Accessing HTTP Interfaces within X3D Script Nodes

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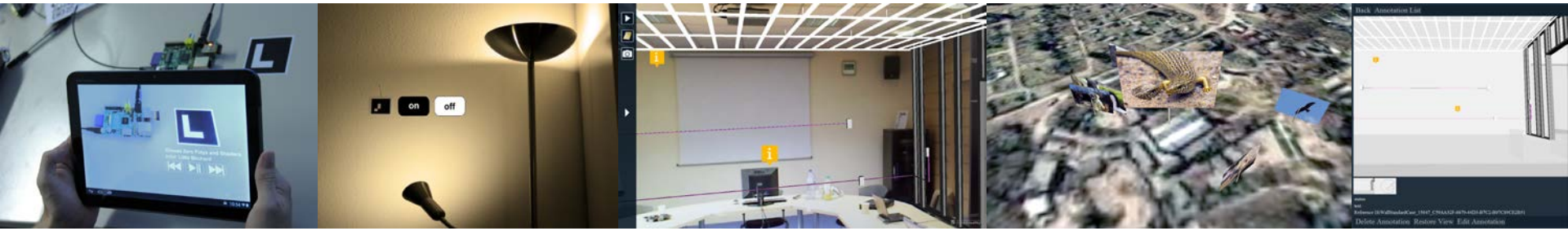

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WEB 3D 2012

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  - What is possible with current Browsers?
- Related Work
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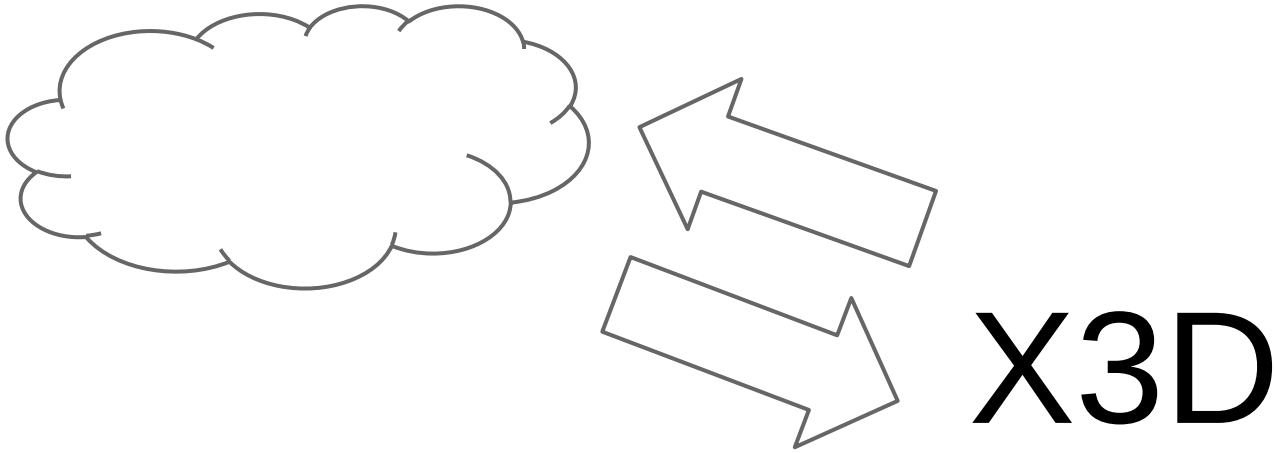
- Current work

What is the Problem?



Accessing Web Data from inside a X3D Scene

Why would i want to do this?

- Web APIs to access and store data
  - Images
  - Messages
  - Databases
  - Interfaces
  - ...

