
Javascript... FOR SCIENCE!

the need for interdisciplinary co-operation

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I work for Mozilla

**I work on Firefox OS
but also: I spend a lot of time teaching**

I am Dr. Bill Mills

@billdoesphysics on twitter



I work for TRIUMF

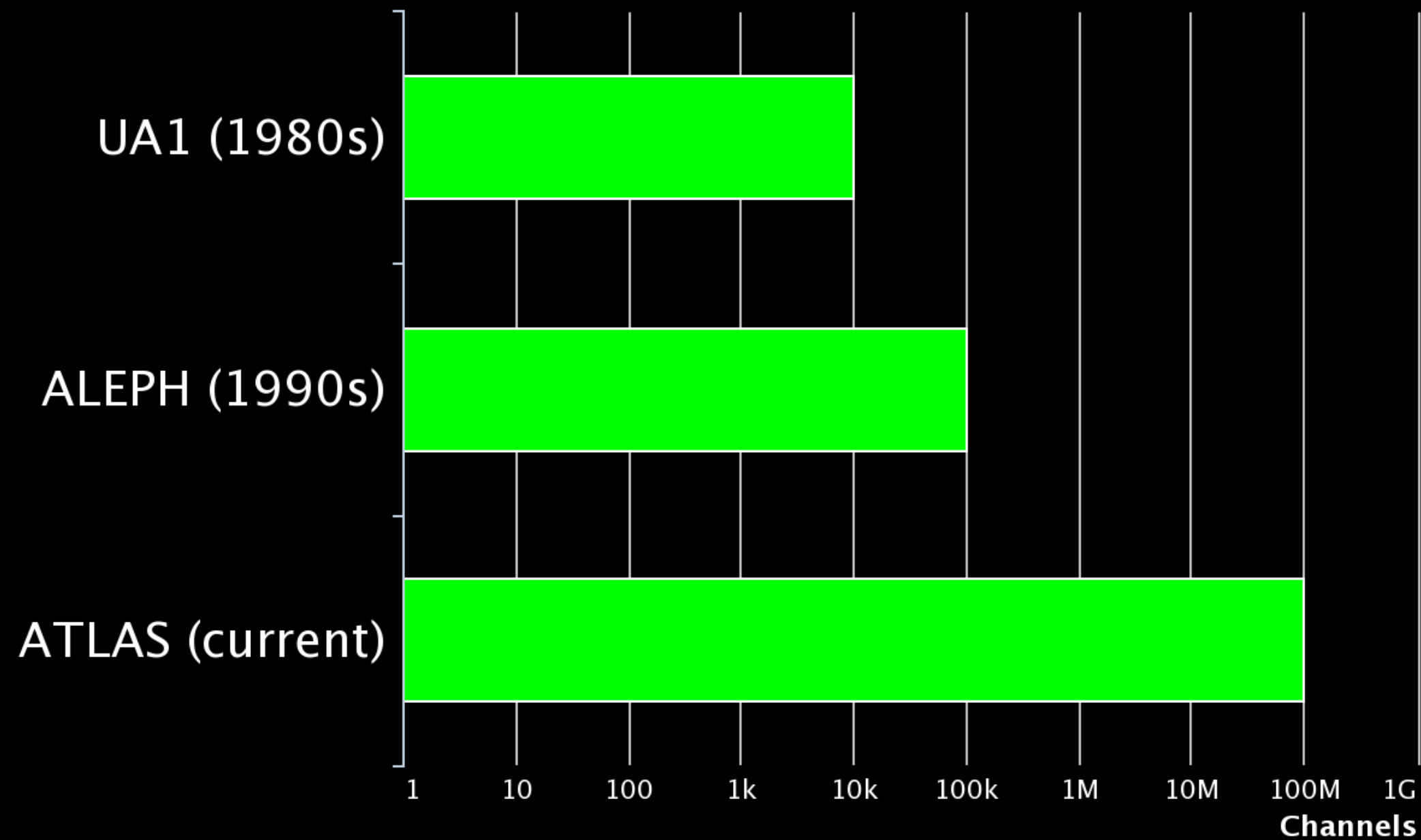
Canada's national lab for nuclear physics.

