blueprism®

Robotic Process Automation Software

Blue Prism Customer Support Guide:

TESTING CONNECTIVITY

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Contents

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Introduction

This document is provided to offer a number of tests for checking the connectivity of various Blue Prism software components on a distributed architecture. It lists the types of network testing which can be performed and the expected results.

The circumstances which may prompt such tests are when the software is reporting connectivity error messages within the Control Room interface of the Interactive Client software, or if such errors are seen in the Blue Prism Event Log for a Blue Prism component.

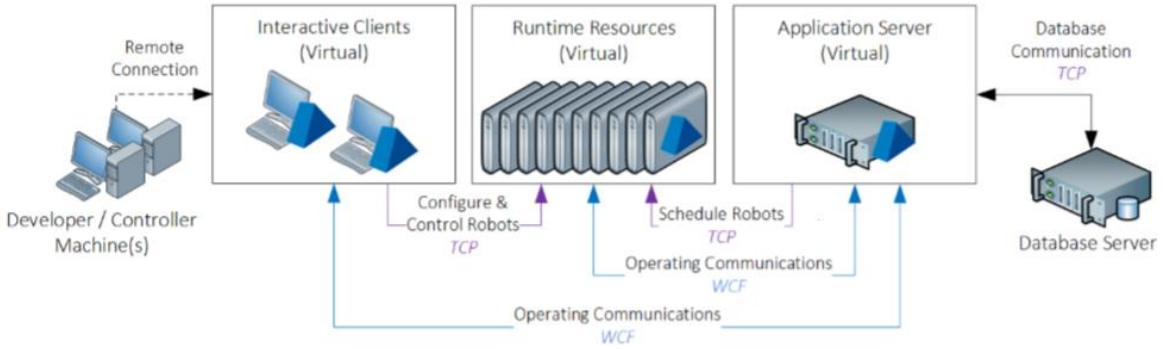
Audience

The information in this document is suitable for network administrators, or any customer role where access to and configuration of network components such as routers and firewall specification, and DNS and WINS administration is granted.

Applies To

This document applies to Blue Prism software versions 4.2 and 5.0. Version 6 operates differently in terms of reporting the status of Runtime Resources. Although the connectivity tests are still valid there is enhanced status and error reporting in Control Room in Version 6.

Blue Prism Architecture Overview

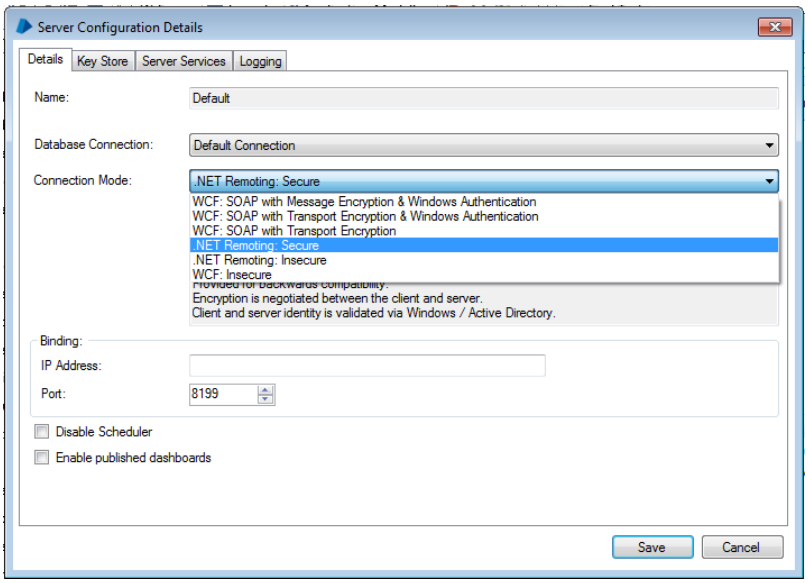


More detail can be obtained by requesting the ***Infrastructure Reference Guide*** *from Blue Prism Customer Support.*

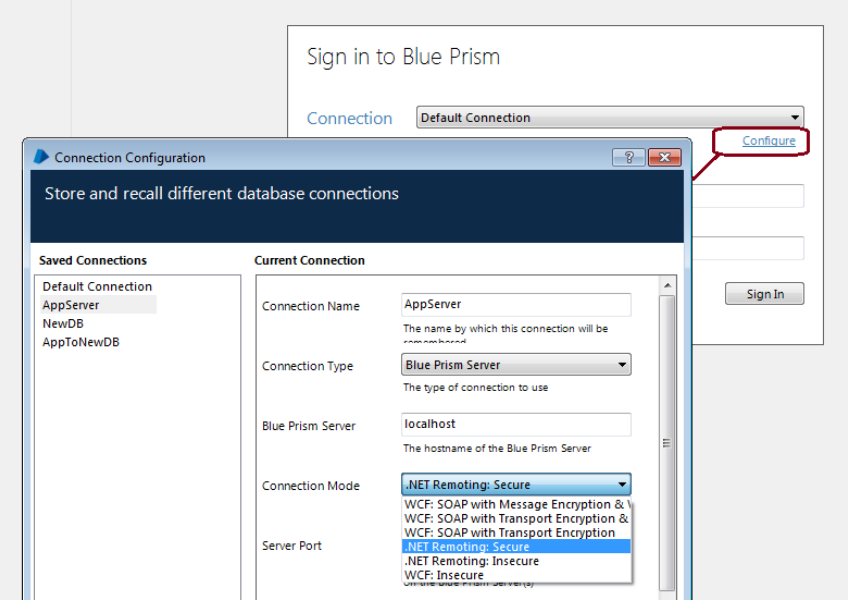
Blue Prism Connection Methods

Blue Prism defines the connection method used between components within its Application Server configuration (via the BPSERVER utility), and also in the Connection configurations (via the Interactive Client or DBCONNAME parameter for Runtime Resources).

