

Improving the Application's Performance



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Overview



Caching as performance booster

In-memory caching

Caching tag helper

Using a distributed cache

Response caching

Managing Compression





A question from Bethany

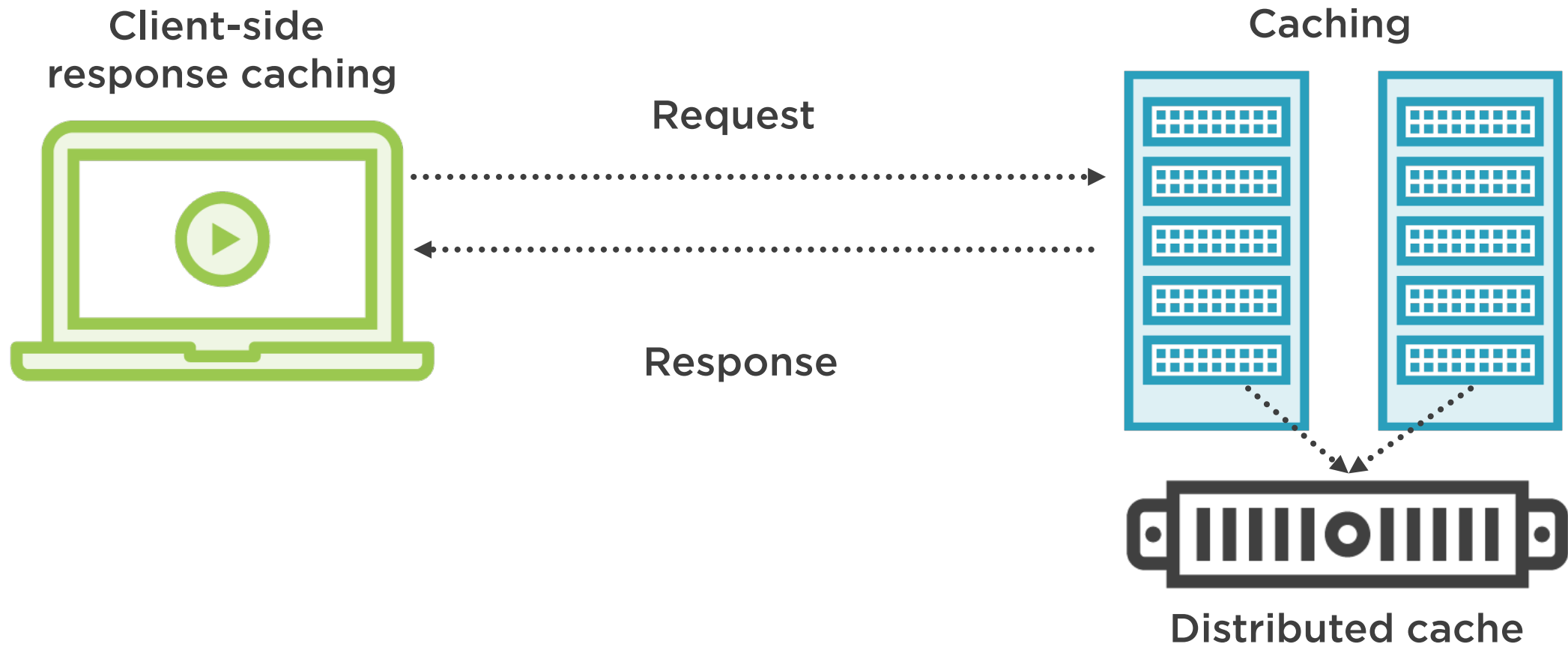
- Sometimes my site seems to be rather slow. Is there anything that can be done?