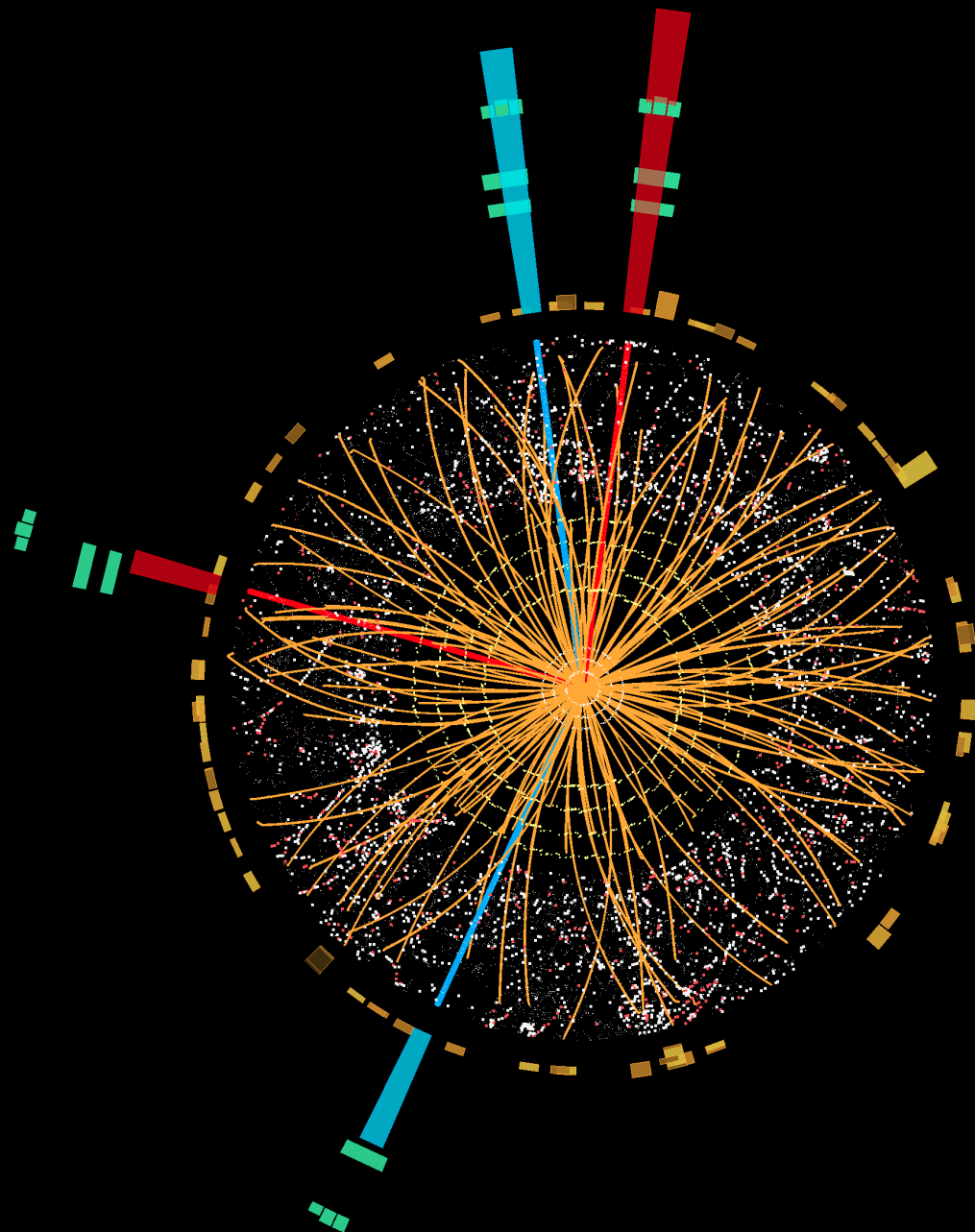
Let's Change the World

REALTALK

Moore's Law, CERN Style

Channels per Experiment





Sometimes You Just Don't Know Better



```

1161 //map data from the JSONP store into the DAQ object, summing rates as we move upstream:
1162 for(Fkey in this.DAQmap){
1163     if(this.dataKeys.indexOf(Fkey) == -1){
1164         this.DAQmap[Fkey].trigRequestRate = 0;
1165         for(Skey in this.DAQmap[Fkey]){
1166             if(this.dataKeys.indexOf(Skey) == -1){
1167                 this.DAQmap[Fkey][Skey].trigRequestRate = 0;
1168                 this.DAQmap[Fkey][Skey].dataRate = 0;
1169                 for(Pkey in this.DAQmap[Fkey][Skey]){
1170                     if(this.dataKeys.indexOf(Pkey) == -1){
1171                         this.DAQmap[Fkey][Skey][Pkey].oldTrigRequestRate = this.DAQmap[Fkey][Skey][Pkey].trigRequestRate;
1172                         this.DAQmap[Fkey][Skey][Pkey].oldDataRate = this.DAQmap[Fkey][Skey][Pkey].dataRate;
1173                         this.DAQmap[Fkey][Skey][Pkey].trigRequestRate = 0;
1174                         this.DAQmap[Fkey][Skey][Pkey].dataRate = 0;
1175                         for(Ckey in this.DAQmap[Fkey][Skey][Pkey]){
1176                             if(window.JSONPstore['scalar']){
1177                                 if( window.JSONPstore['scalar'][this.DAQmap[Fkey][Skey][Pkey][Ckey].detector] ){
