Microsoft Teams

Network Assessment Tool

# Summary

The Microsoft Teams Network Assessment Tool provides the ability to perform simple network performance and network connectivity tests using the same real-time media technology as a Microsoft Teams client.

**Network Connectivity Checker**

The Microsoft Network Assessment Tool provides an ability to verify network connectivity between the user location and a Microsoft relay server. The relay connectivity checker verifies network connectivity to the load-balancer relay (VIP), AND one relay instance (DIP) forwarded to by the load-balancer relay. The checker tests connectivity via UDP, TCP (Pseudo-TLS/Full-TLS), and HTTPS transport protocol. The checker tests connectivity to port 3478 (control port) of the load-balancer relay, and ports 3478-3481 of the relay instance. The checker also checks whether the load-balancer relay is QoS (Quality of Service) enabled, which means the load-balancer redirects packets to relay instance ports 3479-3481 (instead of 3478) depending on modality (audio = 3479, video = 3480, screenshare/data = 3481). The relay server addresses and ports are described here: <https://support.office.com/en-us/article/Office-365-URLs-and-IP-address-ranges-8548a211-3fe7-47cb-abb1-355ea5aa88a2#bkmk_teams>. By default, a default relay load-balancer relay FQDN for Worldwide Office 365 Endpoints is used, but the user may also input a custom FQDN in the configuration file. The checker performs DNS resolution to obtain a relay load-balancer IP address. However, the user may also specify to check connectivity to a specific load-balancer relay IP address in the configuration file. If the user inputs a relay IP address, then the input relay FQDN (default or custom) will be ignored. The user may also specify the source port range to use on its client machine to connect to the relay from.

To modify the configuration file, please refer to the *Configuration* section below. To obtain the relay load-balancer FQDN’s for U.S. Government DoD Endpoints and U.S. Government GCC High Endpoints, please also refer to the *Configuration* section below.

The Microsoft Teams Network Assessment Tool also provides the ability to verify network connectivity between the user location and the Microsoft Network are correctly configured for other services required in Microsoft Teams calls. These services include (with protocol provided):

* Call Controller (HTTP and UDP)
* Conversation Service (HTTP)
* Chat Service (HTTP)
* Trouter Service (HTTP)
* Broker Service (HTTP)

The addresses and ports are described here: <https://support.office.com/en-us/article/Office-365-URLs-and-IP-address-ranges-8548a211-3fe7-47cb-abb1-355ea5aa88a2#bkmk_teams>.

If the media stack logs were enabled in the configuration file (see Configuration), then they will be generated after running the connectivity checker in this location: %appdata%\Microsoft\NetworkAssessmentTool\NetworkAssessmentTool.msrtc-\*.blog.

**Network Quality Checker**

The Microsoft Network Assessment Tool provides the ability to perform a simple test of network performance to determine how well the network would perform for a Microsoft Teams call. The tool tests the connection to a Microsoft relay server by streaming a set of RTP media packets to the server and back for however long the user specifies. In this checker, the client tries to allocate with the relay load-balancer (VIP). As in a Teams call, UDP relay connection is given priority over TCP/HTTPS relay connections, and to do that, the checker ensures that UDP relay allocations start slightly before TCP/HTTPS allocations. If relay allocations succeed, then the tool will continue on with sending media packets to the forwarded relay instance (DIP). The tool periodically (every ~5 seconds) reports:

* Timestamp
* Packet loss rate
* Round-trip latency
* Jitter
* Media Path Local IP/Port
* Media Path Reflexive (NAT Translated) IP/Port
* Media Path Remote IP/Port
* Whether proxy is used for media flow (only applies to TCP/HTTPS relay connection)

Like the relay connectivity checker, by default, a default relay load-balancer relay (VIP) FQDN for Worldwide Office 365 Endpoints is used, but the user may also input a custom FQDN in the configuration file. The checker performs DNS resolution to obtain a relay load-balancer IP address. However, the user may also specify to check connectivity to a specific load-balancer relay IP address in the configuration file. If the user inputs a relay IP address, then the input relay FQDN (default or custom) will be ignored. The user may also specify the source port range to use on its client machine to connect to the relay from. Unlike for the connectivity checker, the user can also choose to disable UDP or TCP connections to the relay, but not both protocols. The user may also modify the UDP/TCP relay instance (DIP) ports that the client will attempt to send media packets to. The user can press Ctrl+C to end the quality checker at any moment, and this will end the quality checker after the next line of metrics are output on the console.

