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- [\[Basic\]](#) Promise
- [\[Doc\]](#) Events ( )
- [\[Doc\]](#) Timers ( )
- [\[Point\]](#) /
- [\[Point\]](#) /

## promise

`promise`

- [ECMAScript 6](#) - Promise
- [JavaScript](#) - Promise

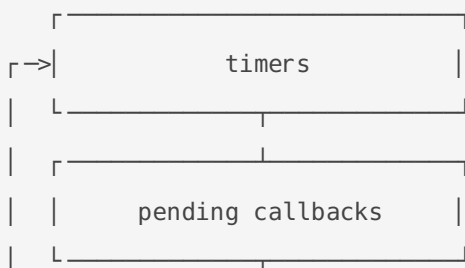
## Event Loop

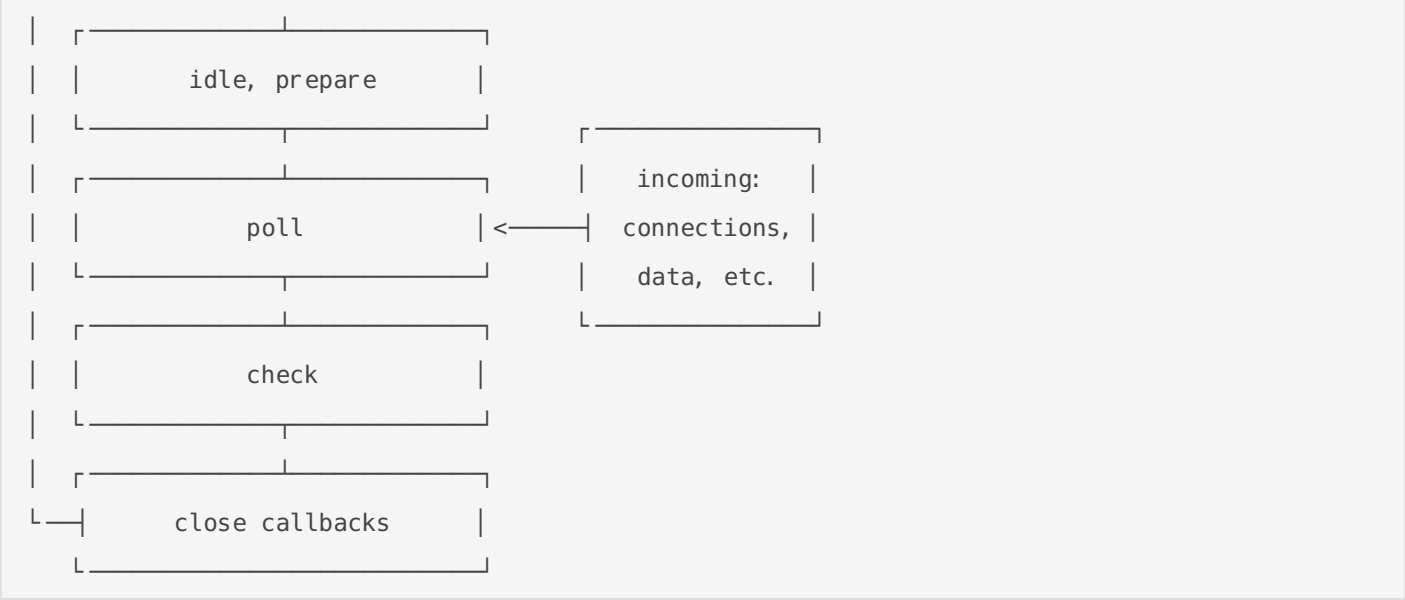
`Event loop` `Node` `Event loop` `Event loop`

Node libuv

“ <https://nodejs.org/en/docs/guides/event-loop-timers-and-nexttick/>  
<https://nodejs.org/zh-cn/docs/guides/event-loop-timers-and-nexttick/>

Event loop





node



### 1 timers

```
setTimeout() || setInterval()
```

### 2 I/O callbacks

- setTimeout() setInterval()
- setImmediate()
- socket.on('close', ...)

### 3 idle, prepare

libuv

### 4 Poll

I/O

I/O

### 5 check

```
setImmediate()
```

### 6 close callbacks

```
socket.on('close', ...)
```

---

`process.nextTick()`

event loop `process.nextTick()`

nextTickQueue nextTickQueue

---

“

<http://www.ruanyifeng.com/blog/2018/02/node-event-loop.html>

<https://github.com/creeperyang/blog/issues/26>

## Macrotask    Microtask

### Microtask

1. `process.nextTick`
2. promises
3. `Object.observe()` (API)
4. `MutationObserver` (DOM change)

### Macrotask

1. `setTimeout`
2. `setInterval`
3. `setImmediate`
4. I/O
5. UI rendering
6. `requestAnimationFrame`

“ WHATWG  
microtask

one cycle of the event loop  
microtask                      microtask

(macro)task    macrotask

“

<https://github.com/ccforward/cc/issues/47>

## timers

`timer`

`require`

API

<http://nodejs.cn/api/timers.html>



Node.js

JavaScript



JavaScript (ES6)

```
const fs = require('fs');  
const data = fs.readFileSync('file.md'); //
```



“

<https://nodejs.org/zh-cn/docs/guides/blocking-vs-non-blocking/#>  
<https://www.zhihu.com/question/19732473>

(Parallel)

(Concurrent)

Image not found or type unknown

```
(Concurrent) = 2 1 .  
(Parallel) = 2 2 .
```

“

“

<https://baike.baidu.com/item/%E5%B9%B6%E5%8F%91#4>  
[https://baike.baidu.com/item/%E5%B9%B6%E8%A1%8C/5806759#reference-\[1\]-8050484-wrap](https://baike.baidu.com/item/%E5%B9%B6%E8%A1%8C/5806759#reference-[1]-8050484-wrap) <https://www.zhihu.com/question/33515481>

## Cluster

nodejs

cluster

nodejs

```
cluster || cluster.fork() || cluster.fork() || child_process.fork()
```

```
cluster.fork() --> child_process.fork()
```

```
const cluster = require('cluster');
const http = require('http');
const numCPUs = require('os').cpus().length;

if (cluster.isMaster) {
  console.log(`    ${process.pid}    `);

  //
  for (let i = 0; i < numCPUs; i++) {
    cluster.fork();
  }

  cluster.on('exit', (worker, code, signal) => {
    console.log(`    ${worker.process.pid}    `);
  });
} else {
  //      TCP
  //      HTTP
  http.createServer((req, res) => {
    res.writeHead(200);
    res.end('    \n');
  }).listen(8000);

  console.log(`    ${process.pid}    `);
}
```

```
$ node server.js
```

```
3596
4324
4520
6056
5644
```

“ <http://nodejs.cn/api/cluster.html>

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