Future of web techs

Experimental features of HTML5

Contents

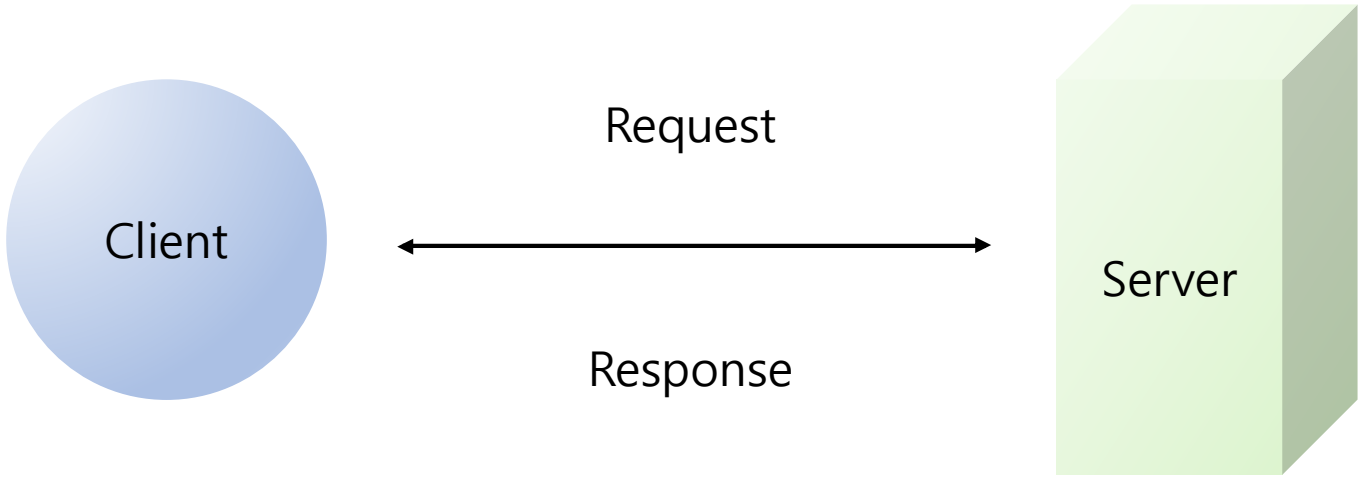
- 1. Evolution of Web
- 2. WebSocket?
  - Duplex communication
    - Polling, Long polling, streaming
- 3. WebAssembly?
  - asm.js, LLVM, Emscripten

