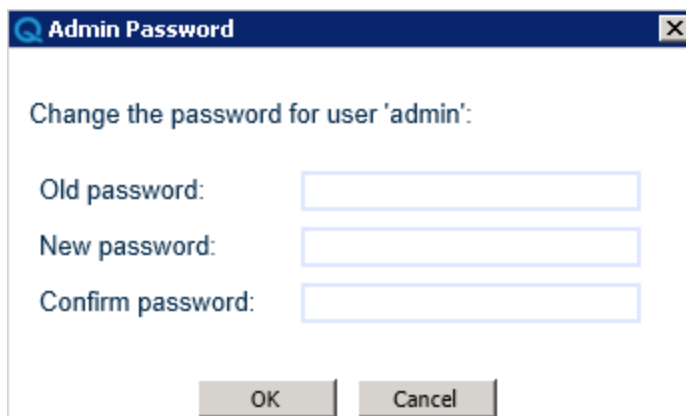
Administrative tasks

- In the **Administrative Tasks** window, you can set the admin password, email and SMTP settings, assign users to groups and domains, and update data.



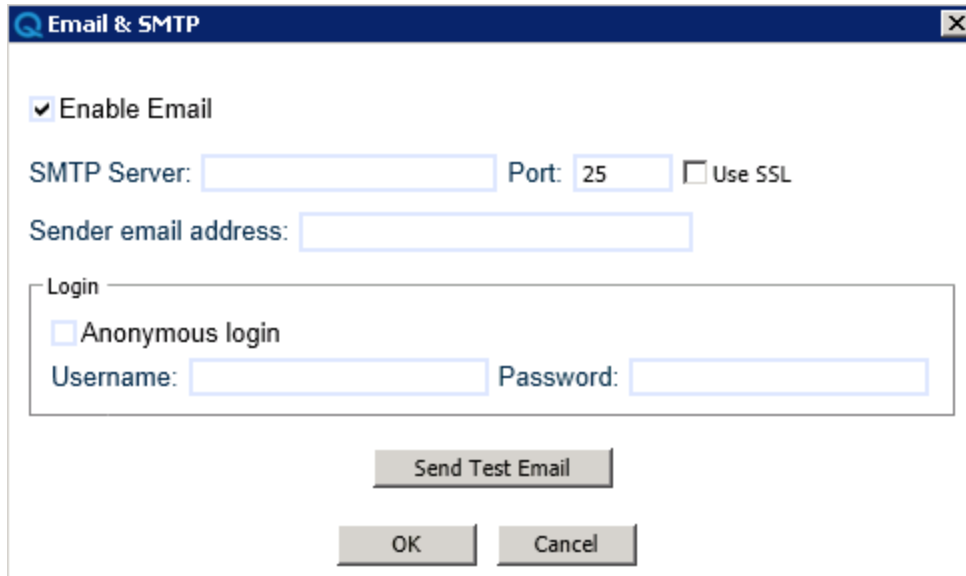
Admin password

- Click the **Admin Password** button to modify the administrator's password.



SMTP mail configuration

1. Click the **Email & SMTP** button, to configure SMTP email settings.

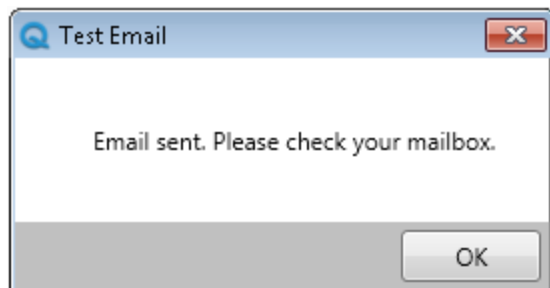


The screenshot shows a dialog box titled "Email & SMTP" with a close button (X) in the top right corner. The dialog contains the following elements:

- A checked checkbox labeled "Enable Email".
- Fields for "SMTP Server:" (empty), "Port:" (containing "25"), and a "Use SSL" checkbox (unchecked).
- A "Sender email address:" field (empty).
- A "Login" section containing:
 - An unchecked checkbox labeled "Anonymous login".
 - "Username:" and "Password:" fields (both empty).
- A "Send Test Email" button.
- "OK" and "Cancel" buttons at the bottom.

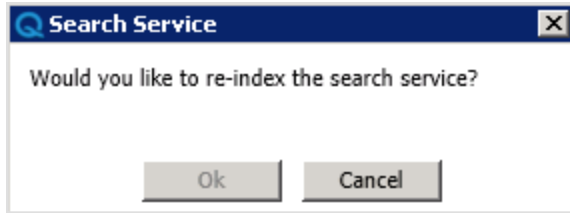
Note: After making changes to the SMTP settings, you need to stop and then restart the Quali Server service.

