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- The Node.js Event Emitter
- Understanding process.nextTick()
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- Don't Block the Event Loop

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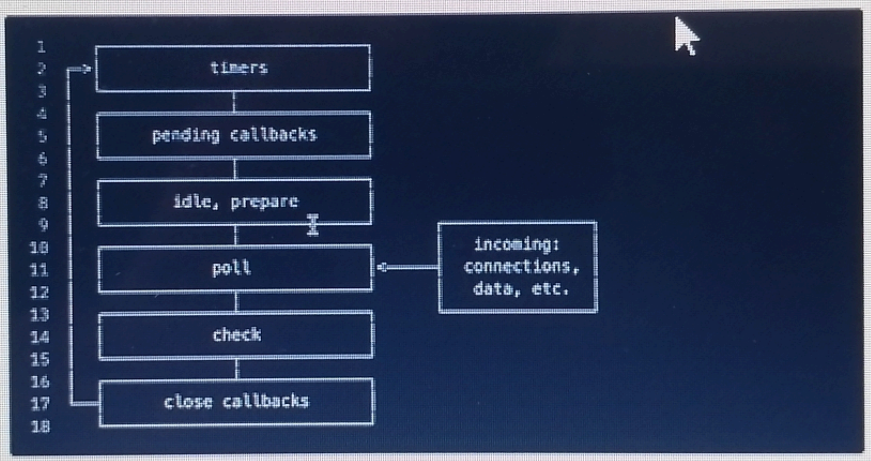
in further detail later in this topic.

Event Loop Explained

When Node.js starts, it initializes the event loop, processes the provided input script (or drops into the REPL, which is not covered in this document) which may make async API calls, schedule timers, or call `process.nextTick()`, then begins processing the event loop.

The following diagram shows a simplified overview of the event loop's order of operations.



> Each box will be referred to as a "phase" of the event loop.

Each phase has a FIFO queue of callbacks to execute. While each phase is special in its own way, generally, when the event loop enters a given phase, it will perform any operations specific to that phase, then execute callbacks in that phase's queue until the queue has been exhausted or the maximum number of callbacks has executed. When the queue has been exhausted or the callback limit is reached, the event loop will move to the next phase, and so on.