To modify the configuration file, please refer to the *Configuration* section below. To obtain the relay load-balancer FQDN’s for U.S. Government DoD Endpoints and U.S. Government GCC High Endpoints, please also refer to the *Configuration* section below.

The results from using this tool can be used as part of a network assessment to determine if the customer network is most optimal for Microsoft Teams: [Prepare your organization's network for Teams - Microsoft Teams | Microsoft Docs](https://docs.microsoft.com/en-us/MicrosoftTeams/prepare-network)

If the media stack logs were enabled in the configuration file (see Configuration), then they will be generated after running the connectivity checker in this location: %appdata%\Microsoft\NetworkAssessmentTool\NetworkAssessmentTool.msrtc-\*.blog.

**Infrastructure Connectivity Tests (HTTP Stack)**

The Microsoft Network Assessment Tool helps resolve issues regarding customer proxy configuration with HTTP Stack tests. These tests attempt to connect to various URLs specified in the configuration file, and generates a report of the HTTP Stack events that occurred throughout the connection attempt. In addition, these tests set various ECS settings, also specified in the configuration file, on the client to determine which configuration works with the customer network to successfully connect to those URLs.

To modify the configuration file, please refer to the *Configuration* section below.

## Preconditions/Restrictions

* PC must meet the requirements for Microsoft Teams systems described here: <https://products.office.com/en-US/office-system-requirements#subscription-plans-section>
* The tool has a dependency on x86 Visual C++ run-time components for Visual Studio 2015. This will be installed automatically when the MSI installer is run. If for some reason, this is not installed, these components can also be downloaded from <https://www.microsoft.com/en-us/download/details.aspx?id=48145>
* Only a single instance of the tool running on PC instance. This tool is not intended for load/stress testing.

## Privacy statement

Microsoft respects your privacy. Please read our [Privacy Statement](https://go.microsoft.com/fwlink/?LinkId=512132) for more details.

# Sample Usage

## View Options

From a command prompt, view the options in the tool by running “NetworkAssessmentTool.exe /?” or ‘NetworkAssessmentTool.exe /usage’. Note that if the user gives invalid arguments when running the executable, the following options will be displayed as well. Here is the sample usage and output:

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe /?  Microsoft Teams - Network Assessment Tool  Usage:  NetworkAssessmentTool.exe [options]  [options]:  <no option> Perform connectivity checks.  /qualitycheck Perform quality checks with relay.  /infraconnectivitytest Perform HTTP stack infra tests.  /interfaces Dumps the list of the interfaces found.  /location Perform lldp and geolocation checks.  /usage or /? Print usage text. |

## Network Connectivity Checker

From a command prompt, execute the tool by simply running “NetworkAssessmentTool.exe”. The following is the sample usage and output:

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe  Microsoft Teams - Network Assessment Tool  Starting Relay Connectivity Check:  UDP, PseudoTLS, FullTLS, HTTPS connectivity will be checked to this relay (VIP) FQDN: worldaz.tr.teams.microsoft.com  If user wants to check connectivity to a particular relay (VIP) IP, please specify in NetworkAssessment.exe.config.  Connectivity check source port range: 50000 - 50019  Relay : 52.115.84.7 is the relay load balancer (VIP)  Relay : 52.115.84.7 is reachable using Protocol UDP and Port 3478  Relay : 52.115.84.7 is QOS (Media Priority) enabled  Relay : 52.115.84.7 is the relay load balancer (VIP)  Relay : 52.115.84.7 is reachable using Protocol PseudoTLS and Port 443  Relay : 52.115.84.7 is the relay load balancer (VIP)  Relay : 52.115.84.7 is reachable using Protocol FullTLS and Port 443  Relay : 52.115.84.7 is the relay load balancer (VIP)  Relay : 52.115.84.7 is reachable using Protocol HTTPS and Port 443  Relay : 52.115.84.153 is the actual relay instance (DIP)  Relay : 52.115.84.153 is reachable using Protocol UDP and Port 3478  Relay : 52.115.84.153 is the actual relay instance (DIP)  Relay : 52.115.84.153 is reachable using Protocol UDP and Port 3479  Relay : 52.115.84.153 is the actual relay instance (DIP)  Relay : 52.115.84.153 is reachable using Protocol UDP and Port 3480  Relay : 52.115.84.153 is the actual relay instance (DIP)  Relay : 52.115.84.153 is reachable using Protocol UDP and Port 3481  Relay connectivity and Qos (Media Priority) check is successful for all relays.  Starting Service Connectivity Check:  Service verifications completed successfully  Service connectivity result has been written to: C:\Users\<alias>\AppData\Local\Microsoft Teams Network Assessment Tool\service\_connectivity\_check\_results.txt |

## Network Quality Checker

From a command prompt, execute the tool by running “NetworkAssessmentTool.exe /qualitycheck”. The following is the sample usage and output:

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe /qualitycheck  Microsoft Teams - Network Assessment Tool  Initializing media flow.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Starting new call  Media flow will start after allocating with relay VIP FQDN: worldaz.tr.teams.microsoft.com  If user wants to allocate with a particular relay VIP IP address, please specify in NetworkAssessment.exe.config.  Waiting for call to end after 300 seconds, displaying call quality metrics every ~5 seconds.  Change the 'MediaDuration' field in the NetworkAssessmentTool.exe.config file to change the media flow duration.  TIMESTAMP is in UTC. LOSS RATE is in percentage, out of 100.  LATENCY and JITTER are in milliseconds, and are calculated as averages in ~5-second windows.  PROTOCOL displays whether UDP, TCP (PseudoTLS/FullTLS), or HTTPS protocol was used to allocate with the relay server.  Note that for PROTOCOL, UDP protocol is attempted first to connect to the relay, by default.  LOCAL ADDRESS is the local client IP and port that media is flowing from.  REMOTE ADDRESS is the peer (relay server) destination IP and port that media is flowing to.  IS PROXIED PATH shows whether a proxy server is used to connect to the relay, only applies to TCP/HTTPS connections  LAST KNOWN REFLEXIVE IP shows what your latest public (NAT translated) IP and port is that the relay sees during media flow.  [If LOSS RATE is 100%, the output lines here will be in red]  Quality check source port range: 50000 - 50019  Call Quality Metrics:  2021-02-05 21:13:05 Loss Rate: 0 Latency: 71.45 Jitter: 10 Protocol: UDP  Local IP: Remote IP: 52.114.149.101:3478  Is Proxied Path: False Last Known Reflexive IP:  2021-02-05 21:13:10 Loss Rate: 0 Latency: 71.65 Jitter: 8 Protocol: UDP  Local IP: Remote IP: 52.114.149.101:3478  Is Proxied Path: False Last Known Reflexive IP:  2021-02-05 21:13:16 Loss Rate: 0 Latency: 71.75 Jitter: 6 Protocol: UDP  Local IP: Remote IP: 52.114.149.101:3478  Is Proxied Path: False Last Known Reflexive IP:  Call Quality Check Has Finished  Call Quality Check result has been written to: C:\Users\<alias>\AppData\Local\Microsoft Teams Network Assessment Tool\quality\_check\_results.csv |

Note that the user pressed Ctrl+C in the middle of media flow, which stops the program. Otherwise, the quality checker would have ran for the user-specified media duration (300 seconds). Also, note that the ‘Local IP’ and ‘Last Known Reflexive IP’ should not be empty, but is removed from the above sample due to privacy issues. Results file is supported on either csv or tsv.