BPSERVER configuration utility for the Application Server:



Blue Prism Server type Connection configuration in an Interactive Client:



.NET Remoting (v4.2 – v6)

The .NET Remoting technology allows for distributed application components to communicate. The communications are initiated by the runtime resources and interactive clients. Blue Prism Application Servers communicate with the Runtime Resources and Interactive Clients via the Callback Port which is typically dynamic (by default), but which can be configured to a fixed value if desired.

The .NET Remoting Callback Port

The .NET Remoting callback channel allows for inter-process communications to provide status updates. This allows primarily for Runtime Resource connectivity status updates and elsewhere within the product for progress bars to report updates during long operations.

By default the Callback Port setting for any Connection configuration will default to a value of "0" (zero). This means that a port is chosen at random when a connection is being made between the two components which use that Connection. The port range available is anywhere in the range from 1024 up to 65,535.

Many organisations will have some form of port monitoring and management software in operation (*such as a firewall*) which may not accept this full range of ports, and so using a static port number may be a preferable option. Since v5.0.32 the option to disable the Callback Port setting is also available (*including all versions of v6*).

Network Address Translation (NAT)

NAT is a means of re-mapping one IP Address to another when it is passed through a routing device.

Microsoft's .NET Remoting does not support Network Address Translation (NAT) and therefore NAT is not supported for the inter-component communication that uses this protocol. WCF is the connection mode which supports NAT.

Windows Communication Framework (v6)

Windows Communication Framework (WCF) removes many of the difficulties associated with the .NET Remoting method.

With WCF there is no Callback Port, and so communications between components can be restricted to a single two-way handshake on a single port, removing the separate communication channel which .NET Remoting required, and also simplifying Firewall configurations.

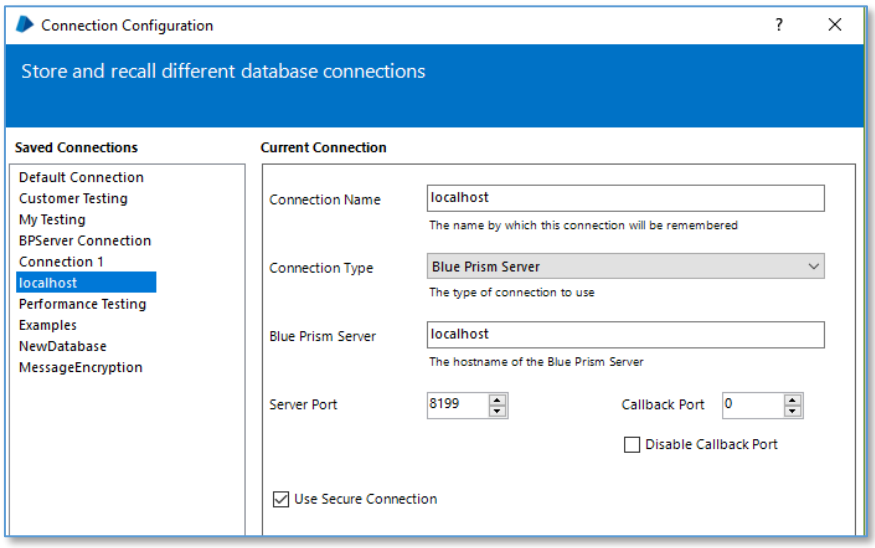
Additionally, WCF connections support Network Address Translation (NAT) between components.

See the document "Selecting a BP Server Connection Mode" for details about the various WCF modes available.