2. In the **SMTP Server** address box, enter the name of the mail server in your organization.
3. In the **Port** field, verify that the specified port for the mail server is correct. Otherwise, enter the correct port number.
4. Select the **Use SSL** check box for secure transmission.
5. In the **Sender email address** field, enter the email address that is used for sending emails.
6. If an anonymous login is not supported in the specified mail server, clear the **Anonymous login** check box. Then enter the username and password of the email sender.
7. After all inputs are specified, click the **Send Test Email** button to test sending an email with these settings. Enter a recipient email and click **OK** to send the test email.



Search service configuration

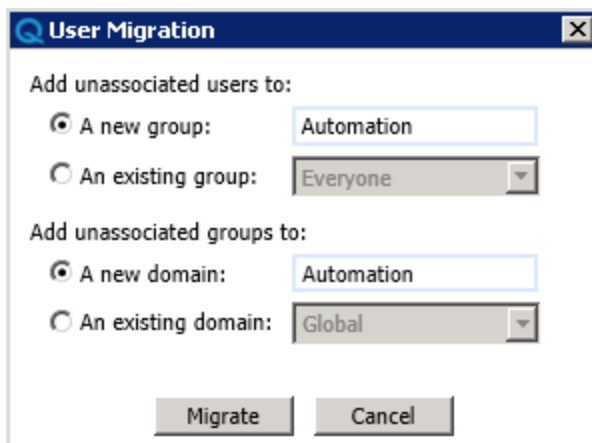
- Click the **Search Service** button to re-index the search service.



User migration

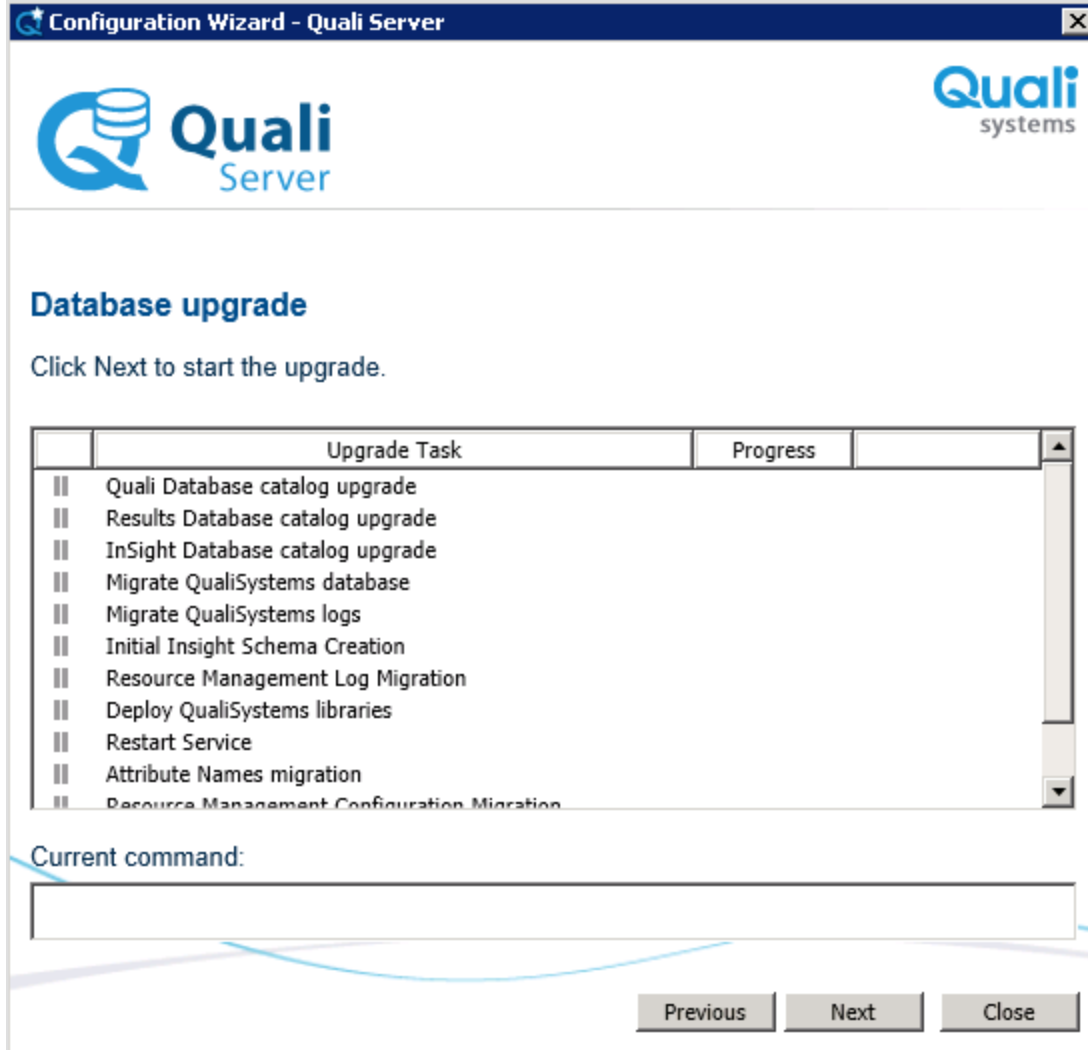
All CloudShell users must be associated with at least one group and one domain. Users without an associated domain are not able to login.