## HTTP Stack (Infrastructure) Tests

From a command prompt, execute the tool by running ‘NetworkAssessmentTool.exe /infraconnectivitytest’. Note that the results from these tests are too large to be placed in this document in a meaningful way. Please contact MS Support for any questions regarding these tests.

# Configuration

## Configuration File

All tool configuration goes into the “NetworkAssessmentTool.exe.config” file. The following is a sample with the default values for the configured fields:

|  |
| --- |
| <?xml version="1.0" encoding="utf-8" ?>  <configuration>  <runtime>  <assemblyBinding xmlns="urn:schemas-microsoft-com:asm.v1">  <dependentAssembly>  <assemblyIdentity name="Newtonsoft.Json" publicKeyToken="30ad4fe6b2a6aeed" culture="neutral" />  <bindingRedirect oldVersion="0.0.0.0-10.0.0.0" newVersion="10.0.0.0" />  </dependentAssembly>  <dependentAssembly>  <assemblyIdentity name="Microsoft.Skype.Seatbelt.Core" publicKeyToken="31bf3856ad364e35" culture="neutral" />  <bindingRedirect oldVersion="0.0.0.0-2.2.0.1" newVersion="2.2.0.1" />  </dependentAssembly>  <dependentAssembly>  <assemblyIdentity name="Microsoft.Skype.ECS.Core" publicKeyToken="31bf3856ad364e35" culture="neutral" />  <bindingRedirect oldVersion="0.0.0.0-1.37.1.430" newVersion="1.37.1.430" />  </dependentAssembly>  <dependentAssembly>  <assemblyIdentity name="Microsoft.Skype.Seatbelt.Core.ClientHelpers" publicKeyToken="31bf3856ad364e35" culture="neutral" />  <bindingRedirect oldVersion="0.0.0.0-2.2.0.1" newVersion="2.2.0.1" />  </dependentAssembly>  </assemblyBinding>  </runtime>  <startup>  <supportedRuntime version="v4.0" sku=".NETFramework,Version=v4.5" />  </startup>  <appSettings>  <!-- Custom FQDN of the relay (VIP) to be used in the relay connectivity and quality checker -->  <!-- Note that if this value is kept empty, then a default FQDN (from ECS) is used -->  <add key="Relay.FQDN" value=""/>  <!-- Custom IP of the relay (VIP) to be used in the relay connectivity and quality checker -->  <!-- Note that if this value is not empty, then the relay FQDN will not be used, and -->  <!-- its DNS resolution will not be attempted - rather, this custom relay IP (exclude -->  <!-- relay port here, insert relay ports in fields below) will be directly used -->  <add key="Relay.IP" value=""/>  <!-- Enable UDP/TCP protocols to connect to the relay, used just for the quality checker -->  <!-- At least one of the following two protocols must be configured -->  <!-- Disable one protocol by setting the field to 'false' -->  <!-- If both protocols are enabled, then UDP will be preferred over TCP if network allows -->  <!-- If an invalid value (not 'true'/'false') is present, then that protocol will be enabled -->  <!-- by default - if UDP is enabled, please specify below Relay.UDPPort field as well, and -->  <!-- if TCP is enabled, please specify below Relay.TCPPort field -->  <!-- Note that this field does not apply to the relay connectivity checker, because the -->  <!