Dashboard Skin Tutorial

For ETS2 HTML5 Mobile Dashboard
v3.0.2

Index

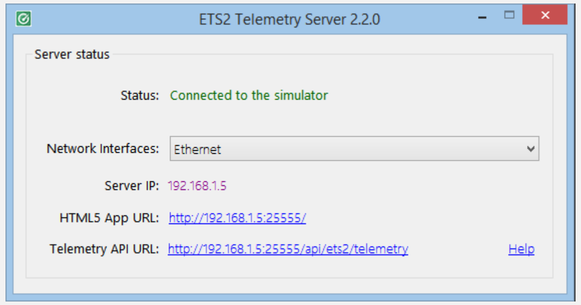
Dashboard engine overview

The telemetry server consists of 3 different parts, connected in the following way:

ETS2 Game

ets2-telemetry-server.dll

⟷ Memory Mapped File



ETS2 Telemetry Server 2.2.0

Server status

Status: Connected to the simulator

Network Interfaces: Ethernet

Server IP: 192.168.1.5

HTML5 App URL: http://192.168.1.5:25555/

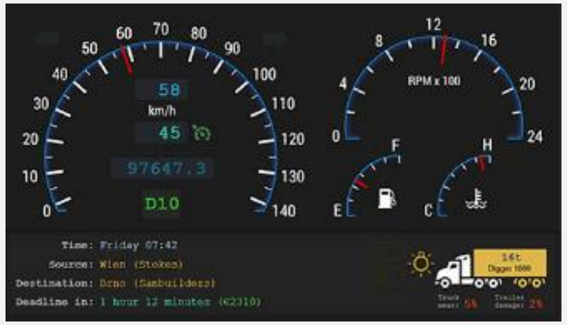
Telemetry API URL: http://192.168.1.5:25555/api/ets2/telemetry

Help

ETS2 Telemetry Server

⟷ HTTP

+ WebSockets



Time: Friday 07:42
Source: Wien (Stokes)
Destination: Brno (Sambuilders)
Deadline in: 1 hour 12 minutes (€2310)
Truck wear: 5%
Trailer damage: 2%

HTML5 Dashboard Application

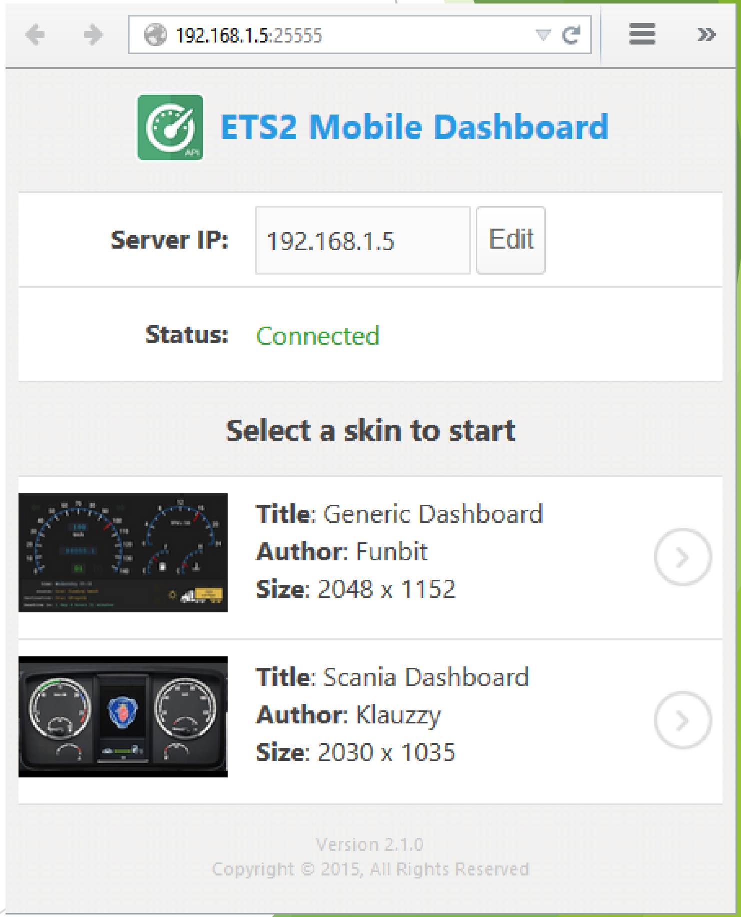
index.html
⇓
dashboard-host.html
↓
dashboard.html

Dashboard menu

When you open the dashboard by clicking on the “HTML5 App URL” link displayed by the server, the first thing you see is the main menu handled by the index.html.

