

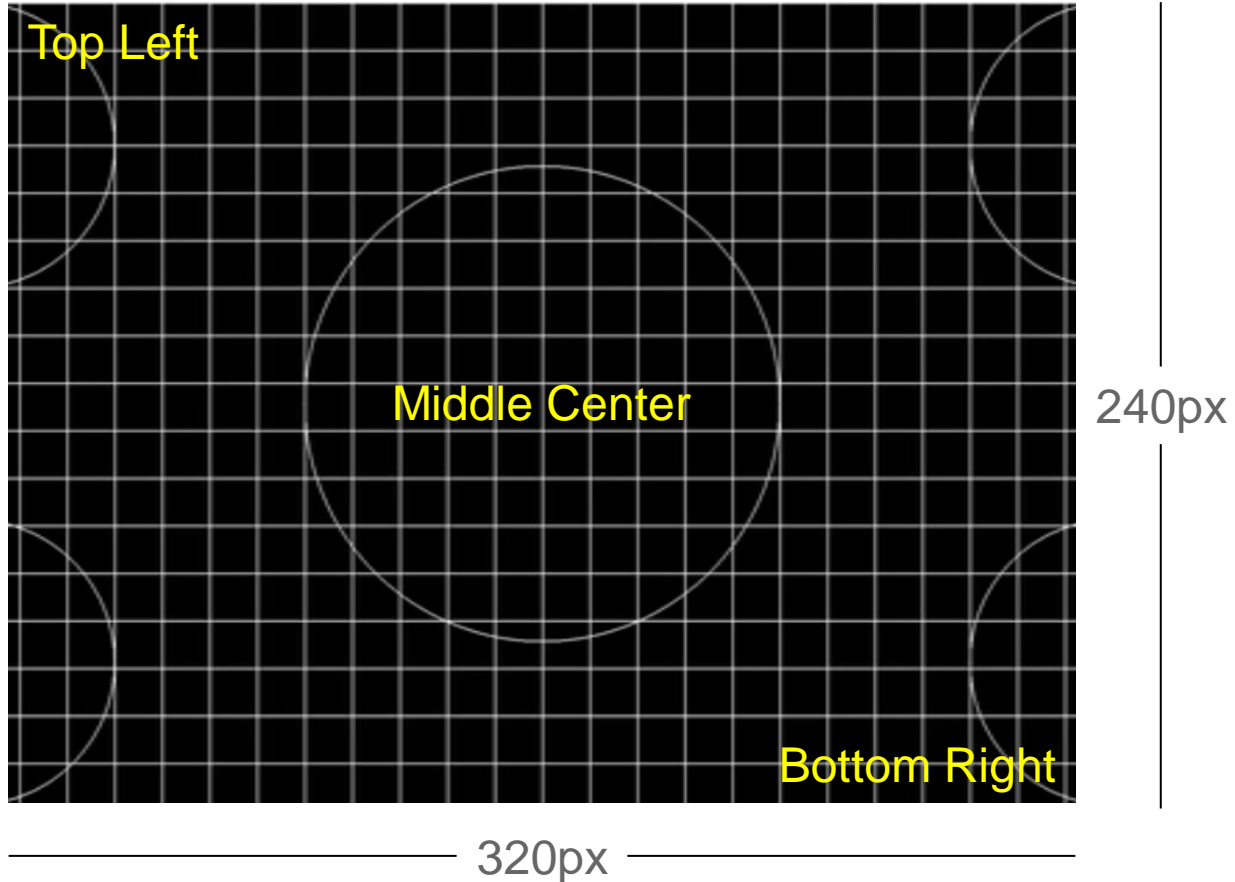
2/13/2013

TTML Aspect Ratio Issue

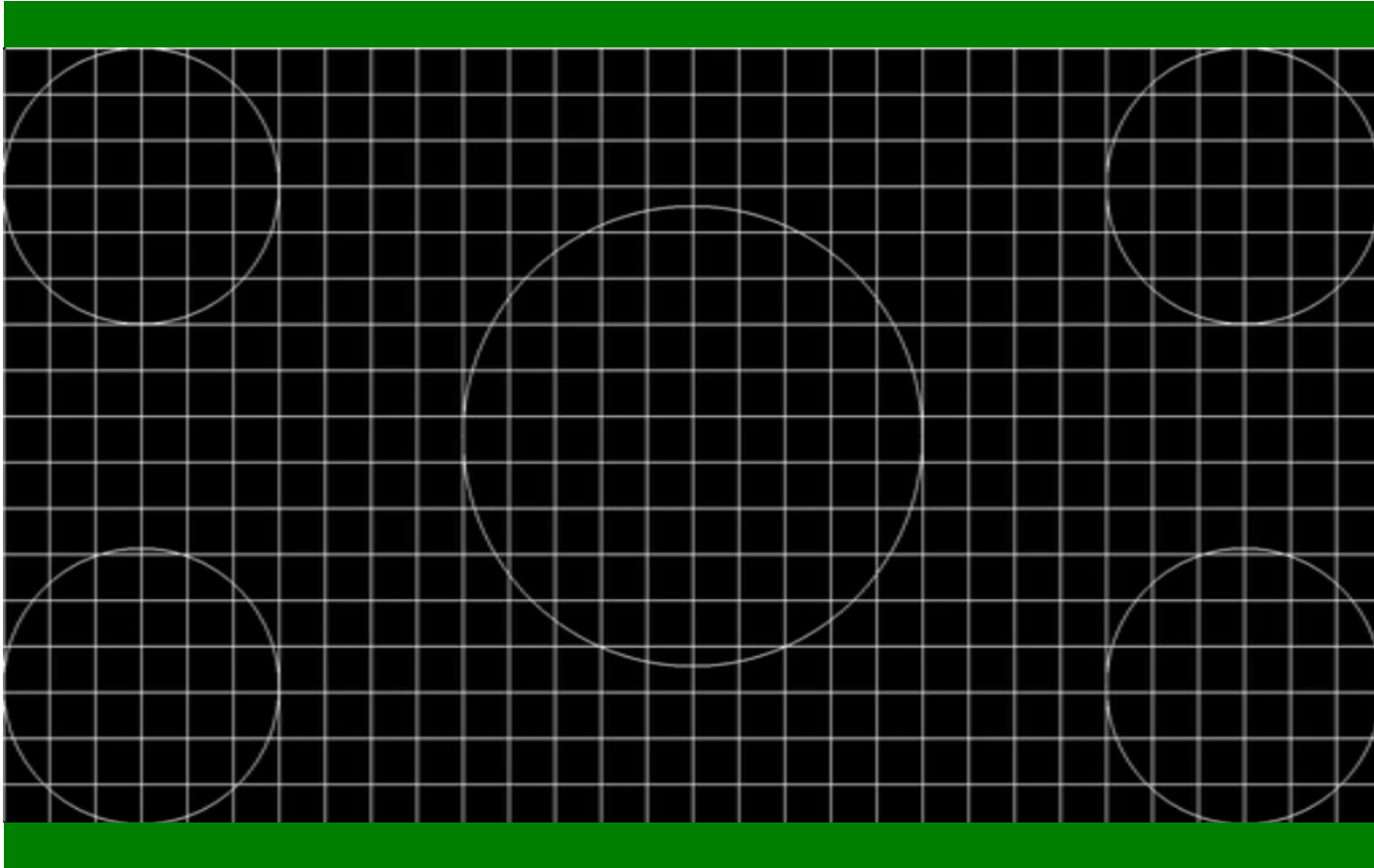
Positioning Example

```
<?xml version="1.0" encoding="utf-8"?>
<tt xml:lang="en"
    xmlns="http://www.w3.org/ns/ttml"
    xmlns:tts="http://www.w3.org/ns/ttml#styling"
    xmlns:ttm="http://www.w3.org/ns/ttml#metadata"
    xmlns:ttp="http://www.w3.org/ns/ttml#parameter"
    tts:extent="320px 240px"
    ttp:pixelAspectRatio="1 1">
<head>
  <layout>
    <region xml:id="topLeft">
      <style tts:origin="0% 0%" tts:extent="100% 100%" tts:displayAlign="before" tts:textAlign="start"/>
    </region>
    <region xml:id="middleCenter">
      <style tts:origin="0% 0%" tts:extent="100% 100%" tts:displayAlign="center" tts:textAlign="center"/>
    </region>
    <region xml:id="bottomRight">
      <style tts:origin="0% 0%" tts:extent="100% 100%" tts:displayAlign="after" tts:textAlign="end"/>
    </region>
  </layout>
</head>
<body>
  <div>
    <p begin="0s" end="1s" region="topLeft">Top Left</p>
    <p begin="0s" end="1s" region="middleCenter">Middle Center</p>
    <p begin="0s" end="1s" region="bottomRight">Bottom Right</p>
  </div>
</body>
</tt>
```