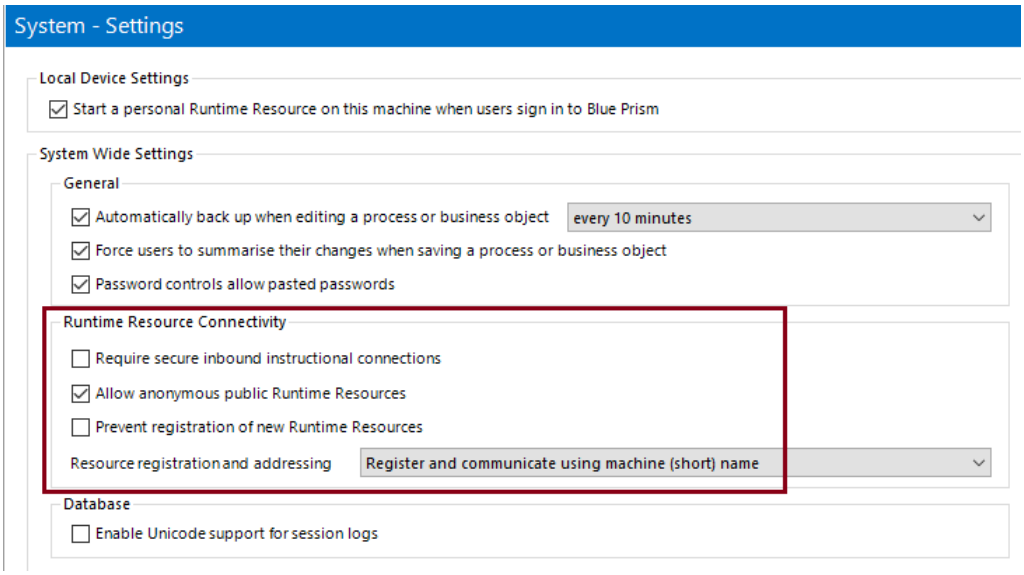
Network-related Configuration Settings

Interactive Client and Runtime Resource configuration settings

Blue Prism stores configuration settings which define the connections between components using Connections. *See the "Installing Enterprise Edition" document for guidance on how to configure these settings*.



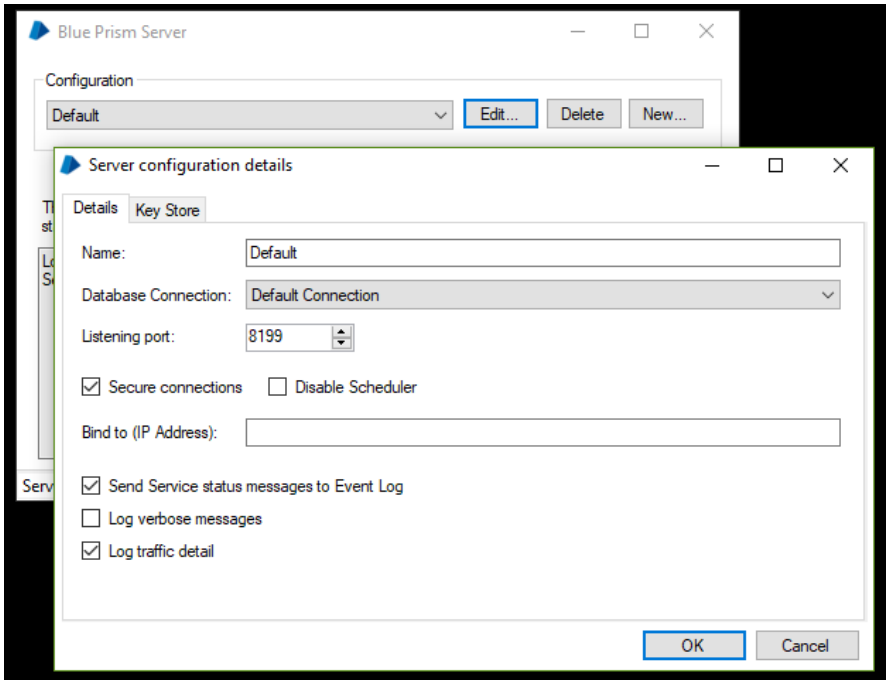
For any defined Connection system-wide settings can be defined to offer further granularity and degrees of security relating to how Runtime Resources connect across the network.



See the "Installing Enterprise Edition" guide for more information about these settings.

Application Server configuration settings

The Blue Prism Application Server defines a Configuration which stores configuration settings defining the way the Blue Prism Server service communicates with the database. These settings are accessed via the BPSERVER application (in the Blue Prism installation directory by default).



Pre-Requisites

Some of these tests may require the use of the following software external to Blue Prism:-

- TELNET Client
- A browser application (such as Internet Explorer, or Chrome)

Common Errors

Below is a list of common connectivity errors, many of which are either documented in the Troubleshooting section of the 'Installing Enterprise Edition' document, or have been recorded in the Knowledge Base available via the Portal.

- Runtime Resource reports "***No connection could be made because the target machine actively refused it*** *<IP Address>:<Port>*" with an Offline status
    - The Runtime failed to report an Offline status because it did not stop correctly.
    - The Application Server to which the Runtime Resource is connected was shut down first.
    - There was a power outage or network communication failure.

- Interactive Client reports "***Failed to connect to Resource PC.***" (seen in Control Room). In the Blue Prism Event Logs the following error is recorded: "***An established connection was aborted by the software in your host machine***"
    - A connection to the Runtime Resource was aborted because it could not connect back to the calling machine with which it has initially established a connection.

Possible reasons for this include:-

- Firewall settings are blocking the communication from the Runtime Resource to the Application Server, or the communication from the Runtime Resource to the Interactive Client.
- The Blue Prism Server service changed from being in a Running state (e.g. was restarted, or was stopped)
- The network traffic between the Runtime Resource machine and the Blue Prism Server service experienced packet loss (dropped packets)
- The Application Server is part of a load balanced architecture, and the load balancer began to route traffic from the Runtime Resource to a different Application Server

- Interactive Client reports "***A connection attempt failed because the connected party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.*** *<IP Address>: <Port>*"

  Possible reasons for this include:-

  - The Blue Prism Server service is not running
  - Firewall settings on the local machine or on the calling machine prevent communication between the two machines on the specified port
  - Both machines need to allow communication on the specified port number

Summary of Tests

To diagnose network connectivity issues the set of tests which need to be performed are these:-

1. **Name resolution** – verify that the name of the Runtime Resource resolves to the correct IP Address and vice versa.
2. **Runtime Resource status** – verify that the Runtime Resource has started correctly and is reporting that it is available on the machine which hosts it
3. **Communication path to Application Server is open** – verify that the Runtime Resource can communicate with the Application Server
4. **Communication path to Interactive Client is open** – verify that the Runtime Resource can communicate with the Interactive Client machine which is reporting its status in Control Room.