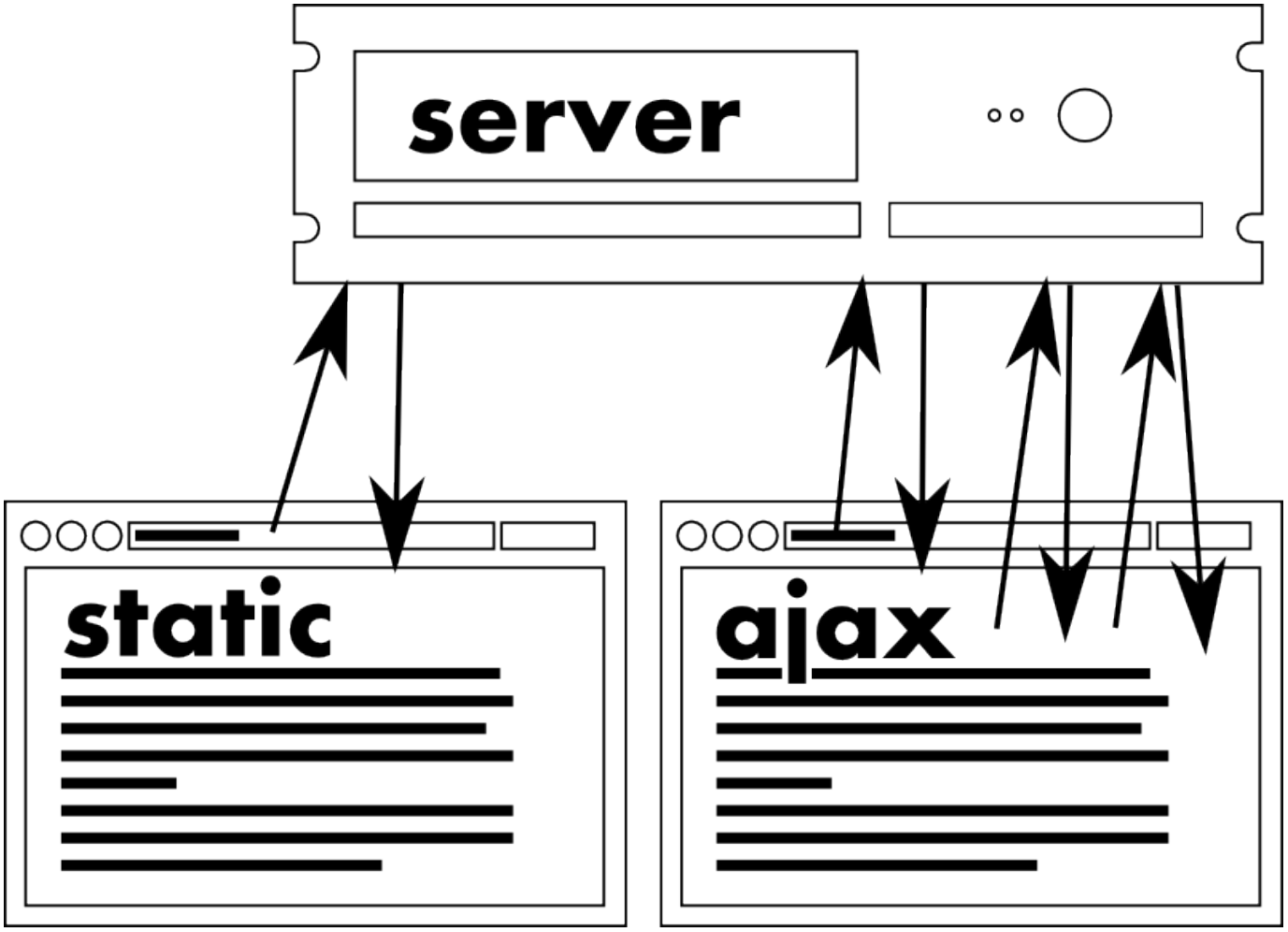
What is currently possible?

- Use java based Script nodes to access web resources
  - X3D browser needs a way to allow the JVM to access the network
  - complicated setup (different language, needs compiling)

How is it done in the Web Browser?

- Load website with resources
  - Comparable with loading an X3D scene
- Dynamic content realised with JavaScript

How is it done in the Web Browser?



