Data-independent Sequencing with the Timing Object

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EU FP7 MediaScape

Browsers

+

Global Timing


No plugins

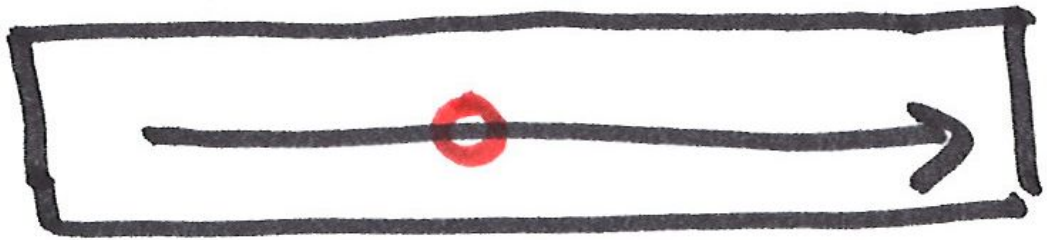
Demo: http://goo.gl/EqN40F

http://mcorp.no/pres/vegas16

Multi-device Timing Community Group

https://www.w3.org/community/webtiming/

Timing Object

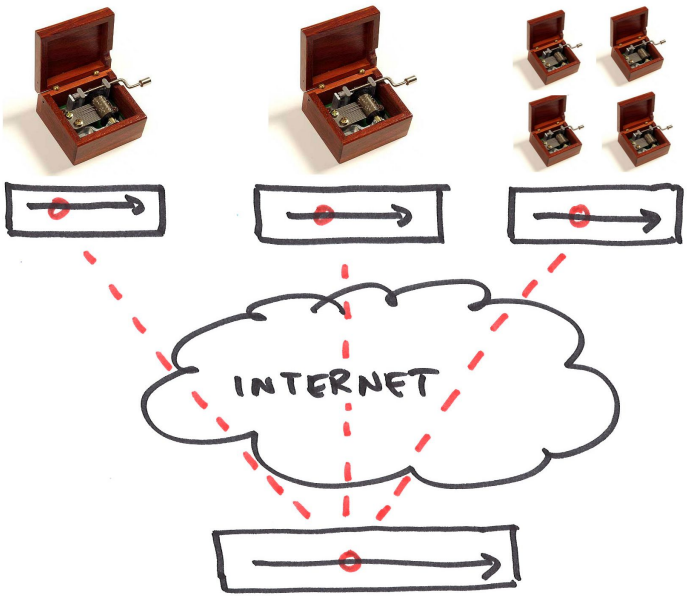


- Represents **motion** through media
  - ... playback, progress, navigation, timer, media clock.
  - Position, velocity, acceleration related to axis/timeline
- Timing & Control
  - timingObject.**update**({position: X, velocity: Y);
  - Play, pause, time-shift, fast-forward, reverse, accelerate ...

Purpose of Timing Object (1/2)

- Temporal interoperability
  - Common interface
- Shared, external timing & control
  - Independent, internal synchronization

Purpose of Timing Object (2/2)



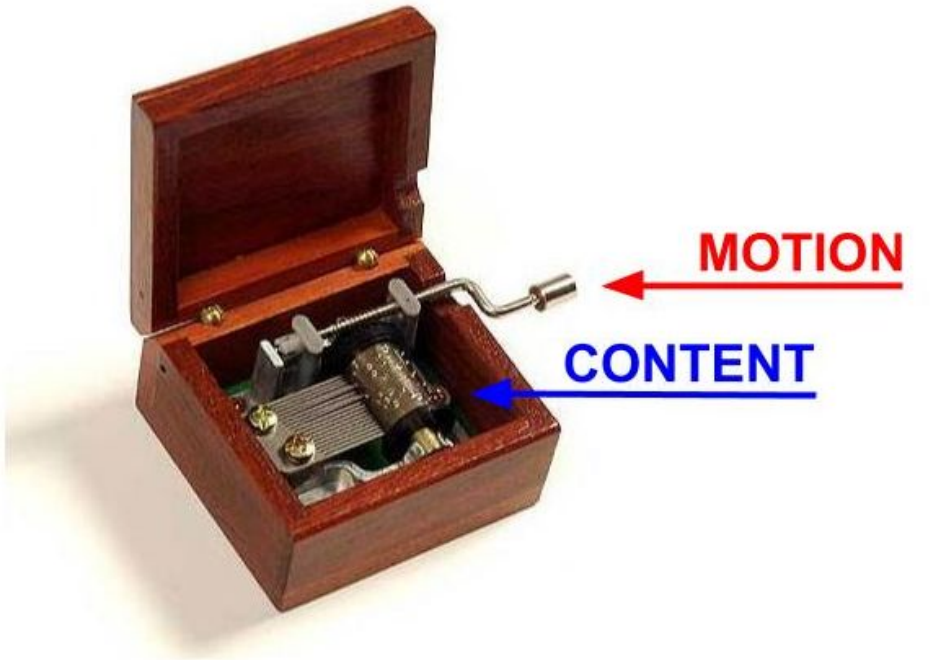
- Gateway to multi-device media!
  - Shared timing & control across Internet
  - Global timing & (remote) control
- Timing Objects
  - Proxies to online timing objects
- Separation of concern
  - Web programmers work with timing objects
  - Timing providers deal with timing
- Temporal interoperability - distributed
  - Reusability, integration, extensibility, flexibility, ...

