KINGSLAND
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DOM Manipulations

Create / Delete DOM Elements, Handle Browser Events

Table of Contents

Event Loop

JS Approach to I/O

- Single threaded language
- HTTP requests
- DB
- Memory and disk read/write

Don't Make the Thread Wait

- Blocking thread requests
- Register a callback
- Handle multiple concurrent operations on one thread

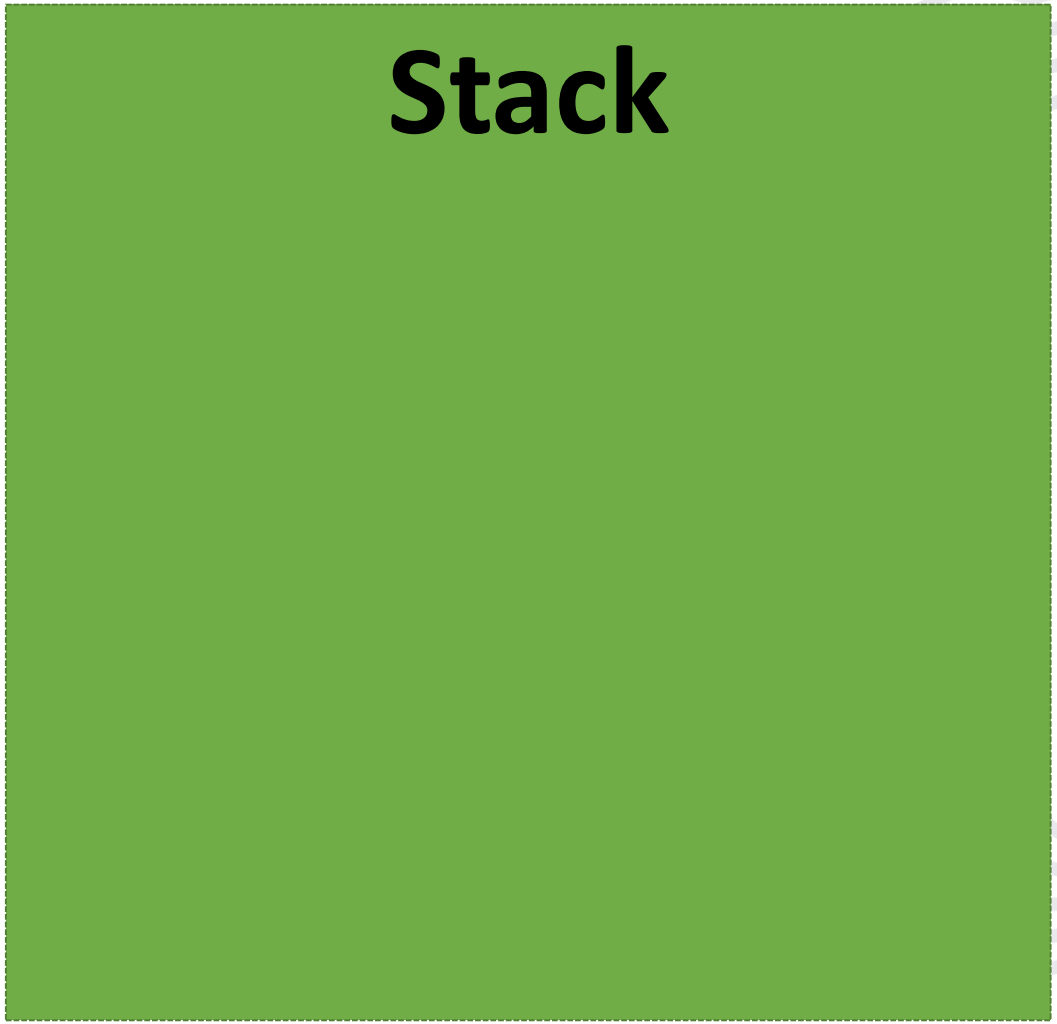
How It's Handled in JS?

- Message queue
- Event loop

Stack calls

```
function foo(x) {
    return x * x;
}
function bar(y) {
    return foo(y + 2);
}

bar(8);
```



