Accessing HTTP Interfaces within X3D Script Nodes

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Contents

• Introduction
  o What is possible with current Browsers?
• Related Work
• Solution
• Examples
• 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
  o Images
  o Messages
  o Databases
  o Interfaces
  o ...
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
  o Comparable with loading an X3D scene
• Dynamic content realised with JavaScript
How is it done in the Web Browser?

Diagram showing interactions between server, static, and ajax components.
How is it done in the Web Browser?

**XMLHttpRequest**

- Communicating with HTTP sources without reloading the site
- W3C Working Draft
- Available in every major web browser
- Can do asynchronous requests
Related Work

- Using the XMLHttpRequest implementation in a Web browser
  - 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
  o Web developer are using it for years
• Common JavaScript engines are easy to extend
  o 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 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

```javascript
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 SFIImages as PNG or JPEG
Questions?

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