Multi-device Timing Community Group

https://www.w3.org/community/webtiming/

- Web and TV Interest Groups
  - https://www.w3.org/2011/webtv/
- Timing Object : Standard Draft Proposal
  - http://webtiming.github.io/timingobject/
- Timingsrc : Implementation (GitHub)
  - http://webtiming.github.io/timingsrc/
  - Timing Object
  - MediaSync - synchronization of HTML5 Media Elements
  - Sequencer - synchronization of timed data
- Online Timing Provider
  - Motion Corporation http://www.motioncorporation.com

Sequencing



- Activating and deactivating media items at the correct time
- Target : Web
  - Framework or Text Track?

- **CONTENT**
  - **Data-independent sequencing**
  - **Generic programming tool**
  - **Any data any purpose**

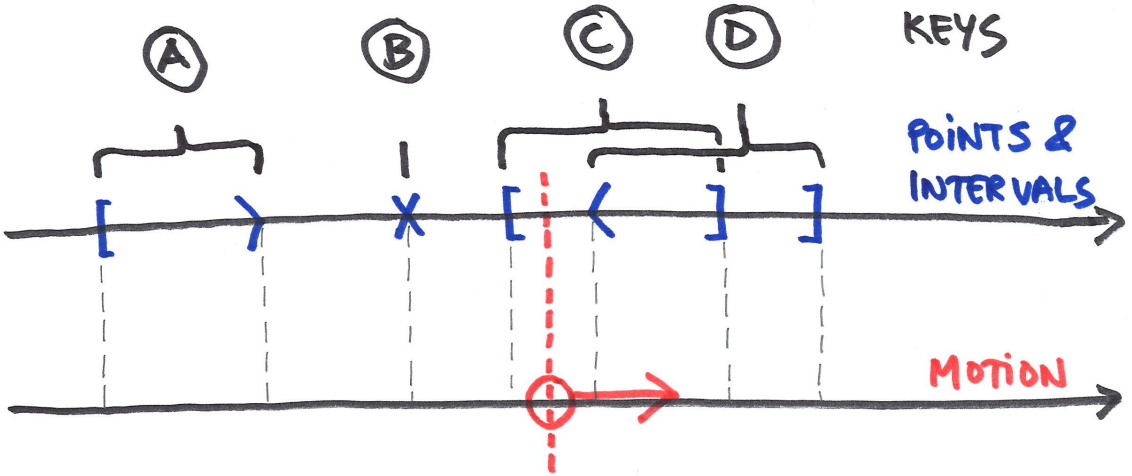
- **MOTION**
  - **Avoid dependence on HTML5 video/audio as motion**
  - **Sequencing driven by Timing Object**

Sequencer

- Generic tool for sequencing discrete media in single and multi-device timed Web applications.
  - Loading and unloading videos?
  - Collaborative viewing of anything Web?
  - Personalized ad-insertions?
  - Secondary device as a Web page?
  - Time-shifting live Web content?
  - Visualizing and replaying system logs or timed user interaction?
  - Timed prefetching of data?
  - Correct timestamping of captured media?

Details

- addCue(); removeCue(); -> (key, interval)
- Emit events -> enter, exit
- Timing Object
- Active keys
- Cue changes during playback



1. Create Sequencer

```
<!DOCTYPE html>
<html>
  <head>
    <script text="javascript" src="http://github.com/webtiming/timingsrc/lib/timingsrc.js"></script>
    <script text="javascript">
      var init = function () {
        // create timing object
        var to = new TIMINGSRC.TimingObject();
        // create sequencer
        var s = new TIMINGSRC.Sequencer(to);
      };
      if (document.readyState === "complete") init();
      else window.onload = init;
    </script>
  </head>
  <body>
  </body>
</html>
```