When dashboard connects to the server, the server enumerates all skins inside "html/skins/*" path and loads their config.json configurations to display the list.

When you select a skin to load, the browser navigates to the dashboard-host.html file that dynamically loads files for the selected skin (html, css, etc.).


192.168.1.5:25555

ETS2 Mobile Dashboard

Server IP: 192.168.1.5 Edit

Status: Connected

Select a skin to start

Title: Generic Dashboard
Author: Funbit
Size: 2048 x 1152

Title: Scania Dashboard
Author: Klauzzy
Size: 2030 x 1035

Version 2.1.0
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Skin file structure

Each skin must be located inside the "html/skins" directory with the name equal to the "name" property defined in the config.json file.

For example, if you want to name your skin "volvo", you should create a directory "volvo" inside the "skins": "html/skins/volvo".

All skins must have at least 5 files:

config.json – defines skin configuration

dashboard.html – defines all dashboard elements supported by the skin

dashboard.css – defines dashboard size and visual style for the dashboard elements

dashboard.jpg – defines dashboard splash screen for the menu (recommended size is 480x275px)

dashboard.js – defines custom dashboard rendering and telemetry property filtering

config.json overview

Every skin must have the following properties defined inside config.json:

- name: name of the skin. This value must be equal to the name of the sub-directory inside "html/skins". For example, if your skin is named "volvo", it must be placed inside "html/skins/volvo".
- title: human readable skin title that will be displayed in the top skin menu
- author: author name
- width: width of the skin in pixels
- height: height of the skin in pixels

Available telemetry properties

The game provides variety of telemetry data: truck speed, trailer name, job income and so on. All this information is available in real time and exposed as JSON by the telemetry server. You can see it by opening the following URL on the computer where server is running:

http://localhost:25555/api/ets2/telemetry

All properties are divided in several categories:

- game – overall game information: current time, pause state, etc.
- truck – truck information: name, speed, gear, light statuses, etc.
- trailer – trailer information: name, mass, attach status, etc.
- job – job information: source and destination cities, income, etc.

You may see the full list of supported properties on the home page here.

dashboard.html overview

The dashboard.html file defines HTML DOM for all dashboard elements.

The minimal dashboard.html for a skin is a div with the "dashboard" class:

```
<div class="dashboard"></div>
```

The dashboard core will automatically fit this div tag into browser's viewport (keeping aspect ratio) using absolute positioning. The width and height values are read from the skin's config.json file.

You have full freedom to choose what HTML tags will be used inside that div for each dashboard element (img, div, span, etc.) and what hierarchy they will have.

For example, you can create a skin that displays only current truck speed and nothing else.

The DOM would look like this:

```
<div class="dashboard">
    <div class="truck-speed"></div>
</div>
```

dashboard.css: overview

The dashboard.css file defines CSS styles for dashboard HTML elements.

There are absolutely no restrictions on the dashboard.css file structure. It is totally up to you and depends on the elements that you use in your skin.

For example, if you have a truck-speed dashboard element defined in your HTML (i.e. a tag with "truck-speed" class), you probably want to have CSS style for that element as well. It could be something like this:

```
.truck-speed {
  color: #2491b9;
  font-weight: bold;
  font-size: 70px;
  position: absolute;
  left: 460px;
  top: 280px;
  width: 190px;
  height: 66px;
}
```

Coordinates for the absolutely positioned elements are relative to the skin size defined in the config.json

dashboard.css: mapping convention

The dashboard core uses a simple but powerful convention for mapping properties from JSON object to CSS class names. There are two main rules:

- Period that splits objects is replaced with the hyphen character. For example:
  "game.connected" property is translated to the "game-connected" CSS class name
  "truck.speed" property is translated to the "truck-speed" CSS class name
  "trailer.placement.x" property is translated to the "trailer-placement-x" CSS class name
- Array indexes are inserted between object names. For example:
  "truck.wheels[0].steerable" property is translated to the "truck-wheels-0-steerable" CSS class name

Telemetry data types

The dashboard core uses CSS class names to apply telemetry data to the HTML elements.