1178                                     this.DAQmap[Fkey][Skey][Pkey][Ckey].trigRequestRate = window.JSONPstore['scalar'][this.DAQmap[Fkey][Skey][Pkey][Ckey].detector];
1179                                     this.DAQmap[Fkey][Skey][Pkey][Ckey].dataRate = window.JSONPstore['scalar'][this.DAQmap[Fkey][Skey][Pkey][Ckey].detector];
1180                                     this.DAQmap[Fkey][Skey][Pkey].trigRequestRate += this.DAQmap[Fkey][Skey][Pkey][Ckey].trigRequestRate;
1181                                     this.DAQmap[Fkey][Skey][Pkey].dataRate += this.DAQmap[Fkey][Skey][Pkey][Ckey].dataRate;
1182                                     this.detSummary[ this.DAQmap[Fkey][Skey][Pkey][Ckey].detector.slice(0,3) ].totalTrigRequestRate += this.DAQmap[Fkey][Skey][Pkey][Ckey].trigRequestRate;
1183                                     this.detSummary[ this.DAQmap[Fkey][Skey][Pkey][Ckey].detector.slice(0,3) ].totalDataRate += this.DAQmap[Fkey][Skey][Pkey][Ckey].dataRate;
1184                                 }
1185                             }
1186                         }
1187                     }
1188                 }
1189                 this.DAQmap[Fkey][Skey].trigRequestRate += this.DAQmap[Fkey][Skey][Pkey].trigRequestRate;
1190                 this.DAQmap[Fkey][Skey].dataRate += this.DAQmap[Fkey][Skey][Pkey].dataRate;
1191             }
1192         }
1193     }
1194     this.DAQmap[Fkey].trigRequestRate += this.DAQmap[Fkey][Skey].trigRequestRate;
1195 }
1196 }
1197 };
1198

