



# Event Loop, yay



Bert Belder  
@piscisaureus

nodeJS

2010



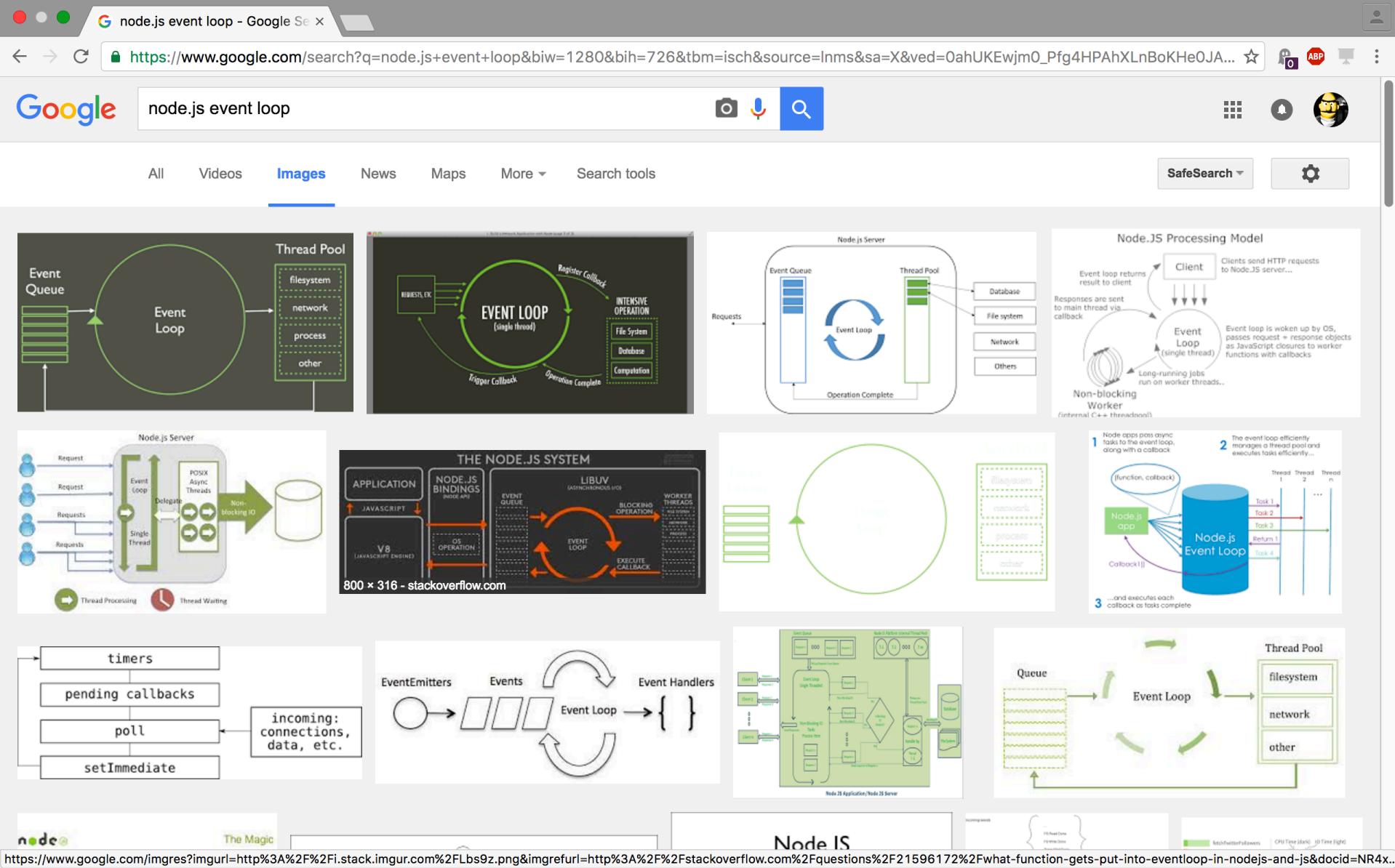
2011

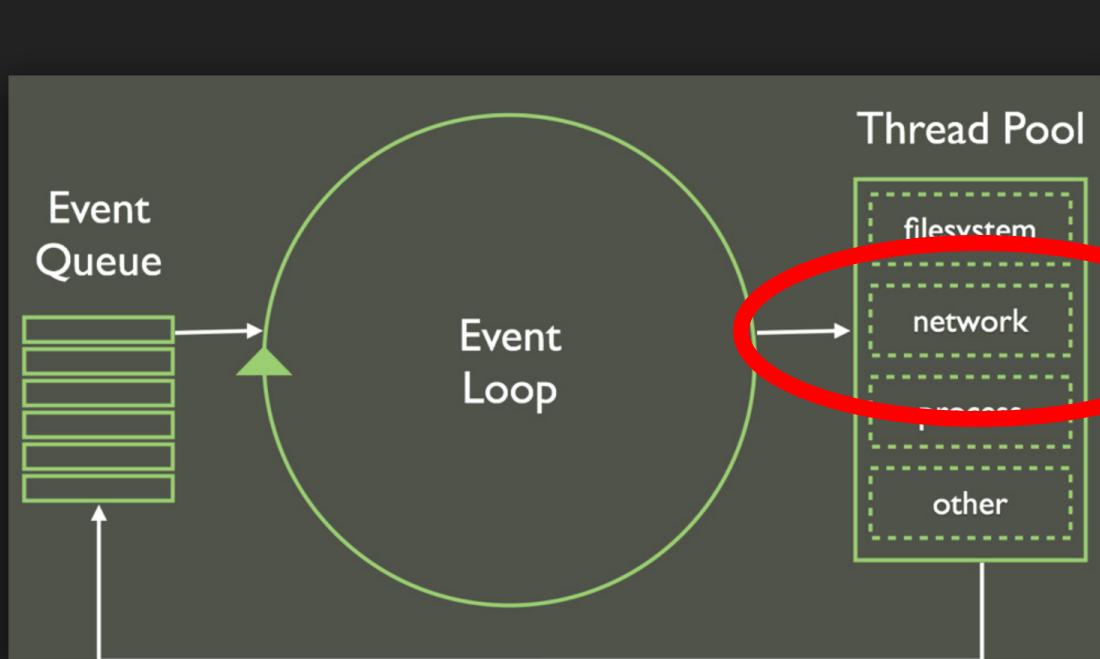
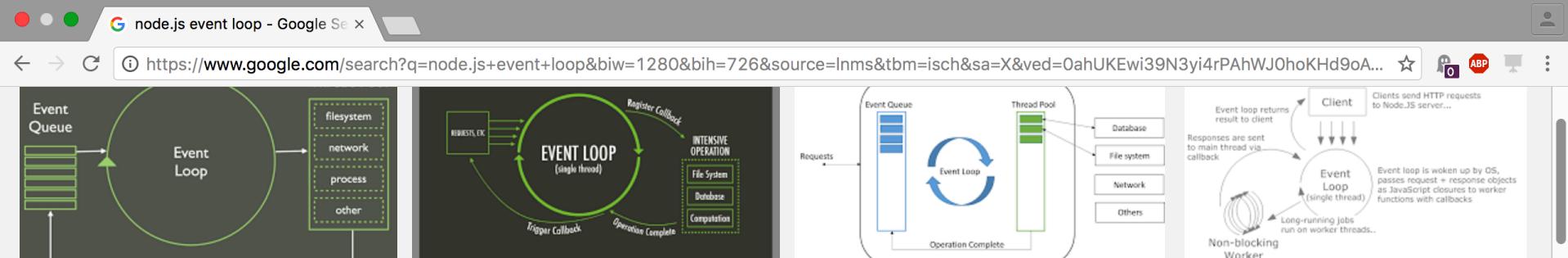
StrongLoop

