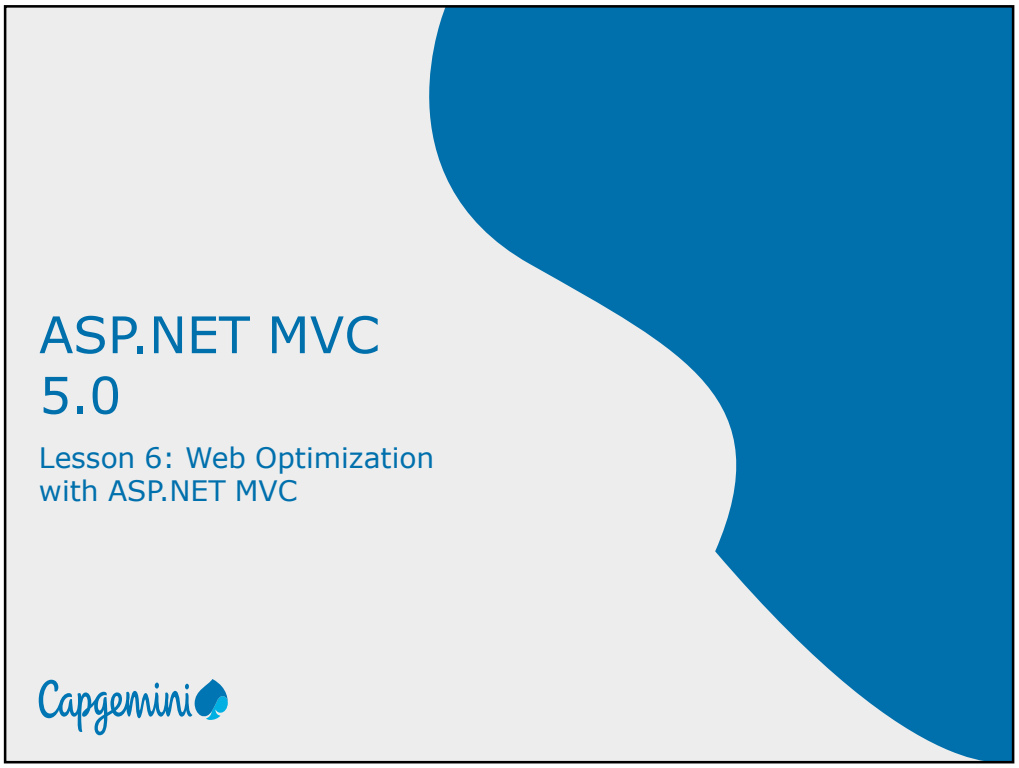

ASP.NET MVC
5.0
Lesson 6: Web Optimization
with ASP.NET MVC
Capgemini

Lesson Objectives

- Bundling & Minification
- Configuring Bundles

5.1 Web Optimization

Web Optimization

- We can optimize the load time of pages by bundling and mini fication scripts and style sheets.
- Bundling and mini fication improves load time by reducing the number of requests to the server and reducing the size of requested assets (such as CSS and JavaScript.)

Most of the current major browsers limit the number of simultaneous connections per each hostname to six. That means that while six requests are being processed, additional requests for assets on a host will be queued by the browser.