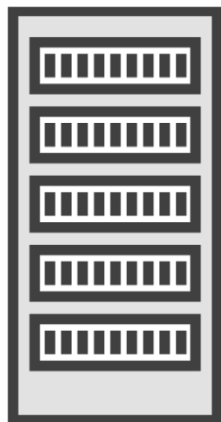
Caching as Performance Booster



Caching Options



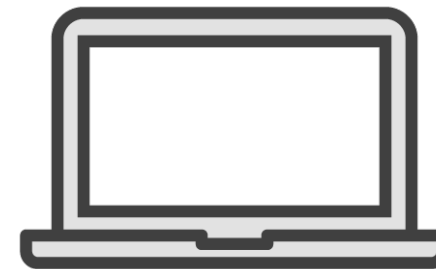
Caching Options



Server-side



Cache server



Client-side





Caching can speed up your site quite a lot
Typically used for stale data



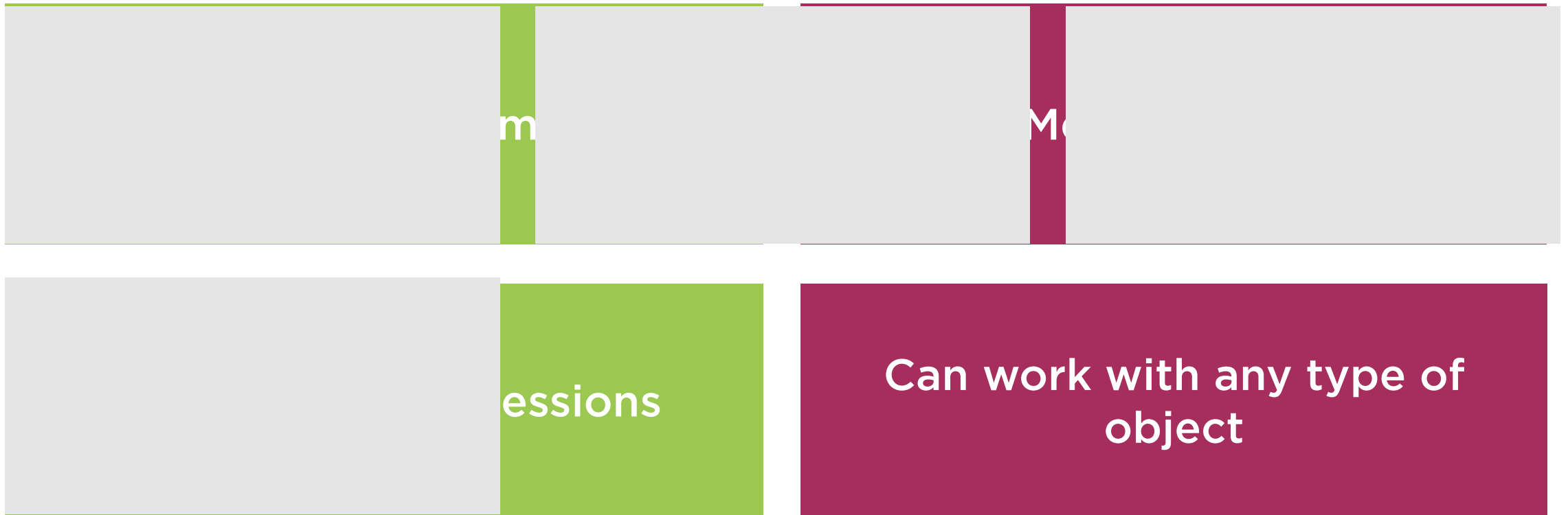


Using caching requires careful planning
Odd side-effects may otherwise occur

In-memory Caching



In-memory Caching



```
"Microsoft.Extensions.Caching.Memory": "1.1.1"
```

Adding the Correct Packages



```
services.AddMemoryCache();
```

Enabling Caching in Startup



Plugged-in Using Dependency Injection

```
public class HomeController : Controller
{
    private IMemoryCache _memoryCache;

    public HomeController(IMemoryCache memoryCache)
    {
        _memoryCache = memoryCache;
    }
}
```