- Click the **User Migration** button to migrate any unassociated users with a default group and domain.



Server upgrade

For server applications, the **Upgrade** window shows the application data upgrade stages.



Installation Validation Procedure

This section describes the procedures to validate the installation.

Verify the status of installed services

1. Launch CloudShell Monitor.
2. Verify that CloudShell service is running with no errors.

Verify that Resource Manager is operational

1. Launch Resource Manager.
2. Create a new resource.
3. Create a new environment.
4. Create a new resource and add it to the environment.
5. Reserve and activate the environment.
6. Perform auto load for a Layer 1 chassis.

Known Issues and Troubleshooting

This section includes known issues and topics to assist in troubleshooting while installing CloudShell 7.1 GA

Known Installation Issues

Application	Description
All	<p>There are two known issues for installing CloudShell on a “clean” PC with no existing components:</p> <ul style="list-style-type: none"> • Setup may require a reboot. Make sure to log back in as the same user that started the installation. • If setup does not restart automatically, you have to restart it manually.
All	<p>A new installation should run between 10-30 minutes. The installation itself takes less than 10 minutes. Initial configuration should not take more than 20 minutes.</p>
Database	<p>When SQL database is selected as the database type in a standalone installation, a separate instance of Microsoft SQL Express 2008 is installed.</p>
All	<p>Installing CloudShell prerequisites requires administration privileges on the installation machine.</p>
All	<p>There is a filename length limitation in CloudShell that forces the user to locate the installation files on a non-deep location (for example, c:\temp) before executing the installer.</p>

Known Upgrade Issues

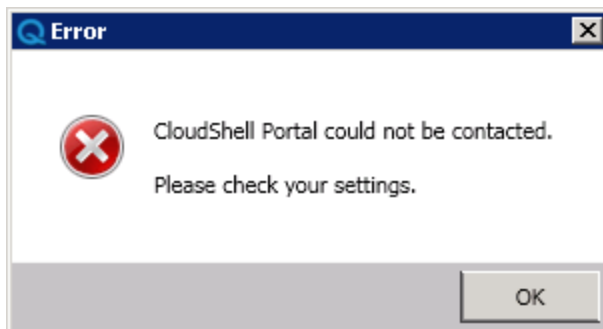
Application	Description
All	<p>Although the CloudShell 7.1 GA installer should leave all of your current configurations intact, it does overwrite your existing applications. This may inadvertently affect some of your current settings. It is therefore imperative to back up your databases before upgrading.</p>
TestShell API	<p>Updating drivers using TestShell API assets:</p> <ul style="list-style-type: none"> • After upgrading to CloudShell 7.1 GA, you need to manually update the

Application	Description
	<p>TestShell API asset in Authoring, and then recompile any drivers using the API methods.</p> <ul style="list-style-type: none"> • Drivers using the API to update values in the Quali Server only require updating of the asset.
Check in all libraries prior to upgrading	Verify that all the libraries are checked in. Checked out libraries are indicated by a different color icon. The parent folder also indicates if the folder contains a checked-out library.
All	<p>Upgrading to version 7.1 GA EA is supported from the following versions:</p> <ul style="list-style-type: none"> • 7.0 GA (and patches) • 6.4 GA (and patches) • 6.3 GA (and patches) <p>When upgrading from versions earlier than 6.3 GA, you must first upgrade to one of the above versions and then to 7.1 GA EA.</p> <hr/> <p>Note: Patches must be installed on GA versions only. Installing a patch on a non-GA version will result in unexpected behavior which may corrupt the database.</p> <hr/>
All	Real-time virus protection may affect performance.

Troubleshooting

Manual IIS installation error: "CloudShell Portal could not be contacted."