2013

IBM

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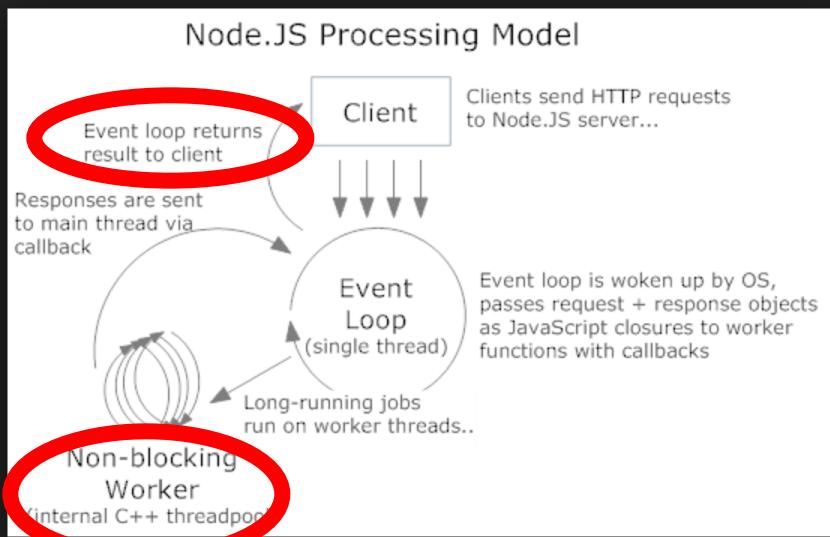
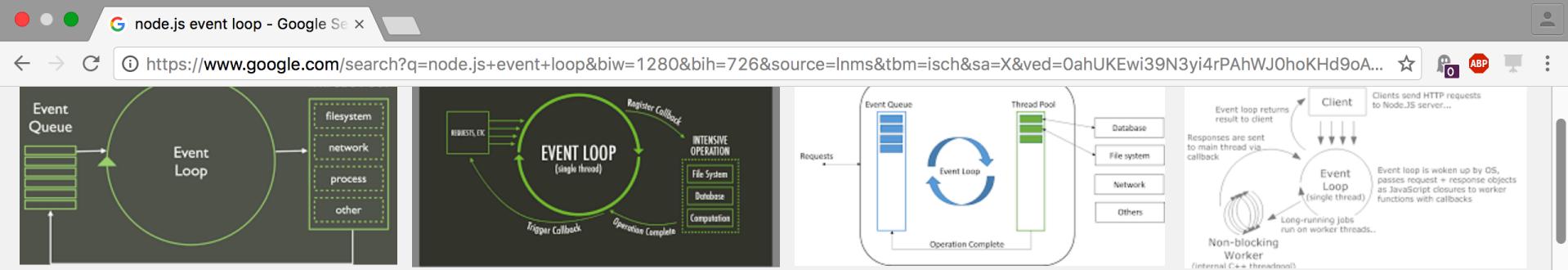


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1 Node uses pre-async tasks to the event loop, along with a callback.

2 The event loop efficiently manages a thread pool and executes tasks efficiently...



### How the single threaded non blockin...

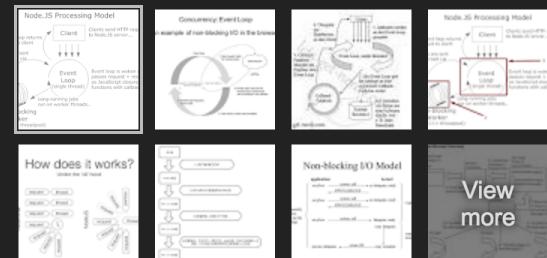
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node.js event loop

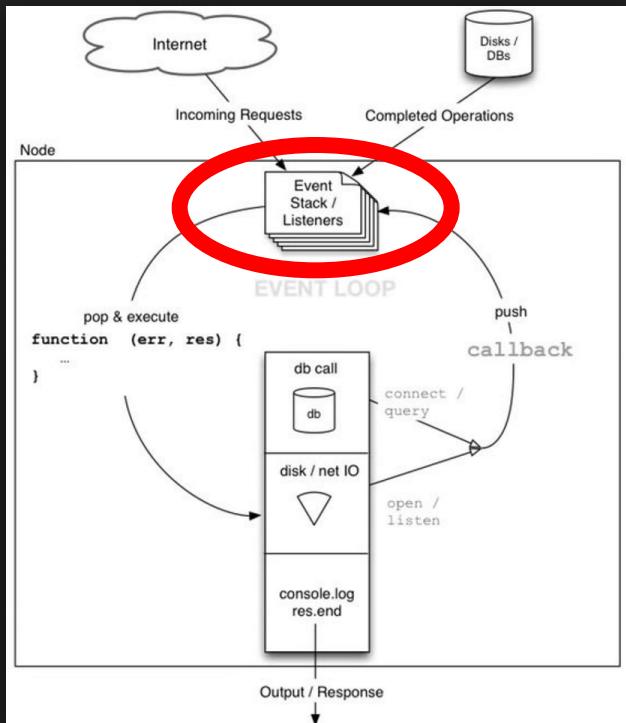
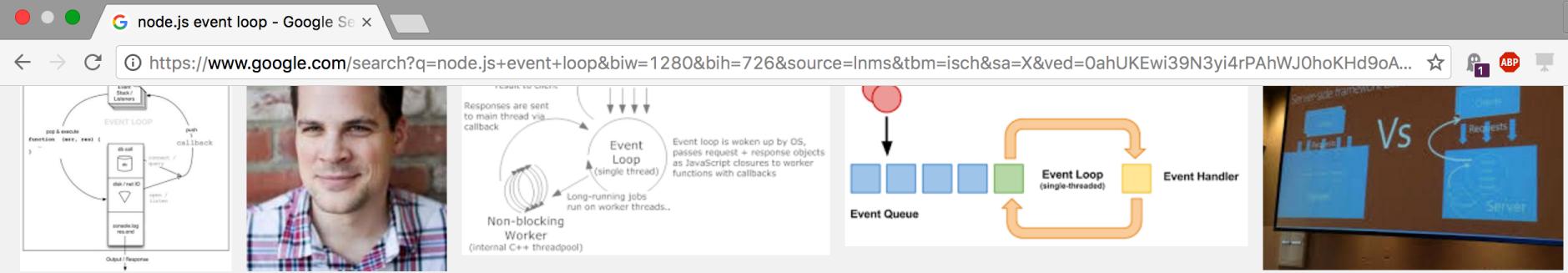
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## node.js event loop flowchart | Cheat ...