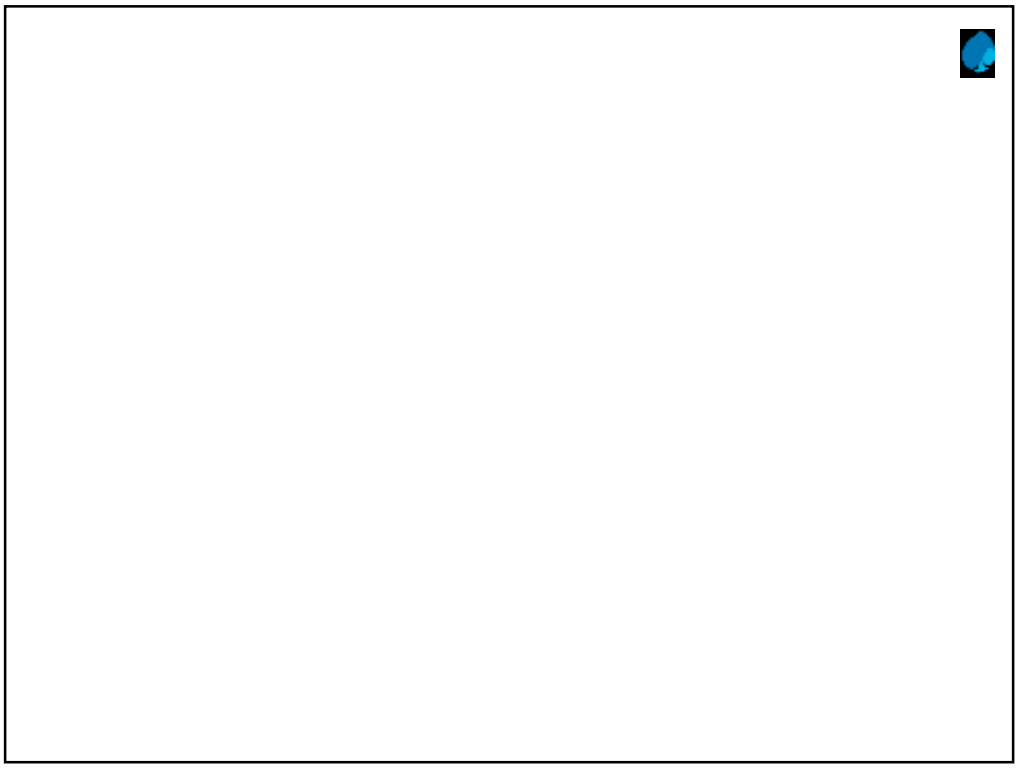
The maximum number of connections per server returned by the **maxConnectionsPerServer** property is determined by the HTTP version (1.0 or 1.1) used by the server. This number applies to any Web server connection, not just to downloads.

The **maxConnectionsPerServer** attribute will return 6 on a broadband connection unless a user or an administrator has overridden the default settings. If the client computer is connected through dial-up,**maxConnectionsPerServer** will return 2 if connected to an HTTP 1.1 server or 4 if connected to an HTTP 1.0 server.

5.2 Bundling & Minification

Bundling & Minification

- Bundling is the process of concatenating multiple files into a single download while minification is the process of making the download as small as possible.
- We can create CSS, JavaScript and other bundles.
- Fewer files makes fewer HTTP requests and that can improve first page load performance.
- Minification performs a variety of different code optimizations to scripts or css, such as removing unnecessary white space and comments and shortening variable names to one character.



Creating Style Bundle

```
bundles.Add(new StyleBundle("~/Content/css").Include("~/Content/site.min.css",
"~/Content/mystyle.min.css"));
```

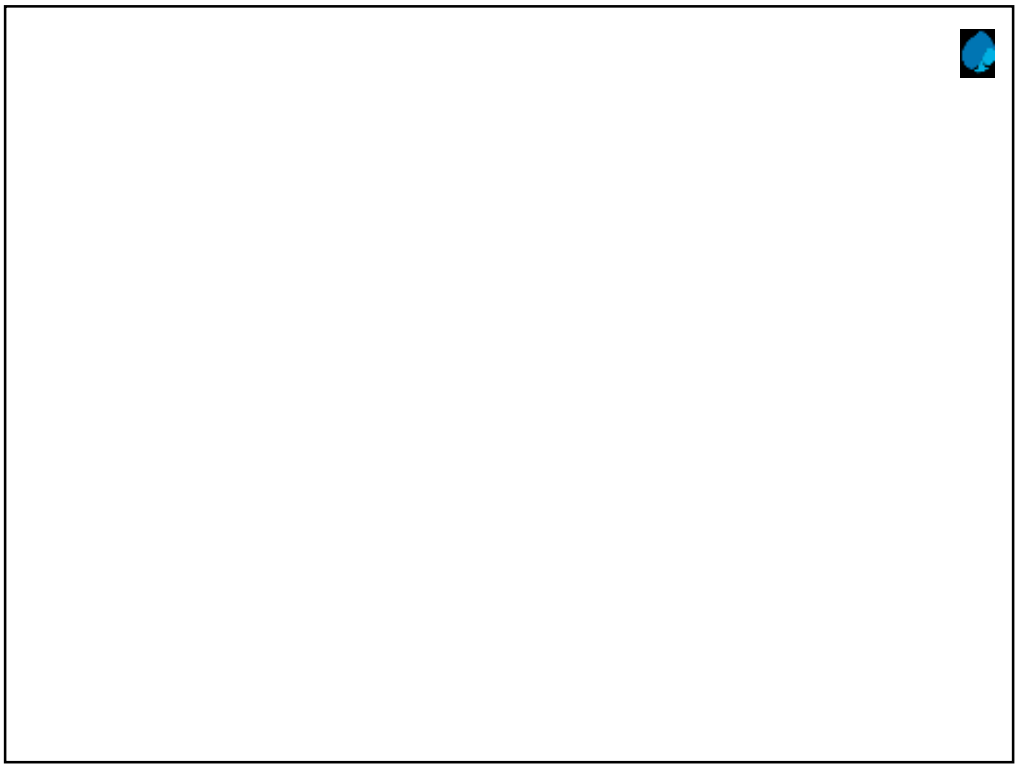
Creating Script Bundle

```
bundles.Add(new ScriptBundle("~/bundles/jqueryval").Include(
 "~/Scripts/jquery-1.7.1.min.js",
 "~/Scripts/jquery.validate.min.js",
 "~/Scripts/jquery.validate.unobtrusive.min.js"));
```