Authoring Intent (4x3 aspect ratio)



Sample Player Render

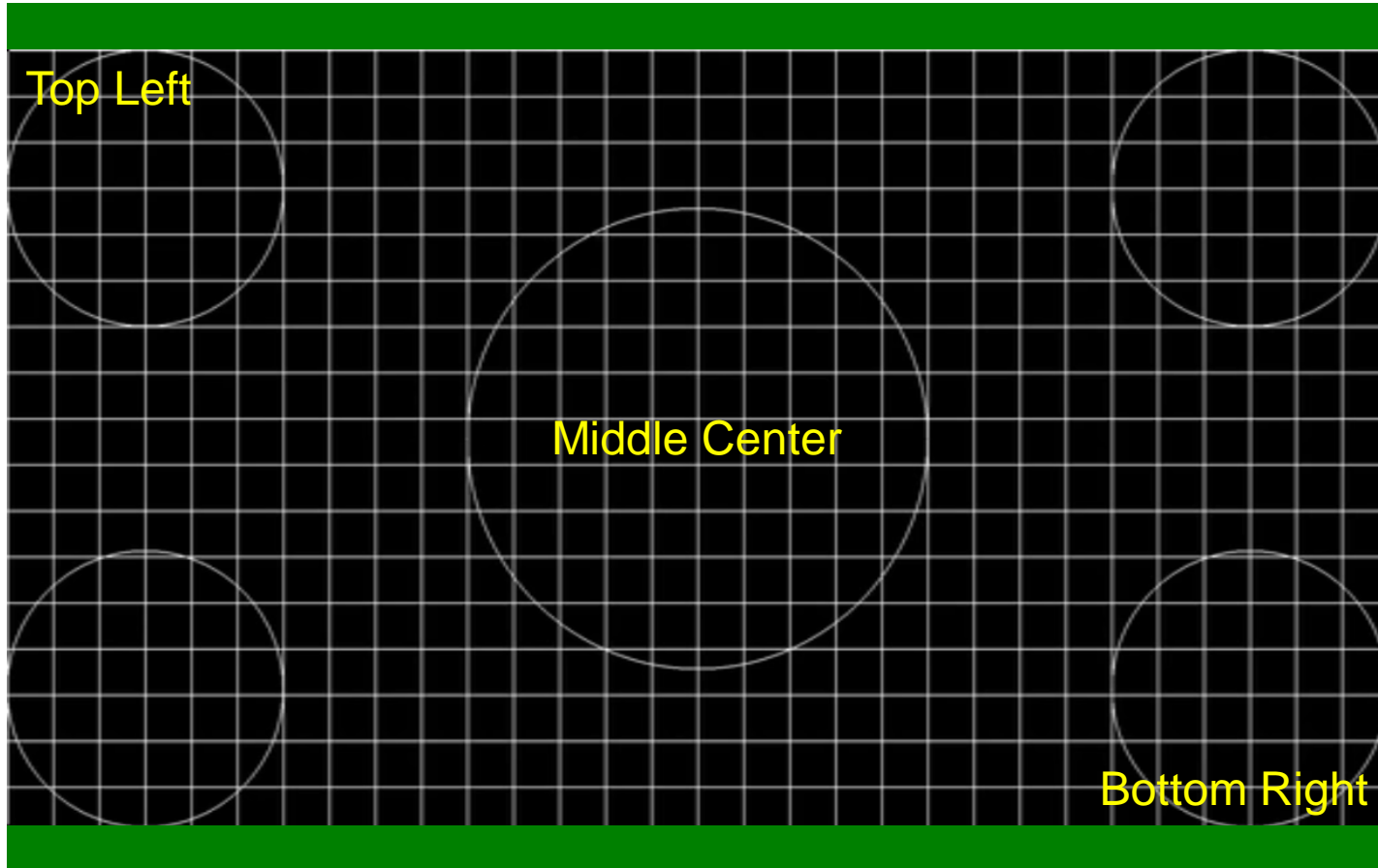


- 16x9 720p version of the same video (1280x720)
- Rendered with green letterboxing on a 16x10 display (1280x800)