How is it done in the Web Browser?

XMLHttpRequest

- Communicating with HTTP sources without reloading the site
- W3C Working Draft
- Available in every mayor webbrowser
- Can do asynchronous requests

Related Work

- Using the XMLHttpRequest implementation in a Webbrowser
  - X3D browser needs to run as a web browser plugin (complicated on mobile or clustered setups)
  - Need to setup the SAI communication between web browser and X3D browser
  - Application logic divided between browsers

Solution: Put XMLHttpRequest into the X3D Browsers Scripting Engine

- Well defined interface
- Well known interface
  - Web developer are using it for years
- Common JavaScript engines are easy to extend
  - X3D browsers already make use of this
- Interface mostly wraps a HTTP client
  - X3D browsers already have HTTP client code

How to use it?

```
xhr = new XMLHttpRequest();

xhr.open('GET',
  'http://localhost/test.txt',false);

xhr.send();

Browser.println(xhr.responseText);
```

JSON and XML responses

```
response =
    JSON.parse(xhr.responseText);
```

or

```
response =
    xhr.responseXML;
```

What has been done with it?

Implemented examples

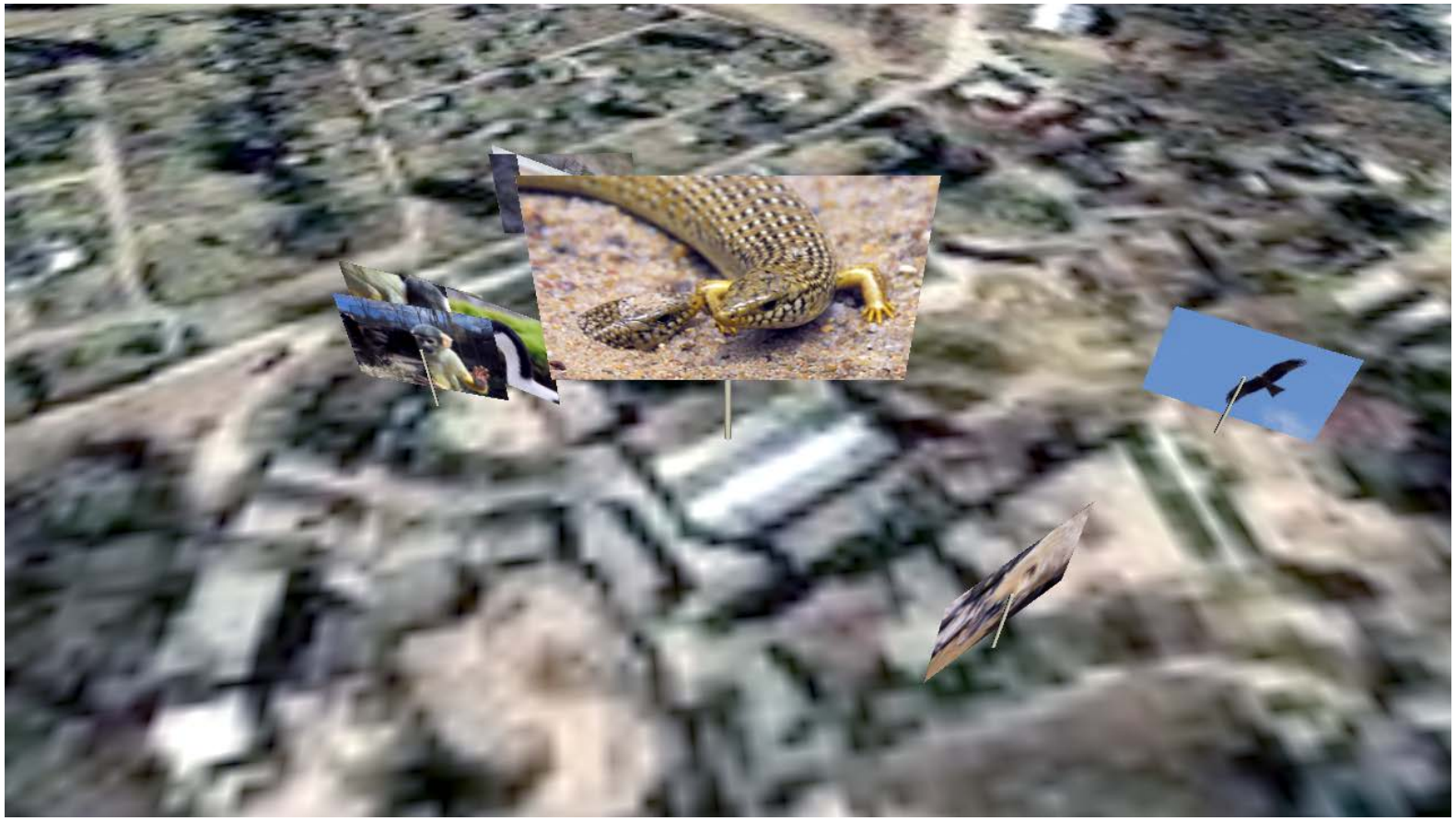
- flickr api example
- annotations store with couchdb
- accessing “hardware” webinterfaces