2. Register cues

```
// Timed data
var array = [
    { data: 'A', start: 0, end: 1 },
    { data: 'B', start: 2, end: 3 },
    { data: 'C', start: 4, end: 5 },
    { data: 'D', start: 6, end: 7 },
    { data: 'E', start: 8, end: 9 },
    { data: 'F', start: 10, end: 11 },
    { data: 'G', start: 12, end: 13 },
    { data: 'H', start: 14, end: 15 },
    { data: 'I', start: 16, end: 17 }
];

// Load timed data, use array indexes as keys into Sequencer
for (var i=0; i<array.length; i++) {
    var obj = array[i];
    s.addCue(i.toString(), new Interval(obj.start, obj.end));
}
```

3. Make a (simple) viewer

```
1  var v = document.getElementById("viewer");
2  s.on("enter", function (e) {
3    var i = parseInt(e.key);
4    v.innerHTML = array[i].data;
5  });
6  s.on("exit", function (e) {
7    v.innerHTML = "";
8  });
```

4. You’re done! Start playback

```
1  document.getElementById('playButton').onclick = function () {
2    timingObject.update({velocity:1.0});
3  };
4  document.getElementById('pauseButton').onclick = function () {
5    timingObject.update({velocity:0.0});
6  };
7  document.getElementById('resetButton').onclick = function () {
8    timingObject.update({position: 0.0});
9  };
```

Shared Motion Timing Provider

```
1  var app = MCorp.app("your_appid");
2  app.run = function () {
3    var timingProvider = app.motions["your_motion_name"];
4    var to = new TimingObject({provider:timingProvider});
5    // good to go!
6  };
7  app.init();
```

- Not limited to Web - anything IP
- And scalable too :)

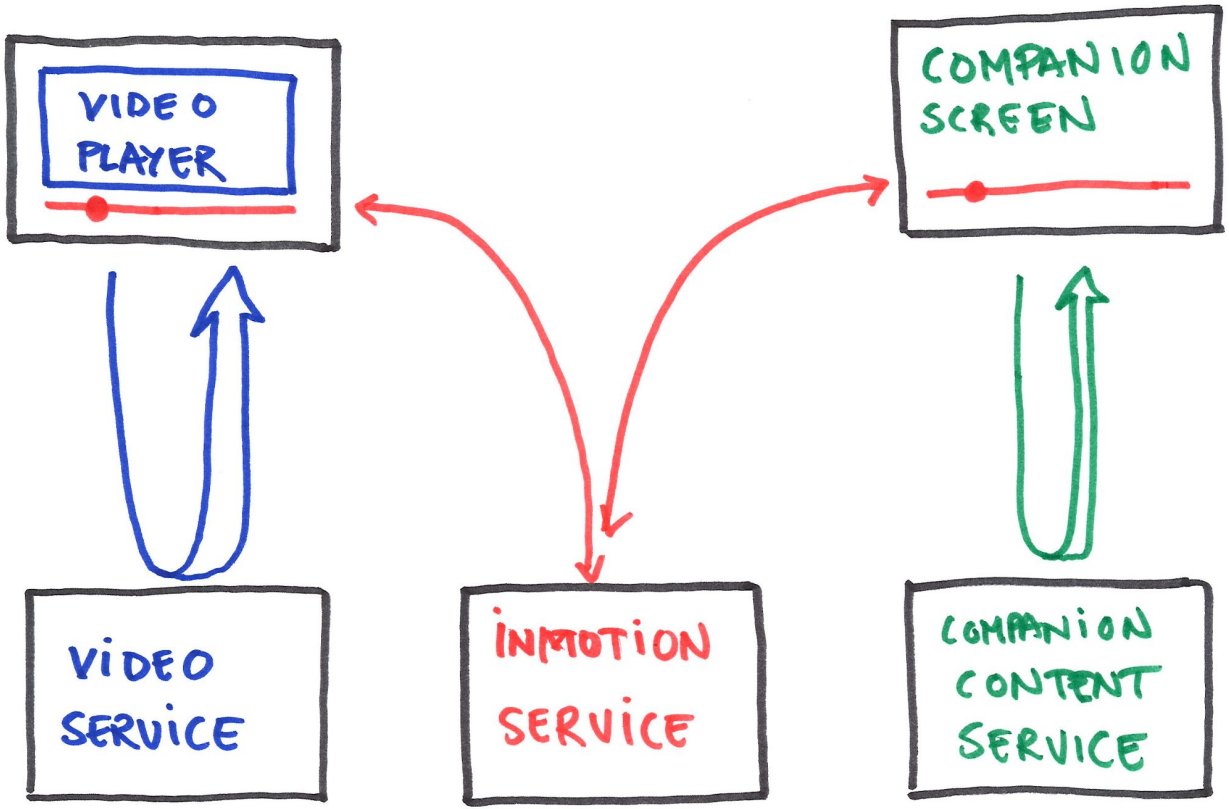
Summary

- Web already excellent platform for precisely timed multimedia!
- With standardization - even better!
- Consider joining the Multi-device Timing CG

