

# Streaming

# Streaming Overview

- Our goal:
  - Build a video sharing site
- Same idea as the image sharing site from HW4
- Except:
  - Videos can be very large
  - When a user watches a video, we don't want to send the entire file in a single request
- **Stream the video in small segments**

# Hosting Video

- Viewing an .mp4 file in a browser
  - Simple since HTML5
- Use the video element
  - Specify the video file as the source
- Each browser implements a video player that will be used

```
<video width="400" controls>  
  <source src="space.mp4" type="video/mp4">  
</video>
```

# Hosting Video

- This will download the entire video
- What if the video is 1 hour long?
- What if the user only watches for 10 seconds?
- Think browsing Netflix and watching the intro to 5 different movies/shows
- Don't want to send all 5 entire videos

```
<video width="400" controls>  
  <source src="space.mp4" type="video/mp4">  
</video>
```

# HLS

- HTTP Live Streaming
- Uses only HTTP[S]
- Video is stored in multiple files
- Request an index file
  - .m3u8
    - Contains a list of all the files for the video
- Host many .ts files containing the video

# HLS

- The built-in browser player will not play HLS video!

# JavaScript Libraries

Let's use JavaScript libraries to do cool things without writing code from scratch

# JavaScript Libraries

```
<script src="https://momentjs.com/downloads/moment.js"></script>
```

Download external libraries using the script tag the same way we downloaded our own code

Makes an HTTP request to download the library

We can add the script element in the head since we don't need any HTML elements rendered before downloading the library



# JavaScript Libraries

```
<script src="https://momentjs.com/downloads/moment.js"></script>
```

When the page loads there will be a second request and the library is downloaded

The library is simply a JavaScript file that others have written and shared with us for free. We call this open-source since everyone has access to the source code

source: <https://github.com/moment/moment/>

# JavaScript Libraries

```
...  
  
<script src="https://momentjs.com/downloads/moment.js">  
  
</script>  
  
...
```

We literally download their code and run it in our browser

```
1  //! moment.js  
2  
3  ;(function (global, factory) {  
4      typeof exports === 'object' && typeof module !== 'undefined' ? module.exports = factory() :  
5      typeof define === 'function' && define.amd ? define(factory) :  
6      global.moment = factory()  
7  })(this, (function () { 'use strict';  
8  
9      var hookCallback;  
10  
11     function hooks () {  
12         return hookCallback.apply(null, arguments);  
13     }  
14  
15     // This is done to register the method called with moment()  
16     // without creating circular dependencies.  
17     function setHookCallback (callback) {  
18         hookCallback = callback;  
19     }  
20  
21     function isArray(input) {  
22         return input instanceof Array || Object.prototype.toString.call(input) === '[object Array]';  
23     }  
24  
25     function isObject(input) {  
26         // IE8 will treat undefined and null as object if it wasn't for  
27         // input != null
```

# JavaScript Libraries

**Great!.. so what did we just download?**

# JavaScript Libraries

```
<p id="datetime"></p>  
<script src="script.js"></script>
```

```
var elem = document.getElementById("datetime");  
elem.innerHTML = moment().format("YYYY-MM-DD<br/><b>h:mm:ss a</b>")
```

The library defines a function named `moment()` which returns the current time as an object that contains several methods

Here we get the current time and call the `format` function to choose how it's displayed using date/time placeholders (ex. `MM` for a 2 digit month)

# JavaScript Libraries

```
<p id="datetime"></p>  
<script src="script.js"></script>
```

```
var elem = document.getElementById("datetime");  
elem.innerHTML = moment().format("YYYY-MM-DD<br/><b>h:mm:ss a</b>")
```

Displays the time in the `<p>` element with id "datetime" in the format

2018-10-18

**10:23:57 pm**

# JavaScript Libraries

This is ok, but it'd be more useful to show the current time instead of the time our code ran

To do this, we'll first wrap our previous code in a function

Then we'll call the built-in "setInterval" function with our function as an argument which will call our function at fixed intervals

The second argument is a Number representing a time in milliseconds

This will call displayTime once per second to give us a live clock

```
function displayTime(){  
  var elem = document.getElementById("datetime");  
  elem.innerHTML = moment().format("YYYY-MM-DD<br/><b>h:mm:ss a</b>");  
}  
  
setInterval(displayTime, 1000);
```

# JavaScript Libraries

**Reminder: You are learning concepts, not memorizing specific examples**

The concept is using JavaScript libraries to do cool things without writing code from scratch

The moment library was an example of this concept