Telemetry JSON has three different data types:

- boolean (for properties like truck.blinkerLeftOn, trailer.attached, game.connected, etc.)
- string (for properties like job.deadlineTime, job.sourceCity, trailer.name, etc.)
- number (for properties like truck.speed, truck.placement.x, truck.gear, etc.)

Each data type is rendered in its own way. See next slides for more information.

Hint: To see all available properties you may click on

the "Telemetry API URL" link displayed by the server.

Dashboard rendering: booleans

boolean (for properties like truck.blinkerLeftOn, trailer.attached, game.connected, etc.)

When value is true the dashboard core adds "yes" CSS class to the respective element found by its class name. When value is false the "yes" class is removed.

For example, when "trailer.attached" property is true, the core searches for all HTML tags having "trailer-attached" class and adds additional "yes" class to them, so the DOM will look like this:

```
<div class="trailer-attached yes"></div>
```

And when the value is false the "yes" class disappears:

```
<div class="trailer-attached"></div
```

Because same class names may be attached to multiple HTML elements you can render same information in different ways (controlled by the dashboard.css)

Dashboard rendering: strings

string (for properties like job.deadlineTime, job.sourceCity, trailer.name, etc.)

For all strings the dashboard core will update HTML content of the respective elements. For example, if you have a job-sourceCity element defined in your dashboard.html:

```
<div class="job-sourceCity"></div>
```

And the current source city value is "Graz" the dashboard core will set the element’s content as follows:

```
<div class="job-sourceCity">Graz</div>
```

Dashboard rendering: numbers (strings)

number (for properties like truck.speed, truck.placement-x, truck.gear, etc.)

There are two ways to display numbers: as a string value or as an analog meter.

By default, all numbers are displayed just like strings, the dashboard core will update HTML content of the respective HTML elements. For example, if you have a trailer-mass element defined in your dashboard.html:

```
<div class="trailer-mass"></div>
```

And the current trailer mass value equals to 14000 the dashboard core will set the element’s content as follows:

```
<div class="trailer-mass">14000</div>
```

Hint: if you like to convert mass from kilograms to tons,

or kmh to mph see dashboard.js section for more information.

Dashboard rendering: numbers (meters)

If you like to render a number as an analog meter instead of a string you should set data-type="meter" attribute to an HTML element. The core will use that HTML element as a meter arrow and will rotate it depending on the value.

All meters must also have the following HTML data attributes defined:

- data-min: minimal possible value (as in JSON response),
  you can also put any telemetry property name here to use its current value
- data-max: maximum possible value (as in JSON response),
  you can also put any telemetry property name here to use its current value ("truck.fuelCapacity" for example)
- data-min-angle: angle in degrees for the arrow for data-min value (0 = vertical, negative = left, positive = right)
- data-max-angle: angle in degrees for the arrow for data-max value (0 = vertical, negative = left, positive = right)

For example, in the default skin truck speed is displayed as a meter and it is defined in the HTML as follows:

```
<div class="truck-speed" data-type="meter"
    data-min="0" data-max="140" data-min-angle="-114" data-max-angle="+114"></div>
```

