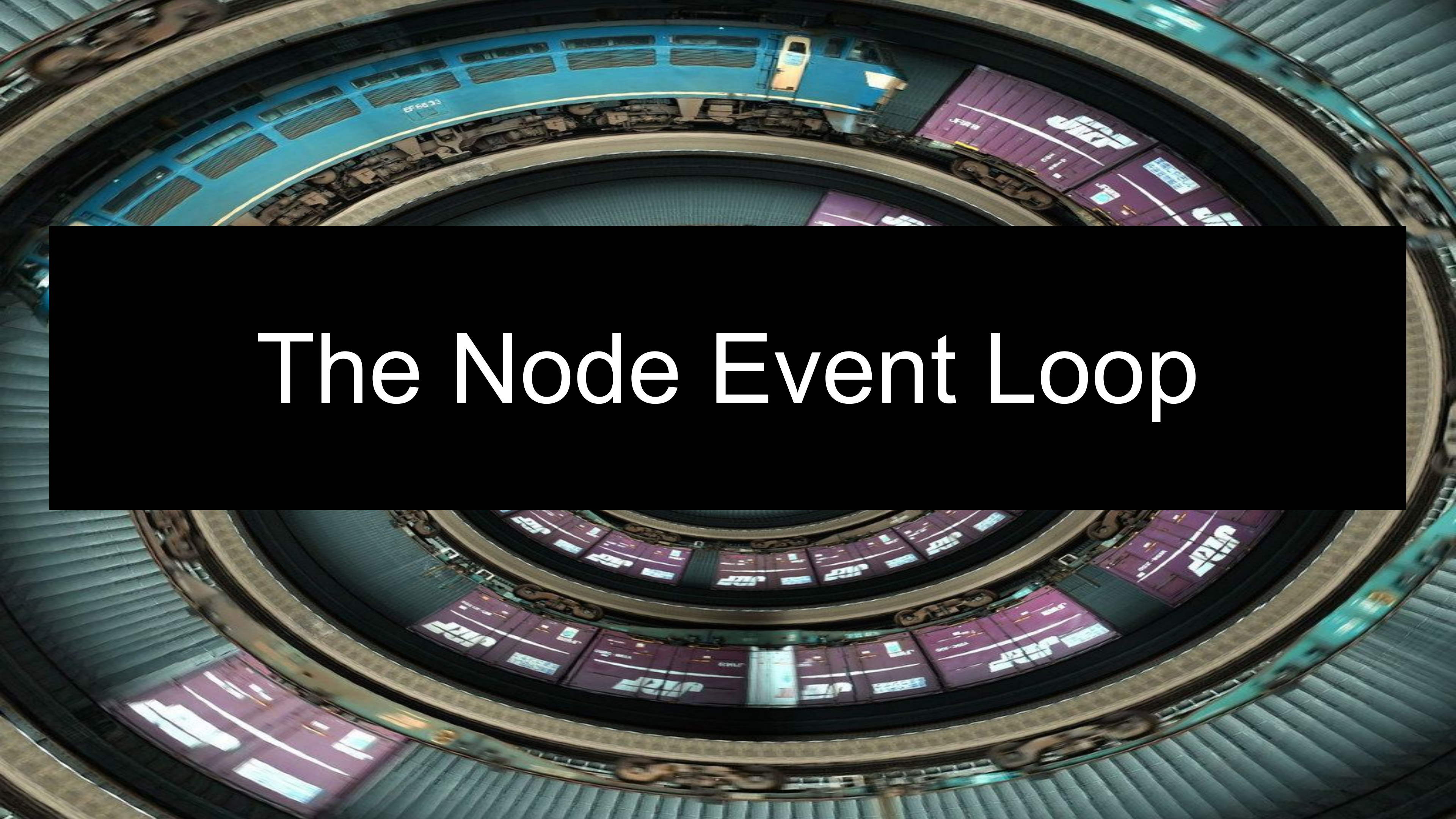