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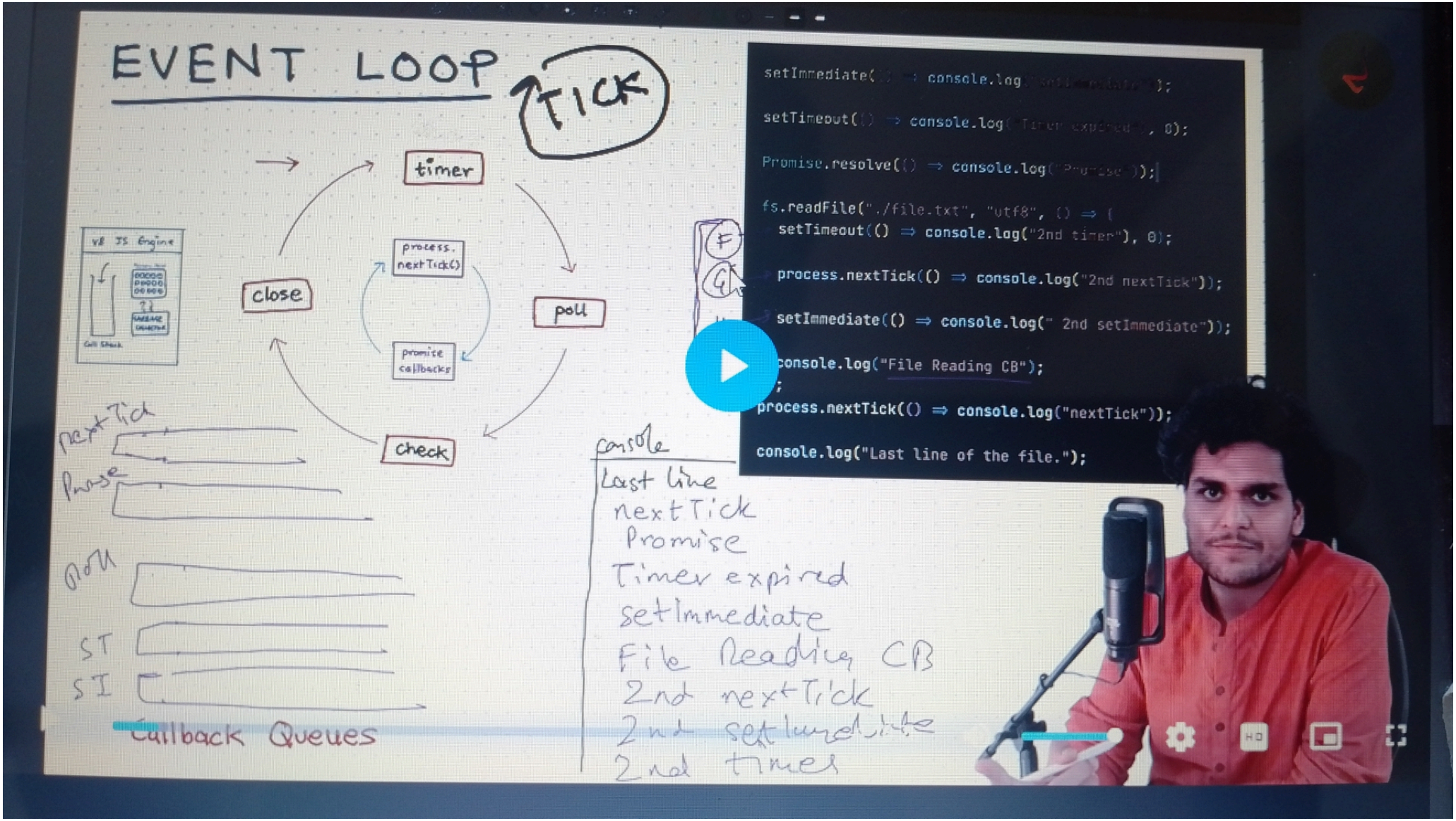
Why use process.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TICK
timer
process.nextTick()
promise callbacks
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check
close
V8 JS Engine
nextTick
Promise
Poll
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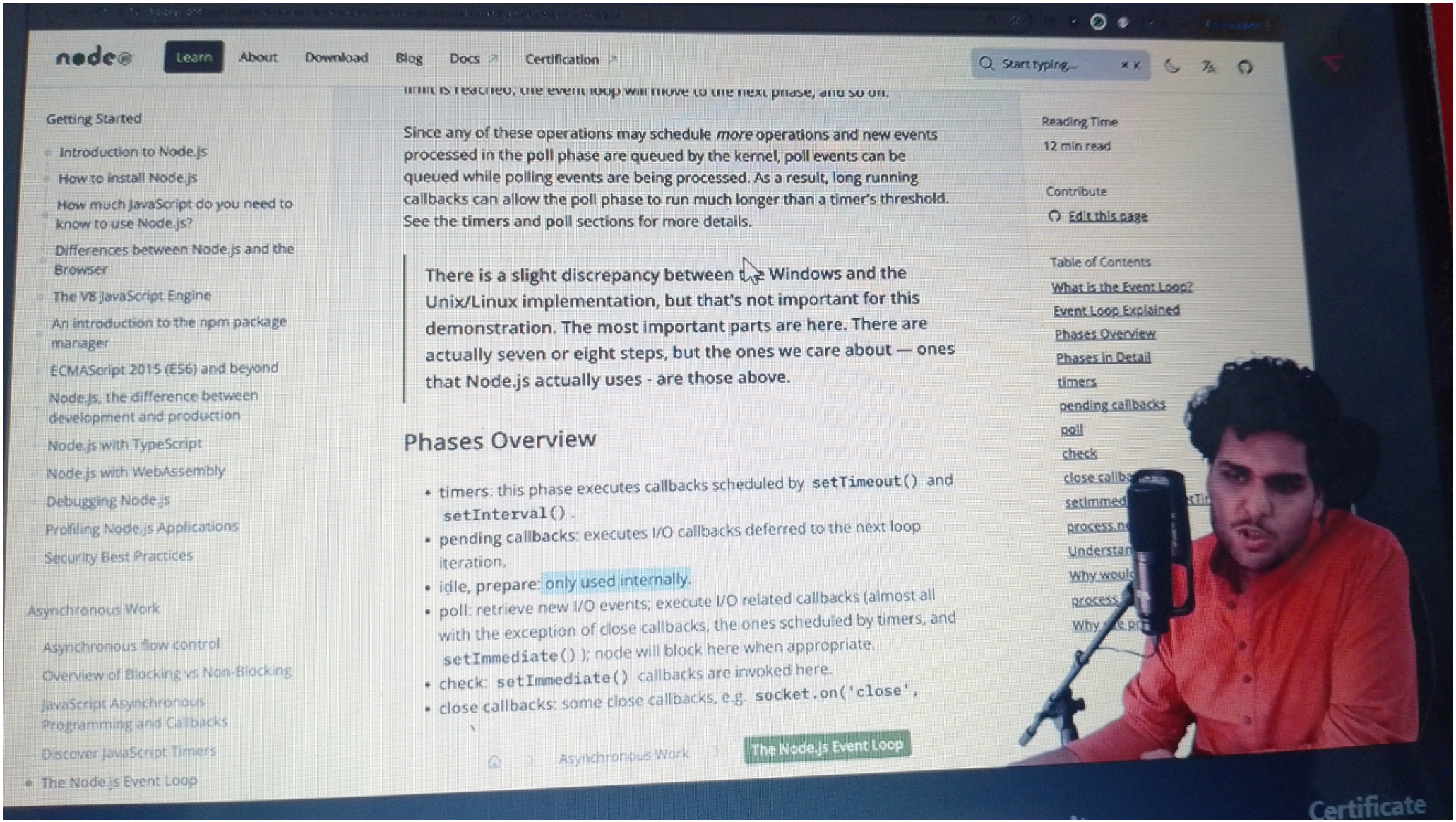
Callback Queues
setImmediate(() => console.log(" 2nd setImmediate"));
setTimeout(() => console.log("Timer expired", 0);
Promise.resolve(() => console.log("Promise"));
fs.readFile("./file.txt", "utf8", () => {
setTimeout(() => console.log("2nd timer"), 0);
process.nextTick(() => console.log("2nd nextTick"));
setImmediate(() => console.log(" 2nd setImmediate"));
console.log("File Reading CB");
process.nextTick(() => console.log("nextTick"));
console.log("Last line of the file.");
console
Last line
nextTick
Promise
Timer expired
setImmediate
File Reading CB
2nd nextTick
2nd setImmediate
2nd timer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limit is reached, the event loop will move to the next phase, and so on.
