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Creating a Custom Speedtest Web Page

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Introduction

This document describes how to set up a customizable web page user interface for Speedtest. The web page uses the Speedtest feature in Paragon Active Assurance via the product's REST API.

The Speedtest web page can be hosted on any web server (that is, not necessarily where Control Center resides), as long as the REST API and access to the Test Agents are configured correctly.

Paragon Active Assurance provides an example web page implementation which is referred to in this document.

Please note that an on-premise installation of Paragon Active Assurance is required for creating a Speedtest web page.

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Speedtest Web Page Implementation

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Below is an overview of the files contained in the Speedtest web page implementation. All of these files need to be hosted on a web server.

The files are included in the Control Center installation and can be accessed at

```
http://<hostname>/static/speedtest_demo/example.html
```

In the file system, they are located at

```
/usr/lib/python3.6/dist-packages/netrounds/static/speedtest_demo
```

> **NOTE**: If you edit these files in place, they will be overwritten during the next upgrade of Control Center. Therefore, for production use, it is strongly recommended that you make copies of the files and host them under a different path.

Speedtest Files

These files should not be changed by the end user.

- `Speedtest.js` – Speedtest implementation.
- `SpeedtestWorker.js` – Internal Speedtest worker implementation.
- `SpeedtestLib.js` – Library exposing the functionality of `Speedtest.js` and the REST API communication to the end user.

Custom User Interface

The following files constitute the example web page implementation. They exemplify how to use the `SpeedtestLib.js` library and how to connect it to the user interface in `example.html`.

- `example.html` – Speedtest web page.
- `static/js/script.js` – Connector between `SpeedtestLib.js` and the HTML.
- `static/js/gauge.js` – User interface meter showing the data transfer speed in real time.
- `static/style.css` – User interface styling.
- `static/logo.png` – Logotype used on the web page.

Setup and Initialization

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Speedtest-enabled Test Agent

The Test Agent that is to be used for the Speedtest measurements must be accessible from the web client performing the Speedtest. In most cases, this means it must be accessible over the internet.

ALLOWED_ORIGINS Setting for REST API

In order for Speedtest to work, the Speedtest web page needs to be able to access the REST API. This means we must add the hostname at which the Speedtest web page is hosted to the `ALLOWED_ORIGINS` settings. If this is not done, the web browser will deny access to the REST API.

On your Control Center instance, open the file `/etc/netrounds/restol.conf` and add this setting:

```
ALLOWED_ORIGINS=https://<hostname>
```

where `<hostname>` is the Fully Qualified Domain Name (FQDN) where the Speedtest web page is hosted.

To learn about how the `ALLOWED_ORIGINS` setting works, read this article: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Access-Control-Allow-Origin

To understand the big picture regarding Cross-Origin Resource Sharing (CORS), you will find this article helpful: https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS

Web Server Redirection from HTTPS to HTTP

Since the Speedtest feature in Paragon Active Assurance uses the unencrypted HTTP protocol for maximum performance, it is important that any web client loading the page uses `http://` in the URL.

However, when linking to this page, or when the protocol `http://` is omitted by the user in the address bar, web browsers will default to `https://`, which will cause issues with the Speedtest page.

For this reason, the built-in Speedtest feature in Paragon Active Assurance has a rewrite rule in the Apache config to redirect any `https://` requests to `http://` for the Speedtest page.

It is recommended that you add such a rewrite rule for your custom Speedtest web page as well. See the following subsections.

Hosting the Custom Speedtest Web Page with Control Center

If you are hosting your custom Speedtest web page on the same web server as Control Center, you can edit the file `/etc/apache2/sites-available/netrounds-ssl.conf`.

Below is the rewrite rule for the built-in Speedtest page:

```
## Rewrite rules
RewriteEngine On
RewriteRule ^/[^/]+/speedtest(?:-flash|-websocket)?/?$ http://%{HTTP_HOST}%{REQUEST_URI} [R]
```

So to add a similar rule for the example web page you would write:

```
RewriteRule ^/static/speedtest_demo/example.html$ http://%{HTTP_HOST}%{REQUEST_URI} [R]
```

NOTE: If you upgrade Control Center to a new version, this file will be overwritten, so you will have to re-add this rule after the upgrade.

Hosting the Custom Speedtest Web Page on a Separate Web Server

If you are hosting the custom Speedtest web page on a different web server than the one where Control Center is hosted, please refer to your web server documentation on how to add a similar rewrite rule.

Including the Speedtest Library

The Speedtest library needs to be included and initialized in the HTML file. In `example.html` this is done as follows:

```
<script src='static/js/Speedtest.js'></script>
<script src='static/js/SpeedtestLib.js'></script>
<script src='static/js/script.js'></script>
<script type='text/javascript'>
    var account = 'dev';
    var apiUrl = 'https://<rest_hostname>/rest';
    var workerScriptPath = 'static/js/SpeedtestWorker.js';
    initSpeedtest(apiUrl, workerScriptPath, account);
</script>
```

Explanations:

- `var account = 'dev'` – Short name of the account in Paragon Active Assurance.
- `var apiUrl = 'https://<rest_hostname>/rest'` – *Replace this* with the URL to the Paragon Active Assurance REST API.
- `var workerScriptPath = 'static/js/SpeedtestWorker.js'` – Path where the worker script will be accessible.