Running the tests

When running network communication tests we are trying to establish a two-way communication path between any two Blue Prism components. It is vital that any test be run in **both directions** – from the calling machine to the target, and from the target to the calling machine.

Throughout the document we use the terms “source” and “target” machine to identify the machine which runs test, and the other machine against which the communication is targeted. A “source” machine is the machine originating the network call and the “target” machine is the machine to which we intend to connect.

TEST 1: Name resolution

Blue Prism communicates with its clients based on **the name of the machine** hosting the software. In order to ensure that the communication is successful between components we suggest checking that the name of the Runtime Resources and the Application Server(s) resolve correctly.

Which components should run these tests?

These tests are valid for:-

- An Interactive Client checking the status of a Runtime Resource (“Client”)
- A Runtime Resource checking its connection to a Blue Prism Application Server via a Blue Prism Server type of connection (“Runtime”)
- An Application Server checking its connection back to the Runtime Resource (“App Server”)

Name Resolution Test

1. Open a command prompt (cmd.exe)
2. Issue an **NSLOOKUP** command specifying the name of the other component to which you are connecting:

   ```
   NSLOOKUP myrobot01
   ```

   - This will return the name of the DNS Server which is resolving the name of the machine, and the IP Address associated with that name
3. Issue an **IPCONFIG** command.
   - This will return the IP Address of the calling machine (in IPv4 format) for the network adaptor being used.
4. Perform the above tests in reverse so that the same information has been obtained from both machines involved in the connection.
5. Check that the IP Address returned by NSLOOKUP matches the IP Address reported by the IPCONFIG command on both machines.

Outcome

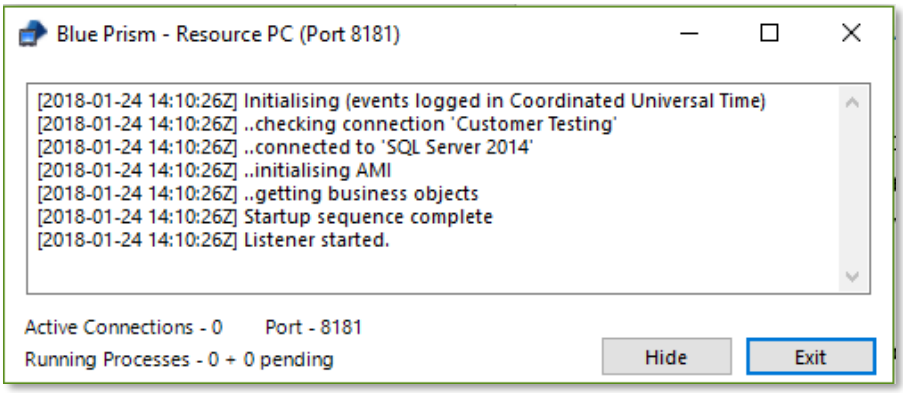
From these tests you will have the IP Addresses of your Client, Runtime and/or Application Server depending on which components you were testing.

You will be able to verify that the IP Addresses are consistent between the components, so that when a Client communicates with a Runtime Resource it has the correct IP Address of the Runtime, and that when the Runtime Resource reports back to the Client then it is using the same IP Address.

You will have established that when the DNS Name of the Client, the Runtime or the Application Server have been specified in a command, then that command will resolve the name to the correct and consistent IP Address.

TEST 2: Runtime Resource status

Blue Prism requires a Runtime Resource listener to be running and ready for communication before it can report as being Connected in the Interactive Client's Control Room interface. These tests will ensure that the Runtime Resource's listener is communicating properly.



There are two forms of test, each designed to return the same information using different methods. The HTTP Status test requires browser software, whereas the TELNET test requires the Windows TELNET Client feature to be installed. Either of these should be installed on the Interactive Client machine in order to perform the tests.

Which components should run these tests?

These tests are valid for:-

- An Interactive Client checking the status of a Runtime Resource ("Runtime")

HTTP Status test

Run this test from a machine which is running an **Interactive Client**.

1. Open a web browser application
2. In the address bar enter the following command:

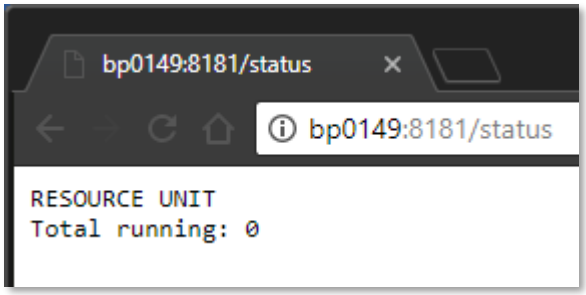
   `http://<resourcename>:<port>/status`

   where <resourcename> is the name of the Runtime Resource and <port> is the number of the port which that Runtime Resource is expected to be listening on.