Since any of these operations may schedule *more* operations and new events processed in the **poll** phase are queued by the kernel, poll events can be queued while polling events are being processed. As a result, long running callbacks can allow the poll phase to run much longer than a timer's threshold. See the **timers** and **poll** sections for more details.
There is a slight discrepancy between the Windows and the Unix/Linux implementation, but that's not important for this demonstration. The most important parts are here. There are actually seven or eight steps, but the ones we care about — ones that Node.js actually uses - are those above.
Phases Overview
timers: this phase executes callbacks scheduled by setTimeout() and setInterval().
pending callbacks: executes I/O callbacks deferred to the next loop iteration.
idle, prepare: only used internally.
poll: retrieve new I/O events; execute I/O related callbacks (almost all with the exception of close callbacks, the ones scheduled by timers, and setImmediate()); node will block here when appropriate.
check: setImmediate() callbacks are invoked here.
close callbacks: some close callbacks, e.g. socket.on('close',
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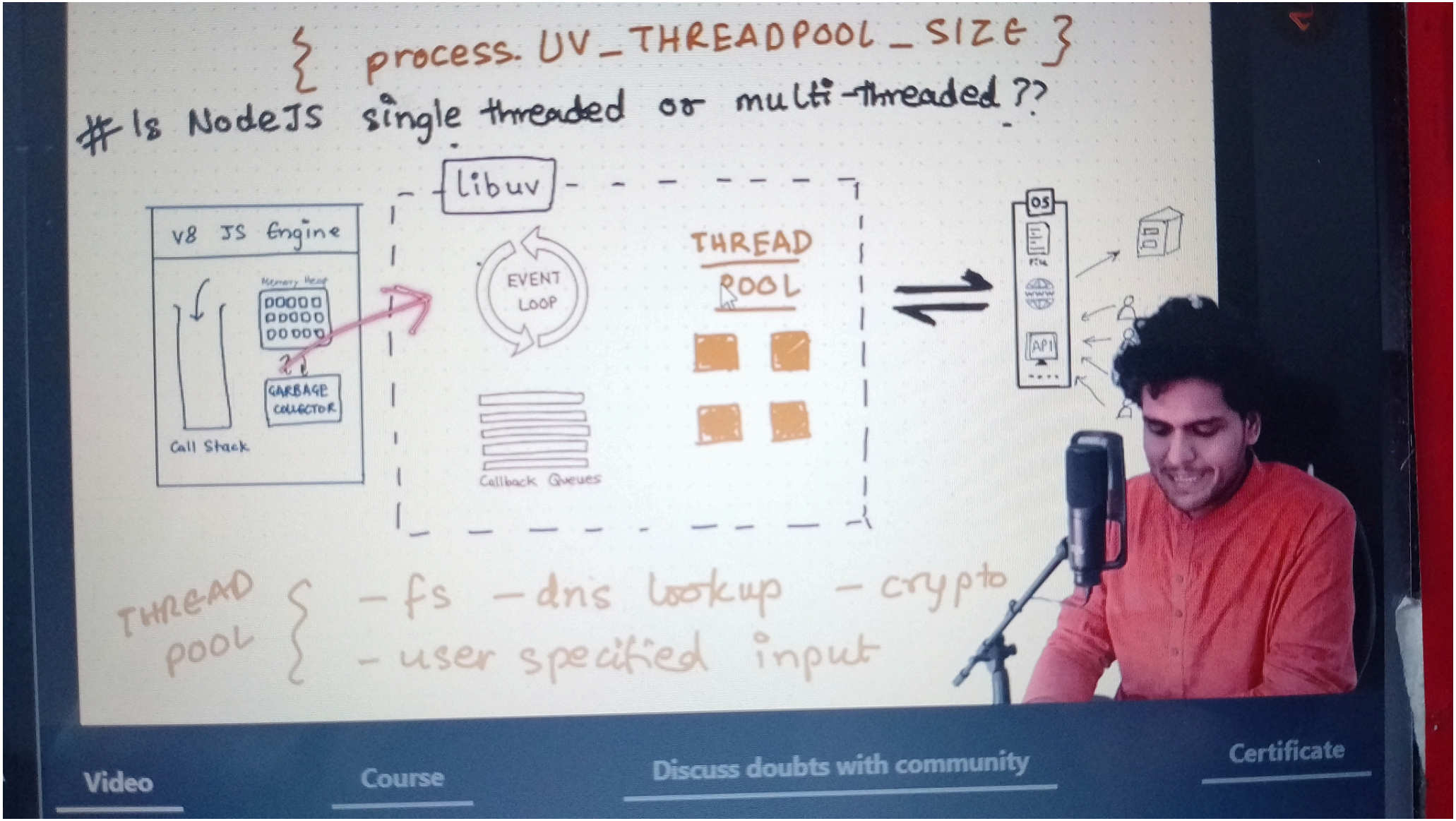
{ process.UV_THREADPOOL_SIZE }
#Is NodeJS single threaded or multi-threaded ??