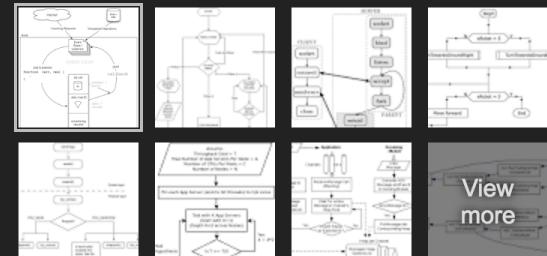
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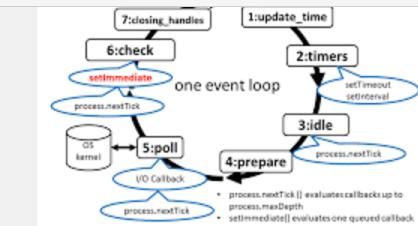
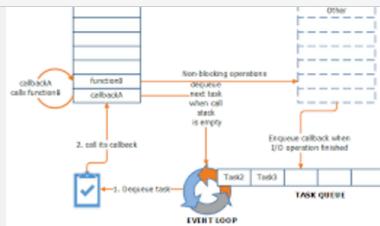
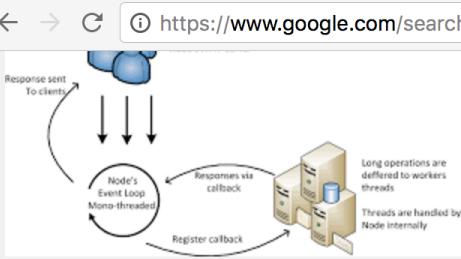
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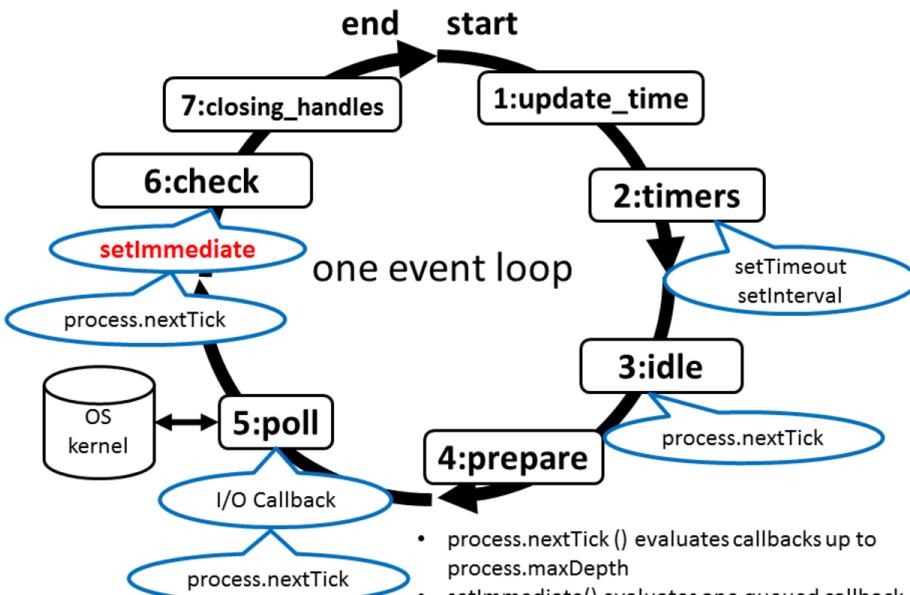
EventMachine in Ruby

```
require 'eventmachine'
include Echo
module Echo
  def process_next_tick
    puts "Somebody Connected"
    if EM.reactor_running?
      EM.add_timer(0.1, proc {
        EM.defer(proc {
          EM.data_stream("data", "echo")
        })
      })
    end
  end
end
EM.start_server('127.0.0.1', 8081, Echo)
server.on_start { |server|
  EM.setInterval(0.5, proc {
    EM.log("Server Started")
  })
}
```

Node.js

```
var net = require('net');
var server = net.createServer(function (socket) {
  socket.on('connection', function () {
    console.log('Someone Connected');
    socket.pipe(socket);
  });
  socket.on('data', function (data) {
    if (data === 'quit') {
      process.exit();
    }
    socket.write(data);
  });
});
server.listen(1337, '127.0.0.1');
```

## setImmediate semantics in node-v0.9.x



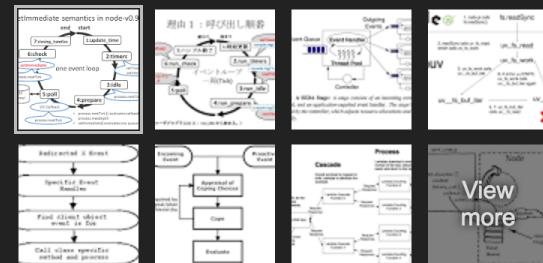
## How Node.js event loop model scales...

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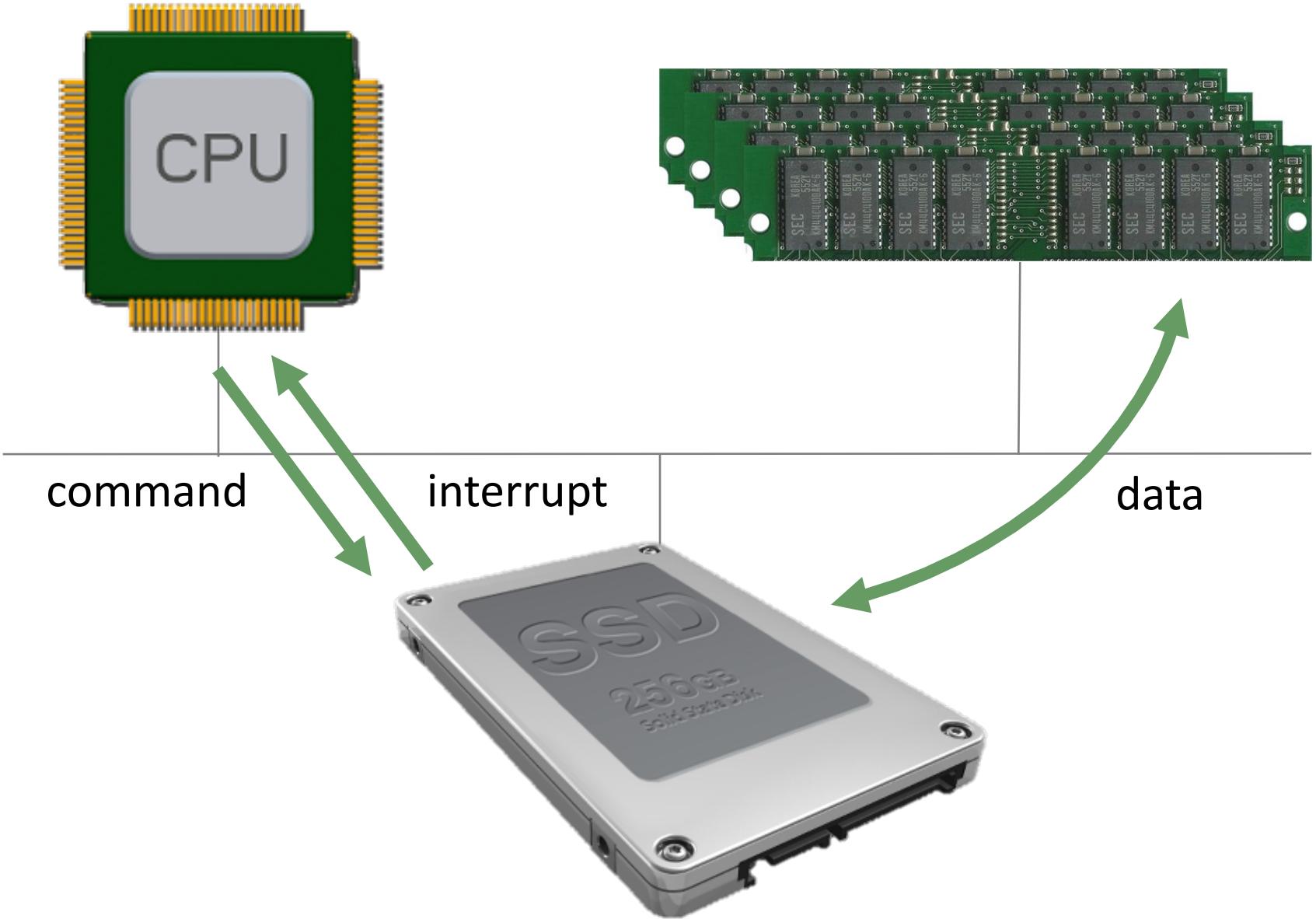
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```
int main(int argc, const char* argv[]) {  
    /* FAKE C CODE ALERT */  
    /* DO NOT TRY THIS AT HOME it won't work*/  
  