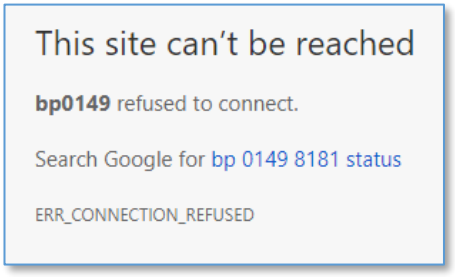
   e.g. `http://myrobot01:8181/status`

HTTP Status Test Result

The expected result from this test is a response from the Runtime with a status of **RESOURCE UNIT**, and listing the number of processes running on that resource:



If the Resource is not running then a **Connection Refused** failure message will be reported, for example:



TELNET Test

Run this test from an **Interactive Client** machine.

1. Open a command prompt (cmd.exe)
2. Type the following command:

   `TELNET <runtime name> <port number>`

   e.g. `TELNET runtimeresource01 8181`

TELNET test result

If the test is successful then the Command Prompt window will go blank, awaiting further Telnet instructions. You can close the Command Prompt at this point.

Telnet connection successful via CMD.EXE

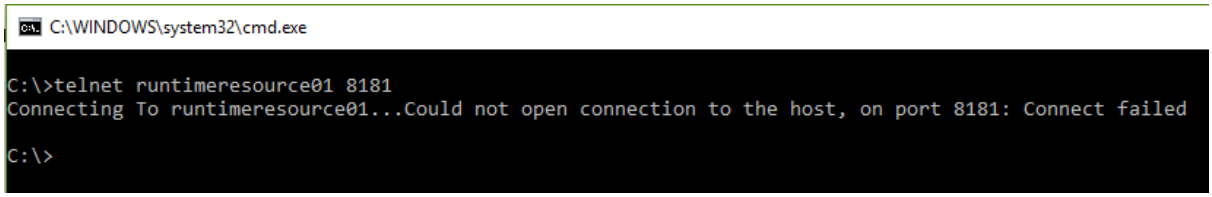
If the test fails then you know that either the DNS Name is incorrect, that the port number specified is wrong, or that the source machine cannot connect to a running Runtime Resource due to some network problem.

Outcome

From these tests you will have established that the Runtime Resource is running and that it can be communicated with on the specified port number using its DNS Name. Having run the test from a source machine you will also have verified that the source machine can identify and communicate with the target machine by DNS Name and that the Port number is open and can be connected to in this direction.

Errors

The main error you may encounter is "Connect failed":



This indicates that the machine name and port number combination is either not correct, or that the Runtime Resource instance is not started on that machine.

Ensure that you have verified the DNS Name resolution using the information in the section above called "**Name resolution** – verify that the name of the Runtime Resource resolves to the correct IP Address and vice versa.".

TEST 3: Communication path to the Application Server is open

Blue Prism communicates with its Application Server based on a combination of **the name of the machine** hosting the Blue Prism Server service, and the **port number** configured for the TCP socket to connect to.

In order to ensure that the communication is successful between components we suggest checking that the communication with the Application Server(s) can be established.

Which components should run these tests?

These tests are valid for:-

- A Runtime Resource ("Runtime") checking its connection to a Blue Prism Application Server ("App Server") via a Blue Prism Server type of connection
- An Interactive Client ("Client") checking the status of a Runtime Resource ("Runtime") using a Blue Prism Server type of Connection

TRACERT test

1. Open a command prompt (cmd.exe)
2. Issue an **TRACERT** command specifying the name of the Application Server to which you are connecting:

```
TRACERT <application server name>
e.g. TRACERT appserver01
```

   - This will return the names of any network components through which the communication is relayed, and the associated time for the communication from point to point during the trace

TRACERT test result

A successful test is evidenced by packets being able to be sent along the communication route without timing out.

"Request timed out"

Be aware that some servers may deliberately time out such requests for security reasons. The occasional "Request timed out" message may therefore be deliberate and not necessarily an indication of a network issue. However, we suggest asking your IT Department to explain any "Request timed out" messages that result from this test in case there is a network issue.

TELNET Test

Run this test from an **Interactive Client** or **Runtime Resource** machine.

1. Open a command prompt (cmd.exe)
2. Type the following command:

```
TELNET <application server name> <port number>
e.g. TELNET appserver01 8199
```

TELNET test result

If the test is successful then the Command Prompt window will go blank, awaiting further Telnet instructions. You can close the Command Prompt at this point.

Telnet connection successful via CMD.EXE

If the test fails then you know that either the DNS Name is incorrect, that the port number specified is wrong, or that the source machine cannot connect to a running Runtime Resource due to some network problem

NETSTAT test

Run this test on the Application Server.