libuv
V8 JS Engine
Memory Heap
GARBAGE COLLECTOR
Call Stack
EVENT LOOP
Callback Queues
THREAD POOL
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API
THREAD POOL
- fs - dns lookup - crypto
- user specified input
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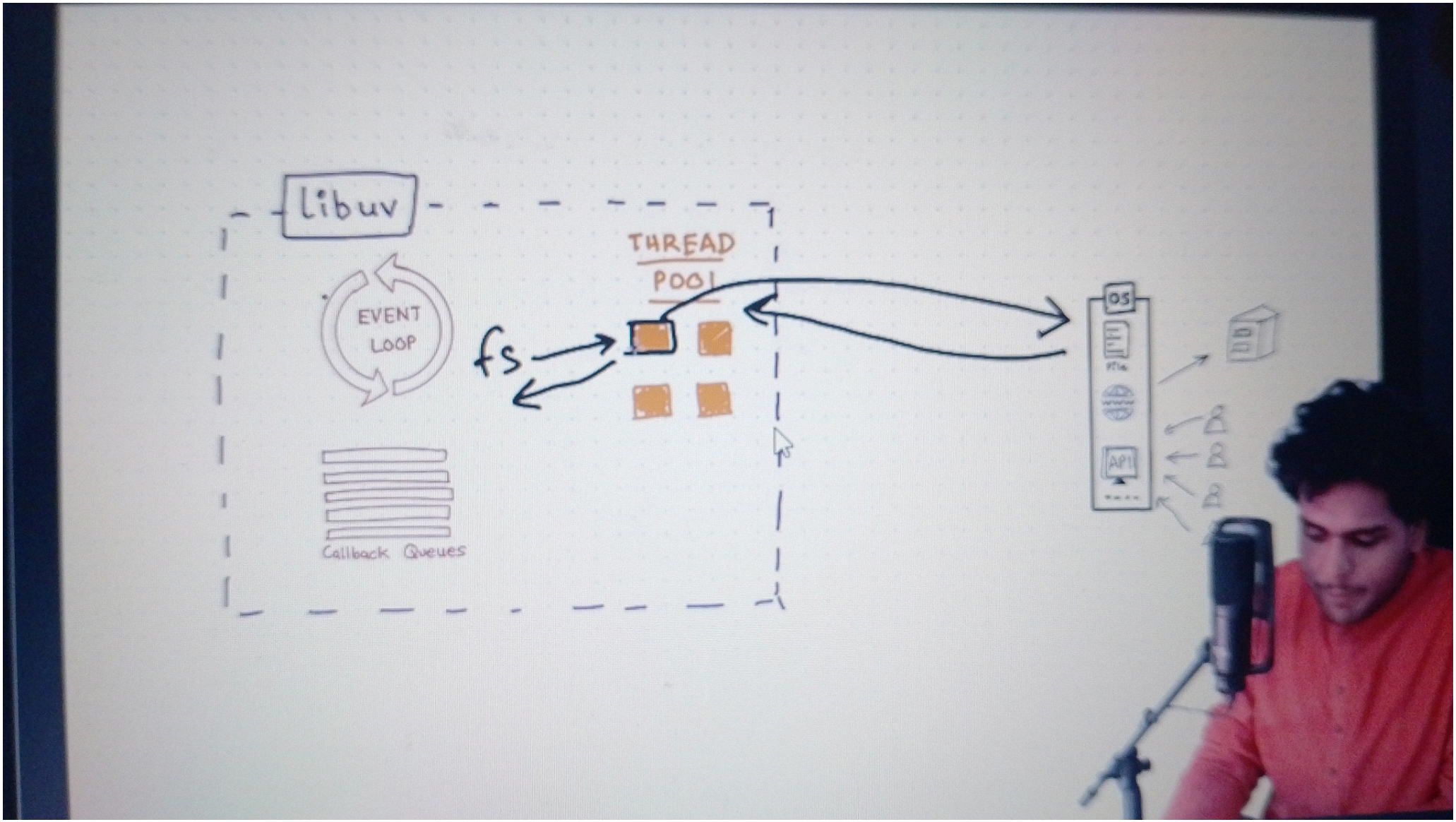
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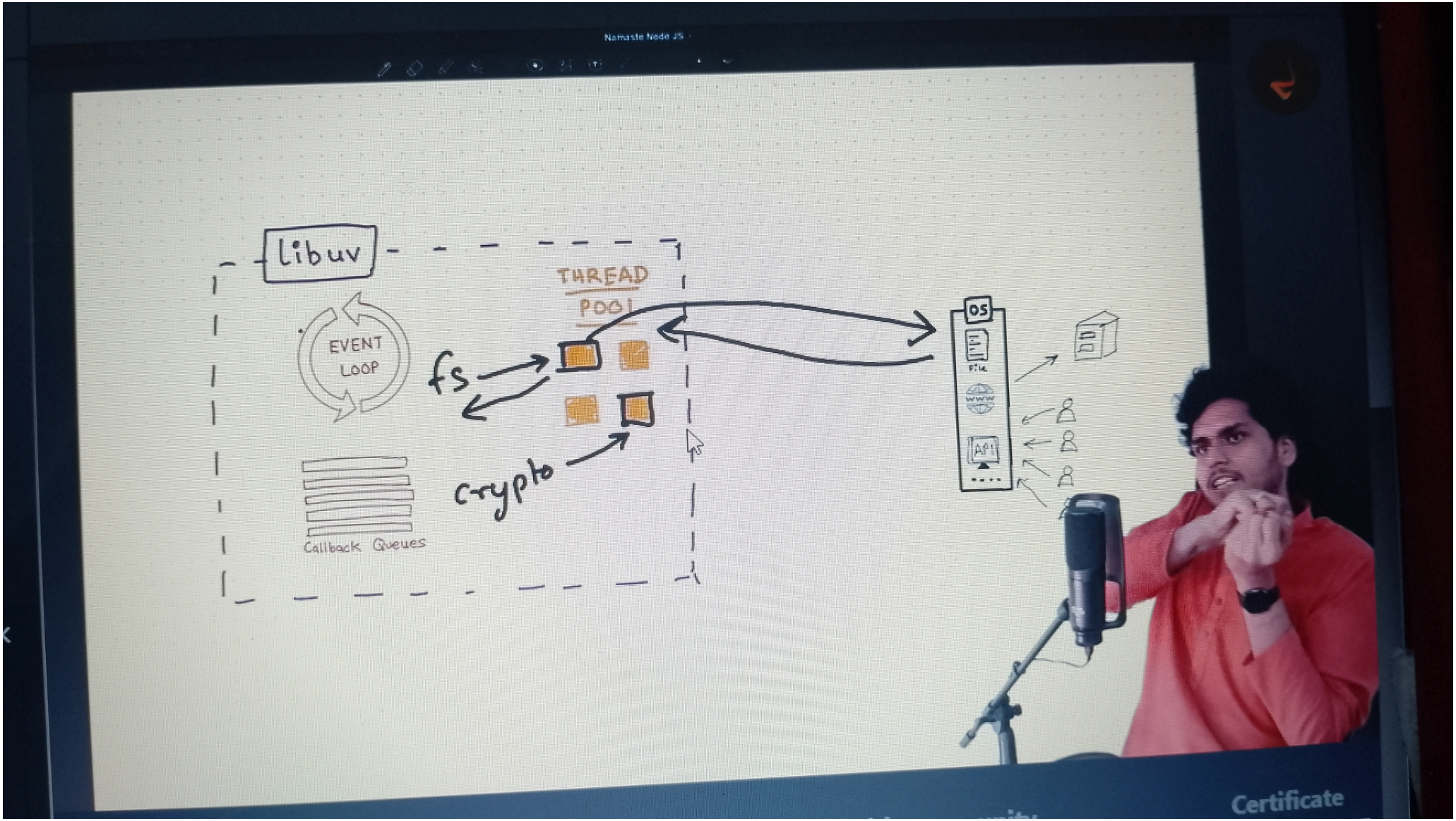