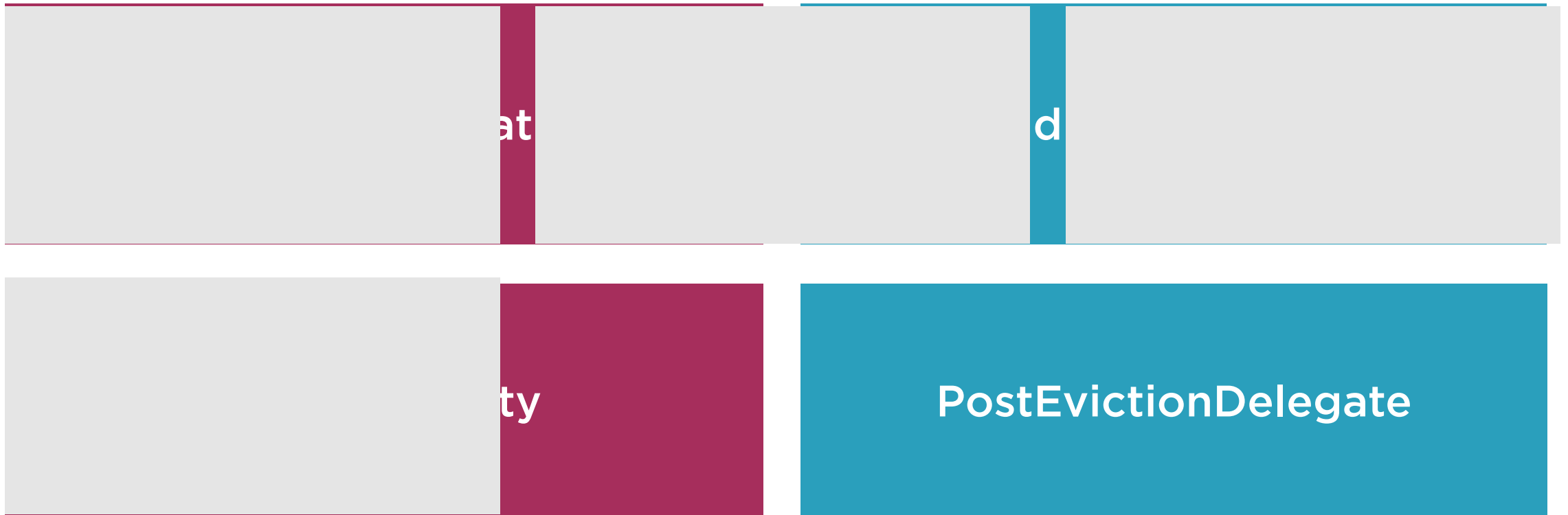


Using IMemoryCache

```
if (!_memoryCache.TryGetValue  
    (CacheEntryConstants.PiesOfTheWeek, out  
    piesOfTheWeekCached))  
{  
    _memoryCache.Set(  
        CacheEntryConstants.PiesOfTheWeek,  
        piesOfTheWeekCached,  
        cacheEntryOptions);  
}
```



MemoryCacheEntryOptions



Demo



Adding support for IMemoryCache
Using IMemoryCache



Caching Tag Helper





Server-side

Uses IMemoryCache behind the scenes

Requires sticky sessions



```
<cache expires-after="@TimeSpan.FromSeconds(30)">  
    @await Component.InvokeAsync("CategoryMenu")  
</cache>
```

The Cache Tag Helper



Expiration Options

expires-after

expires-on

expires-sliding



```
<cache vary-by-user="true">  
    @await Component.InvokeAsync("CategoryMenu")  
</cache>
```