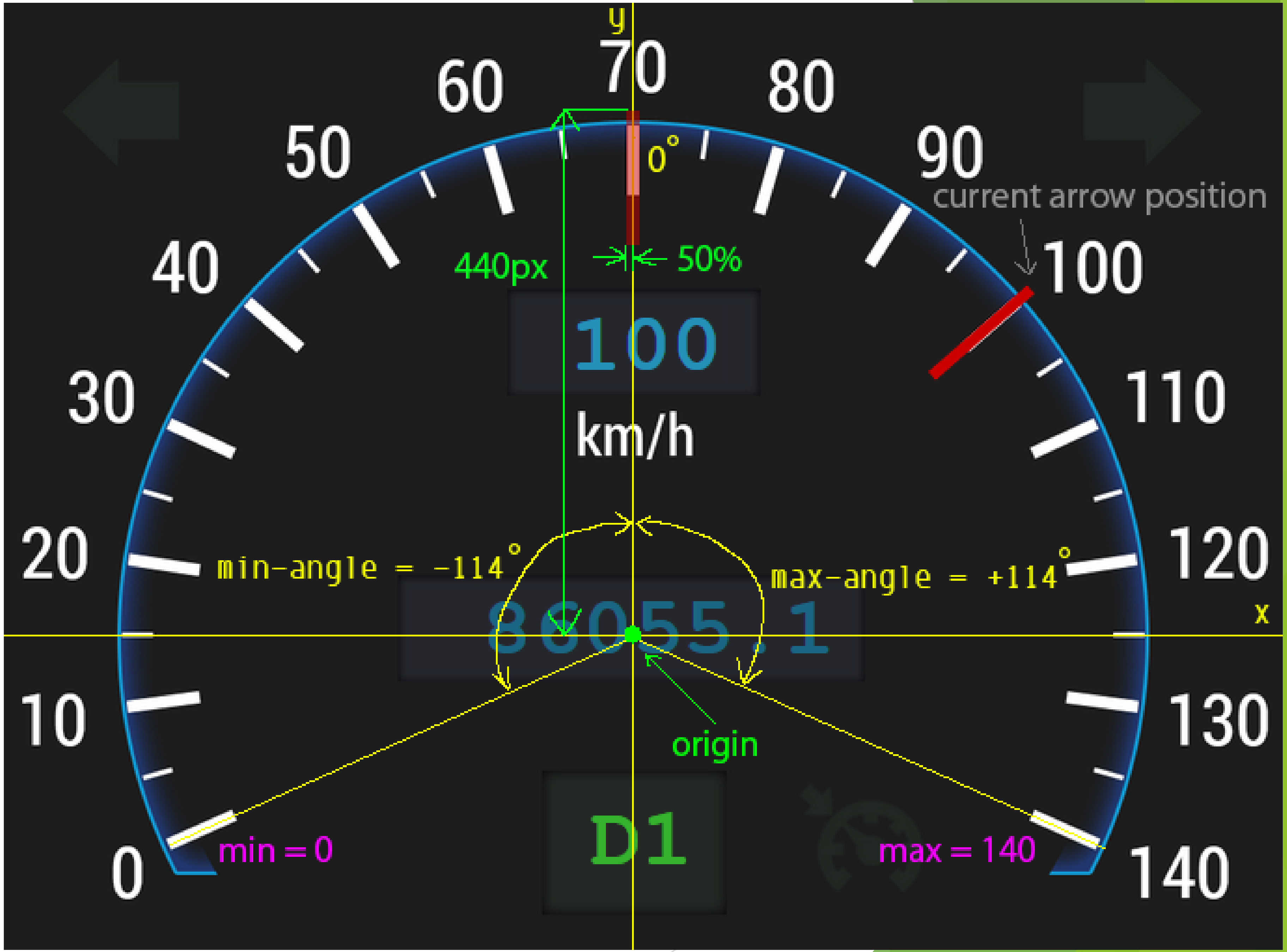
Here is how it looks in the browser:

When you define the styles for your arrow in the CSS, keep in mind that the default position must always be vertical (i.e. 0 degree rotation). The arrow will rotate around its origin between min-angle and max-angle depending on the current value. The origin must be defined in the CSS via transform-origin property. In the default skin it is defined as:

transform-origin: 50% 440px;

Which means that the origin is the point 50% to the right from the top-left corner of the arrow element (center of the small red transparent rectangle on the screenshot) and 440px down from the top. The origin is marked as a big solid green dot.

To get the correct coordinates for your own skin you should open your skin background in a graphic editor and check pixel offsets which will be relative to your skin size.