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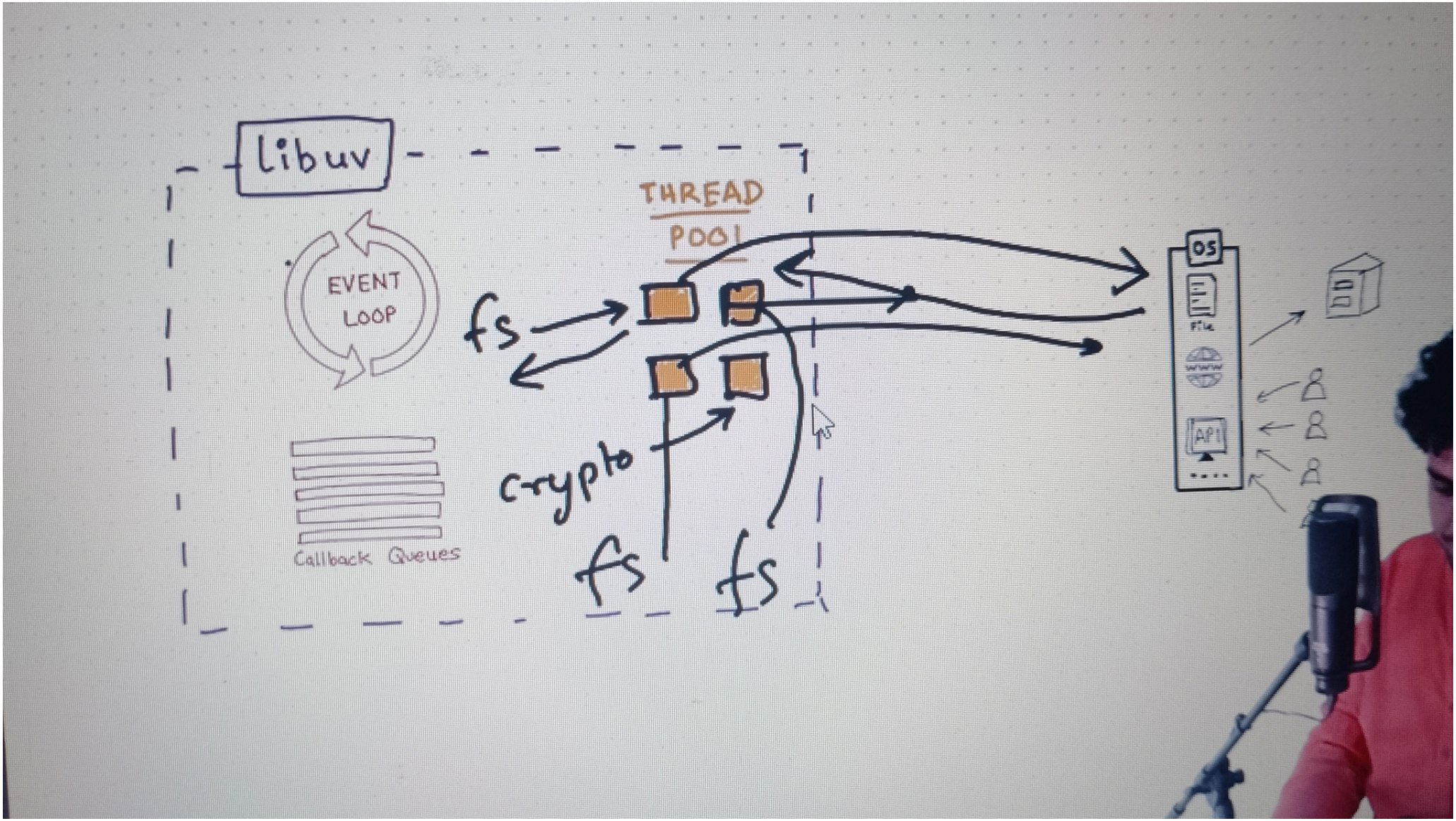
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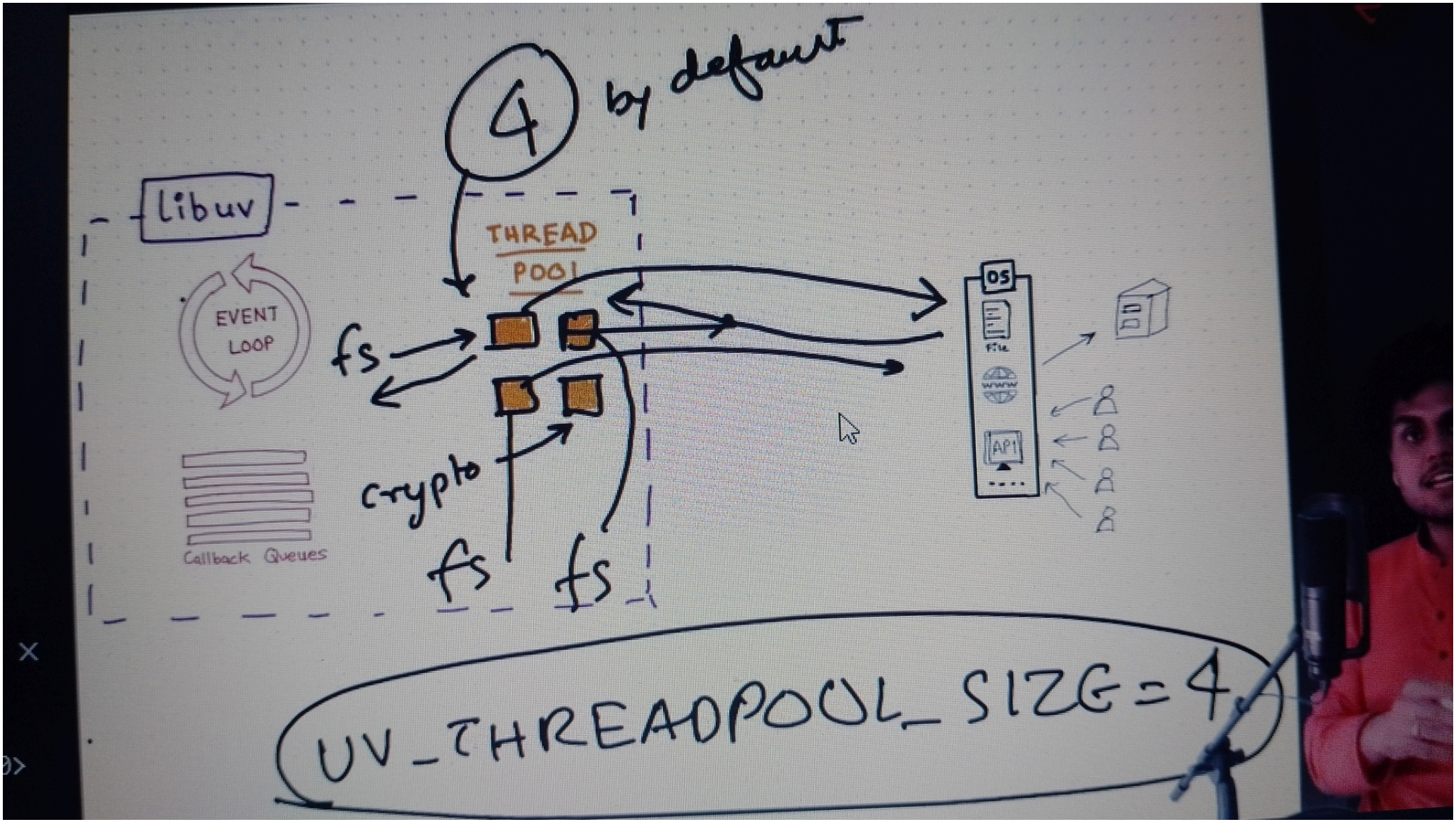