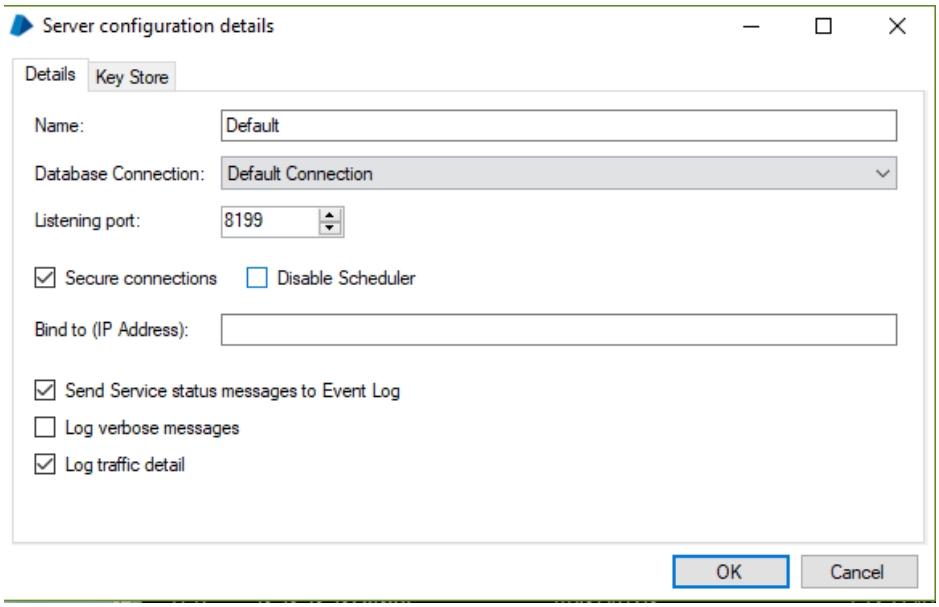
- Issue a NETSTAT command on the Application Server to which you are connecting:

```
NETSTAT -a
```

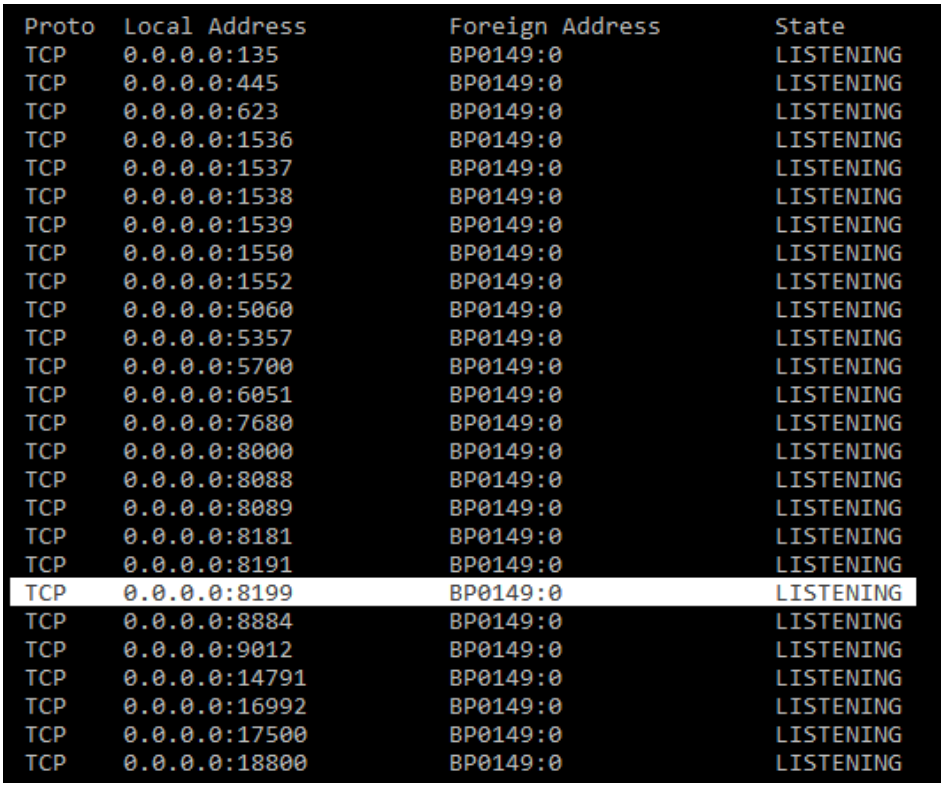
NETSTAT result

The Application Server is expected to be listening on the port number configured in the BPSERVER configuration utility.

In this example there is a service defined by the "Default" configuration which is set to use a listening port of 8199:



This is reflected in the NETSTAT result:



Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	BP0149:0	LISTENING
TCP	0.0.0.0:445	BP0149:0	LISTENING
TCP	0.0.0.0:623	BP0149:0	LISTENING
TCP	0.0.0.0:1536	BP0149:0	LISTENING
TCP	0.0.0.0:1537	BP0149:0	LISTENING
TCP	0.0.0.0:1538	BP0149:0	LISTENING
TCP	0.0.0.0:1539	BP0149:0	LISTENING
TCP	0.0.0.0:1550	BP0149:0	LISTENING
TCP	0.0.0.0:1552	BP0149:0	LISTENING
TCP	0.0.0.0:5060	BP0149:0	LISTENING
TCP	0.0.0.0:5357	BP0149:0	LISTENING
TCP	0.0.0.0:5700	BP0149:0	LISTENING
TCP	0.0.0.0:6051	BP0149:0	LISTENING
TCP	0.0.0.0:7680	BP0149:0	LISTENING
TCP	0.0.0.0:8000	BP0149:0	LISTENING
TCP	0.0.0.0:8088	BP0149:0	LISTENING
TCP	0.0.0.0:8089	BP0149:0	LISTENING
TCP	0.0.0.0:8181	BP0149:0	LISTENING
TCP	0.0.0.0:8191	BP0149:0	LISTENING
TCP	0.0.0.0:8199	BP0149:0	LISTENING
TCP	0.0.0.0:8884	BP0149:0	LISTENING
TCP	0.0.0.0:9012	BP0149:0	LISTENING
TCP	0.0.0.0:14791	BP0149:0	LISTENING
TCP	0.0.0.0:16992	BP0149:0	LISTENING
TCP	0.0.0.0:17500	BP0149:0	LISTENING
TCP	0.0.0.0:18800	BP0149:0	LISTENING

TEST 4: Communication path to the Runtime Resource is open

Blue Prism communicates with its Runtime Resource(s) based on a combination of **the name of the machine** hosting the 'automate.exe' process, and the **port number** configured for the TCP socket to connect to.

e.g. `runtimeresource01:8181`

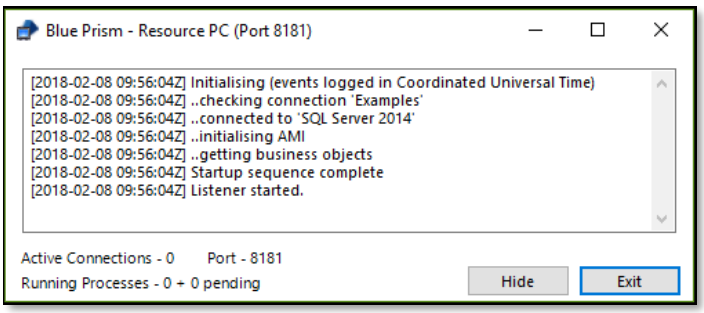
In order to ensure that the communication is successful between components we suggest checking that the communication with the Runtime Resource(s) can be established.

A Runtime Resource needs to be running in order for its listener to be listening for communications from other Blue prism components (e.g. awaiting work instructions from an Application Server or a status request from an Interactive Client).

A Runtime Resource is initiated by a command line instruction, for example:

```
C:\Program Files\Blue Prism Limited\Blue Prism Automate\automate.exe
/resourcepc /public /port 8181
```

When the Runtime Resource is started it will display a status window on the machine where it is running:



Which components should run these tests?

These tests are valid for:-

- An Application Server ("App Server") checking its connection to a Blue Prism Runtime Resource ("Runtime") via a Blue Prism Server type of connection
- An Interactive Client ("Client") checking the status of a Runtime Resource ("Runtime")

TRACERT test

3. Open a command prompt (cmd.exe)
4. Issue an **TRACERT** command specifying the name of the Runtime Resource to which you are connecting:

```
TRACERT <runtime resource name>
```

```
e.g. TRACERT runtimeresource01
```

- This will return the names of any network components through which the communication is relayed, and the associated time for the communication from point to point during the trace

TRACERT test result

A successful test is evidenced by packets being able to be sent along the communication route without timing out.

"Request timed out"

Be aware that some servers may deliberately time out such requests for security reasons. The occasional "Request timed out" message may therefore be deliberate and not necessarily an indication of a network

issue. However, we suggest asking your IT Department to explain any “Request timed out” messages that result from this test in case there is a network issue.

TELNET Test

Run this test from an **Interactive Client** or **Application Server** machine.

3. Open a command prompt (cmd.exe)
4. Type the following command:

```
TELNET <runtime resource name> <port number>
```

e.g. `TELNET runtimeresource01 8181`

TELNET test result

If the test is successful then the Command Prompt window will go blank, awaiting further Telnet instructions. You can close the Command Prompt at this point.

Telnet connection successful via CMD.EXE

If the test fails then you know that either the DNS Name is incorrect, that the port number specified is wrong, or that the source machine cannot connect to a running Runtime Resource due to some network problem

NETSTAT test

Run this test on the Application Server.

- Issue a NETSTAT command on the Runtime Resource to which you are connecting:

```
NETSTAT -a
```