The Evolution of the Web

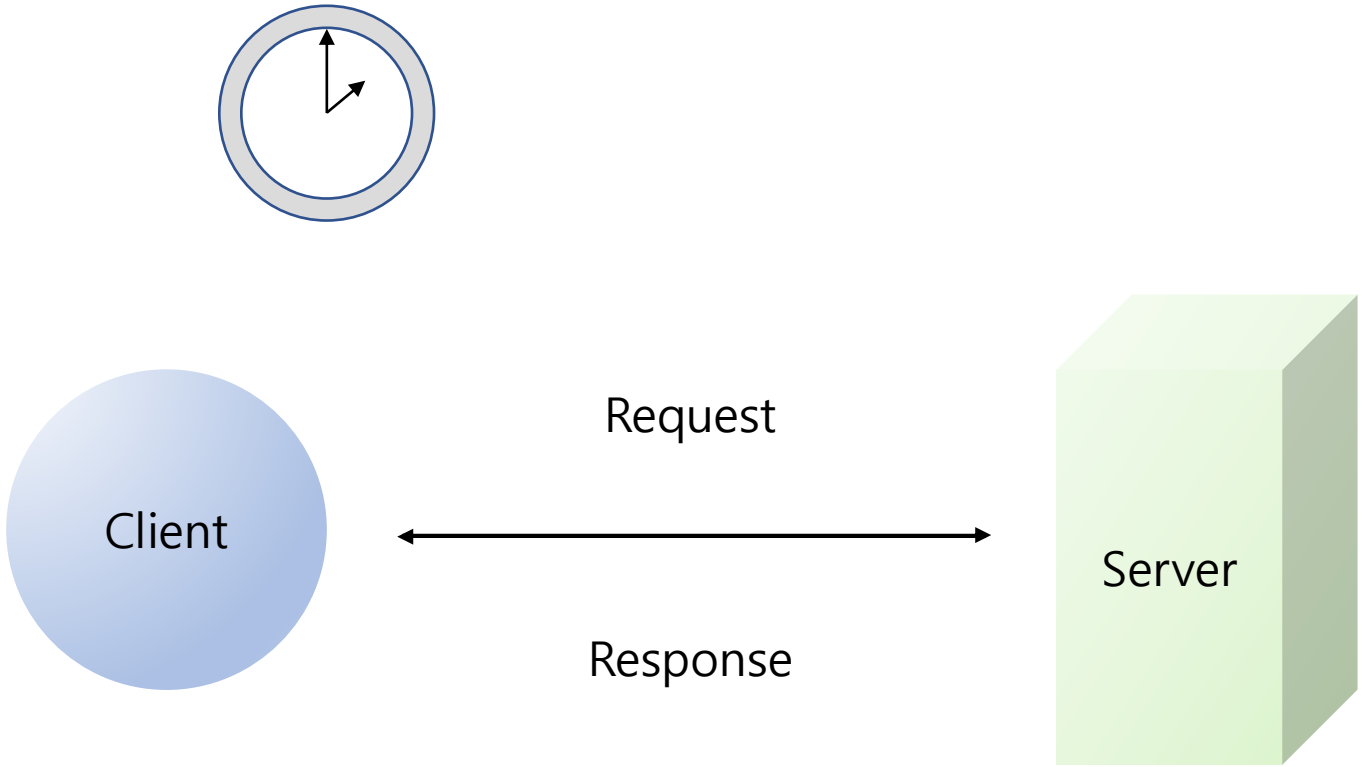
- http://www.evolutionoftheweb.com/

Duplex communication

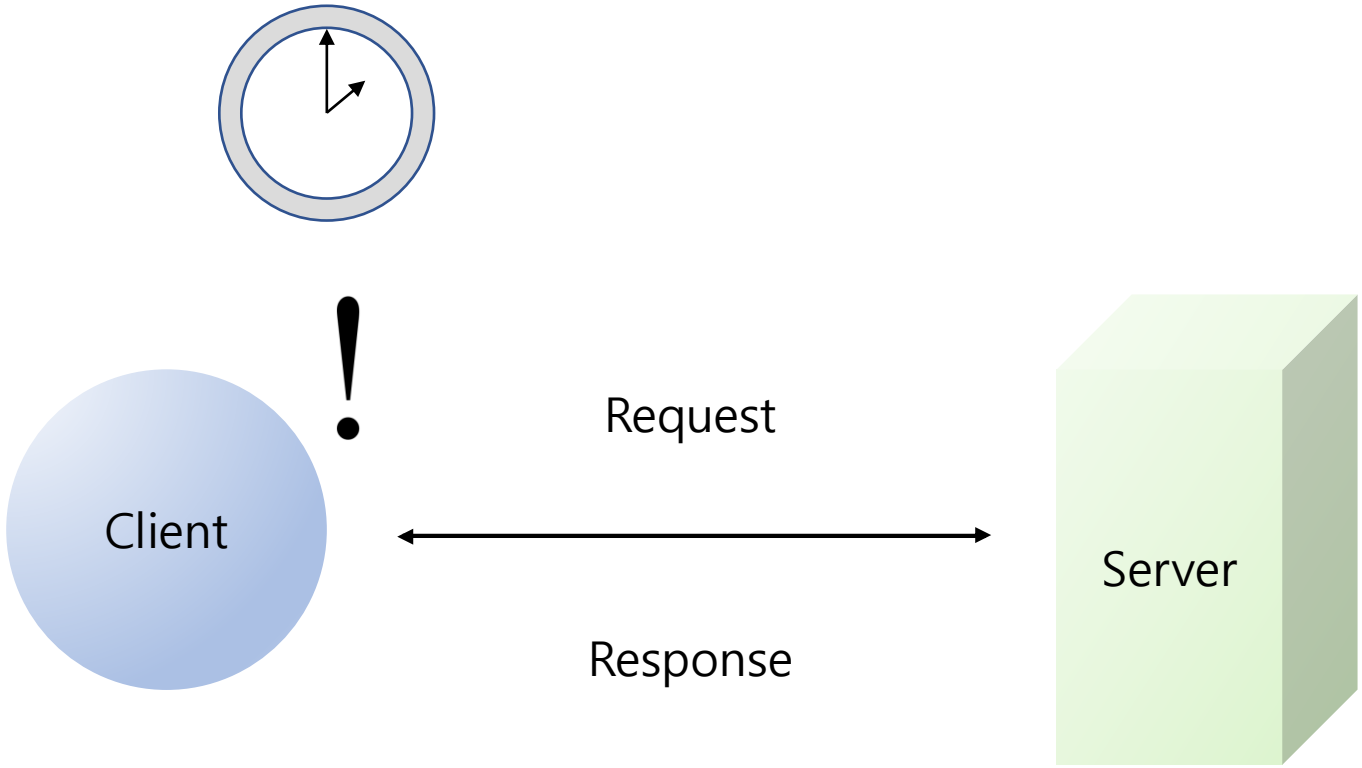
Half-duplex communication



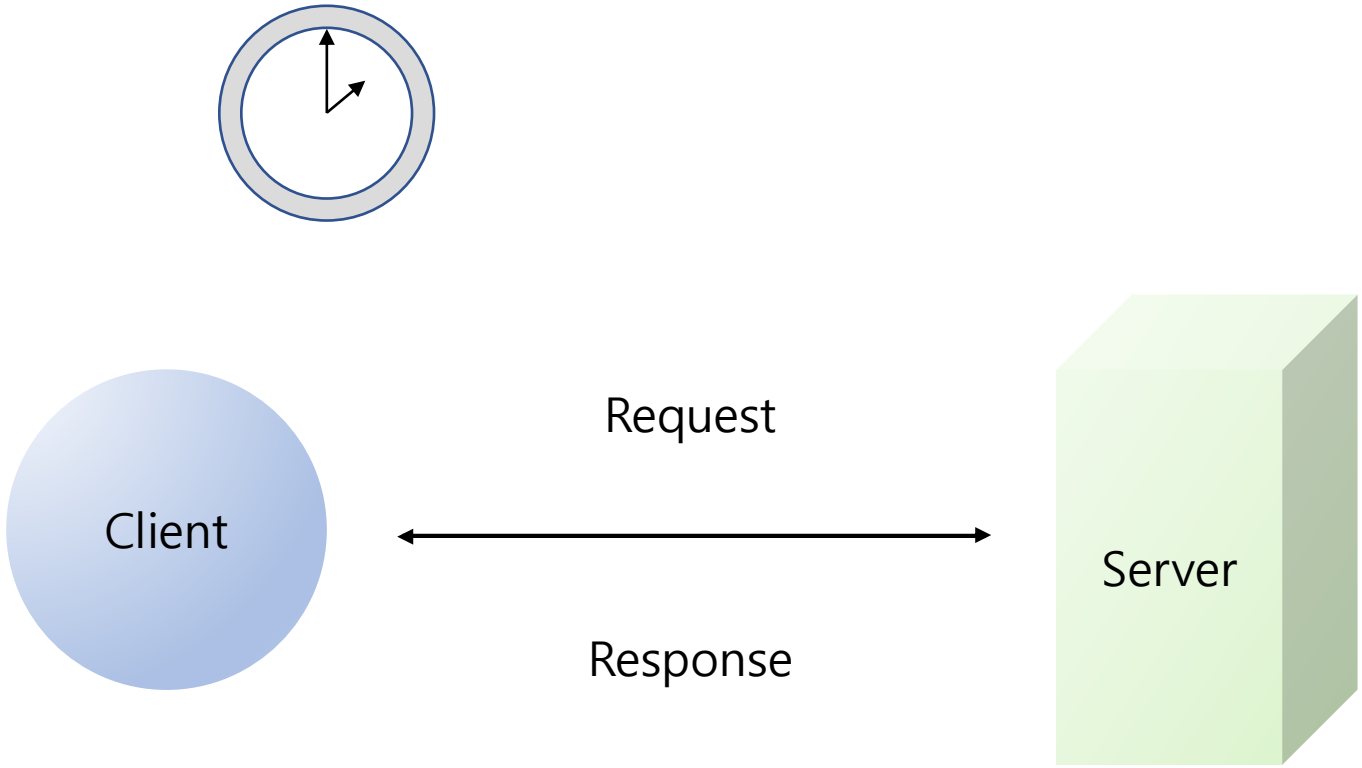
Polling



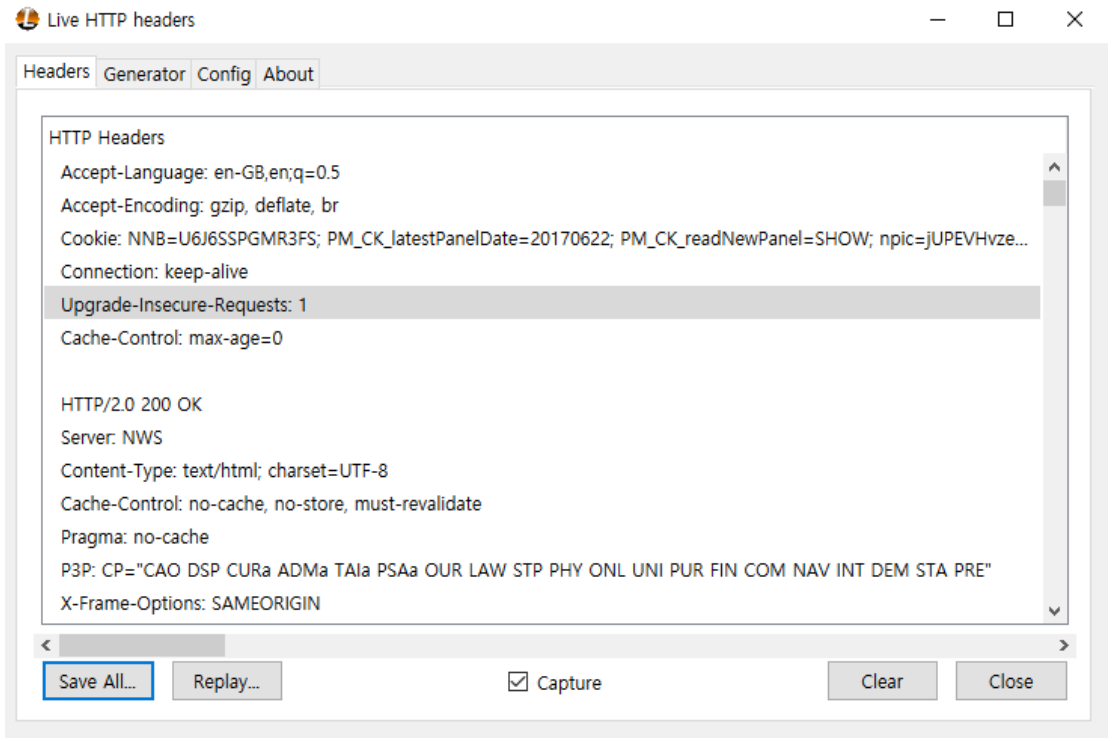
Long-Polling

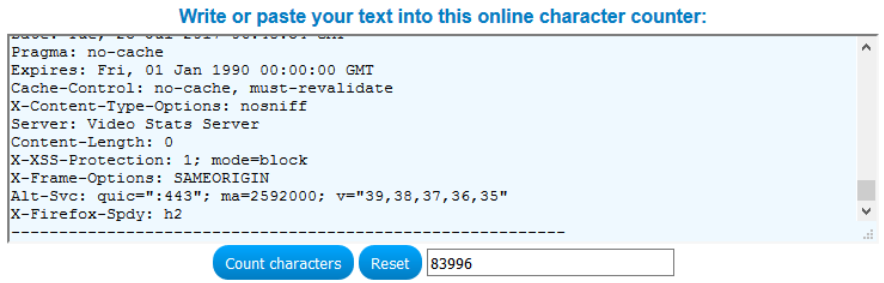


Streaming