    int fd = socket();  
    int result = connect(fd, "www.zombo.com", 8080);  
  
    if (result == 0) {  
        char buf[1024];  
        int sent = write(fd, "hello zombo!", 12);  
        int received = read(fd, buf, 1024);  
    }  
  
    close(fd);  
}
```

SUNNY  
HIGH 84° LOW 62° PAGE 08

# The Washington Times

THURSDAY, JUNE 29, 1989 \*

WASHINGTON, D.C.

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# Major operating systems have been faking synchronous I/O for years

By Paul M. Rodriguez  
and George Archibald

A homosexual prostitution ring is under investigation by federal and District authorities and includes among its clients key officials of the Reagan and Bush administrations, military officers, congressional aides and U.S. and foreign businessmen with close social ties to Washington's political elite, documents obtained by The Washington Times reveal.

One of the ring's high-profile clients was so well-connected, in fact, that he could arrange a middle-of-the-night tour of the White House for his friends on Sunday, July 3, of last year. Among the six persons on the extraordinary 1 a.m. tour were two male prostitutes.

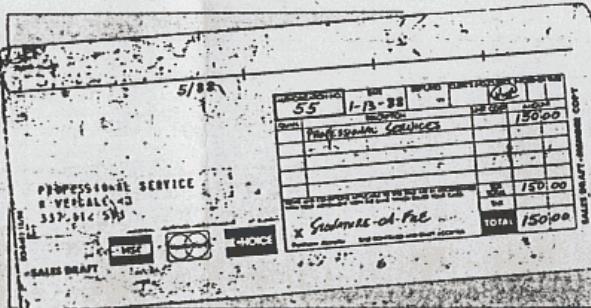
Federal authorities, including the Secret Service, are investigating

## linux, windows, os x all implicated in kernel scandal of the century

criminal aspects of the ring and have told male prostitutes and their homosexual clients that a grand jury will deliberate over the evidence throughout the summer, The Times learned.

Reporters for this newspaper examined hundreds of credit-card vouchers, drawn on both corporate and personal cards and made payable to the escort service operated by the homosexual ring. Many of the vouchers were run through a so-called "sub-merchant" account of the Chambers Funeral Home by a son of the owner, without the company's knowledge.

Among the client names contained in the vouchers — and identified by prostitutes and escort operators — are government officials, locally based U.S. military officers,



businessmen, lawyers, bankers, congressional aides and other professionals.