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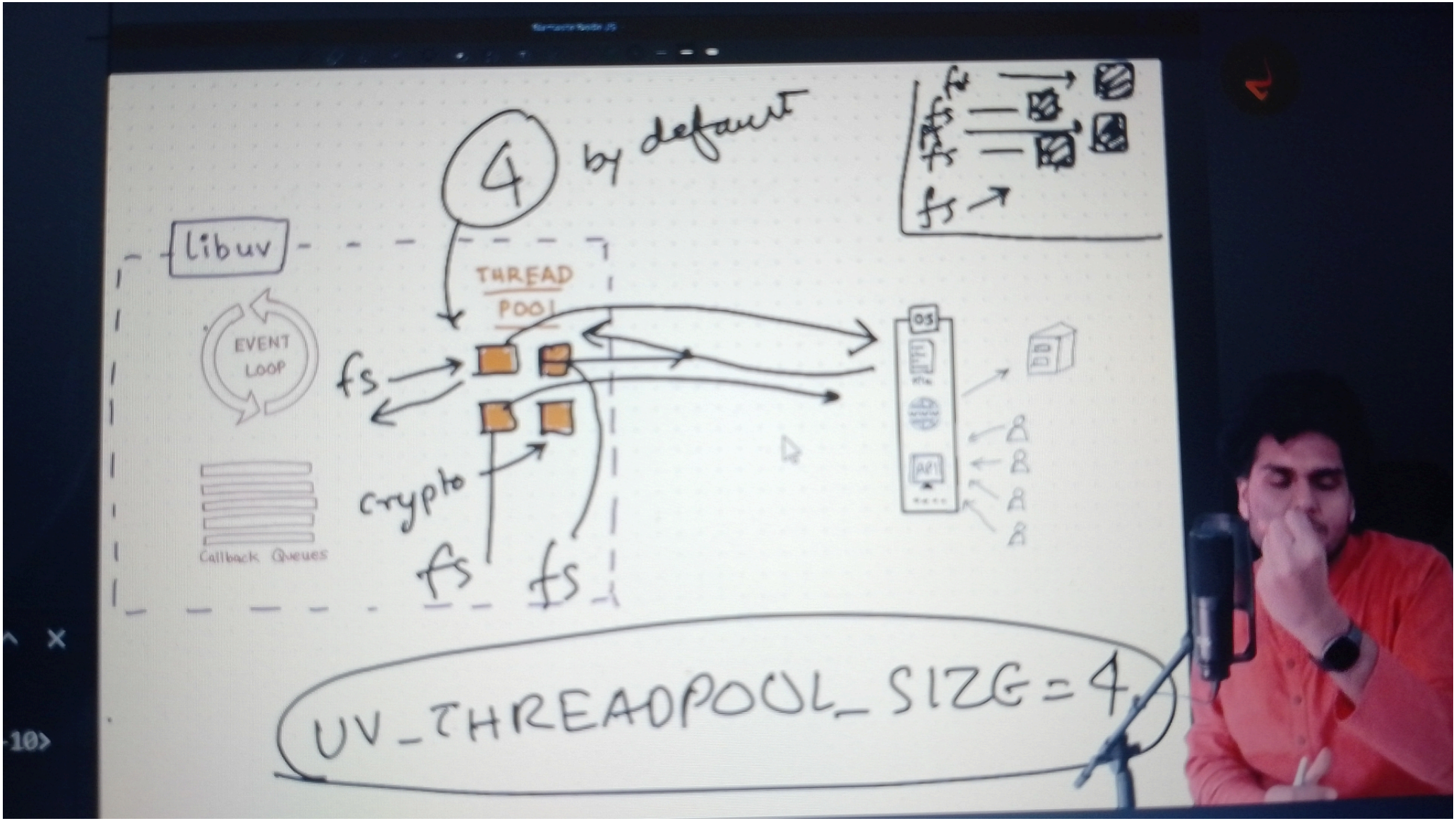
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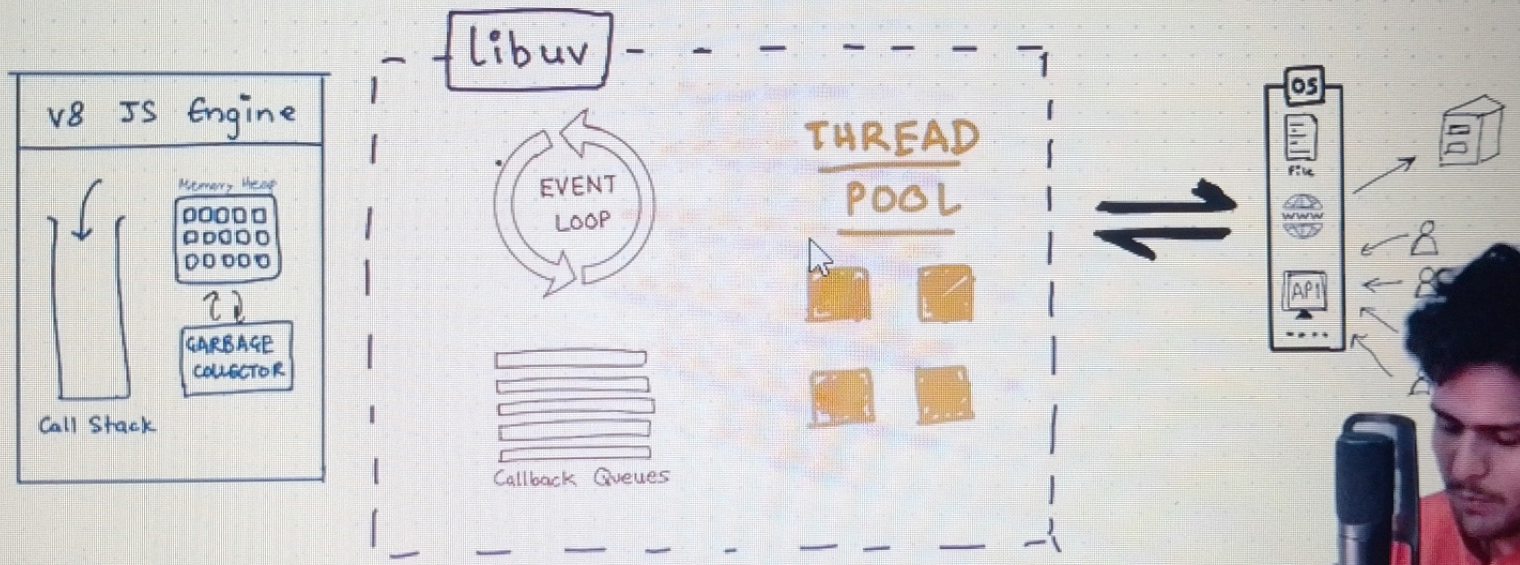
Is NodeJS single threaded or multi-threaded ??