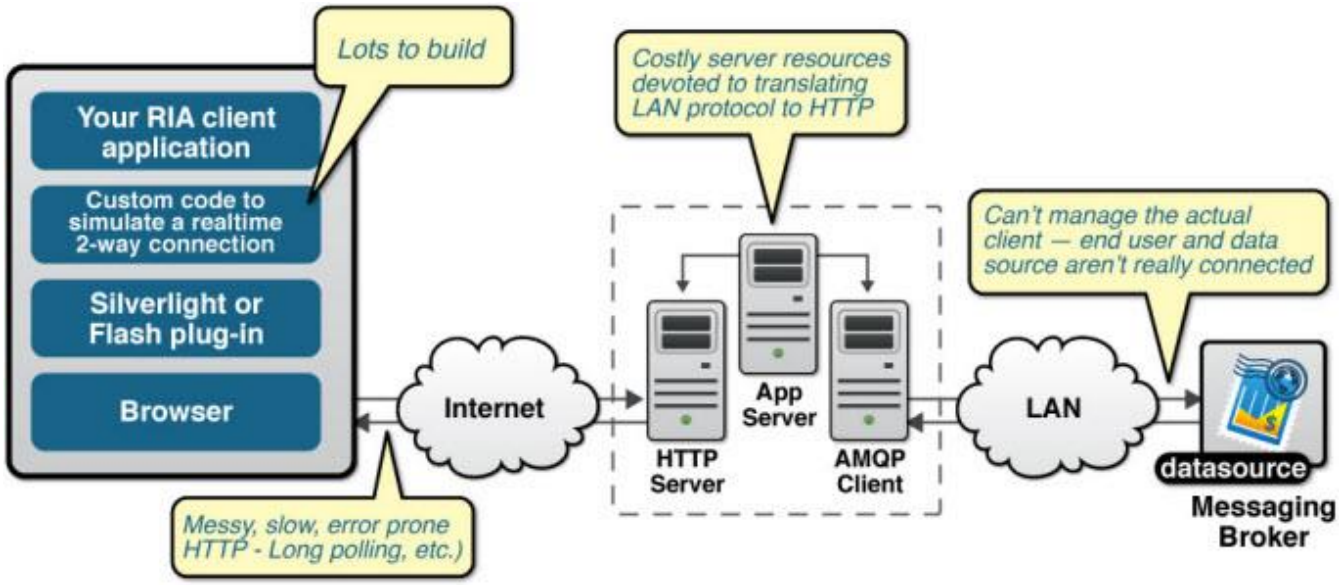


Inefficient HTTP Request





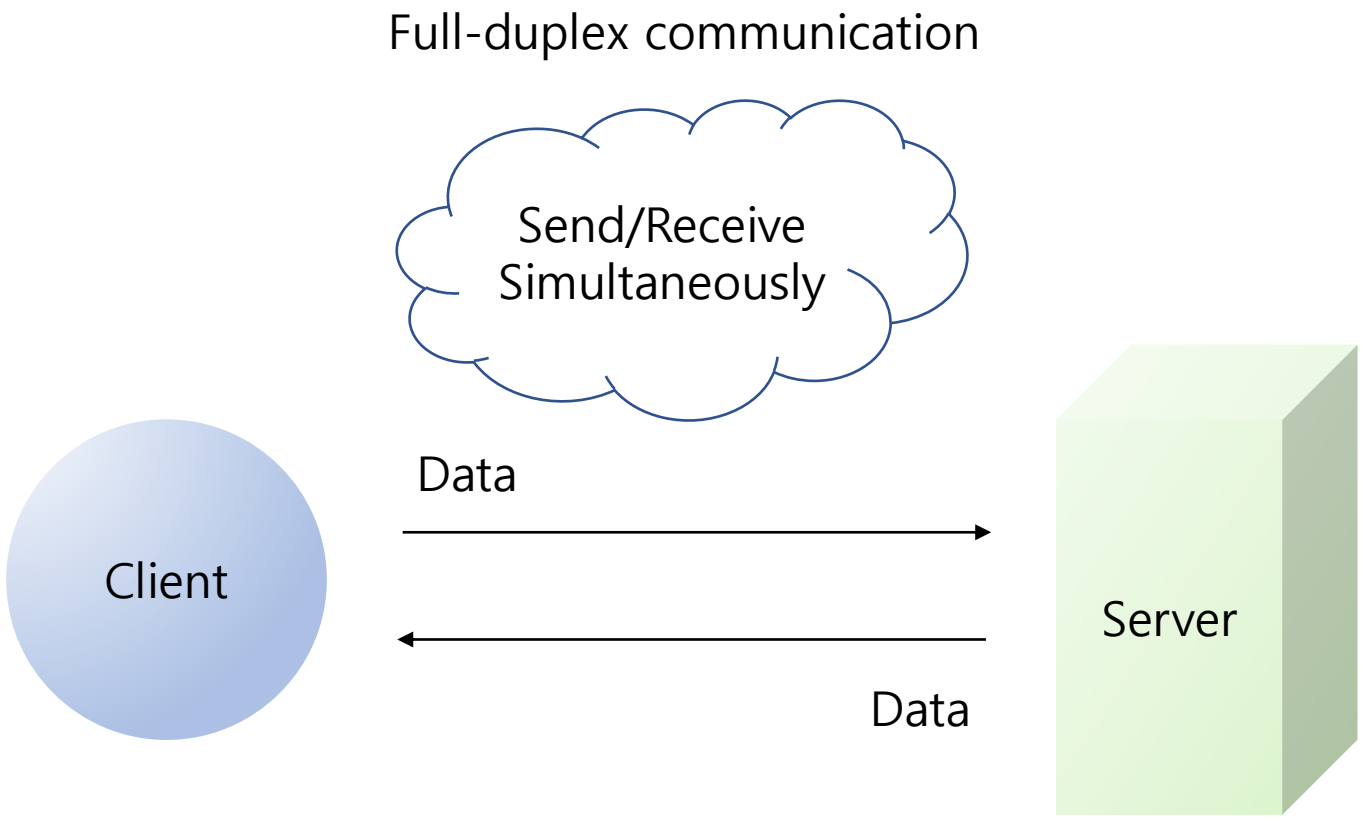
Inefficient HTTP Request



WebSocket!

- A TCP-based, standardised communication protocol
  - IETF Standard - RFC 6455
  - Related API is being standardised by the W3C
- Provides full-duplex communication
  - Low overhead
- Easy-to-use API