Editors of The Times said the newspaper would print only the

names of those found to be in sensitive government posts or positions of influence. "There is no intention of publishing names or facts about the operation merely for titillation,"

said Wesley Pruden, managing editor of The Times.

The office of U.S. Attorney Jay B. Stephens, former deputy White House counsel to President Reagan, is coordinating federal aspects of the inquiry but refused to discuss the investigation or grand jury action.

Several former White House colleagues of Mr. Stephens are listed among clients of the homosexual prostitution ring, according to the credit-card records, and those persons have confirmed that the charges were theirs.

Mr. Stephens' office, after first saying it would cooperate with The Times' inquiry, withdrew the offer late yesterday and also declined to say whether Mr. Stephens would recuse himself from the case be-

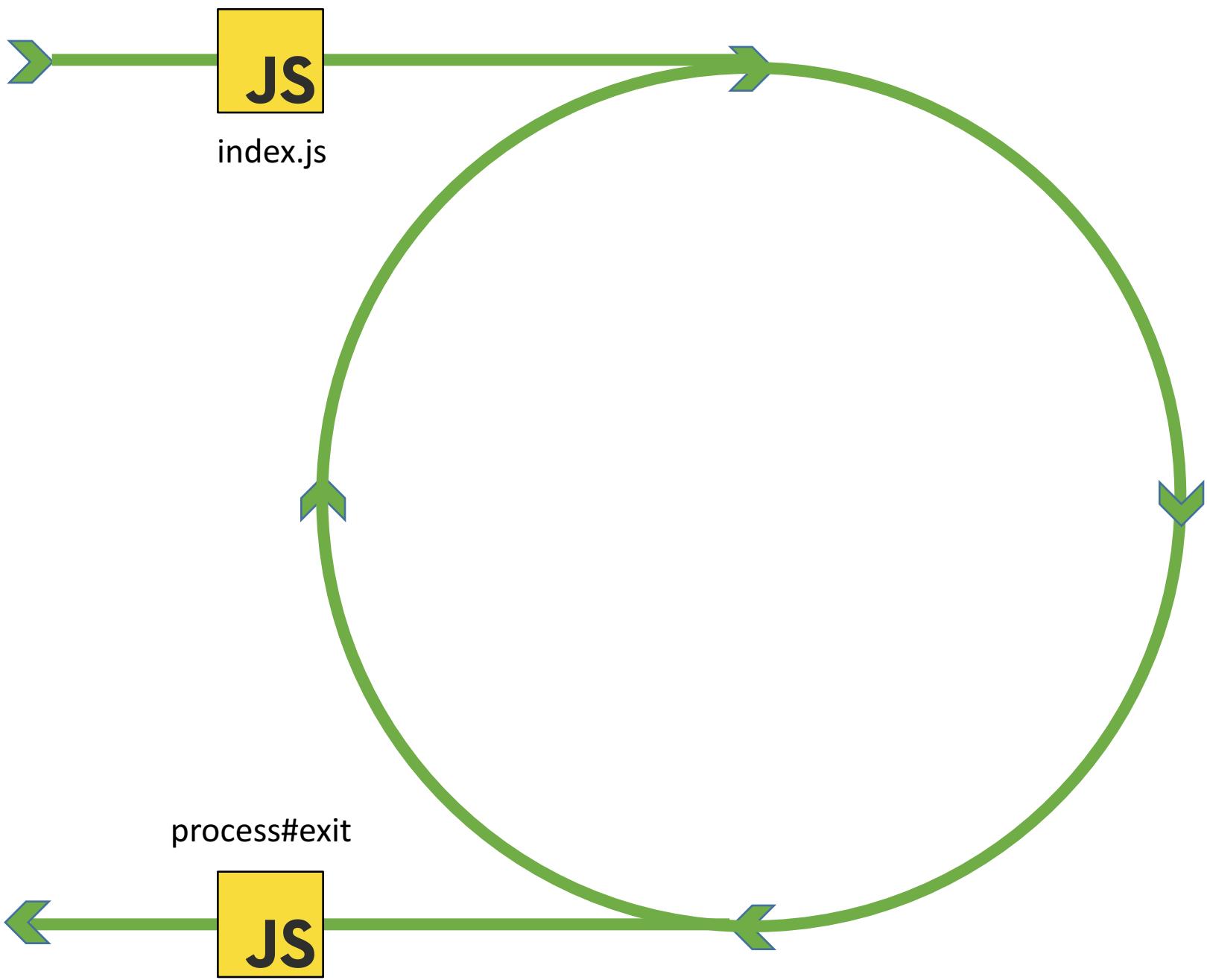
cause of possible conflict of interest.