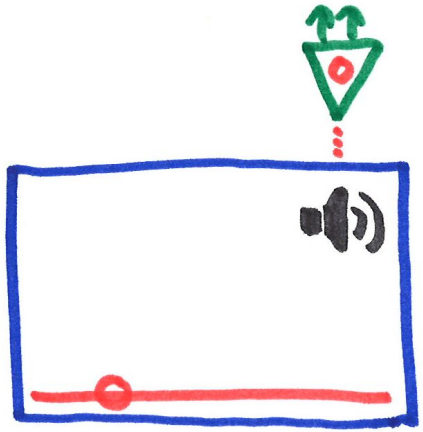
Thank you!

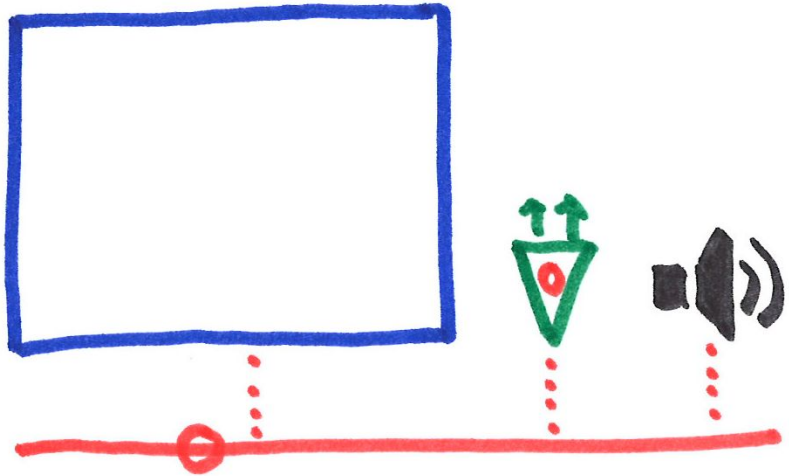
Appendix

Integration

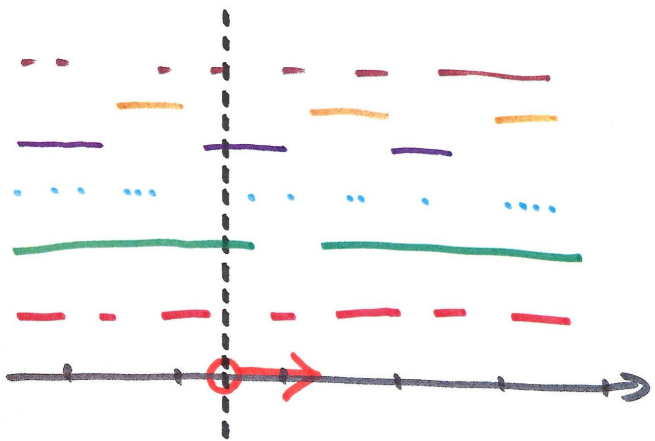


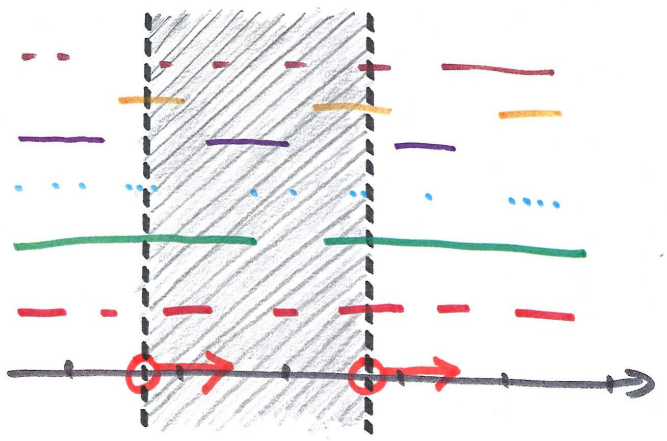
Media-centric -> Timing-centric





Default sequencing - Window sequencing





Implementation

- Goals
  - Precision, low resource consumption, correctness
- setTimeout
  - Precision typically down to a few milliseconds
  - Push for improvements in native setTimeout

Limitations

- Goals
  - simple concept - generic programming tool
- No particular support for
  - Relative timing statements
  - Repetitive patterns
  - Structured key-space
- Avoid - one sequencer that does it all.
- Instead - different sequencers suitable for different problems.