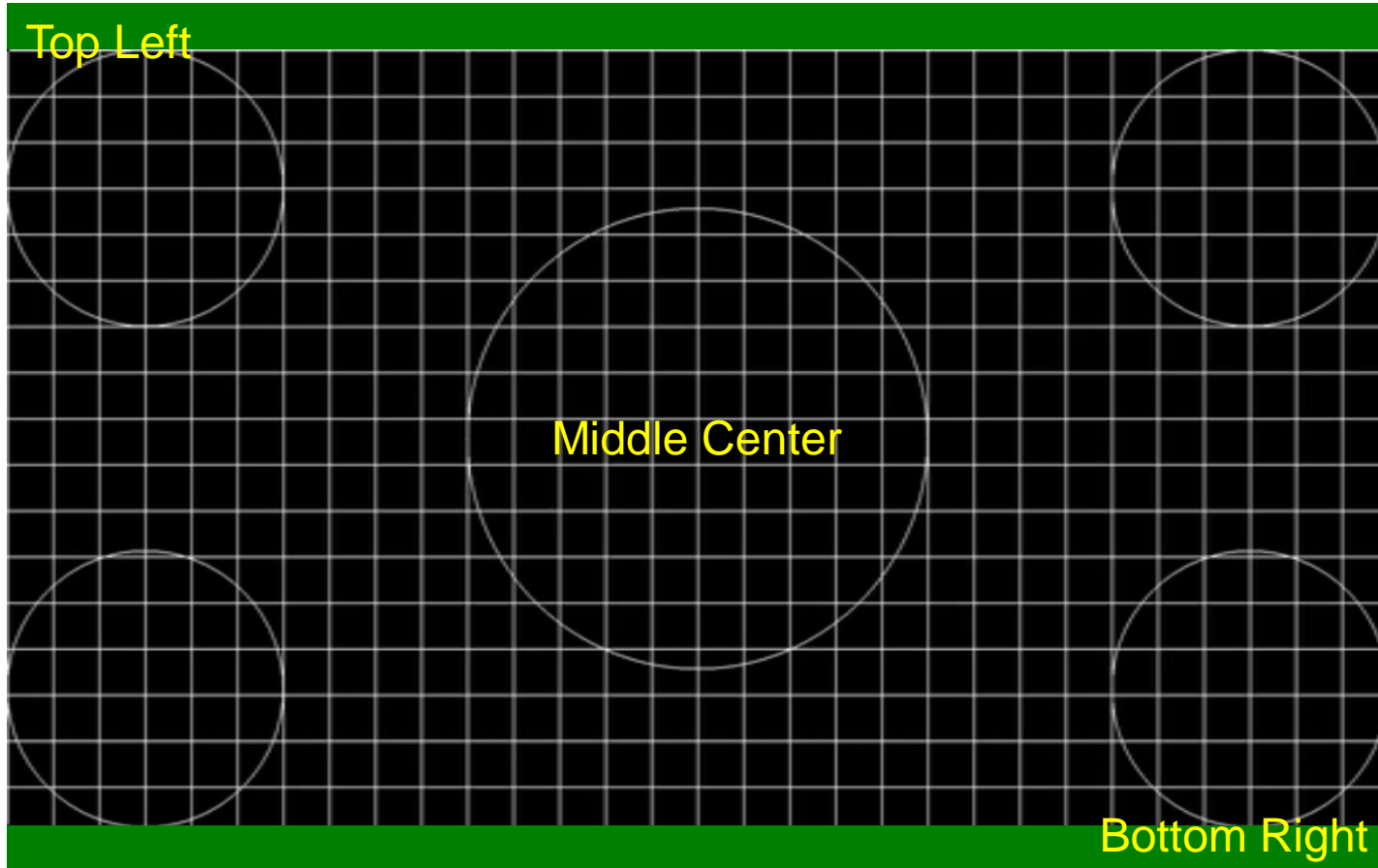
Possible Rendering Interpretations

1. Scale authored pixels to video resolution
2. Scale authored pixels to display resolution
3. Preserve authored pixels and render inside the video resolution
4. Preserve authored aspect ratio (4x3) and scale to the video resolution