-- relay connectivity checker checks both UDP and TCP relay connectivity -->  <add key="Relay.EnableUDP" value="true"/>  <add key="Relay.EnableTCP" value="true"/>    <!-- UDP relay port allocated, used just for the quality checker -->  <!-- If UDP is enabled above, UDP Port should be in range 3478-3481 -->  <!-- If TCP is enabled above, TCP Port should be 443 -->  <!-- Note that this field does not apply to the relay connectivity checker, because the -->  <!-- relay connectivity checker checks connectivity to all the UDP ports in the above range -->  <add key="Relay.UDPPort" value="3478"/>  <add key="Relay.TCPPort" value="443"/>    <!--default source port ranges (inclusive) for the relay connectivity and quality checker -->  <!-- Audio: 50000-50019  Video: 50020-50039  VBSS: 50040-50059 -->  <add key="MinimumSourcePort" value="50000"/>  <add key="MaximumSourcePort" value="50019"/>  <!-- Duration of media flow for the quality checker, in seconds -->  <!-- Note that Ctrl+C can be pressed at any time to stop the quality check -->  <add key="MediaDuration" value="300"/>  <!-- Full path specified for the results files -->  <!-- Note: if omitted or in blank, default is  %appdata%\..\Local\Microsoft Teams Network Assessment Tool -->  <!-- Example: "C:\\Skype\\MicrosoftTeamsNetworkAssessmentTool" -->  <add key="FullPathForResultsFiles" value=""/>  <!-- File name of where detailed service connectivity check results are stored -->  <!-- Directory: %appdata%\..\Local\Microsoft Teams Network Assessment Tool -->  <add key="OutputFileName" value="service\_connectivity\_check\_results.txt"/>  <!-- File name of where quality check results are stored in either csv or tsv -->  <!-- Directory: %appdata%\..\Local\Microsoft Teams Network Assessment Tool -->  <add key="ResultsFileName" value="quality\_check\_results.csv"/>  <!-- URLs and ECS Configs to be used the HTTP Stack connectivity tests -->  <add key="httpstack.urls" value="  https://go.trouter.teams.microsoft.com/;  https://ic3.events.data.microsoft.com/Collector/3.0/;  https://config.teams.microsoft.com/config/;  https://api.flightproxy.teams.microsoft.com/api/v2/epconv/"/>  <add key="httpstack.ecsconfigs" value=';  {"TLS\_Force\_Full\_Handshake":0, "GenericTcpConnect\_Version":1};  {"TLS\_Force\_Full\_Handshake":0, "GenericTcpConnect\_Version":2, "Proxy\_RespectSystemProxy":1};  {"TLS\_Force\_Full\_Handshake":1, "GenericTcpConnect\_Version":1};  {"TLS\_Force\_Full\_Handshake":1, "GenericTcpConnect\_Version":2, "Proxy\_RespectSystemProxy":1};' />  <add key="httpstack.logpath" value="connectivity.log" />  <!-- Debug settings -->  <!-- Enable media logs generation -->  <add key="Debug.media\_logs\_enabled" value="false"/>  <!-- Enable telemetry to be sent to Aria -->  <add key="TelemetryEnabled" value="false"/>  <!-- Tenant Identification to be used on Aria -->  <add key="TenantId" value=""/>  </appSettings>  </configuration> |