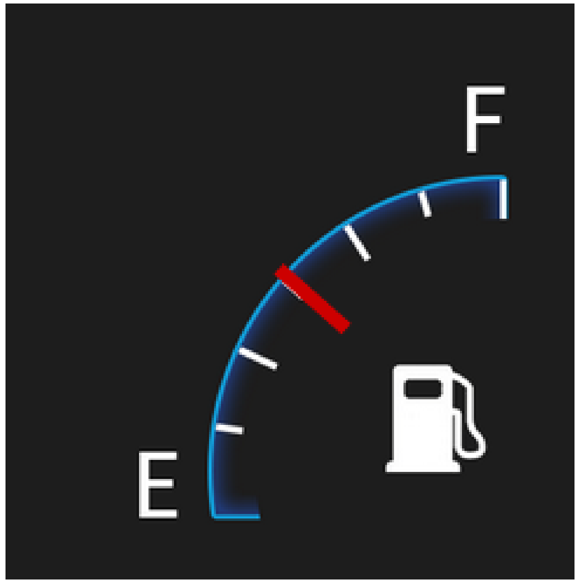


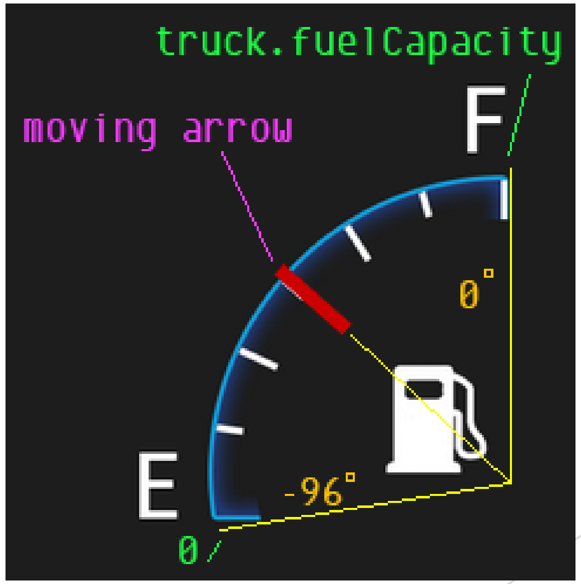
Dashboard rendering: numbers (meters)

Here is another example from the default skin. The fuel is displayed as a meter defined in the HTML as follows:

```
<div class="fuel" data-type="meter"
      data-min="0" data-max="truck.fuelCapacity" data-min-angle="-96" data-max-angle="0"></div>
```

Here is how it looks in the browser ("min" & "max" are green, "min-angle" & "max-angle" are yellow):





Dashboard rendering: current value

When dashboard core renders an element (string, number or boolean) it always updates data-value attribute, so if you check the DOM inside your browser you will see something like this:

```
<div class="trailer-mass" data-value="14000">14000</div>

<div class="job-sourceCity" data-value="Graz">Graz</div>

<div class="trailer-attached yes" data-value="true"></div>
```

This feature allows you to customize the element design depending on the current value.

For example, the following CSS selector may be used to set a special style for the neutral gear value:

```
.truck-gear[data-value="N"]
{
   color: white;
}
```

Dashboard rendering: special properties

There are only 2 special (i.e. always available and not related to the game telemetry data) properties available for now:

- game.connected – boolean property updated by the telemetry server that defines whether telemetry server is connected to the simulator or not. You may use it to hide some dashboard indicators when server is not connected.
- statusMessage – human readable string property containing current dashboard core status ("Connected, waiting for the drive...", etc.). You should use it to inform user about current status. See "html/scripts/config.js" for the full list of strings.

dashboard.js overview

The dashboard.js file works like a small plugin for your skin.

It contains 3 JavaScript functions used by the dashboard core:

```
initialize = function (skinConfig, utils) {
   …
}

filter = function (data, utils) {
   …
}

render = function (data, utils) {
   …
}
```

dashboard.js: initialize function

```
initialize = function (skinConfig, utils) { … }
```

This function is called only once when skin is loading.