```

```

1235 rotate_extension7->rotateX(M_PI/2.0);
1236 rotate_extension7->rotateX(alpha);
1237 rotate_extension7->rotateY(beta);
1238 rotate_extension7->rotateZ(gamma);
1239
1240 z = -this->can_face_thickness/2.0 -(shell_suppressor_extension_length/2.0
1241 - (this->suppressor_extension_thickness
1242 + this->suppressor_shell_thickness*2.0)
1243 * tan(this->bent_end_angle)/2.0)
1244 * cos(this->bent_end_angle) +this->bent_end_length +(this->BG0_can_seperation
1245 + this->side_BG0_thickness
1246 + this->suppressor_shell_thickness*2.0)/tan(this->bent_end_angle)
1247 - (this->suppressor_extension_thickness + this->suppressor_shell_thickness*2.0)
1248 * sin(this->bent_end_angle) +this->shift +this->back_inner_radius
1249 - this->forward_inner_radius +extension_back_shift
1250 - this->suppressor_shell_thickness/2.0 + dist_from_origin;
1251
1252 x = -(shell_suppressor_extension_length*tan(shell_suppressor_extension_angle)/2.0
1253 + (this->forward_inner_radius
1254 + this->hevimet_tip_thickness)*sin(this->bent_end_angle) - this->BG0_can_seperation*2.0 - 0.4*mm)/2.0;
1255
1256 y = -((this->suppressor_extension_thickness/2.0 + this->suppressor_shell_thickness)
1257 / cos(this->bent_end_angle)
1258 + (shell_suppressor_extension_length/2.0 -(this->suppressor_extension_thickness
1259 + this->suppressor_shell_thickness*2.0)
1260 * tan(this->bent_end_angle)/2.0)*sin(this->bent_end_angle) -(this->back_inner_radius
1261 + this->bent_end_length +(this->BG0_can_seperation +this->side_BG0_thickness
1262 + this->suppressor_shell_thickness*2.0)
1263 / tan(this->bent_end_angle) -(this->suppressor_extension_thickness
1264 + this->suppressor_shell_thickness*2.0)
1265 * sin(this->bent_end_angle))
1266 * tan(this->bent_end_angle)) + extension_radial_shift;
1267
1268 G4ThreeVector move_inner_extension7((x*cos(theta)+z*sin(theta))*cos(phi)-y*sin(phi),(x*cos(theta)+z*sin(theta))*sin(phi)+y*cos(phi),-
1269
1270 this->rightSuppressorExtensionAssembly->MakeImprint(exp_hall_log, move_inner_extension7, rotate_extension7, copy_number++);
1271
1272 G4RotationMatrix* rotate_extension8 = new G4RotationMatrix;
1273 rotate_extension8->rotateY(M_PI/2.0);
1274 rotate_extension8->rotateZ(M_PI/2.0 + this->bent_end_angle);
1275 rotate_extension8->rotateX(M_PI/2.0);
1276 rotate_extension8->rotateX(alpha);
1277 rotate_extension8->rotateY(beta);
1278 rotate_extension8->rotateZ(gamma);
1279

```

```
longestStringEver.cxx x longestStr
13459 "    }\n"
13460 "    }\n"
13461 "    }\n"
13462 "    request.open('GET', url, true);\n"
13463 " } else\n"
13464 "    request.open('GET', url, false);\n"
13465 "    request.send(null);\n"
13466 "\n"
13467 "    if (callback == undefined) {\n"
13468 "        var array = request.responseText.split('$#-----#$\n');\n"
13469 "        for (var i=0 ; i<array.length ; i++) {\n"
13470 "            if (paths[i].match(/[*/]/)) {\n"
13471 "                array[i] = array[i].split('\n');\n"
13472 "                array[i].length--;\n"
13473 "            } else\n"
13474 "                array[i] = array[i].split('\n')[0];\n"
13475 "            }\n"
13476 "        return array;\n"
13477 "    }\n"
13478 "    }\n"
13479 "\n"
13480 "function GetRecord(path)\n"
13481 "{\n"
13482 "    var request = XMLHttpRequestGeneric();\n"
13483 "\n"
13484 "    var url = '?cmd=jget&odb=' + path + '&name=1';\n"
13485 "    request.open('GET', url, false);\n"
13486 "    request.send(null);\n"
13487 "    return request.responseText;\n"
13488 "}\n"
13489 "\n"
13490 "function ExtractRecord(record, key)\n"
13491 "{\n"
13492 "    var array = record.split('\n');\n"
13493 "    for (var i=0 ; i<array.length ; i++) {\n"
13494 "        var ind = array[i].indexOf(':');\n"
13495 "        if (ind > 0) {\n"
13496 "            var k = array[i].substr(0, ind);\n"
13497 "            if (k == key)\n"
13498 "                return array[i].substr(ind+1, array[i].length);\n"
13499 "        }\n"
13500 "        var ind = array[i].indexOf('[');\n"
13501 "        if (ind > 0) {\n"
13502 "            var k = array[i].substr(0, ind);\n"
13503 "            if (k == key)\n"
13504 "                return array[i].substr(ind+1, array[i].length);\n"
13505 "        }\n"
13506 "    }\n"
13507 "    return null;\n"
13508 "}\n"
13509 "\n"
13510 "return GetRecord(path);\n"
13511 "}"
```