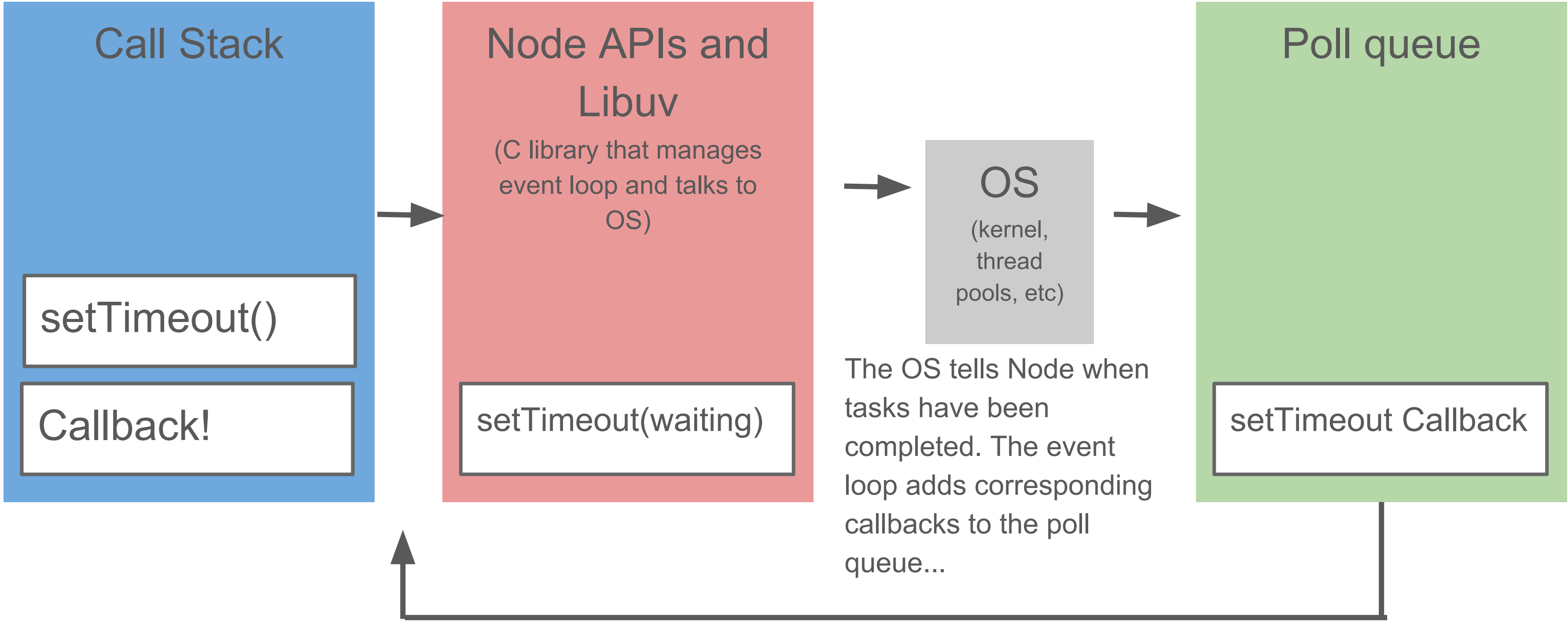