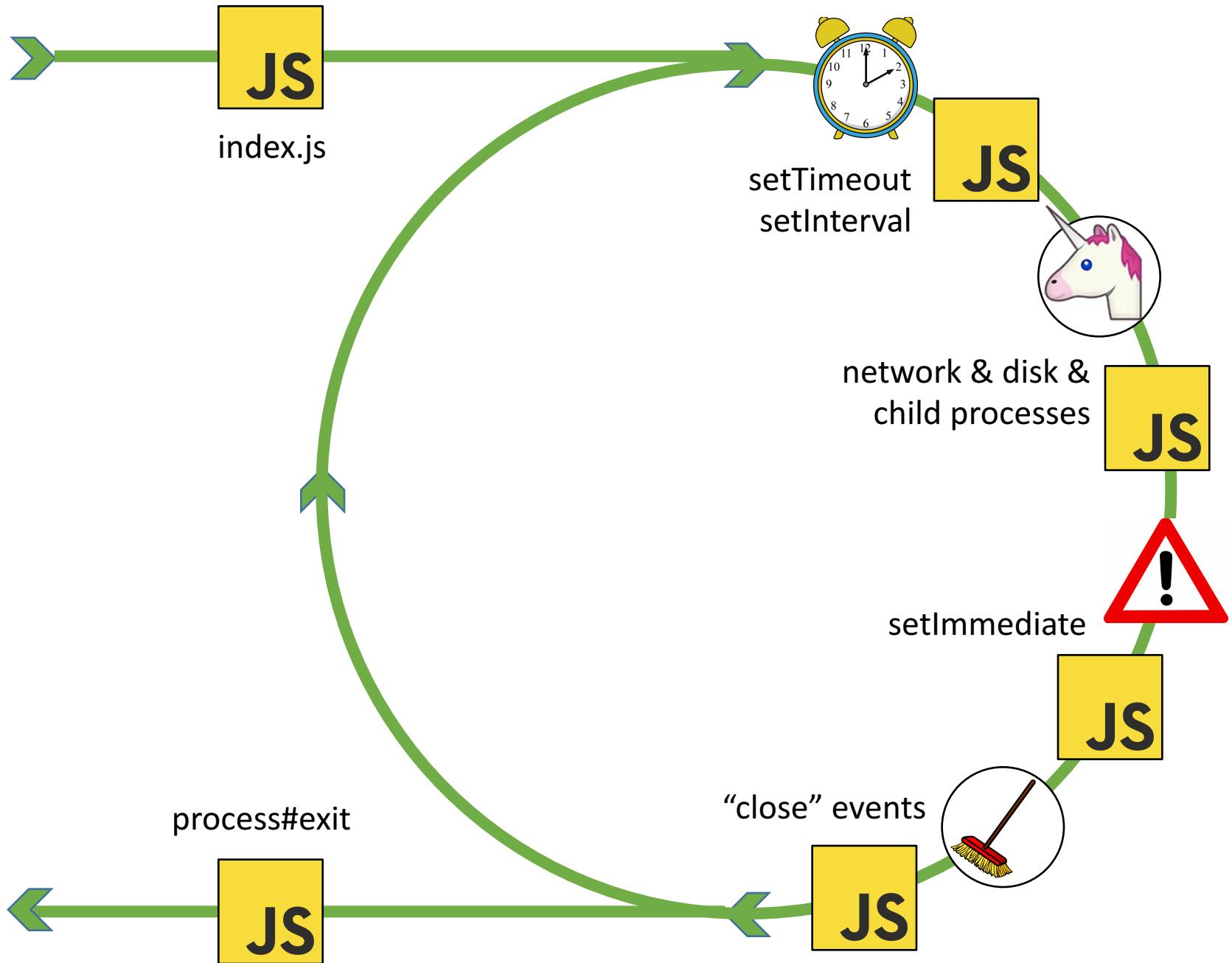
At least one highly placed Bush administration official and a wealthy businessman who procured homosexual prostitutes from the escort services operated by the ring are cooperating with the investigation, several sources said.

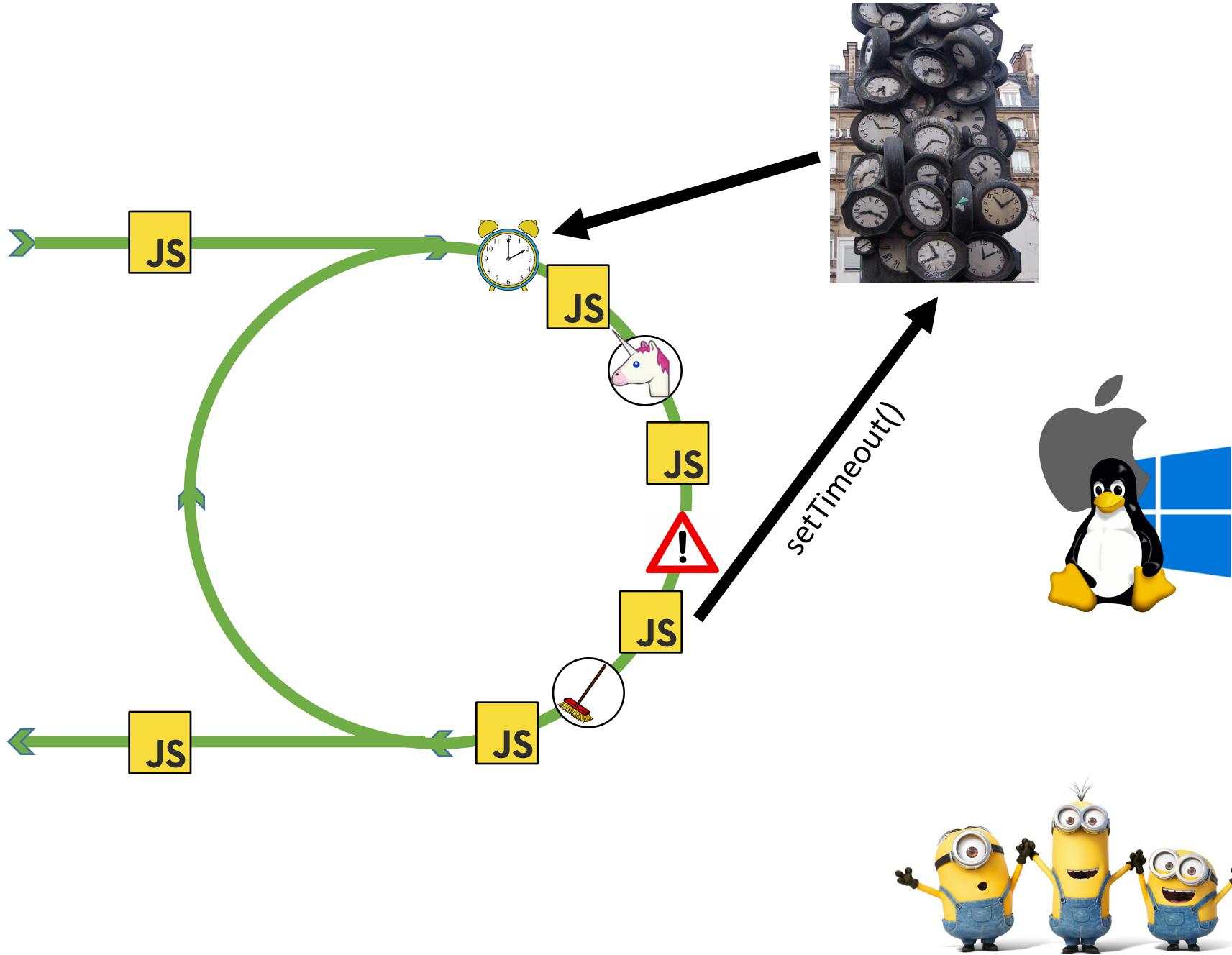
Among clients who charged homosexual prostitute services on major credit cards over the past 18 months are Charles K. Dutcher, former associate director of presidential personnel in the Reagan administration, and Paul R. Balach, Labor Secretary Elizabeth Dole's political personnel liaison to the White House.

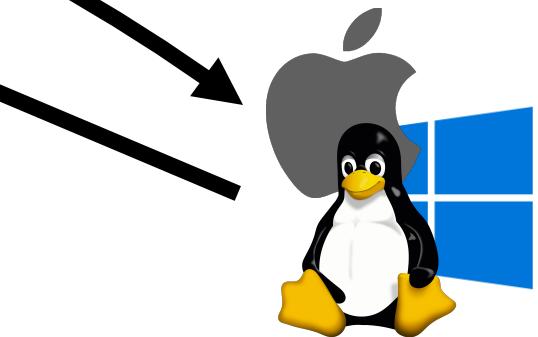
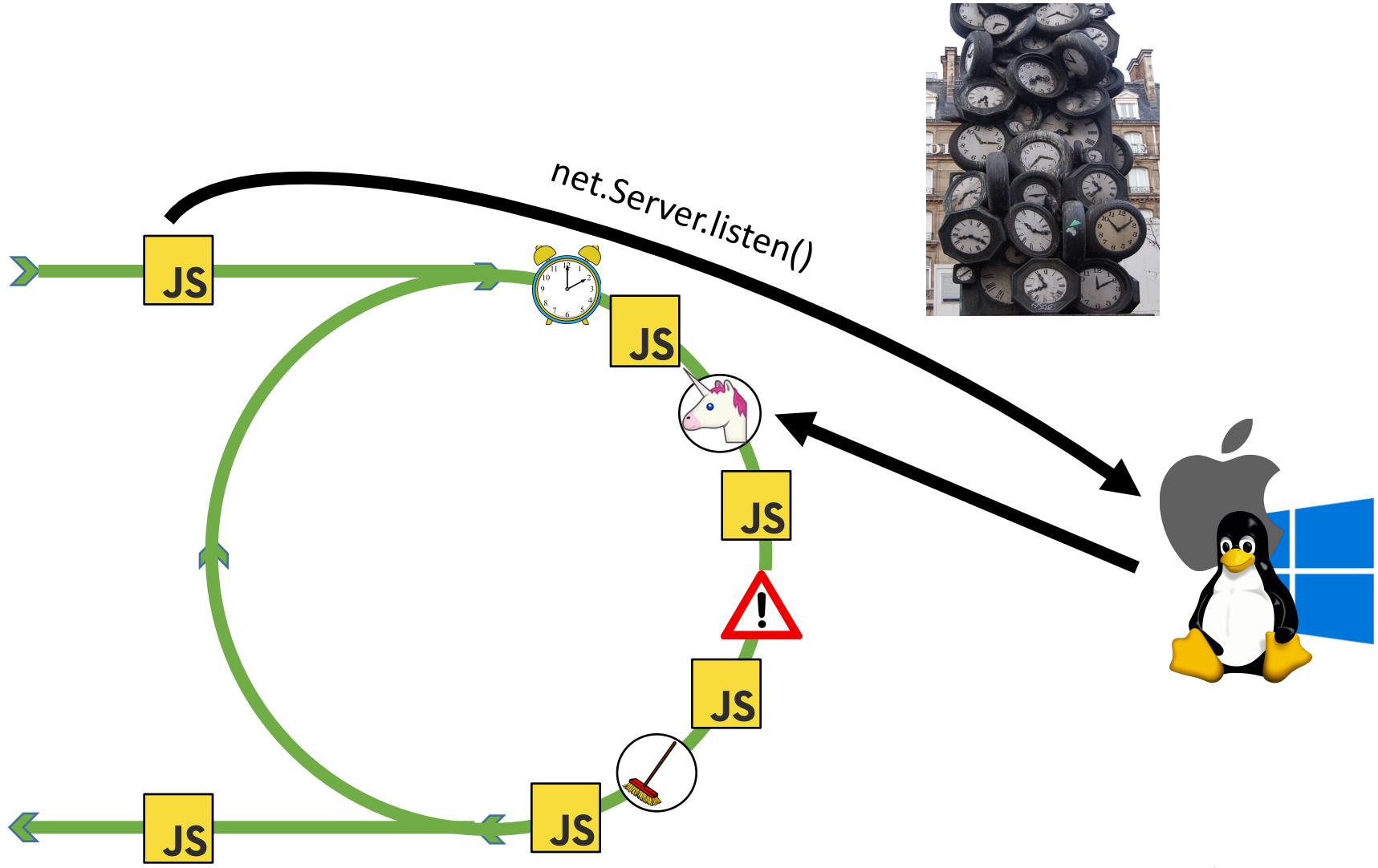
In the 1970s, Mr. Dutcher was a congressional aide to former Rep. Robert Bauman, Maryland Republican, who resigned from the House after he admitted having engaged in sexual liaisons with teen-age male

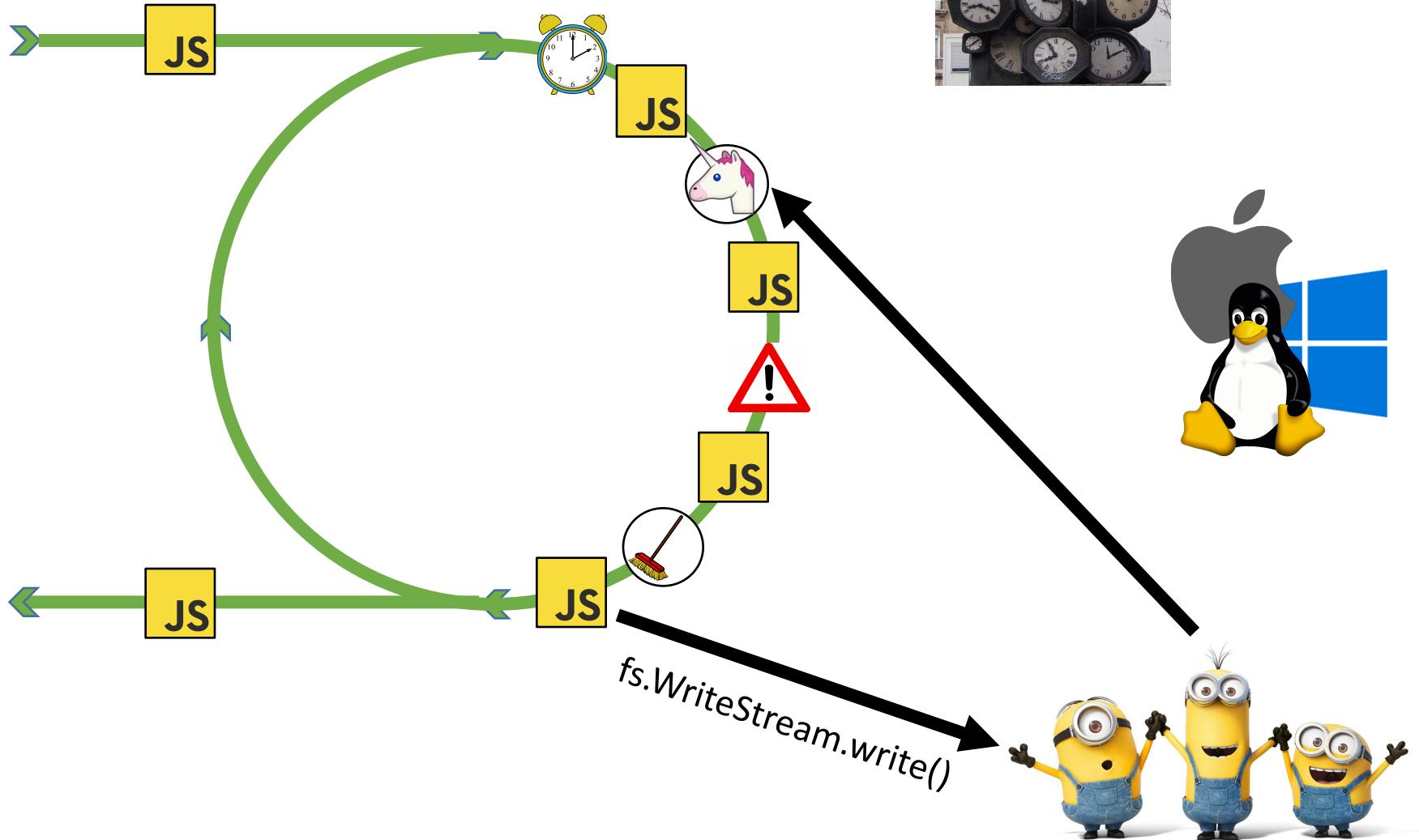
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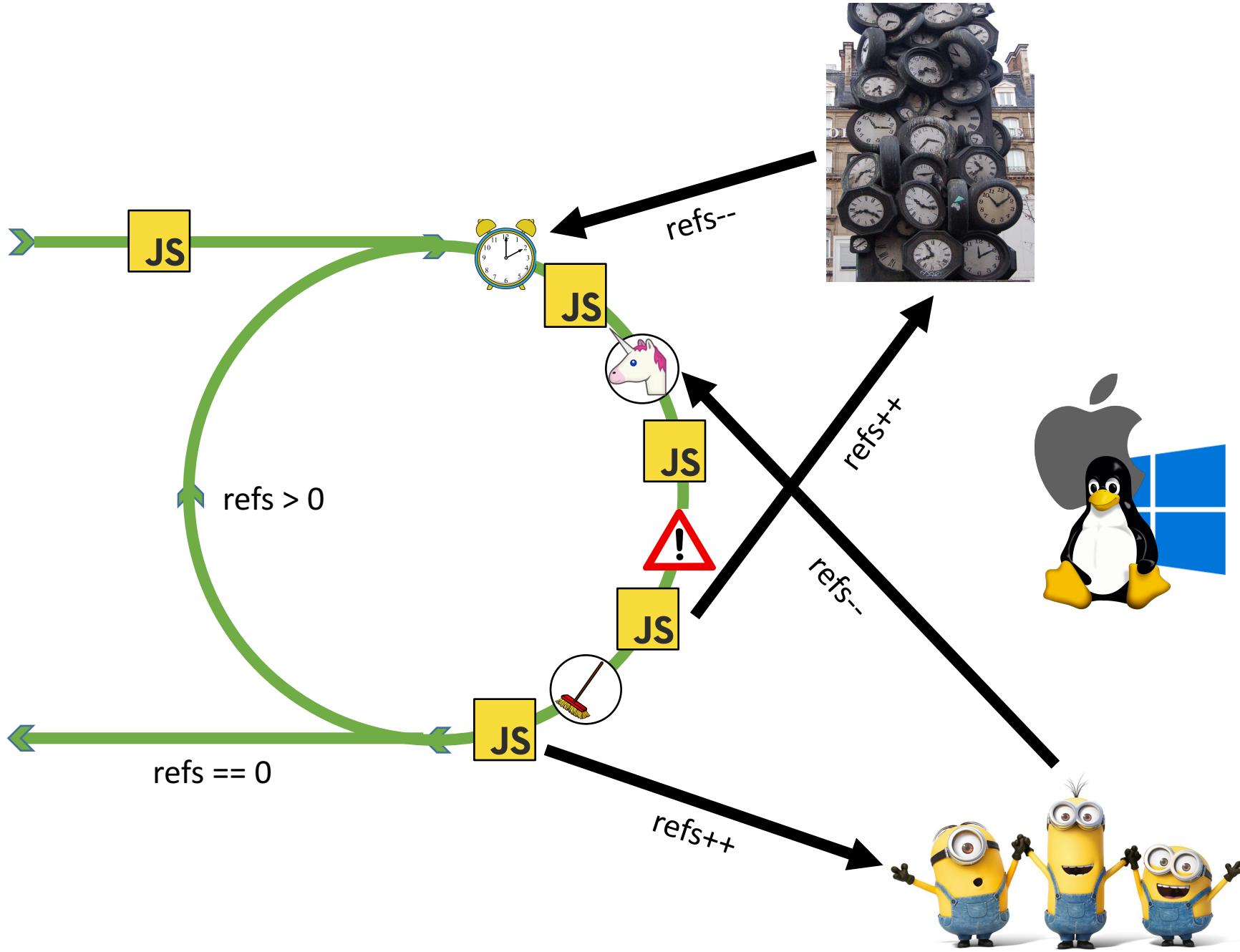