This is an explanation of each of the keys. Keys are case-insensitive.

|  |  |  |
| --- | --- | --- |
| Configuration | Description | If Not Specified |
| Relay.FQDN | Custom FQDN of the relay load-balancer (VIP) used for the relay connectivity checker and quality checker. MAY be omitted if the user wishes to test a default Worldwide Endpoint cloud FQDN (read from ECS) or if the user wishes to test a custom relay IP address. See below subsection *FQDN Configuration* to obtain relay load-balancer FQDN’s for U.S. Government DoD and GCC High Endpoints. | If Relay.IP is specified, will use that field. Otherwise, the default Worldwide FQDN will be used, if ECS connectivity allows. |
| Relay.IP | Customer IP of the relay load-balancer (VIP) used for the relay connectivity checker and quality checker. MAY be omitted if the user wishes to test a default Worldwide Endpoint cloud FQDN (read from ECS) or if the user wishes to test a custom relay FQDN. If field is provided (not empty), then MUST be a valid IP. | If Relay.FQDN is specified, will use that field. Otherwise, the default Worldwide FQDN will be used, if ECS connectivity allows. |
| Relay.EnableUDP | Whether to enable UDP relay connections, only used for the quality checker. At least one of Relay.EnableUDP or Relay.EnableTCP must be set to ‘true’. Set this field to ‘false’ to only configure TCP relay connections. SHOULD be set to ‘true’ or ‘false’. **If both UDP and TCP are configured, UDP will be preferred if the relay is reachable via UDP.** | If an invalid value is specified (not ‘true’ or ‘false’), then UDP will be enabled by default. |
| Relay.EnableTCP | Whether to enable TCP relay connections, only used for the quality checker. At least one of Relay.EnableUDP or Relay.EnableTCP must be set to ‘true’. Set this field to ‘false’ to only configure UDP relay connections. SHOULD be set to ‘true’ or ‘false’. **If both UDP and TCP are configured, UDP will be preferred if the relay is reachable via UDP.** | If an invalid value is specified (not ‘true’ or ‘false’), then TCP will be enabled by default. |
| Relay.UDPPort | UDP port to reach the relay server for media flow, only used for the quality checker. MAY be omitted only if the user wishes to connect to the relay via TCP only by setting ‘Relay.EnableUDP’ to ‘false’. RECOMMEND that UDP port falls in the range 3478-3481. If UDP is enabled, this field MUST be present and a valid positive integer. | If UDP and TCP are not specified, quality checker will fail. Otherwise, it will attempt to connect to relay via TCP only. |
| Relay.TCPPort | TCP port to reach the relay server for media flow, only used for the quality checker. MAY be omitted only if the user wishes to connect to the relay via UDP only by setting ‘Relay.EnableTCP’ to ‘false’. RECOMMEND that TCP port is 443 always. If TCP is enabled, this field MUST be present and a valid positive integer. | If UDP and TCP are not specified, quality checker will fail. Otherwise, it will attempt to connect to relay via UDP only. |
| MinimumSourcePort | Minimum client source port (inclusive) that will be used to connect to the relay from. MUST be present and a valid positive integer. | Tool will fail. |
| MaximumSourcePort | Maximum client source port (inclusive) that will be used to connect to the relay from. MUST be present and a valid positive integer. | Tool will fail. |
| MediaDuration | How long (in seconds) that the quality checker will stream media packets to the relay. The user can stop the quality checker by pressing Ctrl+C, which will end the program after the next line of metrics is displayed on the console (after ~5 seconds). MUST be present and a valid positive integer. | Tool will fail. |
| FullPathForResultsFiles | User can set a full valid path on this field if he / she wants to provide a different location to output the results file for the quality checker and connectivity results | Will output files to default location |
| ResultsFileName | Name of file where the **quality check results** will be written in either csv or tsv format. The default file directory will be:  %appdata%\..\Local\Microsoft Teams Network Assessment Tool. | If an invalid file name is given, the tool will fail |
| OutputFileName | Name of file where detailed **service connectivity check results** will be written. The file directory will be: %appdata%\..\Local\Microsoft Teams Network Assessment Tool. | If an invalid file name is given, the tool will fail, or just not write to the file. |
| HTTPStack.Urls | List of URL’s that the HTTP Stack tests will attempt to connect to. MUST be a list of valid strings separated by semicolons, new lines, or tabs. RECOMMEND contacting MS Support before changing this field. | The HTTP Stack tests will fail to run. |
| HTTPStack.ECSConfigs | List of ECS settings that the HTTP Stack tests will configure onto the client before connecting to the various URL’s above. MUST be a list of valid strings separated by semicolons, new lines, or tabs. RECOMMEND contacting MS Support before changing this field. | The HTTP Stack tests will fail to run. |
| HTTPStack.LogPath | Directory path of where HTTP Stack test logs are located. The log file directory will be the same directory as the tool executable. By default, the log file should be in the format “connectivity-\*.log”. | If an invalid file name is given, the tool will fail, or just not write to the file. If the field is empty, the file name will be “connectivity.log” by default. |
| Debug.media\_logs\_enabled | Enable the generation of media stack logs. The logs will be generated in: %appdata%\Microsoft\NetworkAssessmentTool\NetworkAssessmentTool.msrtc-\*.blog.  Only the last 10 logs are preserved. | If an invalid value is specified (not ‘true’ or ‘false’), then the media stack logs will be disabled by default. |
| TelemetryEnabled | Enabled log of telemetry data related to connectivity check and quality check. | If an invalid value is specified (not ‘true’ or ‘false’), then telemetry will be disabled by default. |
| TenantId | Unique identifier for Tenant. Is used to identity Tenant specific telemetry on Aria. | If empty, then telemetry is not sent. |