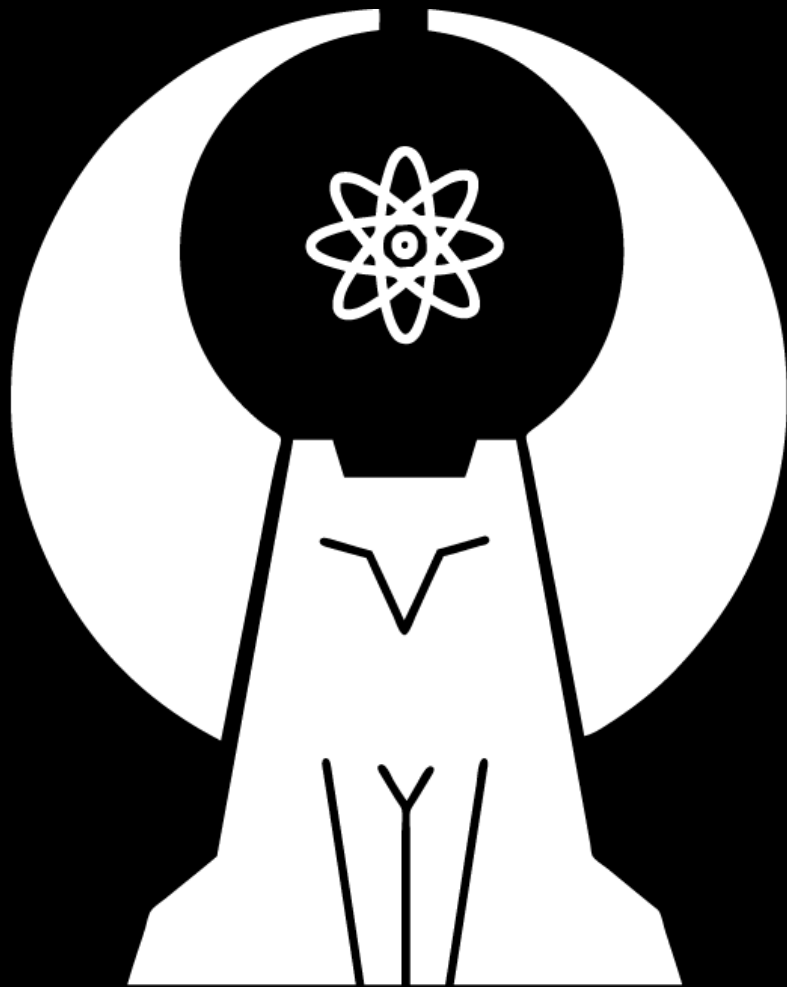
Line 13490, Column 11



An Impetus to Write Unmaintainable Code



But Not All Labs Science The Same!



GRIFFIN

Getting in the Way of Yourself



You Don't Have to Do Everything Yourself



Science Should Always Be A Collaboration

How Do We Adapt Our Culture?

Programmers:

**Just because you are not a scientist does
not mean you can't contribute**

Educate scientists on the merits of open-sourcing their code

Code Reviews

Code Refactoring

UI Design & Strategy



Scaling Infrastructure

Scientists:

**If you are not a software engineer you are
out of your domain**

Get Your Code in the Open

Bring Software Developers and Computing Scientists On Board

Preferably Bring Them in EARLY!

**Just Be Okay Admitting You Write Crap Code
Sometimes**



TDD/BDD

(test-driven-development/behavior-driven-development)

Modularization of Your Code

A photograph of a diverse group of people, including men and women of various ethnicities, cheering enthusiastically with their arms raised in the air. The image has a halftone or dithered texture. A semi-transparent dark grey rectangular box is centered over the image, containing the text "Let Our Powers Combine" in white.

Let Our Powers Combine





linebrowser

interdisciplinaryprogramming.com

(tell your friends)

THANKS STRANGE LOOP!

with love



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mozilla