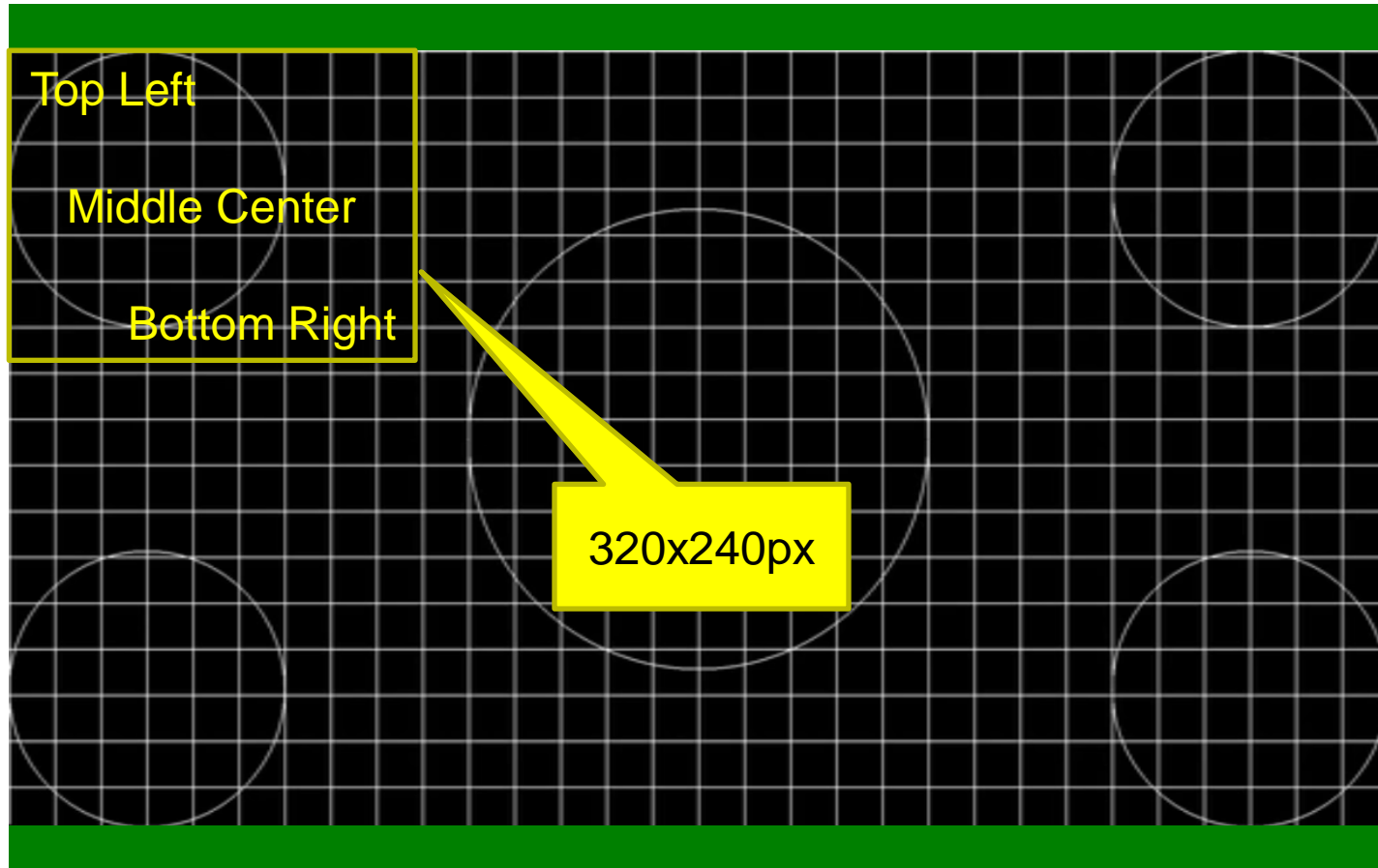
1. Scale authored pixels to video resolution