Vary-by Options



Vary-by Options

vary-by-user

vary-by-route

vary-by-query

vary-by-cookie

vary-by-header

vary-by



Demo



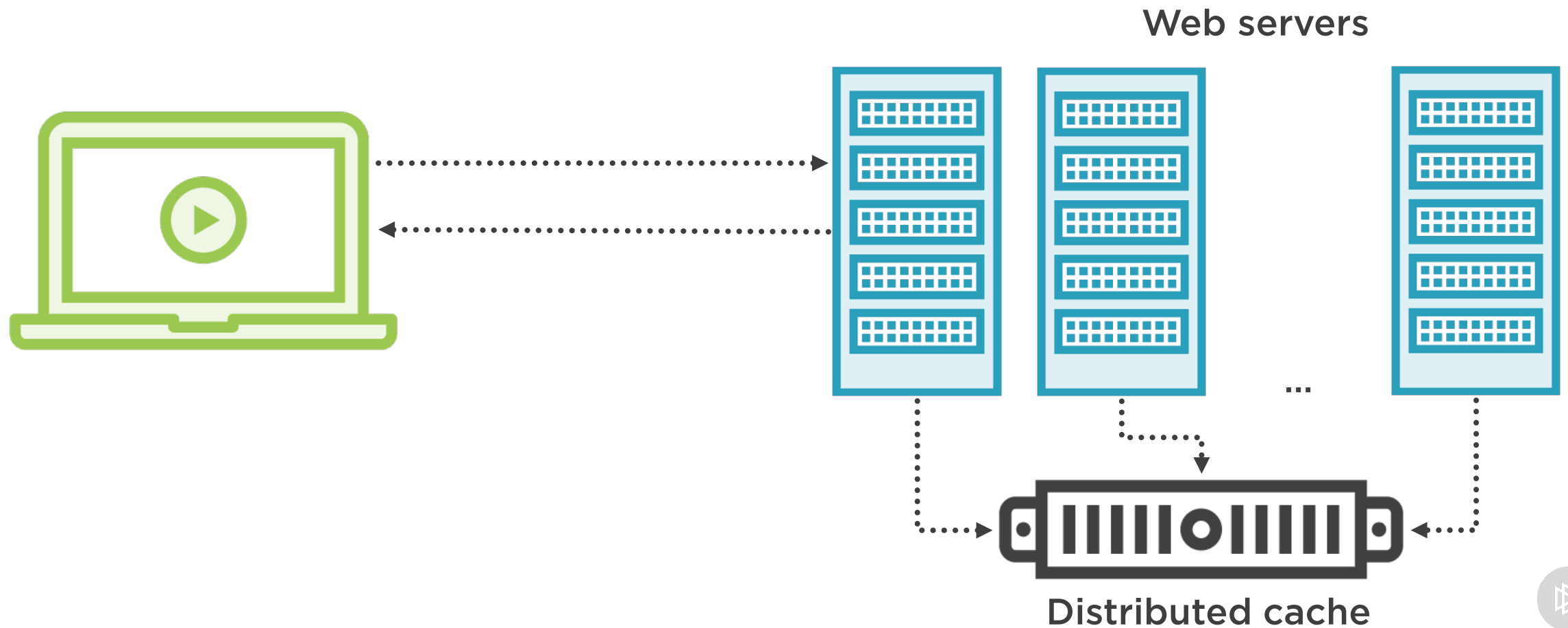
Using the cache tag helper



Distributed Caching



Distributed Caching





No sticky sessions are required

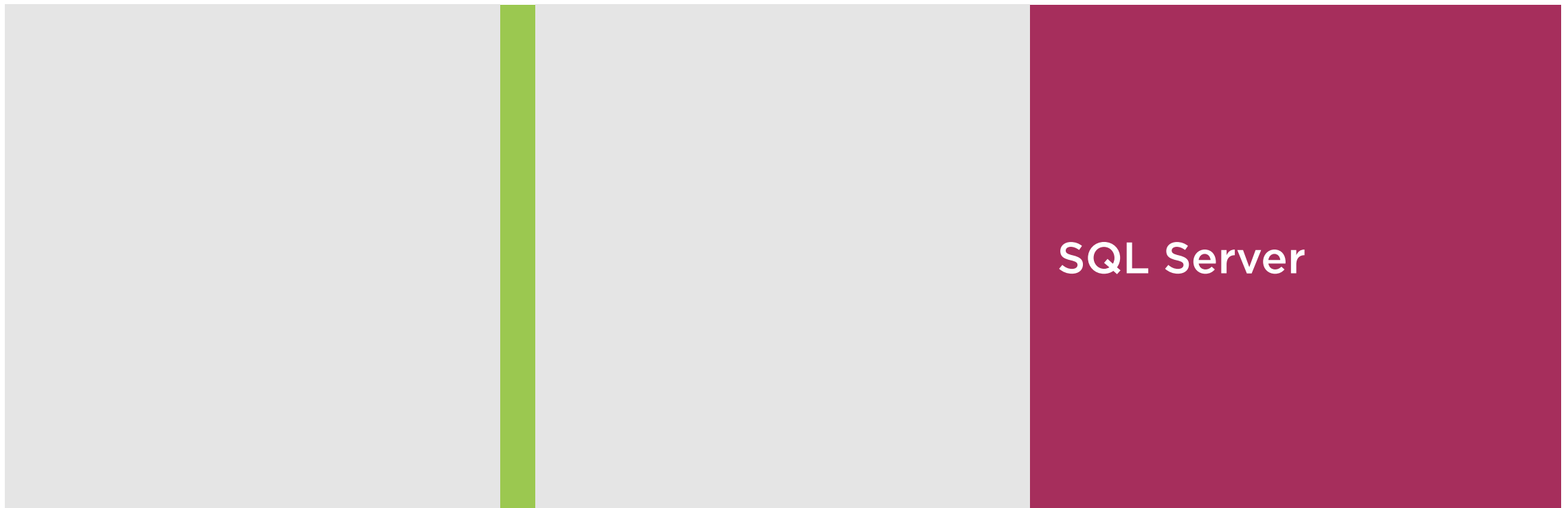
- Identical on all servers

Scalable

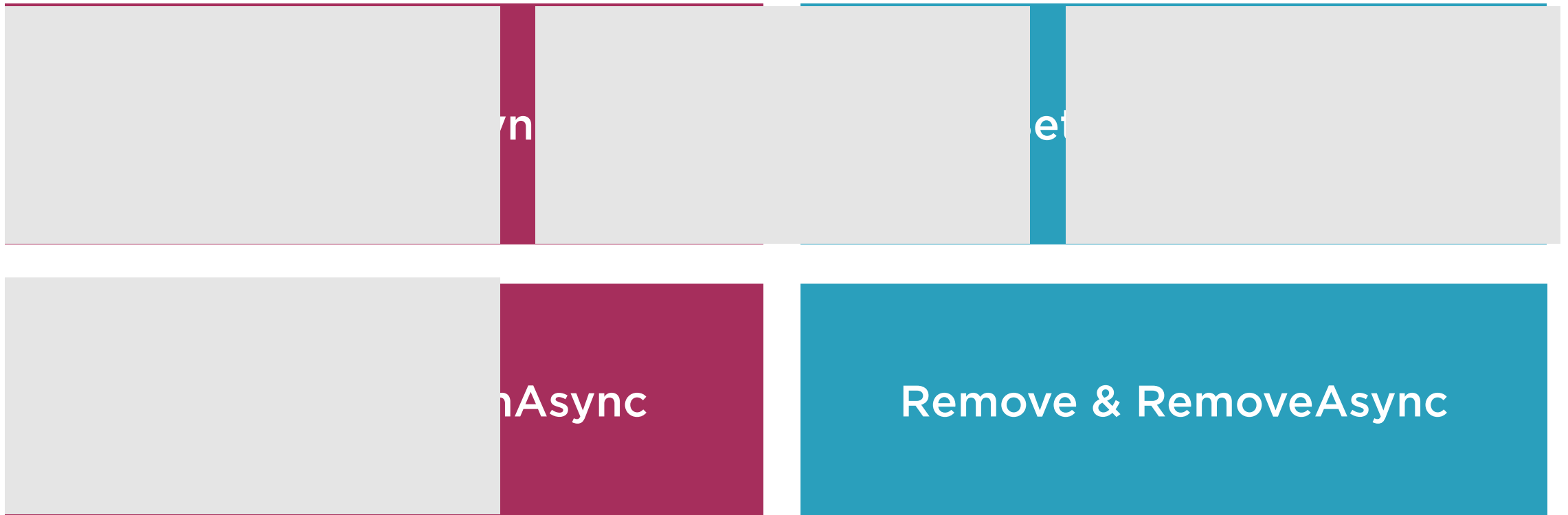
Not impacted by server reboots

Better performance for data store

ASP.NET Core Built-in Support



IDistributedCache



Demo



Setting up Redis

Using the distributed cache



Response Caching





Based on headers

Client-side caching

Limits the load on the server