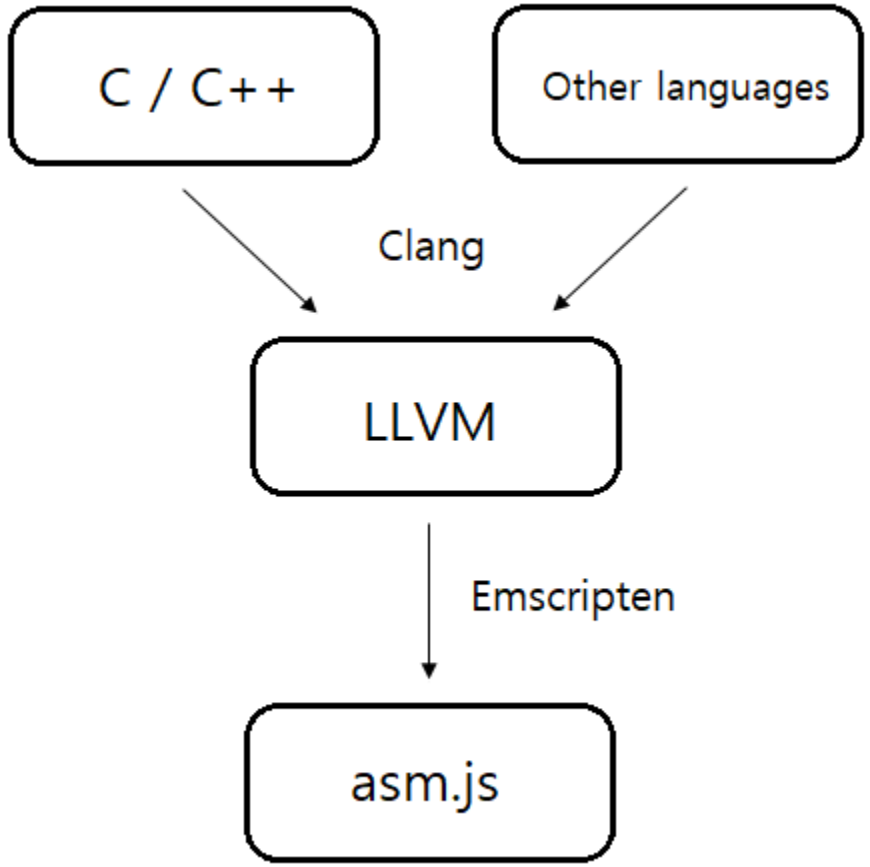
Duplex communication



Sample client

```
function init()
{
    output = document.getElementById("output");
    testWebSocket();
}

function testWebSocket()
{
    websocket = new WebSocket(wsUri);
    websocket.onopen = function(evt) { onOpen(evt) };
    websocket.onclose = function(evt) { onClose(evt) };
    websocket.onmessage = function(evt) { onMessage(evt) };
    websocket.onerror = function(evt) { onError(evt) };
}

function disconnect()
{
    if (websocket.readyState == 1) websocket.close();
}

function doSend()
{
    var msg = document.getElementById("input").value;

    websocket.send(msg);
}
```

asm.js



Programming languages [edit]