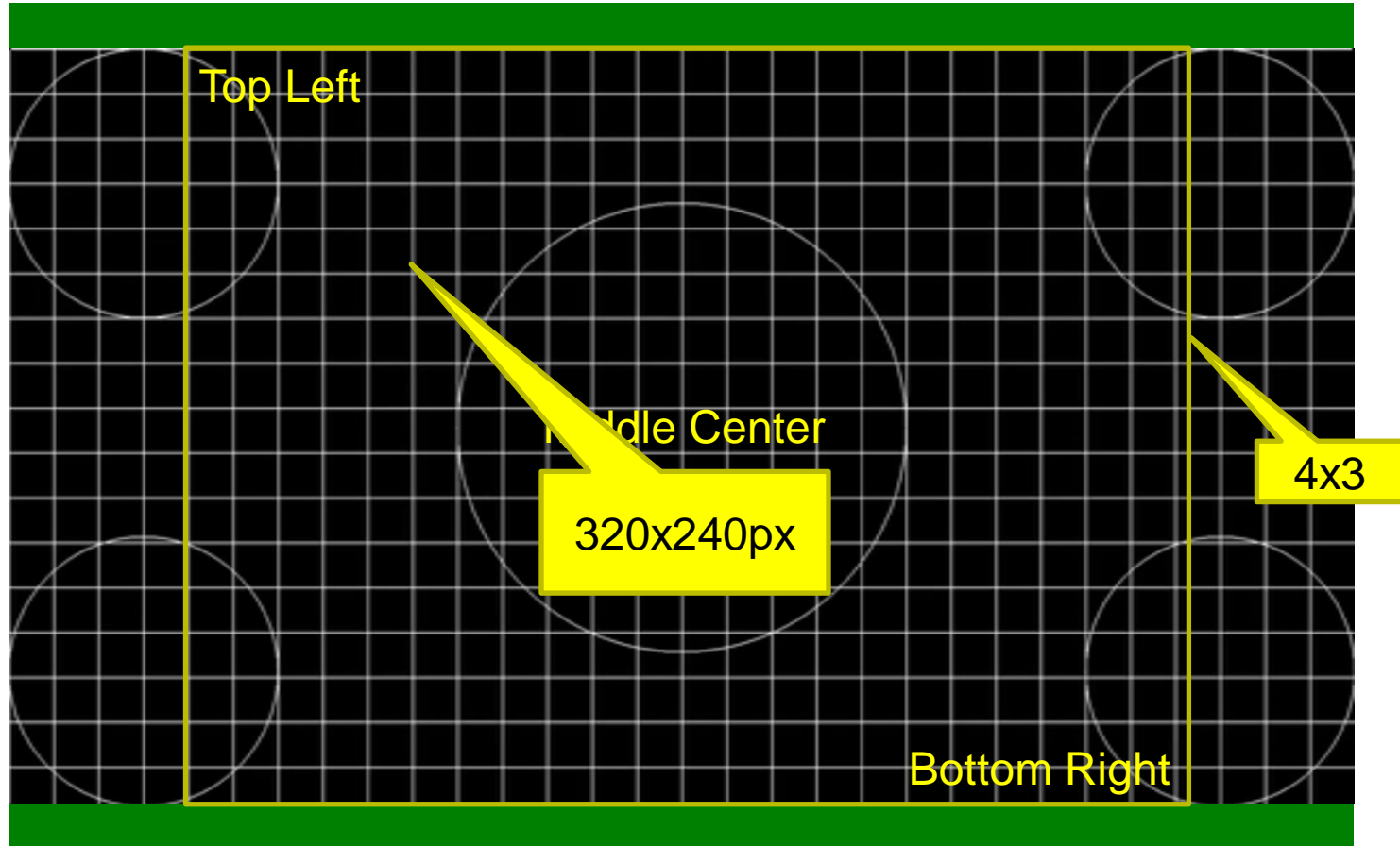
2. Scale authored pixels to display resolution



3. Preserve authored pixels and render them inside the video resolution



4. Preserve authored aspect ratio (4x3) and scale to the video resolution



Resolving the Specification Ambiguity

- Proposal #1: Use extent and pixelAspectRatio on TT element to describe this behavior
 - Specify that the aspect ratio of the root container region is defined by the extent and the pixelAspectRatio placed on the TT element.
 - The root container region should be centered in the caption display area.
- Proposal #2: Define a new tts:aspectRatio attribute
 - The aspect ratio of the root container region is specified if this attribute is placed on the TT element.