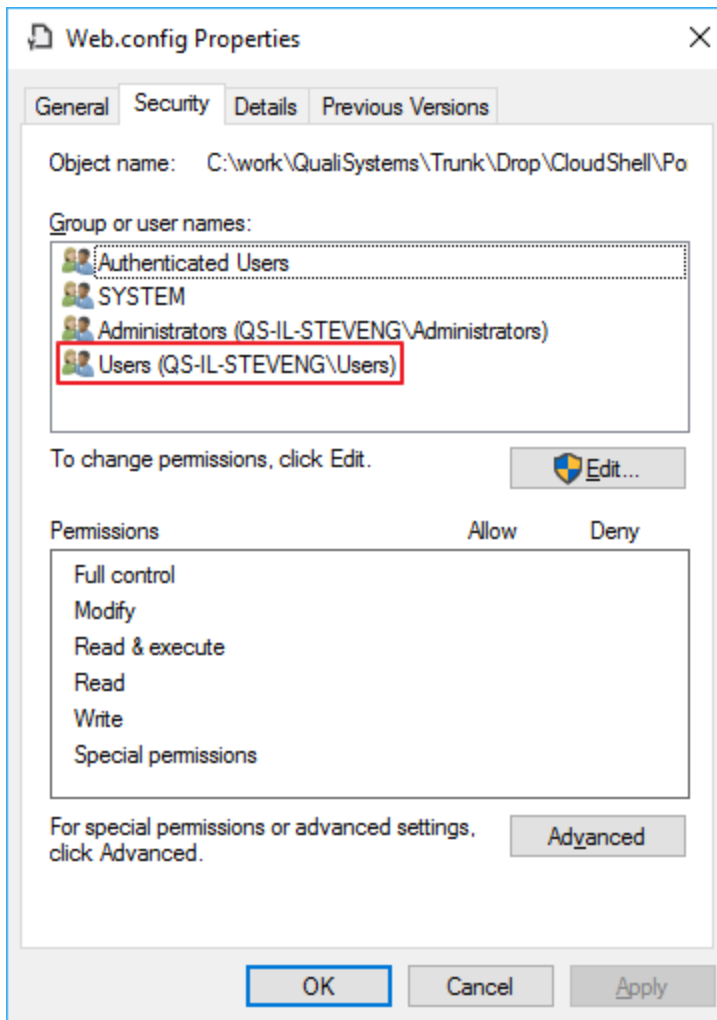
When manually installing the CloudShell IIS site (**Set IIS manually** option), the following error is displayed if the "IIS-IUsers" group is not permitted on the CloudShell Portal installation directory:



To add the IIS-IUsers group to the Portal installation directory:

1. Go to the <Installation drive>\Program Files (x86)\QualiSystems\CloudShell\ directory.
2. Right-click the Portal directory and select **Properties**.
3. In the **Portal Properties** dialog box, click the **Security** tab.
In the **Permissions for Portal** dialog box.
4. Click **Edit** and add the **IIS-IUsers** group.

For example:



5. Click **OK**.
6. Click **OK** in the **Portal Properties** dialog box.

Microsoft Distributed Transactions Coordinator (MSDTC)

In this section:

[MSDTC security configuration](#)

[Firewall settings](#)

MSDTC security configuration

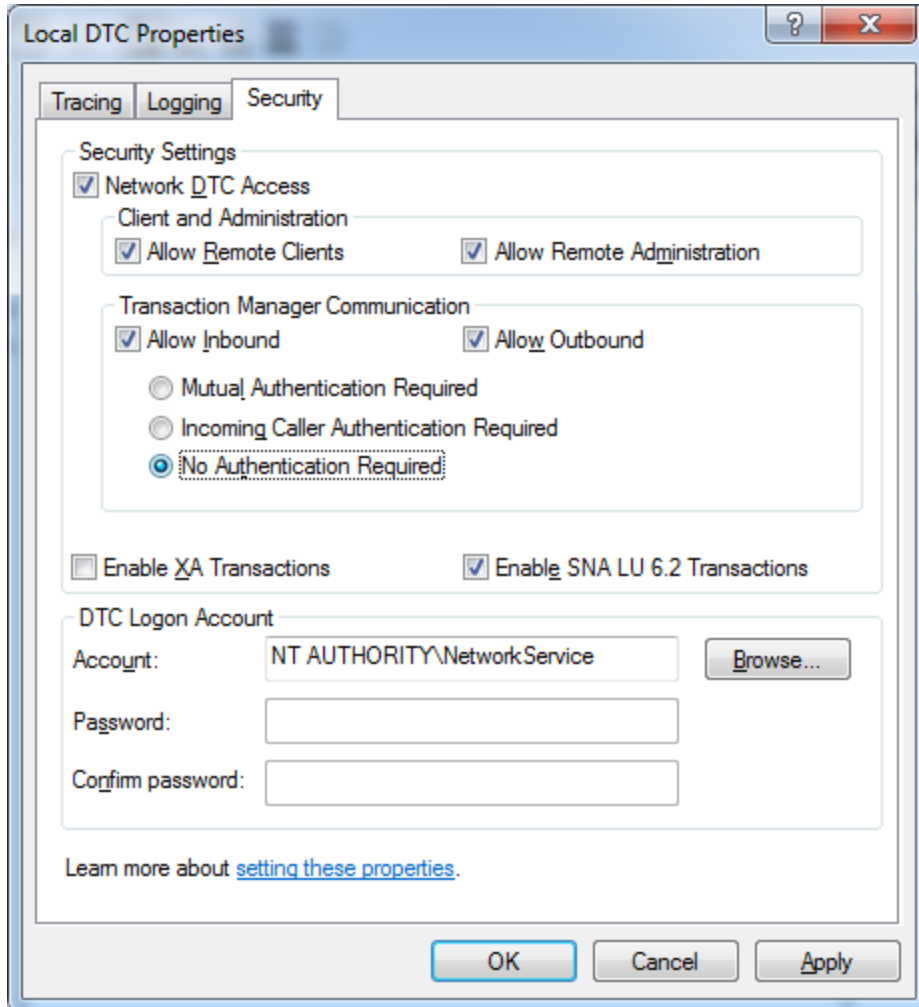
Possible reasons for incorrect MSDTC configuration include:

- MSDTC is not installed.
- MSDTC is not configured to start automatically in Windows Services.
- Security configurations of MSDTC are not correctly defined.

To run the CloudShell Suite applications, configure MSDTC Security settings in machines where databases are installed.

For all supported versions of Windows:

1. Go to **Control Panel > Administrative Tools > Component Services** (or **Start > Run > dcomcnfg**).
2. From the left navigation tree, drill down to **Component Services > Computers > My Computer > Distributed Transaction Coordinator > Local DTC**.
3. Right-click **Local DTC** and select **Properties** from the context menu.
4. In the **Security** tab, select the following options:
 - Network DTC Access
 - Allow Remote Client
 - Allow Remote Administration
 - Allow Inbound
 - Allow Outbound
 - Enable SNA LU 6.2 Transactions
 - No Authentication Required



5. Apply the changes.

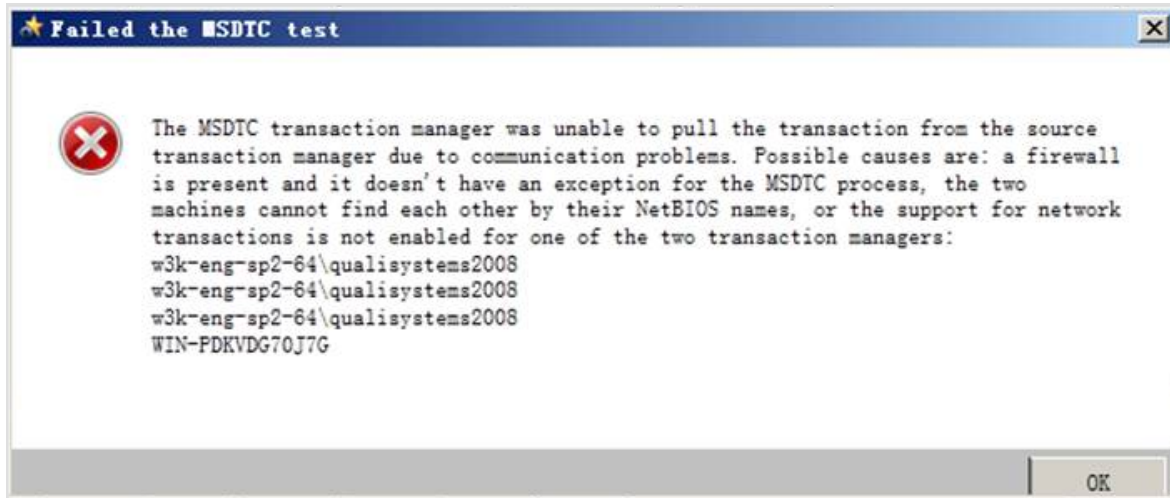
The service restarts. However, you may have to restart the computer(s).

For all operating systems, define the Distributed Transaction Coordinator service to start-up automatically:

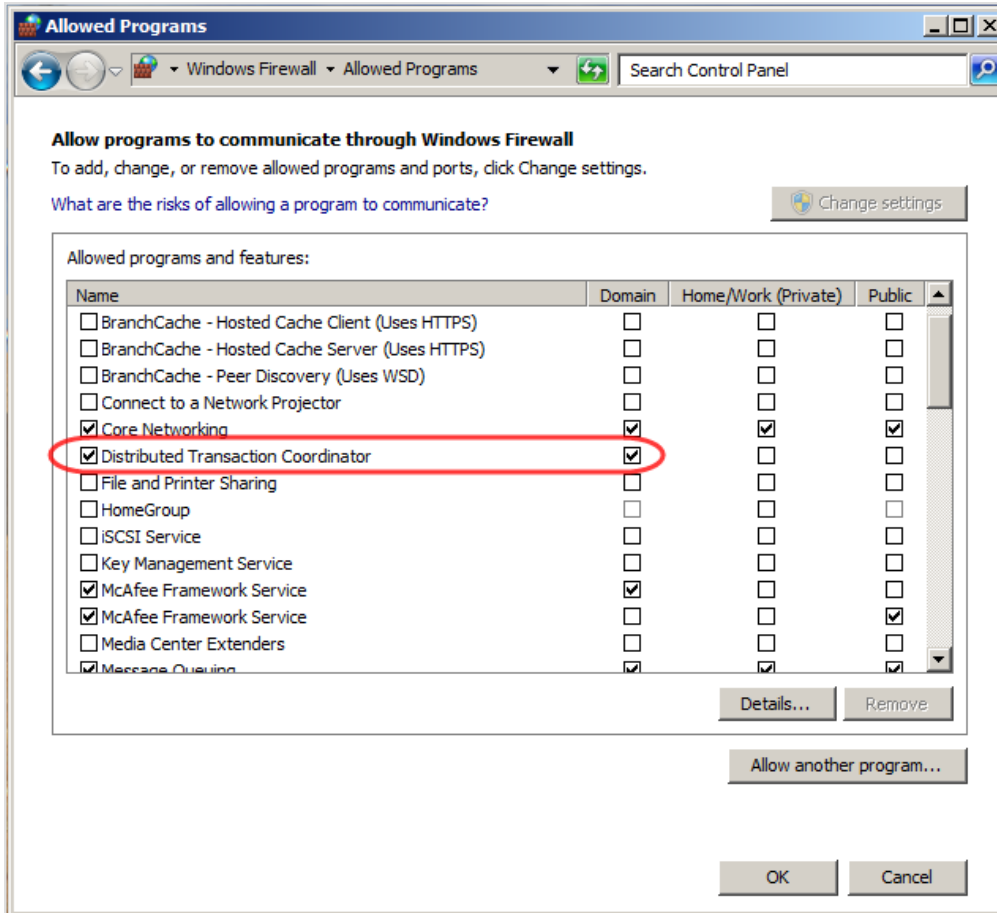
1. Choose **Start > Run** and type **services.msc** and press **Enter**.
2. In the **Services** window, right-click **Distributed Transaction Coordinator**, and select **Properties** from the context menu.
3. In the **Startup type** dropdown list, select **Automatic**.
4. Click **OK** to close the Properties window.

Firewall settings

1. When installing on Windows 7 or Windows Server 2008 OS with East Asian languages, the following error may appear:



2. To resolve this problem make sure that Distributive Transaction Coordinator is permitted to communicate through Microsoft Firewall.



3. Open Control Panel > System and Security > Windows Firewall > Allowed Programs and select Distributed Transactions Coordinator.

Databases

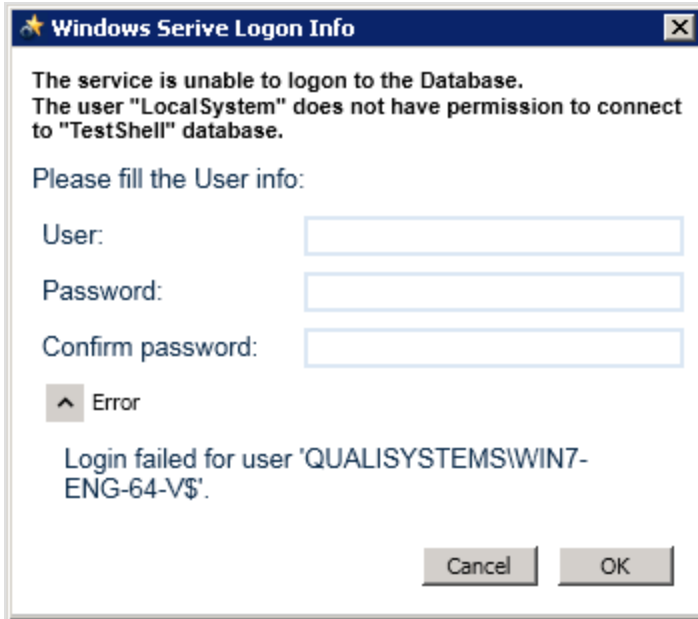
In this section:

[Database permissions](#)

[Remote MSDTC configuration issues](#)

Database permissions

When creating a new database or using an existing database on a remote database server, the following warning message may appear if local user has no permissions to open a remote database:



To grant CloudShell users permissions for a database on a remote machine:

1. In the **User** field, enter the Local System user or Domain User name.
2. Specify the full path, for example:
 <Domain>\<Username>
 -or-
 <Local User on RemoteMachine>\<Username>
3. In the **Password** field, enter the user’s password.
4. Confirm the user password and click **OK** to proceed.