- C/C++: Clang and LLVM
- Lua VM: Lua virtual machine[11]
- Perl: port of (micro)perl-5.16.3[12]
- Python – port of CPython[13]
- Ruby – port of Ruby[14]

Application frameworks [edit]

- pepper.js: Ports of miscellaneous PNaCl apps (earth, voronoi, bullet, etc.)[15]
- Qt: ports of various Qt demos, plus KDE apps, such as Kate[16]

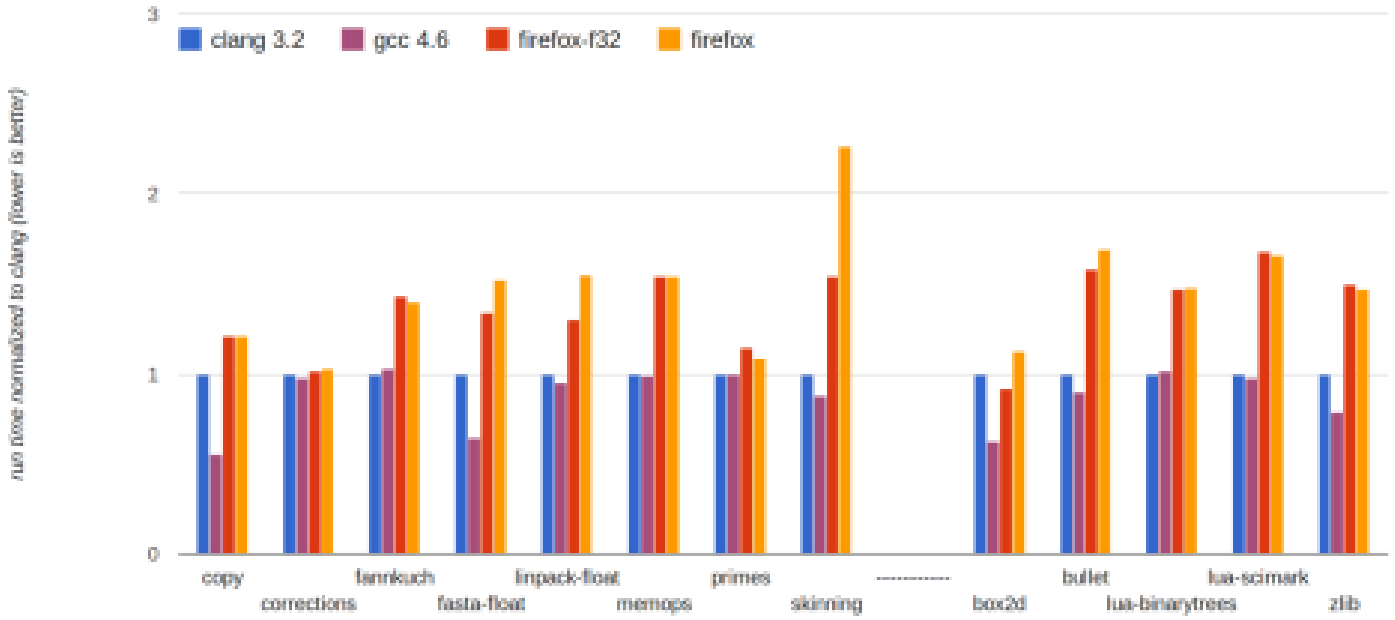
Programs and libraries [edit]

- OpenGL, SDL, and SDL2[17]
- Vim (Vi IMproved)[18]
- FreeType: TrueType font rendering in JavaScript, using FreeType[19]
- SQLite[20]
- GNU Privacy Guard[21]
- ctags[22]
- gnuplot[23]
- Graphviz[24]
- zlib[25]

Game engines [edit]

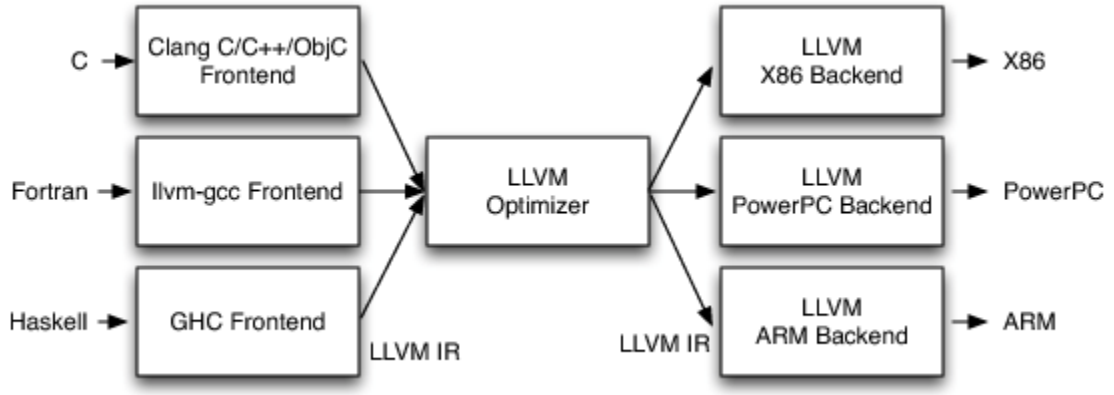
- Unreal Engine 3: was ported in 4 days[26][27]
- Unreal Engine 4
- Unity[28]
- ScummVM, which supports numerous classic adventure games[29]
- Godot[30]