The Node Event Loop

What happens when you run some code in Node?



Call Stack

setTimeout()

Callback!

Node APIs and Libuv

(C library that manages event loop and talks to OS)

setTimeout(waiting)

OS

(kernel, thread pools, etc)

The OS tells Node when tasks have been completed. The event loop adds corresponding callbacks to the poll queue...

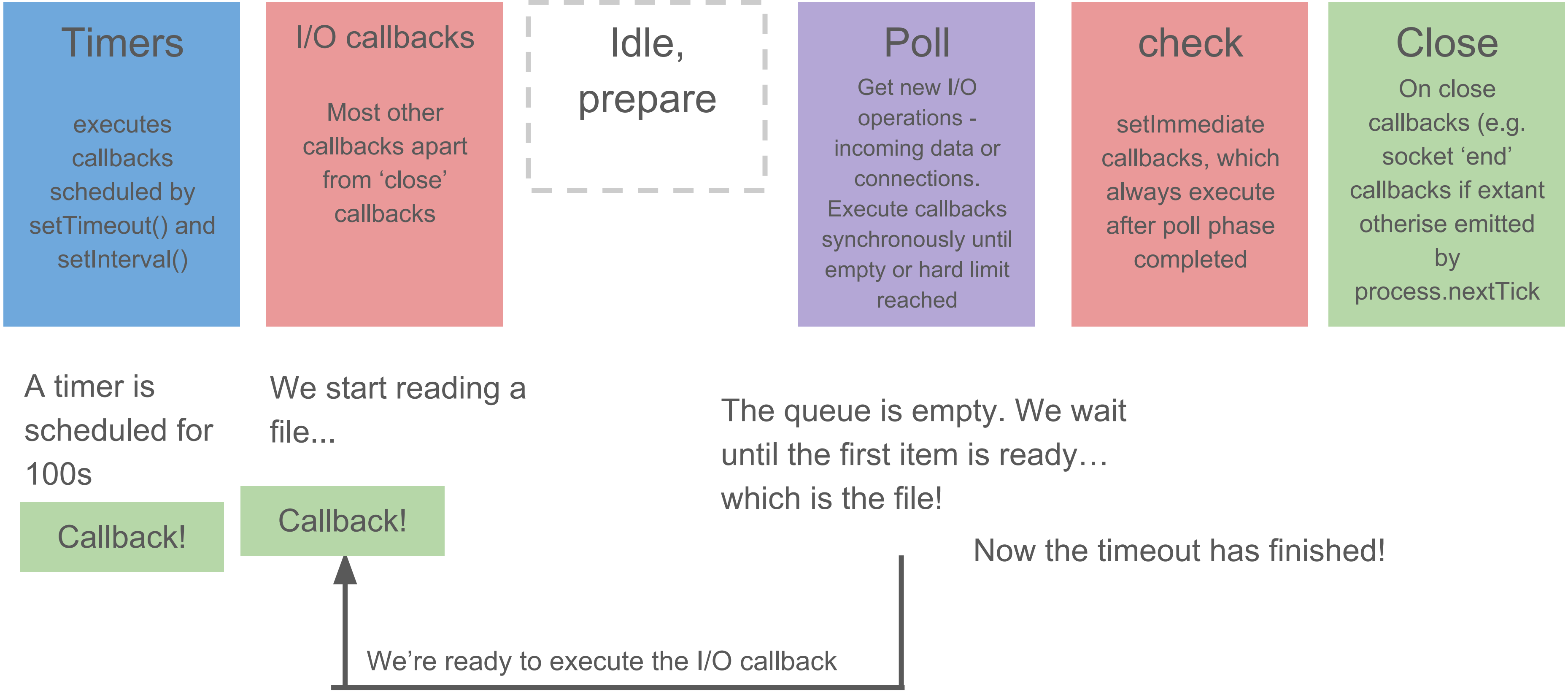
Poll queue

setTimeout Callback

… And checks to see if the call stack is empty. If so it passed any waiting callbacks to the call stack for execution

8 phases to the event loop

We progress to check only if the poll queue is empty and setImmediate has been used… otherwise we wait



Timers

executes callbacks scheduled by setTimeout() and setInterval()

I/O callbacks

Most other callbacks apart from ‘close’ callbacks

Idle, prepare

Poll

Get new I/O operations - incoming data or connections. Execute callbacks synchronously until empty or hard limit reached

check

setImmediate callbacks, which always execute after poll phase completed

Close

On close callbacks (e.g. socket ‘end’ callbacks if extant otherise emitted by process.nextTick

A timer is scheduled for 100s

Callback!

We start reading a file...

Callback!

The queue is empty. We wait until the first item is ready… which is the file!

Now the timeout has finished!

We’re ready to execute the I/O callback

There are 6 main callback queues

- Timers and intervals
- I/O events queue
- Checks / immediates queue
- Close callbacks queue
- Next-tick callback queue. This is checked between each of the main 4 phases of the event loop, and any callbacks here are executed...
- … As are microtasks, which include promise resolutions.

Each completed phase of the event loop is a tick! (So callbacks added using process.nextTick function go onto the next-tick callback queue)

Links

https://medium.freecodecamp.org/walking-inside-nodejs-event-loop-85caeca391a9

https://nodejs.org/en/docs/guides/event-loop-timers-and-nexttick/

https://jsblog.insiderattack.net/event-loop-and-the-big-picture-nodejs-event-loop-part-1-1cb67a182810