Remote MSDTC configuration issues

If the remote database machine has an incorrect MSDTC configuration, the system might issue an error message. For more information to resolve this problem, see [MSDTC security configuration](#).

Fixed server roles

The following table describes fixed server roles. For more information, click this [link](#).

Role	Description	Required for?
sysadmin	Members of the sysadmin fixed server role can perform any activity in the server, for example, set up and maintain the sys-	Required for High

Role	Description	Required for?
	tem or server.	Availability (HA) and Quali Server
serveradmin	Members of the serveradmin fixed server role can change server-wide configuration options and shut down the server.	Required for HA
securityadmin	Members of the securityadmin fixed server role manage logins and their properties. They can GRANT, DENY, and REVOKE server-level permissions. They can also GRANT, DENY, and REVOKE database-level permissions if they have access to a database. Additionally, they can reset passwords for SQL Server logins.	Used only by DB admin
processadmin	Members of the processadmin fixed server role can end processes that are running in an instance of SQL Server.	Might be required during installation
setupadmin	Members of the setupadmin fixed server role can add and remove linked servers by using Transact-SQL statements. (sysadmin membership is needed when using SQL Management Studio.)	Required for HA
bulkadmin	Members of the bulkadmin fixed server role can run the BULK INSERT statement.	Required during normal operation
diskadmin	The diskadmin fixed server role is used for managing disk files.	Not required from app perspective
dbcreator	Members of the dbcreator fixed server role can create, alter, drop, and restore any database.	Required during installation
Public	Every SQL Server login belongs to the public server role. When a server principal has not been granted or denied spe-	Required during nor-

Role	Description	Required for?
	<p>cific permissions on a securable object, the user inherits the permissions granted to public on that object. Only assign public permissions on any object when you want the object to be available to all users. You cannot change membership in public.</p>	<p>mal operation</p>

Network Time Protocol Server

In certain cases Quali Server, QualiX, and Client machines might be synced against different Network Time Protocol (NTP) servers and therefore have slight time differences, causing issues with token-based authentication.

For information about how to resolve this issue, click this [link](#).

Quali customer support

- Customer support for CloudShell applications is available through the [Quali Support Center](#).
- In addition to the knowledge base and community forums, customers can submit and track their support requests through the [Quali Support Center](#).

Documentation

- Additional technical documentation is available in the [Quali's Download Center](#).
- Operational documentation for all CloudShell 7.1 GA applications is available by clicking the **Help** option in any CloudShell application.
- For Quali discussion forums, you can access the [Quali Community Forum](#).

Utilities and Layer 1 Drivers

This section describes the utilities and Layer 1 (L1) drivers that are installed with CloudShell.

Utilities

CloudShell 7.1 GA includes the utilities listed in the following tables:

[System utilities](#)

[Configuration utilities](#)

[Runtime utilities](#)

[Additional configuration files and utilities](#)

System utilities

Utility	Description	Location
CloudShell Monitor	Stores and centralizes logs from all installed CloudShell applications. CloudShell Monitor can also be used to start and stop CloudShell services.	Start menu > QualiSystems > Tools > CloudShell Monitor

Configuration utilities

Utility	Description	Location
CloudShell Configuration	Utility for configuration of installed CloudShell applications.	Start menu > QualiSystems > Tools > CloudShell Configuration

Runtime utilities

CloudShell Runtime Configuration	Runtime support for external script engines.	Start menu > QualiSystems > Tools > CloudShell Runtime Configuration
Remote Runner Service	The Remote Runner Service is a runner managed through Windows services for running scripts and commands in the background. The Remote Runner Service is not required for executing scripts or commands through the Remote Runner GUI.	Windows Services > CloudShell Remote Runner
CloudShell Spy	A runtime debugger that displays running steps when executing a CloudShell Authoring executable project. Installed with CloudShell Runtime.	Start menu > QualiSystems > Tools > CloudShell Spy

Runtime utilities

Utility	Description	Location
CloudShell Runtime Configuration	Runtime support for external script engines.	Start menu > QualiSystems > Tools > CloudShell Runtime Configuration
Remote Runner Service	The Remote Runner Service is a runner managed through Windows services for running scripts and commands in the background. The Remote Runner Service is not required for executing scripts or commands through the Remote Runner GUI.	Windows Services > CloudShell Remote Runner
CloudShell Spy	A runtime debugger that displays running steps when executing a CloudShell Authoring executable project. Installed with CloudShell Runtime.	Start menu > QualiSystems > Tools > CloudShell Spy

Additional configuration files and utilities

Additional configuration files and utilities that are available from the installation archive include:

Utility	Description	Location
Updated resource family definitions	Updated definitions for installed resource family and models. The updates are mandatory for L1 switches* and optional for other devices. *The definitions are included with every driver as well. If you import an updated L1 driver, you do not have to perform this update.	Installation archive\Resource Manager Additional Files\Configuration\system.xml

L1 drivers

CloudShell 7.1 GA includes the following Layer 1 (L1) drivers and driver configuration files, which are installed in the `CloudShell\Server\Drivers` folder.