Performance of asm.js



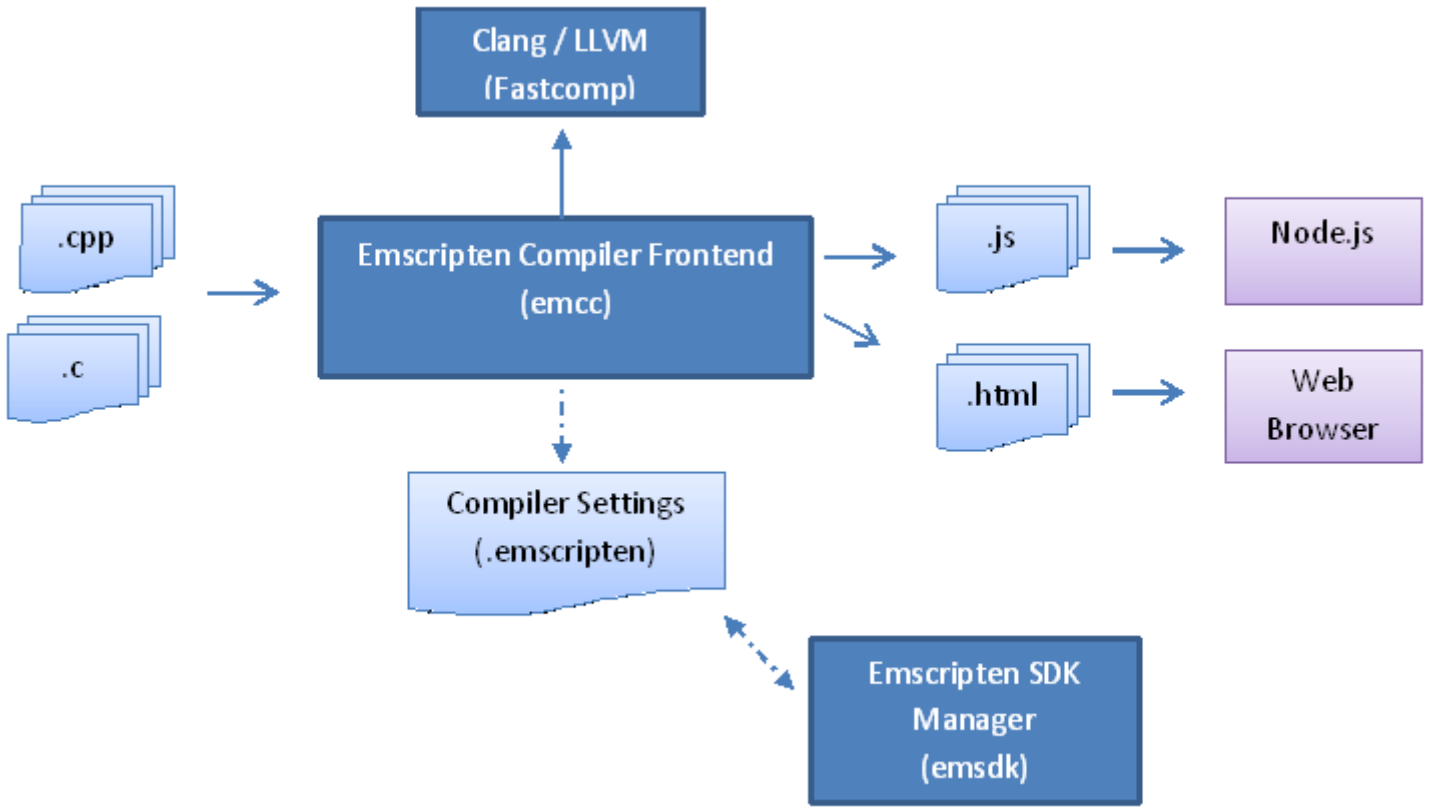
LLVM compiler design

Traditional static compiler design

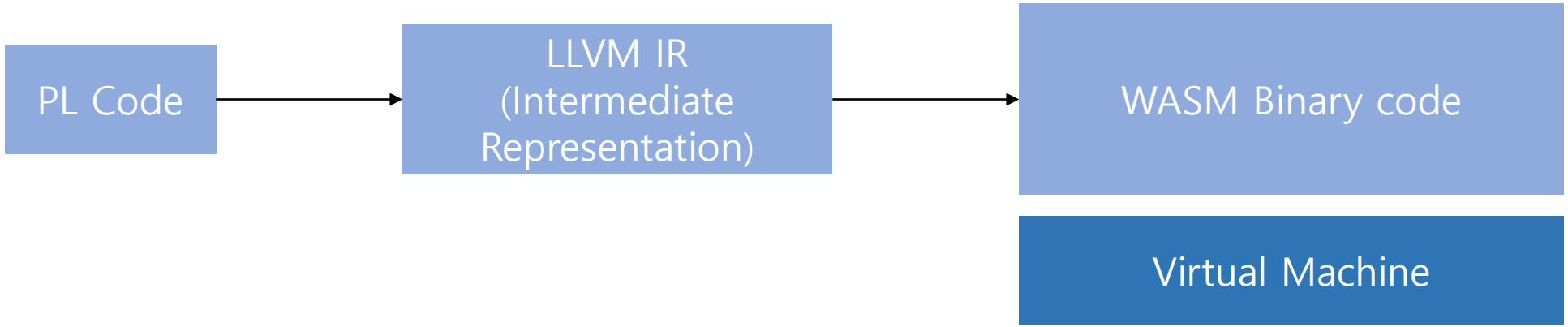


LLVM compiler design

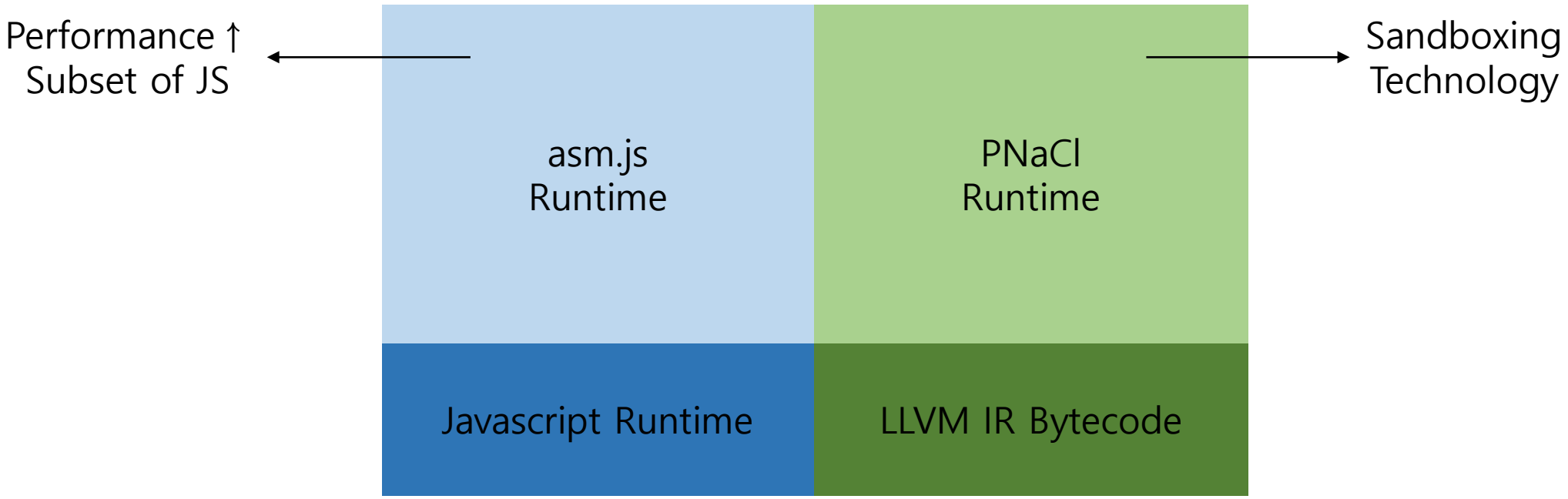
Emscripten


Clang / LLVM
(Fastcomp)
.cpp
.c
Emscripten Compiler Frontend
(emcc)
.js
Node.js
.html
Web
Browser
Compiler Settings
(.emscripten)
Emscripten SDK
Manager
(emsdk)

WebAssembly!



Virtual Machine?

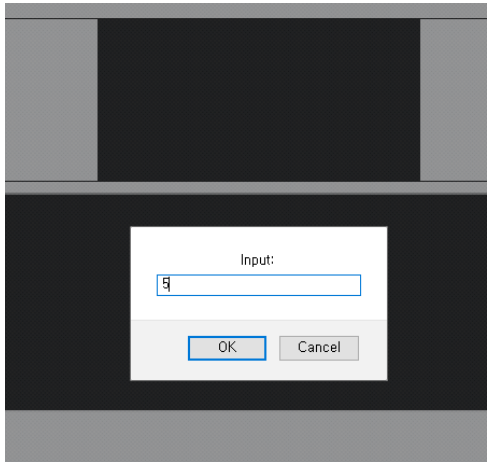


Example

선택 Windows PowerShell

```
PS C:₩Users₩hatcling13₩Documents₩Dev₩emtest> emcc factorial.c -s WASM=1 -o factorial.html
PS C:₩Users₩hatcling13₩Documents₩Dev₩emtest>

PS C:₩Users₩hatcling13₩Documents₩Dev₩emtest> em++ .₩factorial++.cpp -s WASM=1 -o factorial.html
INFO:root:generating system library: libcxx.a... (this will be cached in "C:₩Users₩hatcling13₩.emscripten_cache₩asmjs₩libcxx.a" for subsequent builds)
INFO:root: - ok
INFO:root:generating system library: libcxxabi.bc... (this will be cached in "C:₩Users₩hatcling13₩.emscripten_cache₩asmjs₩libcxxabi.bc" for subsequent builds)
INFO:root: - ok
PS C:₩Users₩hatcling13₩Documents₩Dev₩emtest>
```

이름	수정한 날짜	유형	크기
factorial++	2017-07-27 오전...	C++ Source	1KB
factorial++	2017-07-27 오전...	Firefox HTML Do...	102KB
factorial++	2017-07-27 오전...	JS 파일	277KB
factorial++.wasm	2017-07-27 오전...	WASM 파일	387KB



powered by emscripten

120

Performance of WebAssembly