Initializing Speedtest

In the file `static/js/script.js`, `initSpeedtest` sets up the callback functions, which will handle the Speedtest responses.

```
function initSpeedtest(apiUrl, workerScriptPath, account) {
speedtest = new SpeedtestLib(apiUrl, workerScriptPath, account);
speedtest.setSnapshotResponse(resultSpeed);
```

```
speedtest.setResultResponse(resultDelay);
speedtest.setFailureResponse(failureHandler);
speedtest.setSuccessResponse(successHandler);
speedtest.getServers(setServerDropdown);
speedtest.getCategories(setCategoryDropdown);
```

The argument for each `speedtest.` function should be a callback function which handles the data sent by SpeedtestLib.

- `speedtest.setSnapshotResponse(resultSpeed)` – partial results for the upload/download part of the test; sent during the test run
- `speedtest.setResultResponse(resultDelay)` – partial results for the TCP/ICMP Ping part of the test; sent during the test run
- `speedtest.setFailureResponse(failureHandler)` – sending the report to Control Center failed
- `speedtest.setSuccessResponse(successHandler)` – sending the report to Control Center succeeded
- `speedtest.getServers(setServerDropdown)` – list of available servers was fetched
- `speedtest.getCategories(setCategoryDropdown)` – list of available Speedtest categories was fetched

For example, the `setServerDropdown` callback function populates the available servers in the user interface:

```
function setServerDropdown(serverList) {
    serverList['items'].forEach(function(server) {
        var option = document.createElement('option');
        option.text = server['name'];
        var serverString = server['test_agent_id'] + ':' + server['interface'] + ' ' +
            server['ip'] + ' ' + server['port'] + ' ' + server['test_length'] + ' ' +
            server['tcp_sessions'];
        option.value = serverString;
        document.getElementById('dropdown-server').add(option);
    });
}
```

Here, `serverList` is provided by SpeedtestLib.

For the other callback functions, please refer to `static/js/script.js`.

Starting and Stopping the Test

Starting and stopping a test is as simple as calling `start` and `stop` on the SpeedtestLib instance:

```
speedtest.start(server, category['id'], comment);

speedtest.stop()
```

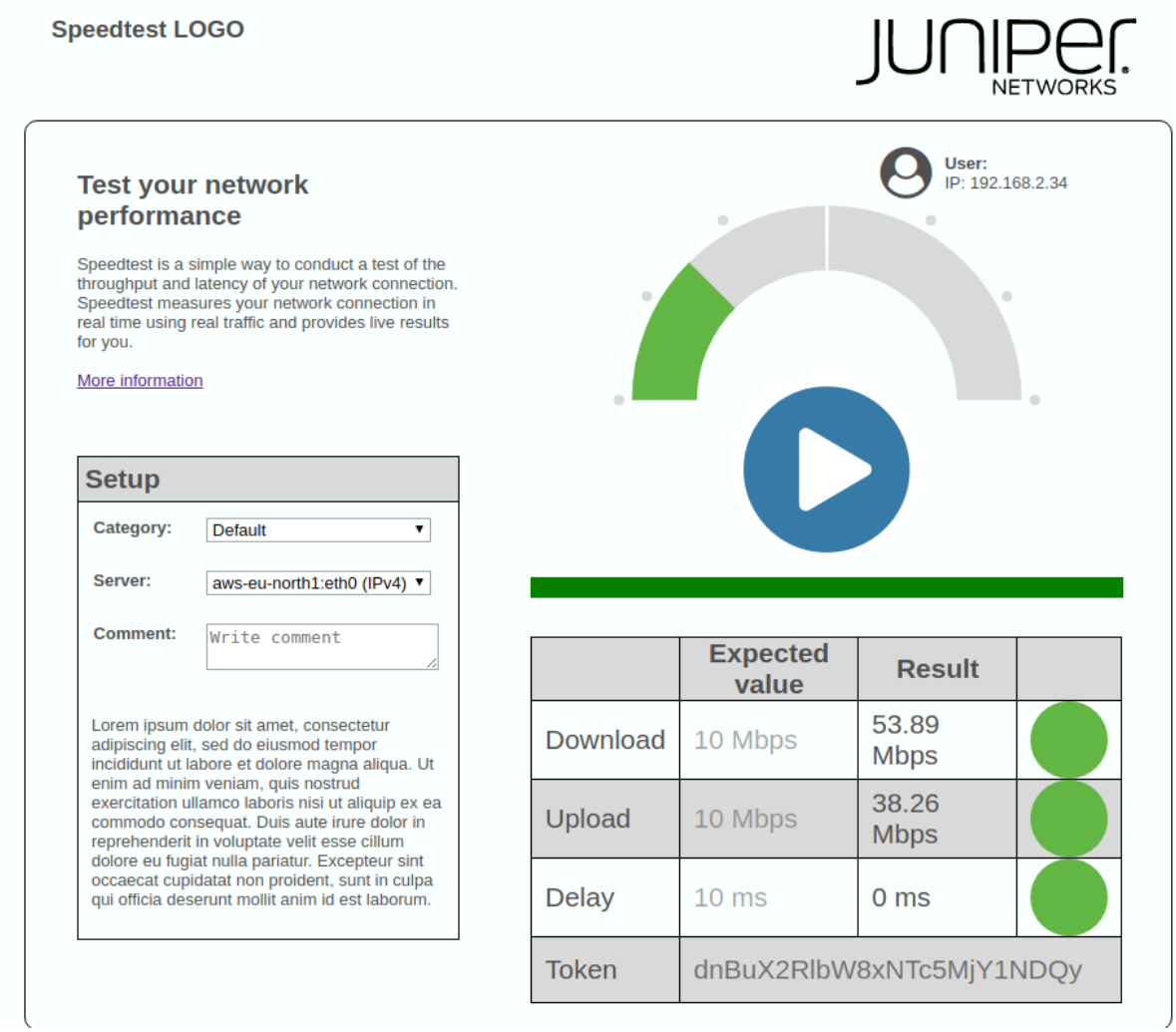
This can be done from the web page by clicking the start and stop buttons. (The latter becomes visible after you click start.)