The list of supported switches for each driver is included in the driver configuration files.

More information on supported drivers is available in the [download page for L1 Switch Drivers](#) which is linked from the main [Quali's Download Center](#).

Driver	Version	Driver configuration file	Supported firm-ware
MRV_MCC_4640	3.0.18.5	MRV_MCC_4640_RuntimeCon-fig.xml	MRV v4.6 mcc 04
MRV_MCC_4840	3.0.18.5	MRV_MCC_4840_RuntimeCon-fig.xml	MRV v4.8 mcc 04
MRV_MCC_4870	3.0.18.5	MRV_MCC_4870_RuntimeCon-fig.xml	MRV v4.8 mcc 07
ONPATH_Hori- zon_0244	3.0.18.5	ONPATH_Horizon_0244_ RuntimeConfig.xml	Horizon 2.4.4
CW_GLX4000	3.0.14	CW_GLX4000_RuntimeCon-fig.xmls	LXfw v1.10.0.0
APCON_ AGGREGATE	3.0.17	APCON_AGGREGATE_ RuntimeConfig.xml	CLI3-4
APCONCLI4	3.0.18.3	APCON_CLI4_RuntimeCon-fig.xml	CLI3-4
Calient_S_5.2-7	3.0.18.3	Calient_S_5.2-7_RuntimeCon-fig.xml	Calient S-Series 5.2-7
Calient_FC_2301	3.0.18.3	Calient_FC_2301_RuntimeCon-fig.xml	Calient FiberConnect 2.3.0.1
FiberZone_AFM	3.0.17	FiberZone_AFM_RuntimeCon-fig.xml	FiberZone_AFM 5.2.0.5
FiberZone_AFM_ C3	3.0.18.2	FiberZone_AFM_C3_ RuntimeConfig.xml	FiberZone_AFM_C3 5.2.0.5
JUNOS_12.3R3.4 (L2 as L1)	3.0.18.3	JUNOS_12.3R3.4_RuntimeCon-fig.xml	MX/EX SW versions 12.3R3.4

Quali Certified Libraries

This section describes the libraries that are provided with CloudShell.

API libraries

The API libraries provide external access to CloudShell functionality.

Library	Version	Description
TestShell API	7.1.03	TestShell API, which extends many of the CloudShell features for use through automation or 3rd parties including: lab, user, and domain management, resource, environment, and reservation operations, and more.
TestShellAPICore	7.1.02243	Used to build drivers in the Authoring application.
Quali API	7.0.0.0	Quali API supports the Scheduling and Queuing functionality and associated Quali API functions
REST Client	1.0.7.6	A simple API for Representational State Transfer (REST) commands and communication. The library is designed to let the user connect, authenticate and send REST requests.
RESTSharp	105.1.0.0	Used by Quali API. It is a library for .NET technology.

Other libraries

Editor, virtualization, traffic and device manager libraries are available from the [Quali's Download Center](#).

Revision History

CloudShell Version	Doc revision number	Description
7.0	1.0	Updated procedure for applying Quali activation code.
7.0 Patch 1 [7.0.0.8538]	1.0	<p>Oracle database no longer supported. Removed from relevant sections.</p> <p>System Requirements updated to include all variants of Windows Server 2012 - see Quali Server requirements</p> <p>.NET Framework version updated to 4.0 to 4.5.2</p> <p>Added minimum required execution server size 60MB.</p>
7.1 EA	1.0	<p>Added port 8029 for communication between Quali server and the Executions server</p> <p>Changed CloudShell Required Ports table.</p> <p>Added note - Install on Windows Server machine for use in production.</p>
7.1 GA	1.0	Replaced the CloudShell Required Ports table.
	2.0	Updated SQL Server versions required for High Availability (HA) solutions.
	3.0	<p>Updated links to Quali's download center and the community page</p> <p>Configure the Self-Service Portal: updated "Error 500.19" troubleshooting and added a troubleshooting issue related to manual IIS configurations (explained in Manual IIS installation error: "CloudShell Portal could not be contacted.")</p> <p>Quali Server requirements: Server 2008 R2 - Service Pack 1 is required for CloudShell 7.1 GA Patch 3 and above, updated High Availability DB and OS requirements</p>
	4.0	Client Applications : Windows 8.0/8.1 added