## Relay FQDN Configuration

Here are the various relay FQDN’s that should be used for each Office 365 customer plan:

|  |  |
| --- | --- |
| Office 365 Endpoint | Recommended Relay FQDN |
| Worldwide (including GCC) | worldaz.tr.teams.microsoft.com |
| U.S. Government DoD | tr.dod.teams.microsoft.us |
| U.S. Government GCC High | tr.gov.teams.microsoft.us |

# Troubleshooting

Users may encounter errors when using the tool. This section documents the list of known errors and what to expect.

## Installation Errors

If the dependencies are not installed as described in the Preconditions section, the user will see an error message similar to the sample below.

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe  Microsoft Teams - Network Assessment Tool  Unhandled Exception: System.IO.FileNotFoundException: Could not load file or assembly 'Microsoft.Skype.ECS.Client, Version=3.0.0.1, Culture=neutral, PublicKeyToken=31bf3856ad364e35' or one of its dependencies. The system cannot find the file specified.  at NetworkAssessmentTool.Program.LoadECSConfig()  at NetworkAssessmentTool.Program.Main(String[] args) in C:\skype\MSRTC\msrtc\src\networkassessmenttool\vnext\nat\tool\Program.cs:line 115 |

In the sample above, the library “Microsoft.Skype.ECS.Client.dll” was not installed correctly, or was removed from the target directory. Ensure that the following dependencies (libraries, executable, configuration file) are all present in the target directory:

* Microsoft.Skype.ECS.Client.dll
* Microsoft.Skype.ECS.Core.dll
* Microsoft.Skype.Seatbelt.Core.ClientHelpers.dll
* Microsoft.Skype.Seatbelt.Core.Common.dll
* Microsoft.Skype.Seatbelt.Core.dll
* NetworkAssessmentMediaLibApi.dll
* NetworkAssessmentLib.dll
* NetworkAssessmentTool.exe
* NetworkAssessmentTool.exe.config
* Newtonsoft.Json.dll
* RtmCodecs.dll
* RtmPal.dll
* skypert.dll

To fix this issue, double-click on the installer (MSI) file and click on the “Repair” option.

## Configuration Errors

If there are errors in the configuration file, the user would see an error statement and the tool will not run the particular test. This is considered a fatal error. For example, if a relay IP is provided in the configuration file, but is an invalid IP address, then the following error message will show:

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe  Microsoft Teams - Network Assessment Tool  ERROR: Invalid configuration detected: Relay.IP must be a valid IP address.  Please check the NetworkAssessmentTool.exe.config file. |

For more information on requirements for the fields in the configuration file, please refer to the *Configuration* section above.

## Relay Connectivity Errors

The configured relay may not always be reachable. This could be due to network conditions or even relay outages. This may not be a fatal error and the tool could continue to run the relay connectivity and quality checker. For example, when the default or custom relay FQDN is unreachable, but the user specifies a reachable relay IP address in the configuration file, then the relay connectivity and quality checker would still succeed, because if the relay IP is configured, any input relay FQDN is ignored. If no relays configured are reachable however, then the relay connectivity and quality checker will still run, but they will just display information about failed relay connectivity. For example, here’s a sample of the user failing to connect to the relay when running the quality checker:

|  |
| --- |
| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe /qualitycheck  Microsoft Teams - Network Assessment Tool  Initializing media flow.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Starting new call  Media flow will start after allocating with relay VIP FQDN: worldaz.tr.teams.microsoft.com  If user wants to allocate with a particular relay VIP IP address, please specify in NetworkAssessment.exe.config.  Waiting for call to end after 300 seconds, displaying call quality metrics every ~5 seconds.  Change the 'MediaDuration' field in the NetworkAssessmentTool.exe.config file to change the media flow duration.  TIMESTAMP is in UTC. LOSS RATE is in percentage, out of 100.  LATENCY and JITTER are in milliseconds, and are calculated as averages in ~5-second windows.  PROTOCOL displays whether UDP, TCP (PseudoTLS/FullTLS), or HTTPS protocol was used to allocate with the relay server.  Note that for PROTOCOL, UDP protocol is attempted first to connect to the relay, by default.  LOCAL ADDRESS is the local client IP and port that media is flowing from.  REMOTE ADDRESS is the peer (relay server) destination IP and port that media is flowing to.  IS PROXIED PATH shows whether a proxy server is used to connect to the relay, only applies to TCP/HTTPS connections  LAST KNOWN REFLEXIVE IP shows what your latest public (NAT translated) IP and port is that the relay sees during media flow.  [If LOSS RATE is 100%, the output lines here will be in red]  Quality check source port range: 50000 – 50019  ERROR: Call setup failed - Failed to establish connection with local relay.  ERROR: Check that the relay is configured correctly in your config file.  ERROR: Recommend running the connectivity checker for more details.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Call Quality Check Has Finished  Call Quality Check result has been written to: C:\Users\<alias>\AppData\Local\Microsoft Teams Network Assessment Tool\quality\_check\_results.csv |

## ECS Connectivity Errors

ECS connectivity is required for some of the tests in this tool. The connectivity and quality checker both require ECS connectivity. For the service connectivity checker, without ECS connectivity, these tests will not run. For the relay connectivity checker and quality checker, without ECS connectivity, the custom relay FQDN/IP from the configuration will be read, but the quality checker tests SHOULD still fail because the relay credentials required for relay allocations are read from ECS. The relay connectivity checker tests COULD still succeed because these tests only require initial allocation (not final allocation) to succeed with the relay, which does not necessarily require relay credentials. Here is an example of when ECS connectivity fails when running the quality checker, and a relay FQDN is still specified in the configuration file:

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| C:\Program Files (x86)\Microsoft Teams Network Assessment Tool>NetworkAssessmentTool.exe /qualitycheck  Microsoft Teams - Network Assessment Tool  Failed to read parameters from ECS: Specified argument was out of the range of valid values.  Parameter name: value  Attempting to use relay FQDN from app config file (NetworkAssessmentTool.exe.config).  Change 'Relay.FQDN' key in app config to set custom relay FQDN. Recommend consulting MS Support to do so.  Initializing media flow.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Starting new call  Media flow will start after allocating with relay VIP FQDN: worldaz.tr.teams.microsoft.com  If user wants to allocate with a particular relay VIP IP address, please specify in NetworkAssessment.exe.config.  Waiting for call to end after 300 seconds, displaying call quality metrics every ~5 seconds.  Change the 'MediaDuration' field in the NetworkAssessmentTool.exe.config file to change the media flow duration.  TIMESTAMP is in UTC. LOSS RATE is in percentage, out of 100.  LATENCY and JITTER are in milliseconds, and are calculated as averages in ~5-second windows.  PROTOCOL displays whether UDP, TCP (PseudoTLS/FullTLS), or HTTPS protocol was used to allocate with the relay server.  Note that for PROTOCOL, UDP protocol is attempted first to connect to the relay, by default.  LOCAL ADDRESS is the local client IP and port that media is flowing from.  REMOTE ADDRESS is the peer (relay server) destination IP and port that media is flowing to.  IS PROXIED PATH shows whether a proxy server is used to connect to the relay, only applies to TCP/HTTPS connections  LAST KNOWN REFLEXIVE IP shows what your latest public (NAT translated) IP and port is that the relay sees during media flow.  [If LOSS RATE is 100%, the output lines here will be in red]  Quality check source port range: 50000 - 50019  ERROR: Call setup failed - Failed to establish connection with local relay.  ERROR: Check that the relay is configured correctly in your config file.  ERROR: Recommend running the connectivity checker for more details.  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Call Quality Check Has Finished  Call Quality Check result has been written to: C:\Users\<alias>\AppData\Local\Microsoft Teams Network Assessment Tool\quality\_check\_results.csv |

## Other Errors

If any other errors are encountered, relevant information should be logged in the console. The user should provide the console output and contact MS Support for further investigation.