NodeJS

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What is NodeJS?

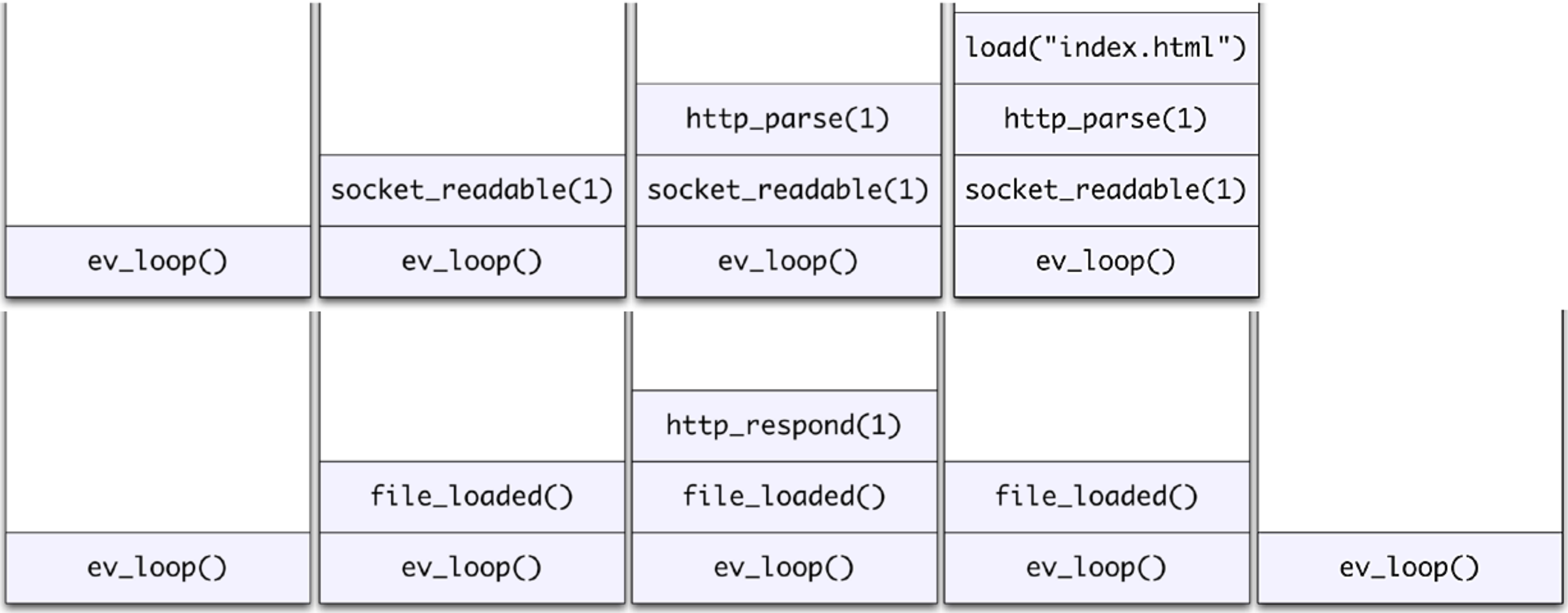
- A JavaScript runtime environment running Google Chrome’s V8 engine
  - a.k.a. a server-side solution for JS
  - Compiles JS, making it really fast
- Runs over the command line
- Designed for high concurrency
  - Without threads or new processes
- Never blocks, not even for I/O
- Uses the CommonJS framework
  - Making it a little closer to a real OO language

Concurrency: The Event Loop

- Instead of threads Node uses an event loop with a stack
- Alleviates overhead of context switching

Event Loop Example

- Request for “index.html” comes in
- Stack unwinds and ev_loop goes to sleep
- File loads from disk and is sent to the client



ev_loop()

socket_readable(1)
ev_loop()

http_parse(1)
socket_readable(1)
ev_loop()

load("index.html")
http_parse(1)
socket_readable(1)
ev_loop()

ev_loop()

file_loaded()
ev_loop()

http_respond(1)
file_loaded()
ev_loop()