{ process.UV_THREADPOOL_SIZE }



THREAD POOL { - fs - dns.lookup - crypto
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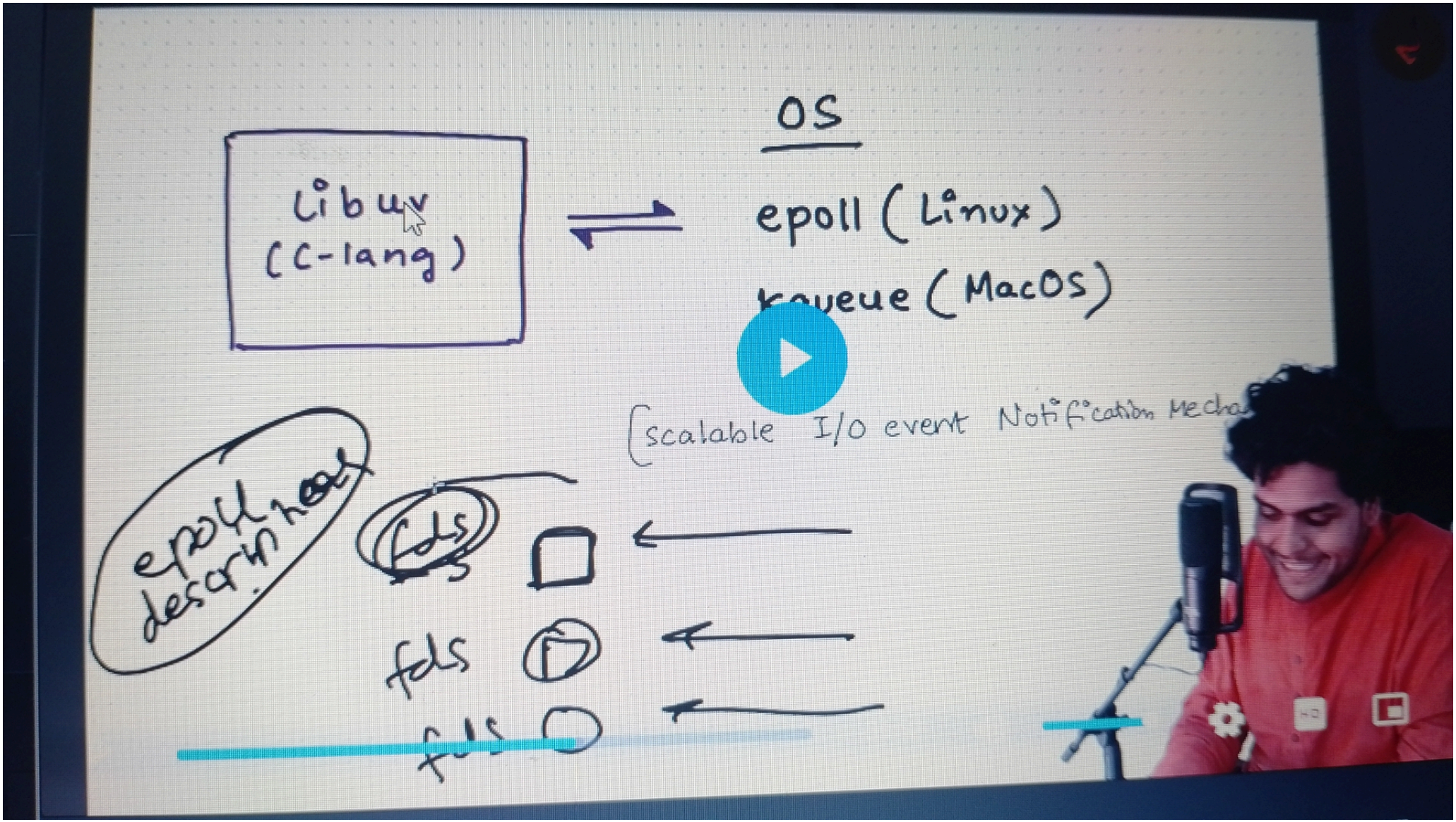
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- sync methods
- complex Regex
- Heavy JSON objects
- Complex calculations/loops

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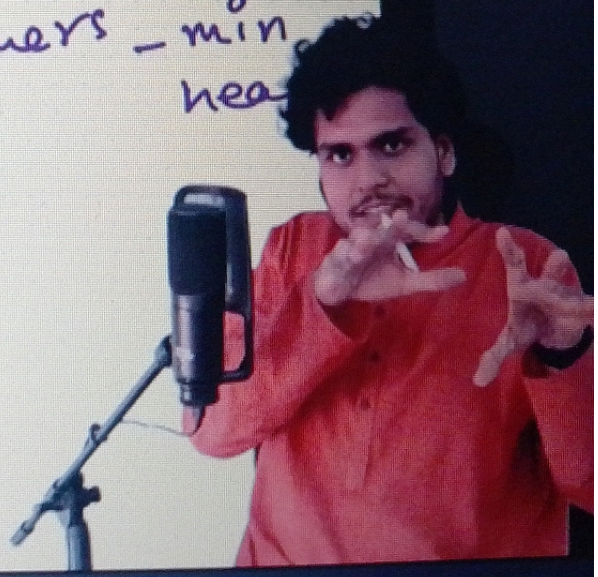

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