Above both the bundles are defined with in BundleConfig class as shown below:

```
public class BundleConfig
{
 public static void RegisterBundles(BundleCollection bundles)
 {
 bundles.Add(new StyleBundle("~/Content/css").Include("~/Content/site.min.css",
 "~/Content/mystyle.min.css"));

bundles.Add(new ScriptBundle("~/bundles/jqueryval").Include(
 "~/Scripts/jquery-1.7.1.min.js",
 "~/Scripts/jquery.validate.min.js",
 "~/Scripts/jquery.validate.unobtrusive.min.js"));
 }
}
```



Creating Bundle using the "*" Wildcard Character

"*" wildcard character is used to combines the files that are in the same directory and have same prefix or suffix with its name. Suppose you want to add all the scripts files that exist with in "~/Script" directory and have "jquery" as prefix then you can create bundle like below:

```
bundles.Add(new
ScriptBundle("~/bundles/jqueryval").Include("~/Scripts/jquery*.js"));
```

You can also add all the css that exist with in "~/Content" directory and have ".css" extension(as suffix) like below:

```
bundles.Add(new StyleBundle("~/Content/css").Include("~/Content/*.css"));
```

5.3 Configuring Bundles

Configuring Bundles

- IN ASP.NET MVC 5 we can perform Bundling and Minification
- We need to add files under Register Bundles method in the App_Start\BundleConfig.cs file
- The Bundle class Include method which takes an array of strings, where each string is a virtual path to resource.
- Bundling and minification is enabled or disabled by setting the value of the debug attribute in the compilation Element in the Web. config file. By default it is set to true. To enable bundling and minification, set the debug value to "false"
- We can override the Web. config setting with the Enable Optimizations property on the BundleTable class

```
<system.web>
   <compilation debug="true" />
</system.web>
```

BundleConfig.cs

```
public static void RegisterBundles(BundleCollection bundles)
 {
 bundles.Add(new ScriptBundle("~/bundles/jquery").Include( "~/Scripts/jquery-
{version}.js"));
BundleTable.EnableOptimizations = true;
}
```

DEMO

- Web Optimization Demo

Image Optimization

- Images are static content and they do take some bandwidth when requested via a web server.
- One way to solve this is to reduce the size of the images, in other words optimize the images.
- Image "Optimization" does not mean that it reduces the quality of the image. But it will re-arrange the pixels and palettes to make the overall size smaller.
- There are many third-party tools that can optimize images.

Tools for Image Optimization

1. CSS Sprites :
- CSS Sprites are a means of combining multiple images into a single image file for use on a website, to help with performance.
- This reduces the overhead of having to fetch multiple images.
- While the total image size (sometimes) goes up with sprites, several images are loaded with a single HTTP request.

2. Image Optimizer Visual Studio extension
3. Google's Page Speed
   - This is another great Chrome browser extension.
   - Once installed, it is also available as a part of the chrome developer tool bar

- There is no guarantee that you could make all the optimizations that these tools suggest.
- At the end, it is all based on the website, and requirements you need to support.

DEMO

- Image Optimization Demo
  - with CSS Sprites
  - Image Optimizer tool of Visual Studio
  - Google's Page Speed

Summary

- Bundle is a logical group of files that is loaded with a single HTTP request.
- Minification is technique for removing unnecessary characters (like white space, newline, tab) and comments from the JavaScript and CSS files to reduce the size which cause improved load times of a webpage
- Building blocks of bundling are available under namespace System. Web .Optimization
- Bundling and Minifications reduce the number of bytes needed to download