Managed using the `ResponseCache` attribute

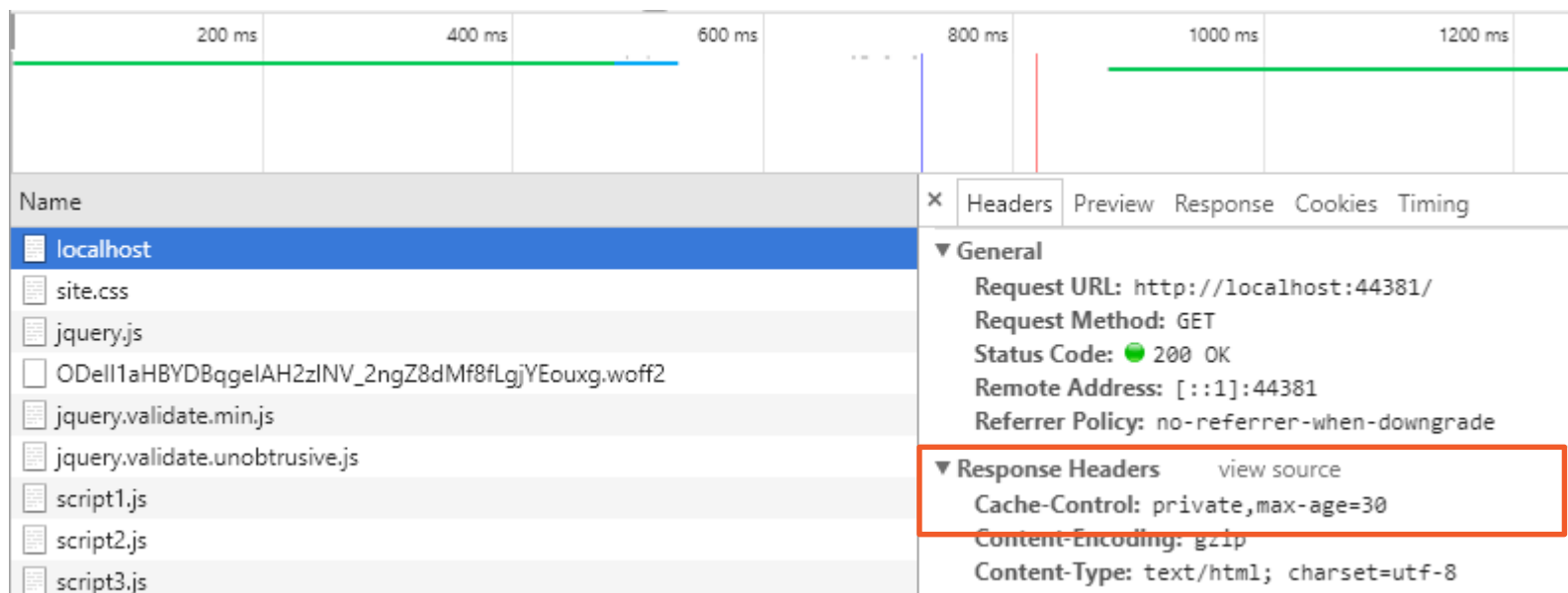


```
[ResponseCache(Duration = 30, VaryByHeader = "User-Agent")]  
public ActionResult Index()  
{ ... }
```

ResponseCache attribute



The Result



Available Options



Cache Profiles

```
services.AddMvc
(
    config =>
    {
        config.CacheProfiles.Add("Default",
            new CacheProfile
            {
                Duration = 30,
                Location = ResponseCacheLocation.Any
            });
        config.CacheProfiles.Add("None",
            new CacheProfile
            {
                Location = ResponseCacheLocation.None,
                NoStore = true
            });
    }
)
```



Demo



Adding response caching



Managing Compression





Compression can reduce amount of data being transferred

Results in more responsive applications

Works on HTML, CSS, JavaScript etc

Headers:

- Accept-Encoding from client
- Content-Encoding from server

`Microsoft.AspNetCore.ResponseCompression`

Works Through Middleware



```
public void ConfigureServices(IServiceCollection services)
{
    services.AddResponseCompression();
}
```

Adding Support for Compression




```
public void Configure(IApplicationBuilder app)
{
    services.Configure<GzipCompressionProviderOptions>
        (options => options.Level =
            System.IO.Compression.CompressionLevel.Optimal);
}
```

