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## Subject: Server Sent Events Example

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Server-Sent Events (SSE) is a technology that enables a server to push real-time updates to a web application over an HTTP connection. Unlike traditional request-response mechanisms where the client initiates communication, SSE allows the server to initiate data transmission to the client once the client establishes a connection.

main.cpp:

```
#include <Core/Core.h>
```

```
using namespace Upp;
```

```
struct MySocket {  
    TcpSocket socket;  
    bool initialized = false;  
};
```

```
class SSEServer  
{
```

```
private:
```

```
    TcpSocket server;  
    Array<MySocket> clients;  
    Mutex mx;
```

```
    bool end = false;  
    Thread th;
```

```
    int port;
```

```
    bool accept()  
    {  
        if(end) return false;
```

```
        mx.Enter();  
        clients.Add();  
        mx.Leave();  
        MySocket& client = clients.Top();  
        bool ret = false;  
        DUMP(clients.GetCount());  
        if(client.socket.Accept(server)) {
```

```
            HttpHeader h;  
            h.Read(client.socket);
```

```
            bool authorized = true;  
            // authenticate the user using h.f2 (/token)
```

```

if(authorized) {
    client.socket.Put("HTTP/1.1 200 OK\r\n"           //Standard HTTP header line
        "Content-Type: text/event-stream\r\n"        //This is the only allowed MIME type for SSE
        "Transfer-Encoding: chunked\r\n"            //Chunked encoding lets it know when an
event is done without knowing packet boundaries.
        "Access-Control-Allow-Origin: *\r\n"        //Because the HTML comes from a file, not this
server, we have to allow access
        "\r\n");

    ret = true;
    client.initialized = true;
}
else {
    client.socket.Put("HTTP/1.1 401 Unauthorized\r\n" //Standard HTTP header line
        "\r\n");
    ret = false;
}
}

if(ret == false) {
    mx.Enter();
    clients.Remove(clients.GetCount() - 1);
    mx.Leave();
}

return ret; //End of header indicator
}

void WriteChunk(const String& str)
{

String out;
out << FormatIntHex(str.GetCount()) << "\r\n" << str << "\r\n";
mx.Enter();
for(auto& c:clients) {
    if(!c.socket.IsEof() && !c.socket.IsError()) {
        c.socket.Put(out);
    }
}

for(int i = clients.GetCount(); i > 0 ; i--) {
    MySocket& c = clients[ i - 1 ];

    if(c.initialized && ( c.socket.IsEof() || c.socket.IsError())) {
        clients.Remove(i-1);
    }
}
}

```

```

    mx.Leave();
}

public:

SSEServer(int Port = 6500): port(Port)
{
    server.Listen(port, 5);
}

~SSEServer()
{
    mx.Enter();
    for(auto&client: clients) client.socket.Close();
    mx.Leave();
    server.Close();
}

void Start() {
    Cout() << "Listn at port " << port << "\n";
    end = false;
    th.Run([&] {while(!end){accept(); Sleep(1);}});
}

void Stop() {
    end = true;
    TcpSocket soc;
    soc.Connect("localhost", port);
    soc.Connect("localhost", port);
    soc.Connect("localhost", port);
    th.Wait();
}

void WriteData(String d) { WriteData(~d); }
void WriteData(const char* data) {
    //Build up an event in server-send-event format. The message consists of
    //one or more fields of the form:
    //field: value\n
    //Followed by an empty line.
    //
    //The main tag is "data:" which carries the data payload.
    //See
https://developer.mozilla.org/en-US/docs/Web/API/Server-sent\_events/Using\_server-sent\_events
    //for more info (e.g. different message types and dispatch)
    String msg;

    if(Upp::Random(10)>5)
        msg << "event: " << "custom" << "\n"; // Send same msgs as 'custom' event instead of

```

'message' (the default).

```
msg << "data: " << data << "\r\n";  
msg << "\r\n"; //Empty field ends the message.
```

```
//Send the message data using chunked encoding  
WriteChunk(msg);
```

```
}  
};
```

CONSOLE\_APP\_MAIN

```
{  
  SSEServer sse;  
  bool end = false;  
  Thread th;  
  th.Start([&] {  
    while(!end){  
      Time t = GetSysTime();  
      String s ;  
      s << t;  
      sse.WriteData(s);  
      Sleep(1000);  
    }  
  });
```

```
sse.Start();  
Cout() << "Press enter to terminate\n" ;  
ReadStdIn();  
end = true;  
sse.Stop();  
th.Wait();  
}
```

index.html:

```
<!DOCTYPE html>  
<html>  
<head> <meta charset="UTF-8"> </head>  
<body>
```

```
<h1>Getting server updates</h1>  
<div id="result"></div>
```

```
<script>  
if(typeof(EventSource) !== "undefined") {
```

```
var source = new EventSource("http://127.0.0.1:6500/token");
source.onmessage = function(event) {
    document.getElementById("result").innerHTML += "Data: " + event.data + "<br>";
// console.log(event);
};

source.addEventListener("custom", function(event) {
    document.getElementById("result").innerHTML += "Custom: " + event.data + "<br>";
// console.log(event);
});

source.onerror = function(event) {
    document.getElementById("result").innerHTML += "Connection failed<br>";
};
} else {
    document.getElementById("result").innerHTML = "Sorry, your browser does not support
server-sent events...";
}
</script>

</body>
</html>
```

---