

# 12 Performance

## 12.1 Graphics Performance

### 12.1.1 Introduction (informative)

The performance metrics here have been derived from a set of graphics benchmarks programs – the can be run from <http://orange-opensource.github.com/orangemark/>. Use of these benchmark programs is **OPTIONAL** in the present document. It is up to a testing or certification regime where graphics performance is relevant to decide whether to use them as-is, to use a derivative or to do something completely different.

Performance is expressed in a power of 2 logarithmic scale of the complexity of a page which can be updated at 25Hz. For example, when moving a frame around;

- 1 means moving one frame around
- 2 means moving 2 frames around simultaneously
- 3 means moving 4 frames around simultaneously
- 4 means moving 8 frames around simultaneously
- 5 means moving 16 frames around simultaneously

Although the benchmark programs measure performance up to 10, typical TV use-cases are unlikely to benefit from values higher than 5. Values of 1 or 2 are unlikely to offer a good user experience, hence this section focuses on features that can be supported with values 3, 4 or 5.

### 12.1.2 Performance Levels

Graphics performance is defined in terms of a number of performance levels. This version of the specification defines two levels, “1” and “2”. An OITF that advertises level “1” graphics performance in its device capabilities **SHALL** comply with the minimum performance defined for that level. An OITF that advertises level “2” graphics performance in its device capabilities **SHALL** comply with the minimum performance defined for that level. An OITF **MAY** not comply with the minimum performance for even level “1” in which case it **SHALL NOT** advertise either levels “1” or “2” in its device capabilities.

To be clear, in the present document, it is **OPTIONAL** for an OITF to support even graphics performance level “1”.

### 12.1.3 Minimum 2D Graphics Performance

The following table defines the minimum performance that **SHALL** be supported for animations using CSS transitions of the properties listed in order for an OITF to advertise support for levels 1 and 2 respectively.

Values in this table indicate the number of elements of the specified target being animated simultaneously. The number is expressed as a power of 2, i.e. a value of 3 **SHALL** mean 4 simultaneous animations, a value of 5 **SHALL** mean 16 simultaneous animations.

**Table 17: Minimum 2D graphics performance**

Target for the CSS Property	CSS Property being animated	Test	Level 1	Level 2
Frame	background-color	2d/frame-color	3	5
	background-color, opacity	2d/frame-color-alpha	3	5
	left, top	2d/frame-left-top	3	5
	left, top, opacity	2d/frame-opacity	3	5

	transform: rotate	2d/frame-rotate	No requirement	5
	transform: scale	2d/frame-scale	3	5
	transform: skew	2d/frame-skew	No requirement	5
	transform: matrix	2d/frame-matrix	3	5
	border-radius	2d/frame-border-radius	3	5
	width, height	2d/frame-width-height	3	5
	linear-gradient	2d/frame-linear-gradient	3	5
Image	left, top	2d/image-top-left	3	5
	left, top, opacity	2d/image-opacity	3	5
	transform: rotate	2d/image-rotate	No requirement	5
	transform: scale	2d/image-scale	3	5
	transform: skew	2d/image-skew	No requirement	5
	transform: matrix	2d/image-matrix	3	5
Text	left, top, opacity	2d/text-left-top	3	5
	left, top, opacity	2d/text-opacity	3	5
	transform: rotate	2d/text-rotate	No requirement	5
	transform: scale	2d/text-scale	3	5
	transform: skew	2d/text-skew	No requirement	5
	text-shadow	2d/text-emboss	3	5

### 12.1.4 Minimum 3D Graphics Performance

No minimum performance is defined for 3D transforms.

### 12.1.5 Minimum Canvas Performance

No minimum performance is defined for graphics using the Canvas element.

### 12.1.6 Minimum WebGL Performance

No minimum performance is defined for WebGL graphics.

### 12.1.7 Performance Measurement

The source for the benchmark suite can be found at <https://github.com/Orange-OpenSource/orangemark>, version “V1.0.1”.

In order to address variation between successive runs of the tests, it is RECOMMENDED that any testing or certification regime that references these graphics benchmarks programs, or a derivative of them, require them to be run several times and the highest and lowest runs discarded.

The graphics benchmark programs measure frame rate using the `mozPaintCount` property (if supported), otherwise the `requestAnimationFrame()` method (if supported – see [TIMING CONTROL]) or a polyfill based on `setTimeout()`. OITFs MAY support other private or native mechanisms for measuring the frame rate. This specification is silent about the acceptability of these private or native mechanisms, this is a matter for any testing or certification regime that references these graphics benchmark programs.