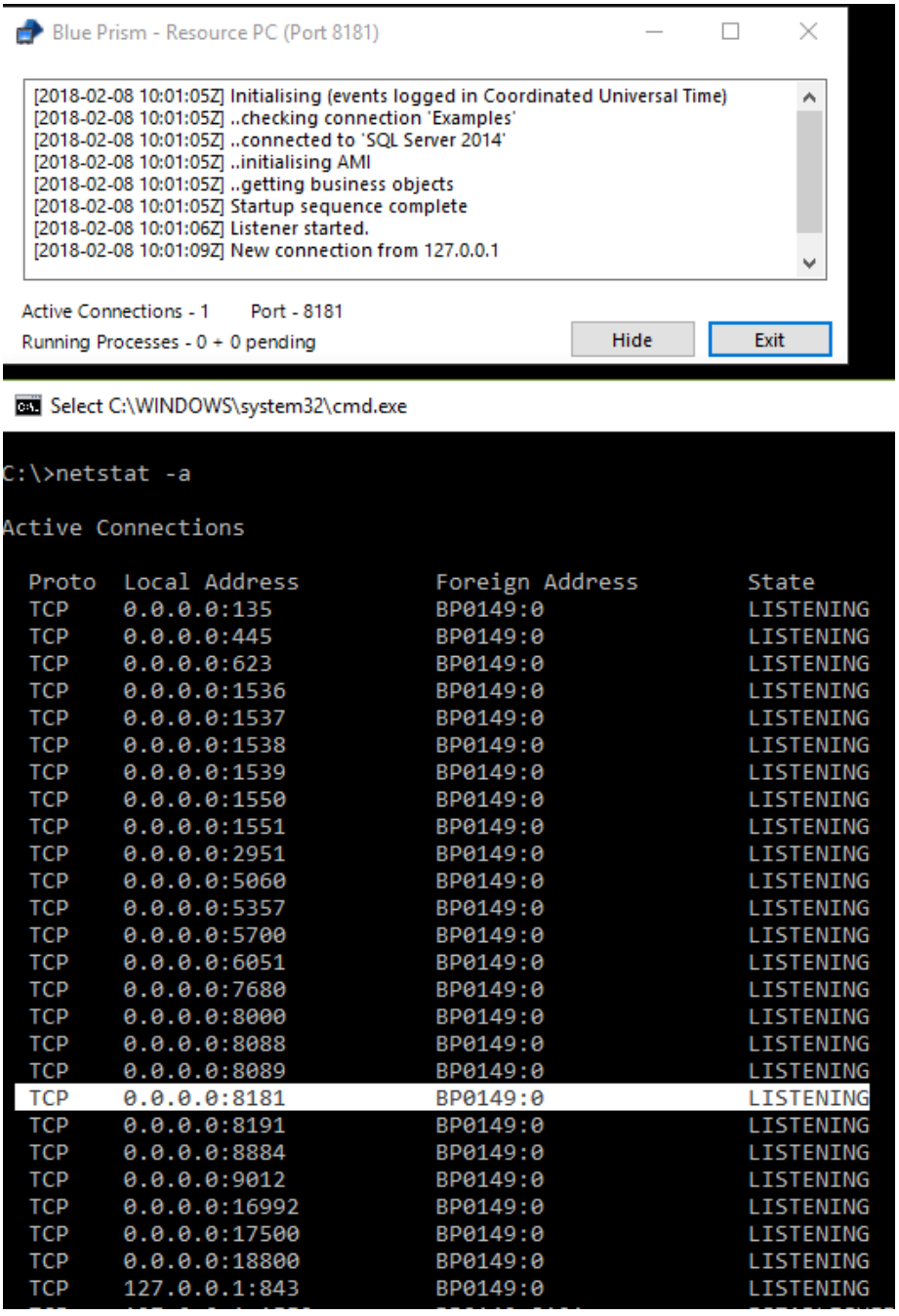
NETSTAT result

The Runtime Resource is expected to be listening on the port number configured by its startup command. For example:

```
C:\Program Files\Blue Prism Limited\Blue Prism Automate\automate.exe
/resourcepc /public /port 8181
```

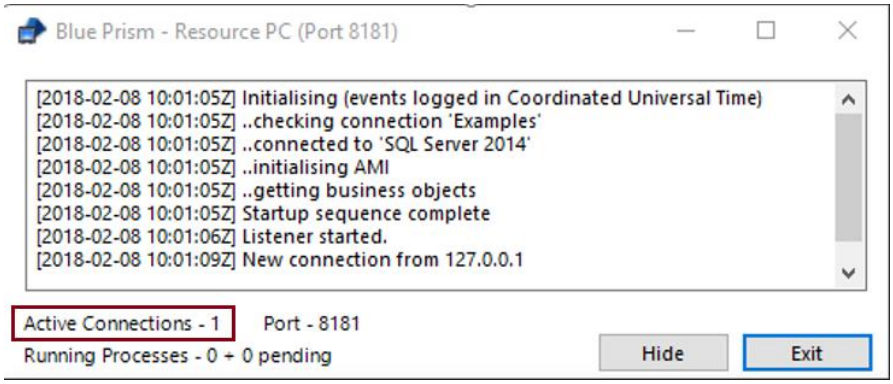
In this example there is a Runtime Resource listener running on the machine using port 8181 (the default). The Runtime Resource status window will report which port number the listener was started on.

This information is reflected in the NETSTAT result:



If the communication path to this machine is open, then it would be expected that a connection would be listed from other machines running Blue Prism components (e.g. the Application Server or the Interactive Client software) in the NETSTAT list.

Blue Prism's Runtime Resource status window will report these incoming connections in the "Active Connections" count.



Next Steps

If connectivity errors have been encountered they should be passed to your Network Administration team or IT Department for further investigation.

If there are questions about the information being reported by Blue Prism then please check for information in the Knowledge Base via the Support Portal (support.blueprism.com).

If you have experienced a specific error arising from Blue Prism, then raise an incident with the Blue Prism Customer Support team via the Portal. You should include the following information:-

- Blue Prism version
- Error message and details if available
- Report of which tests have been done already
- The results of analysis performed by your Network Administration team