Configuring Compression



Without Compression

```
HTTP/1.1 200 OK
Cache-Control: public,max-age=30
Content-Type: text/html; charset=utf-8
Vary: Accept-Encoding
Server: Kestrel
X-SourceFiles: =?UTF-8?B?QzpcRHJvcGJveFxB3JrXFBsdXJhbFNPZ2h0XGFzcGRvdG5ldC1jb3JlLW12Yy1lbnR1c=
X-Powered-By: ASP.NET
Date: Sat, 29 Jul 2017 21:13:35 GMT
Content-Length: 23063

<!DOCTYPE html>

<html>
<head>
  <meta name="viewport" content="width=device-width" />
  <link rel="stylesheet" type="text/css" href="https://fonts.googleapis.com/css?family=Source+Code+Pro" />
  <title></title>

  <link rel="stylesheet" href="//ajax.aspnetcdn.com/ajax/bootstrap/3.3.7/css/bootstrap.min.css" />
  <meta name="x-styleSheet-fallBack-test" content="" class="hidden" /><script>!function(a,b,c,d)
  {
    <link href="/Content/site.css" rel="stylesheet" />
    <script src="/lib/jquery/dist/jquery.js"></script>
    <script src="/lib/jquery/dist/jquery.js"></script>
  }
  </script>
</head>
<body>
  <div class="container">
    <div class="row">
      <div class="col-md-12">
        <div class="text">
          <h1>Hello, World!</h1>
        </div>
      </div>
    </div>
  </div>
</body>
</html>
```

With Compression

Request Headers [Raw] [Header Definitions]

GET / HTTP/1.1

Cache
Cache-Control: max-age=0

Client
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.8
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Safari/537.36

Cookies
☐ Cookie
.AspNetCore.Culture=c%3Den-US%7Cuic%3Den-US
.AspNetCore.Session=CfDJ8O5qWbkFcRhIoKAnIUDVadMwFVULU6%2FhLogFhdR6%2BrhmygNOsGbNB5nSMml9kw29NSIWxNdlc
ai_session=+u6+O|1501362360669|1501362418855.735

Security
Upgrade-Insecure-Requests: 1

Transport

Response body is encoded. Click to decode.

Transformer Headers TextView SyntaxView ImageView HexView WebView Auth Caching Cookies

Raw JSON XML

HTTP/1.1 200 OK
Cache-Control: public,max-age=30
Transfer-Encoding: chunked
Content-type: text/html; charset=utf-8
Content-Encoding: gzip
Server: Kestrel
X-SourceFiles: =?UTF-8?B?QZpcRHJvcGJveFxxb3JrXFBSdXJhbFNPZ2h0XGFZcGRvdG5ldC1jb3JlLW12Yy1lbnRlc
X-Powered-By: ASP.NET
Date: Sat, 29 Jul 2017 21:08:02 GMT

a
00000000
ee0
0\ks000000005200000ew0x00z00n0d0#k:K`I0
'000%000,x00d;0i080000>00:00/000{000W0|00-100|0r_000x!x0+0080000gbo,00,0000UnEn'00L0b0000000011
!00
0ef00010010,0-0q0
+0h00<000&0UF000L000a*u,v0xnv_j0800nV0T00G00to000:0070*00000mF]00R0X0at000\$00Lb(0N0v-t51700x0N
000e000V00X01,0y100wx8
0000_r0D80\$*.3000Y400Y*0000i00000;00000_0
00h2?0G000v1:0

Find... (press Ctrl+Enter to highlight all) View in Notepad



Demo



Working with compression



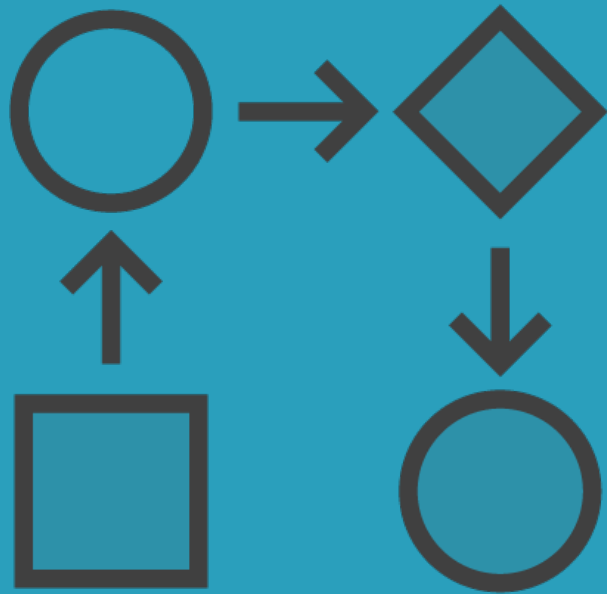
Summary



Several approaches to server-side caching

Response caching for the client

Compression to bring down the number of bytes



Up next:
Automating builds