Get nearby Images from flickr

```
//Get list of nearby Images
xhr.open("http://flickr.com/?method=search&lat=49.874
   &lon=8.660&radius=3");
xhr.send();
picList=xhr.responseXML.photos;
//Get list of nearby Images
for(var i in picList){
   var picid=piclist[i].@id;
   xhr.open("http://flickr.com/?method=geo.getLocation
       &photoid="+picid);
   xhr.send();
   var picPos = xhr.responseXML.location;
   imagepos[picid] = new SFVec3d(picPos.@lat,picPos.@long,
       0.0);
```

(flickr api calls simplified for clarity)

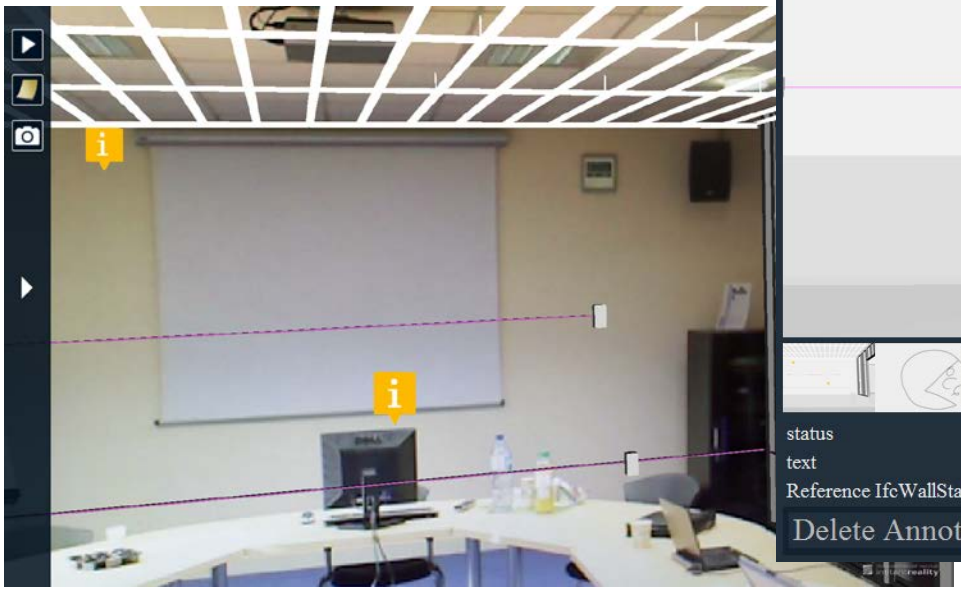
Working with web services



Geolocated images from flickr

Managing Data via HTTP

Annotating building models in AR

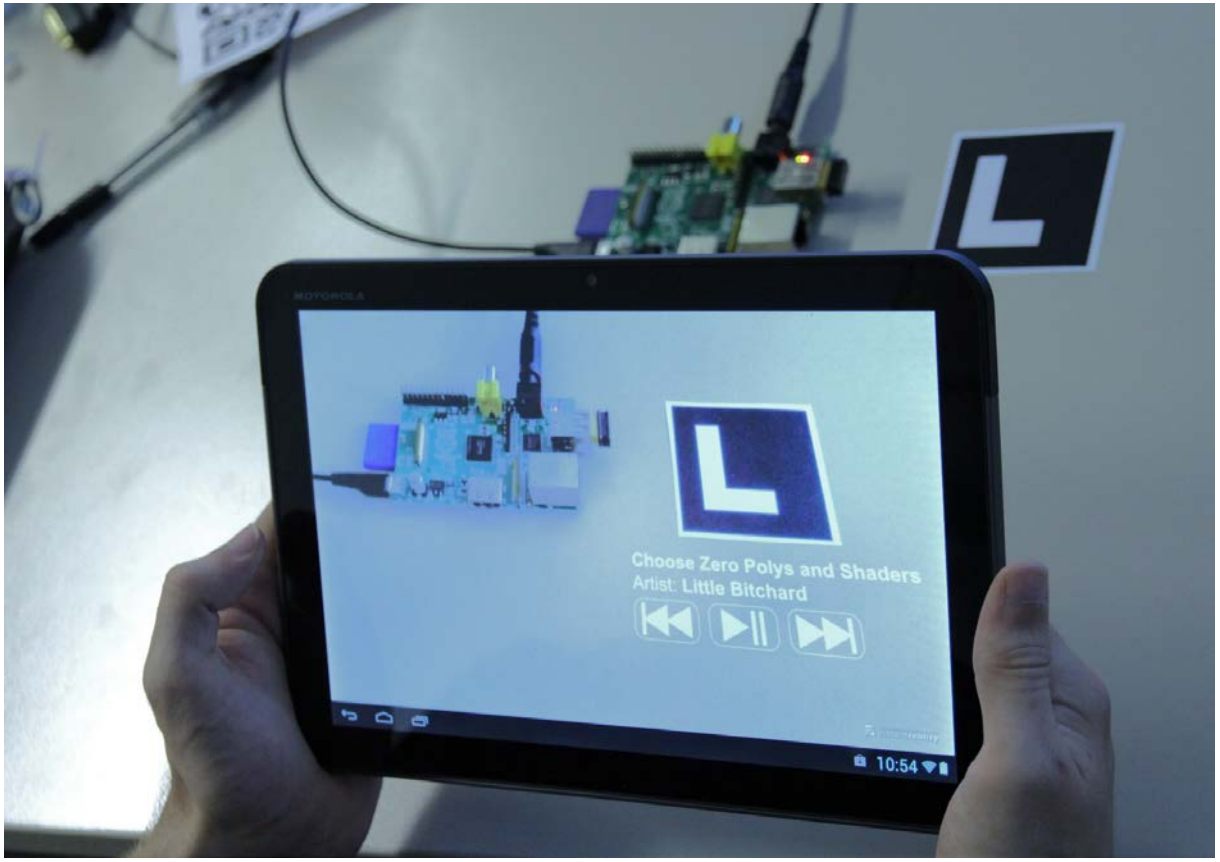


Managing Data via HTTP

Store Data on a Server

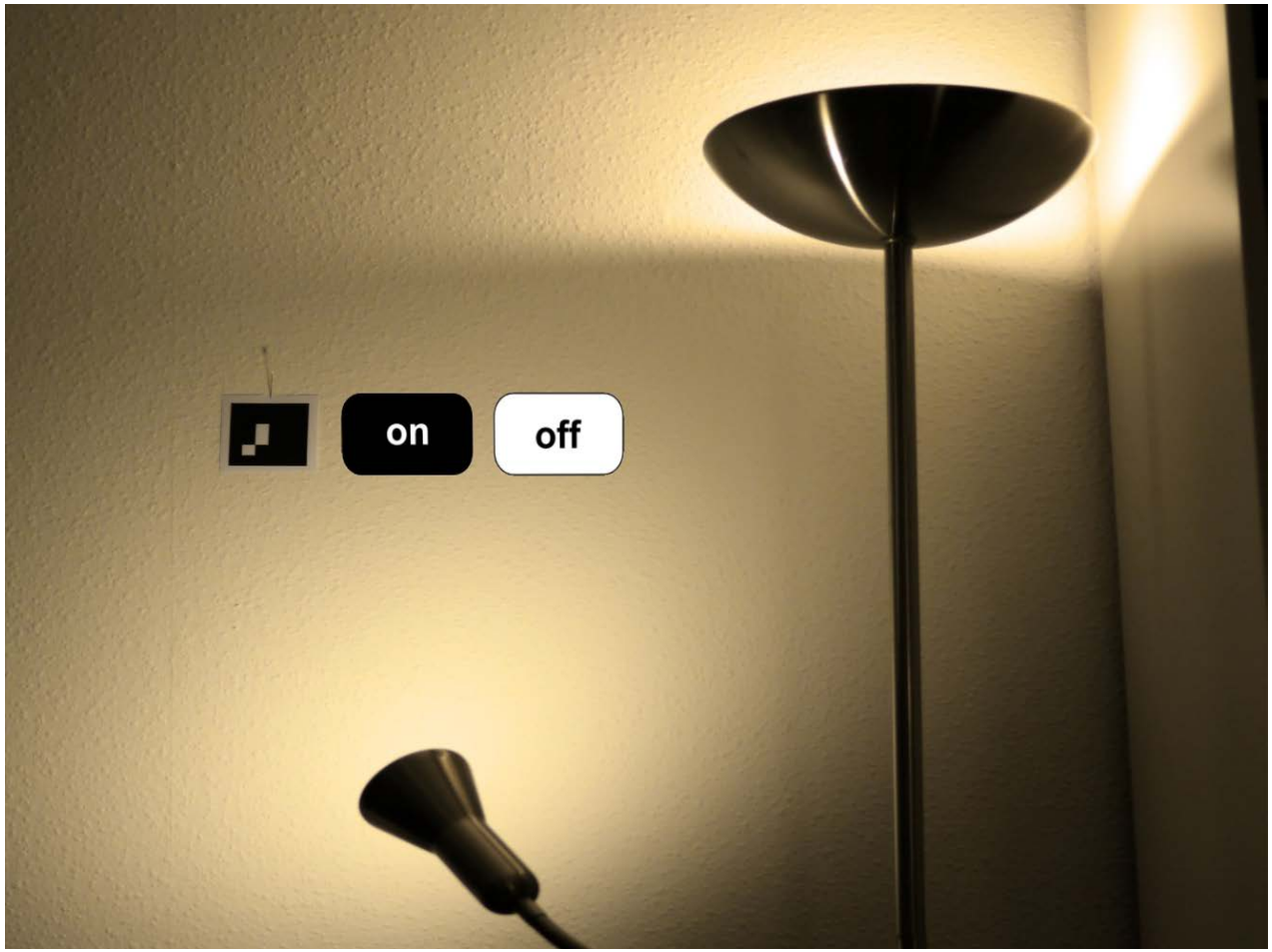
```
annotation=new Object();
annotation.text="Interesting spot";
annotation.position="4 1 2";
annotation.orientation=0 1 0 1.234;

xhr.open('PUT','http://srv:5984/anno/a123');
xhr.send(JSON.stringify(annotation));
```

AR Interaction with headless Hardware



Controlling a mediaplayer with markerbased AR and HTTP requests

AR Interaction with headless Hardware



Home automation with AR

Current Work

- Converters to PUT complex datatypes
  - Sending SFImages as PNG or JPEG

Questions?

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