```
function  () {
```

```
}
```

```
int main(int argc, const char* argv[]) {  
    /* FAKE C CODE ALERT */  
    /* DO NOT TRY THIS AT HOME it won't work*/  
  
    int fd = socket();  
    int result = connect(fd, "www.zombo.com", 8080);  
  
    if (result == 0) {  
        char buf[1024];  
        int sent = write(fd, "hello zombo!", 12);  
        int received = read(fd, buf, 1024);  
    }  
  
    close(fd);  
}
```

```
function 🦄() {
```

```
// Put the main thread to sleep.
```

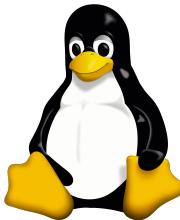
```
// Wake up when:
```

```
//
```

```
// * there are events from the kernel to process
```

```
// * a thread pool thread has completed an operation
```

```
// * the next timer goes off
```



epoll\_wait()



kevent()



GetQueuedCompletionStatusEx()

```
// Return the collected events.
```

```
}
```

## Kernel

tcp / udp sockets, servers  
unix domain sockets, servers  
pipes  
tty input  
dns.resolveXXXX

## Thread Pool

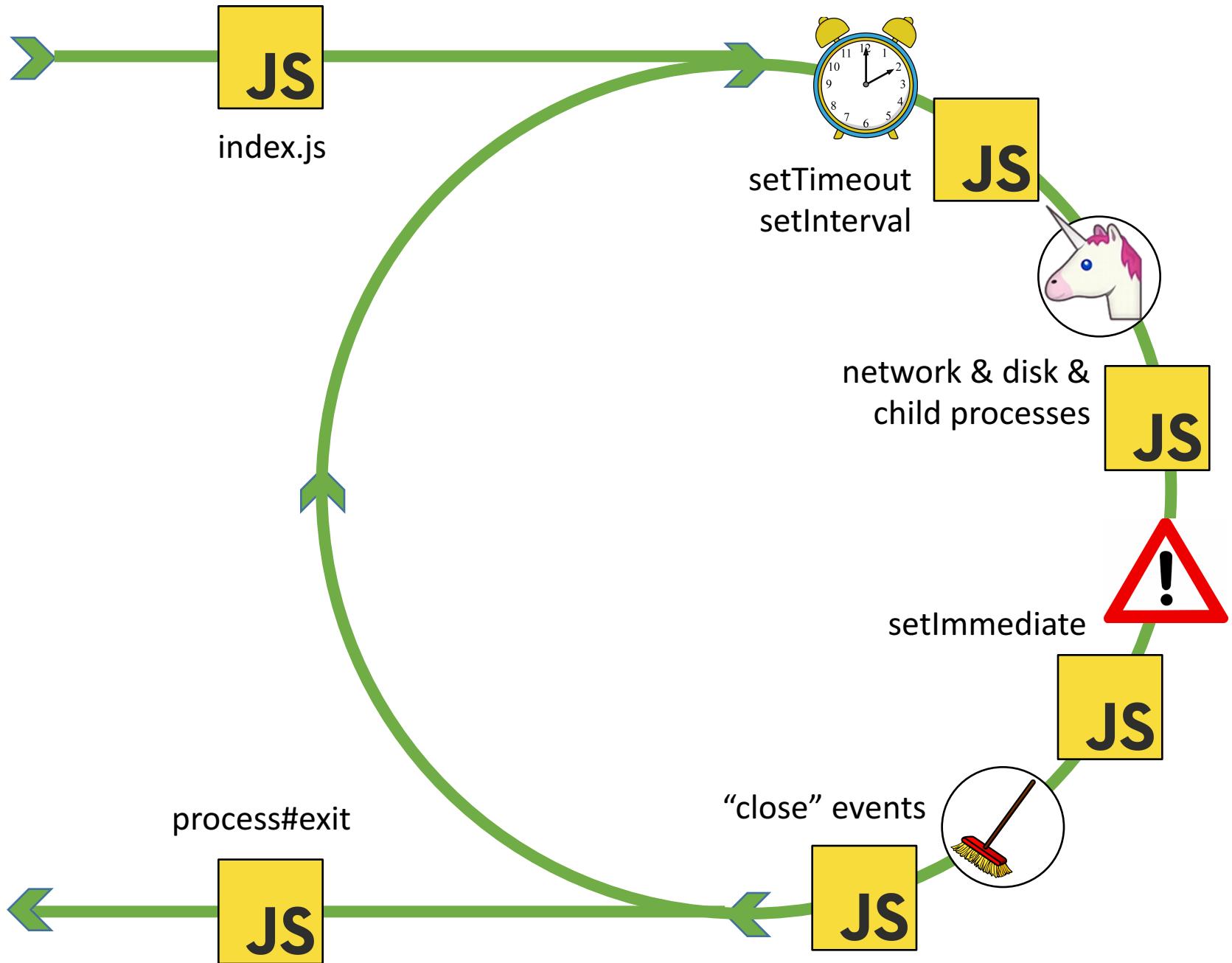
files  
fs.\*  
dns.lookup  
pipes (exceptional)

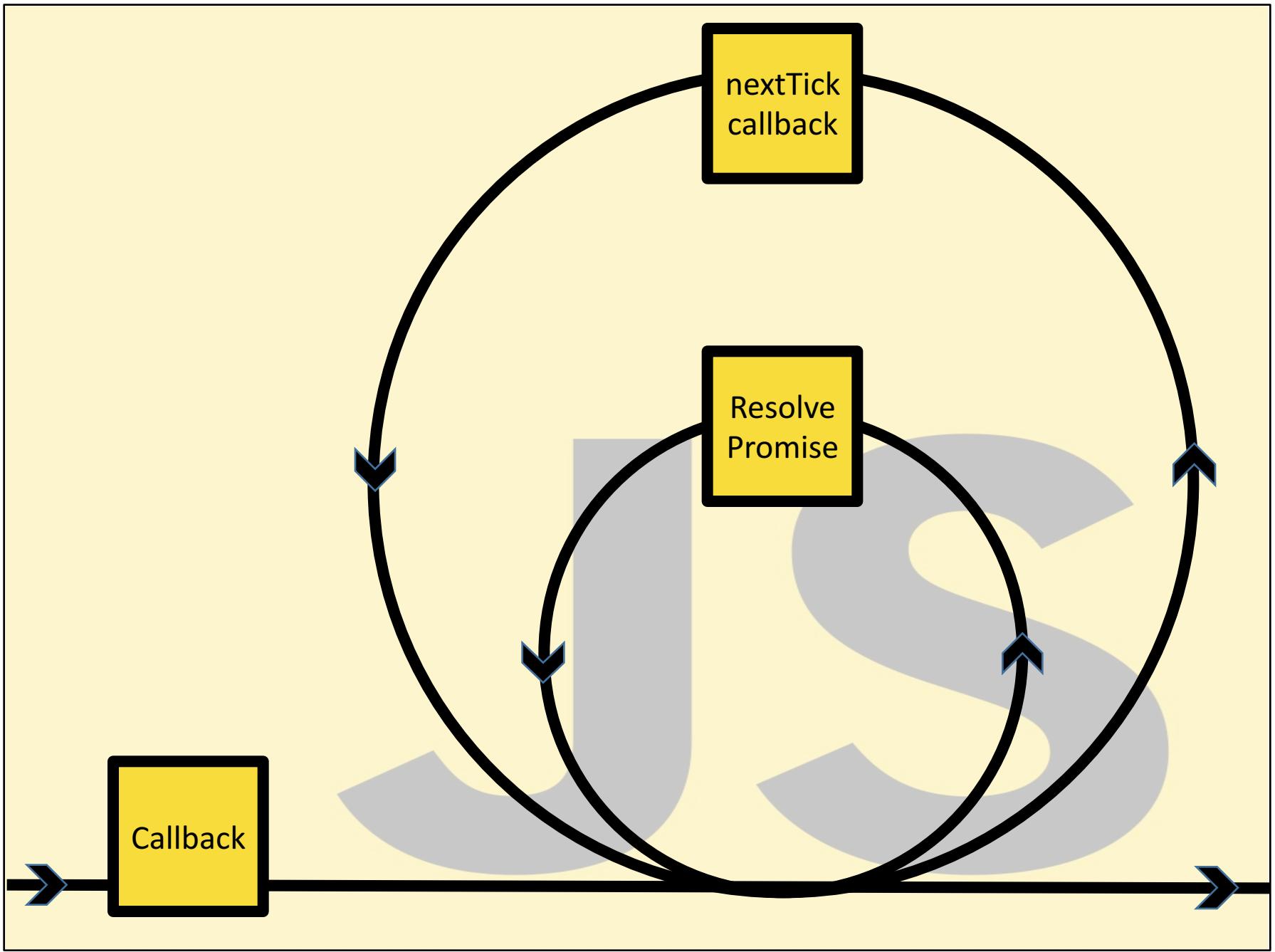
## Signal Handler

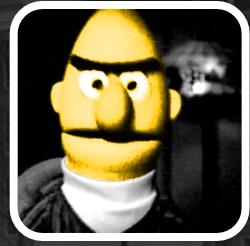
(posix only)  
child processes  
signals

## Wait Thread

(windows only)  
child processes  
console input  
tcp servers (exceptional)







@piscisaureus