The blue bar shows the progress of the test.

Test Results

The example GUI shows metrics and SLA indicators according to the screenshot below. The meter at the top shows the current data transfer speed.

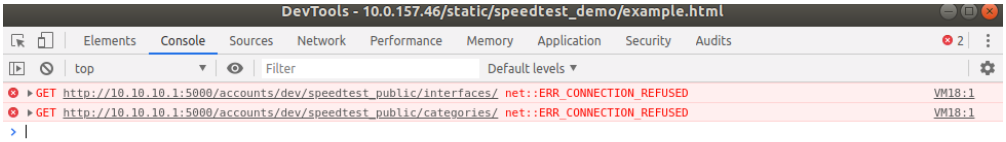
After the test has finished, full results are posted to the Paragon Active Assurance REST API automatically by SpeedtestLib, and either `setSuccessResponse` or `setFailureResponse` is called.



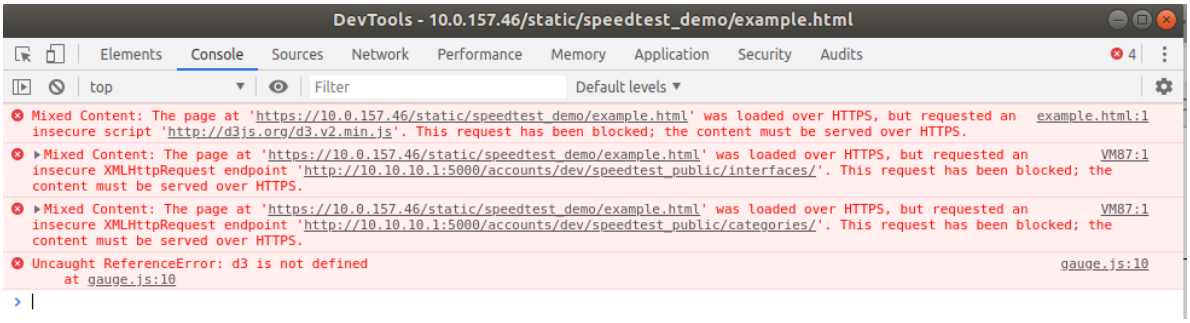
Troubleshooting

It is generally helpful to navigate to the Javascript console ("Developer tools" in Chrome) from the Speedtest page and check for error messages.

- For example, if `apiUrl` is set incorrectly, you will see a "connection refused" message:



- If the URL contains `https://`, you will get these messages:



- If `ALLOWED_ORIGIN` is wrongly configured, messages like these will appear:

```
Access to XMLHttpRequest at
'http://<hostname>/rest/accounts/demo/speedtest_public/interfaces/' from origin
'http://<hostname>' has been blocked by CORS policy: No 'Access-Control-Allow-Origin'
header is present on the requested resource.
Access to XMLHttpRequest at
'http://<hostname>/rest/accounts/demo/speedtest_public/categories/' from origin
'http://<hostname>' has been blocked by CORS policy: No 'Access-Control-Allow-Origin'
header is present on the requested resource.
```

- Something else to keep in mind if you are hosting your Speedtest web page on the same web server as Control Center is to *avoid making inappropriate changes to the Apache configuration files*. For example, it is crucial that `ServerName` be set identically in the files `/etc/apache2/sites-available/netrounds.conf` and `/etc/apache2/sites-available/netrounds-ssl.conf`. If these settings differ, the Speedtest page will not work.

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