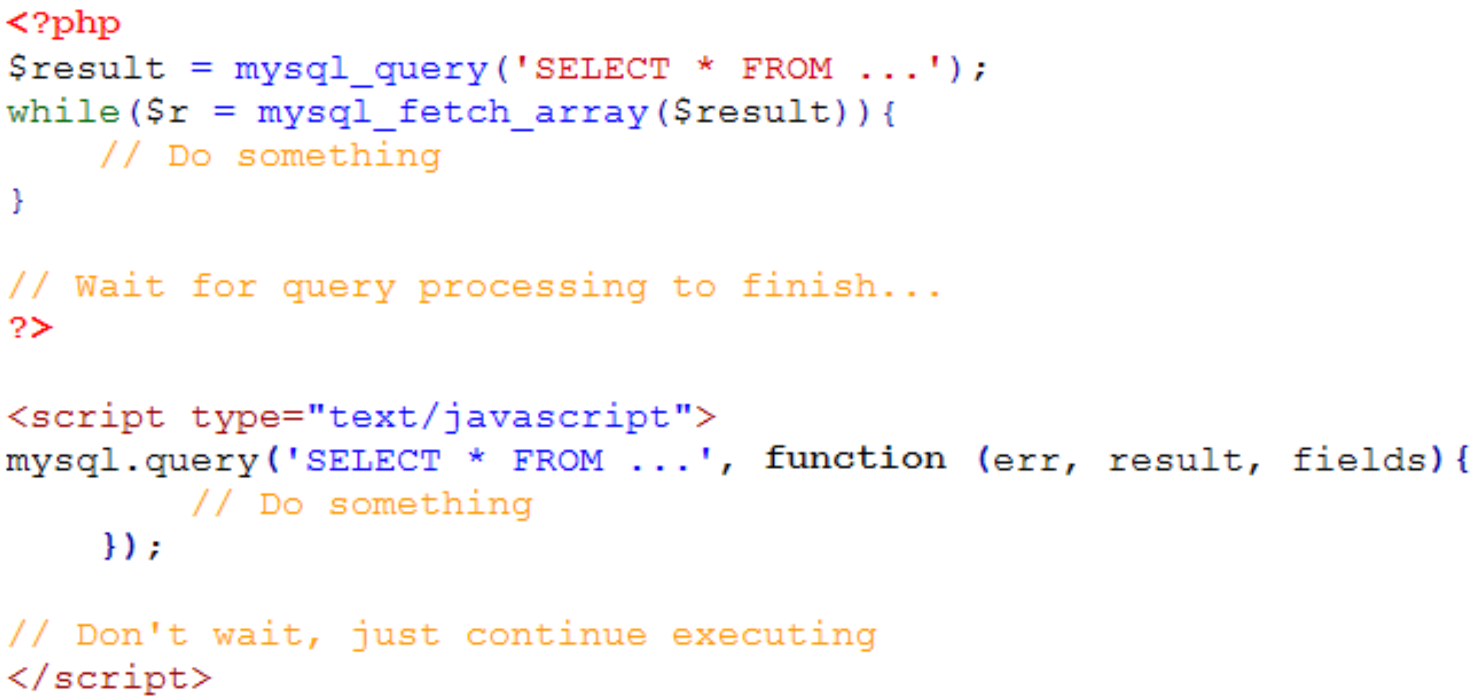
file_loaded()
ev_loop()

ev_loop()

Non-blocking I/O

- Servers do nothing but I/O
  - Scripts waiting on I/O requests degrades performance
- To avoid blocking, Node makes use of the event driven nature of JS by attaching callbacks to I/O requests
- Scripts waiting on I/O waste no space because they get popped off the stack when their non-I/O related code finishes executing

I/O Example



```
<?php
$result = mysql_query('SELECT * FROM ...');
while($r = mysql_fetch_array($result)){
    // Do something
}

// Wait for query processing to finish...
?>

<script type="text/javascript">
mysql.query('SELECT * FROM ...', function (err, result, fields){
        // Do something
    });

// Don't wait, just continue executing
</script>
```

Drawbacks

- Use of JS on both the client and server-side should remove need to “context switch”
  - Client-side JS makes heavy use of the DOM, no access to files/databases
  - Server-side JS deals mostly in files/databases, no DOM
    - JSDom project for Node works for simple tasks, but not much else

Conclusion

- Still in beta
- Non-blocking nature takes some getting used to
- Interesting API
  - Can almost remake Dash!

References

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