You may use it to initialize your custom JavaScript objects, setup DOM,
or preload your CSS images to speed up skin loading process.

The skinConfig argument will contain skin configuration properties from the config.json file.
You may have your own properties there too (that may be used later inside dashboard.js).

The utils argument represents utility object with some useful functions (see next slides).

dashboard.js: filter function

```
filter = function (data, utils) { … }
```

This function is called every time when dashboard core gets fresh telemetry data from the server, but before it is rendered on the screen. The data argument contains all telemetry data properties. The utils argument represents utility object with some useful functions (see next slides).

You may use this function to adjust the current properties or calculate your own ones.

For example, you may convert trailer.mass property from a number of kilograms to a ton string:

```
data.trailer.mass = (data.trailer.mass / 1000.0) + 't';
```

Or, you can introduce a new property called myTruckSpeedMph like this:

```
data.myTruckSpeedMph = data.truck.speed * 0.621371;
```

This new property will be treated and rendered just like any standard property (i.e. dashboard core will find HTML elements having "myTruckSpeedMph" class and will apply the current value to it).

dashboard.js: render function

```
render = function (data, utils) { … }
```

This function is called after dashboard core has finished its own rendering process. This place may be used for custom dashboard visual effect implementations, like animated bars, maps, animated odometers, etc. The data argument contains all available telemetry data properties. The utils argument represents utility object with some useful functions (see next slides). This function is called for each frame being rendered (about 60 times per second) so you should be very careful, time consuming code may decrease your dashboard FPS.

For example, you may implement a horizontal bar reflecting the current speed.
The render implementation would look like this:

```
Funbit.Ets.Telemetry.Dashboard.prototype.render = function (data, utils) {
    $('.truckSpeedBar').width(data.truck.speed * 10);
}
```

dashboard.js: utils

All functions mentioned above contain a special argument called utils.

This object contains the following useful utility functions:

```
utils.formatInteger  = function (num, digits)
var hours = utils.formatInteger(9, 2); // will return string "09"

utils.formatFloat = function (num, digits)
var rounded = utils.formatFloat(456.123, 1); // will return string "456.1"

utils.preloadImages = function (imagePaths)
utils.preloadImages(['images/bg-off.png', 'images/bg-on.png']); // will preload 2 skin images
```

How to create a new skin from a template

In order to create a new skin please do the following steps:

1. Create a copy of the "html/skins/template" directory to something like "html/skins/myskin".
2. Open config.json file and set skin name to "myskin", change its title, author, size, etc.
3. Add dashboard element tags that you are going to support to the dashboard.html file
4. Add styles for these tags to the dashboard.css file
5. Edit dashboard.js if you like to implement custom data filtering or rendering (or leave it as is)
6. Create a splash dashboard.jpg image for your skin
7. Open "HTML5 App URL" and select your new skin from the menu to test it

Testing skin without ETS2

It is possible to run the server in the "test" mode when server uses JSON data from the Ets2TestTelemetry.json file instead of reading real game data. This may be very useful for skin testing, because it is very inconvenient to switch back and forth between the game and the dashboard just to check how new telemetry values are displayed on it.

To enable test mode open Ets2Telemetry.exe.config file and set UseEts2TestTelemetryData option to true and restart the server:

```
<add key="UseEts2TestTelemetryData" value="true" />
```

Please note that you may edit Ets2TestTelemetry.json file in real time (just edit and save), the dashboard will update the values and render them right away without restaring the server.

Publishing your own skin

If you have created a cool skin you may send it to me and I will include it in the official "ETS2 Dashboard Server" distribution published on GitHub.

All you have to do is to pack your skin in a ZIP file and send it to email: funbit @ gmail.com (if you haven't received any reply within a couple of days then most probably your email went to SPAM. You may contact me on the official SCS forum in this case).

Before sending a skin, please make sure that it satisfies the following conditions:

- the size of the skin ZIP is less than 2MB (use JPG images for photos and PNG for flat pictures)
- the skin has all 5 files (config.json, dashboard.html, css, jpg and js)
- the skin has a fresh screenshot for the menu (dashboard.jpg must be around 480x275px)

Happy driving! ☺