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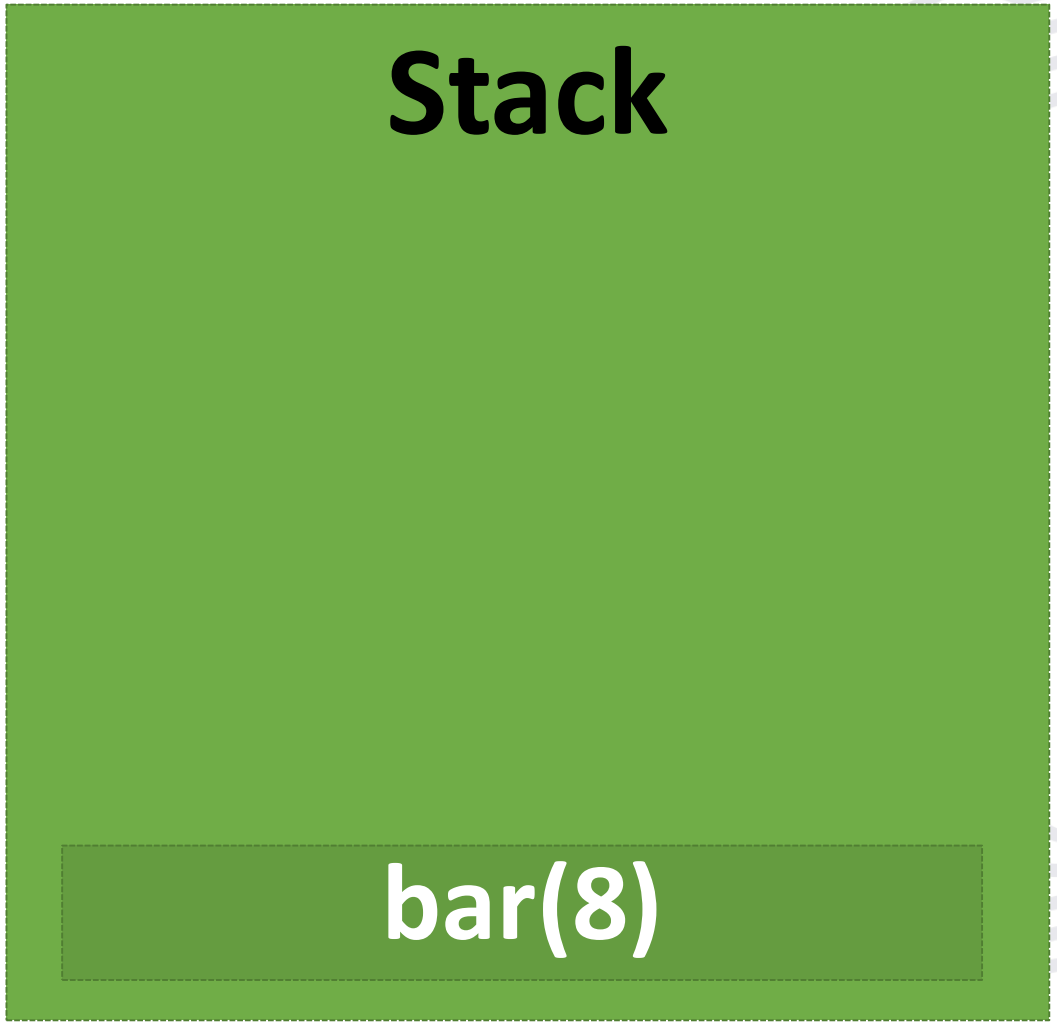

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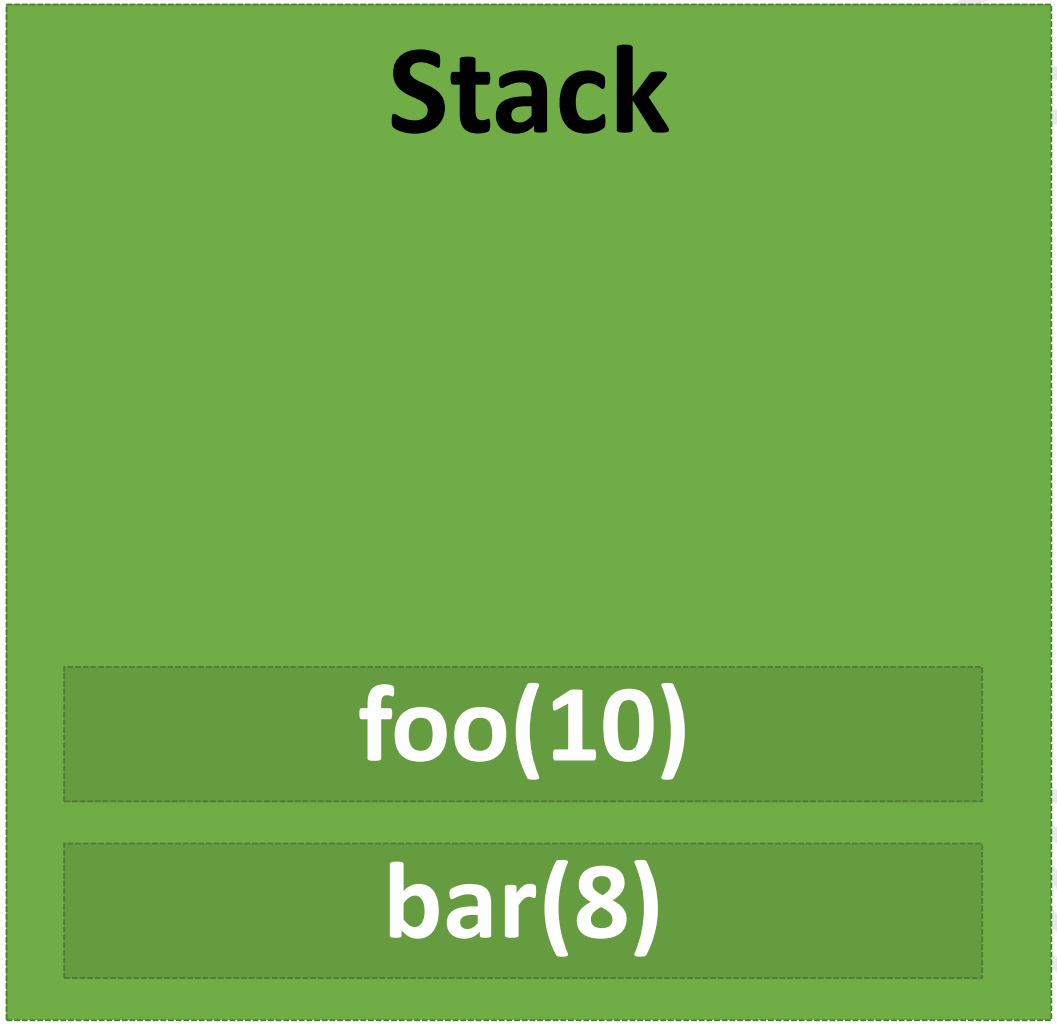

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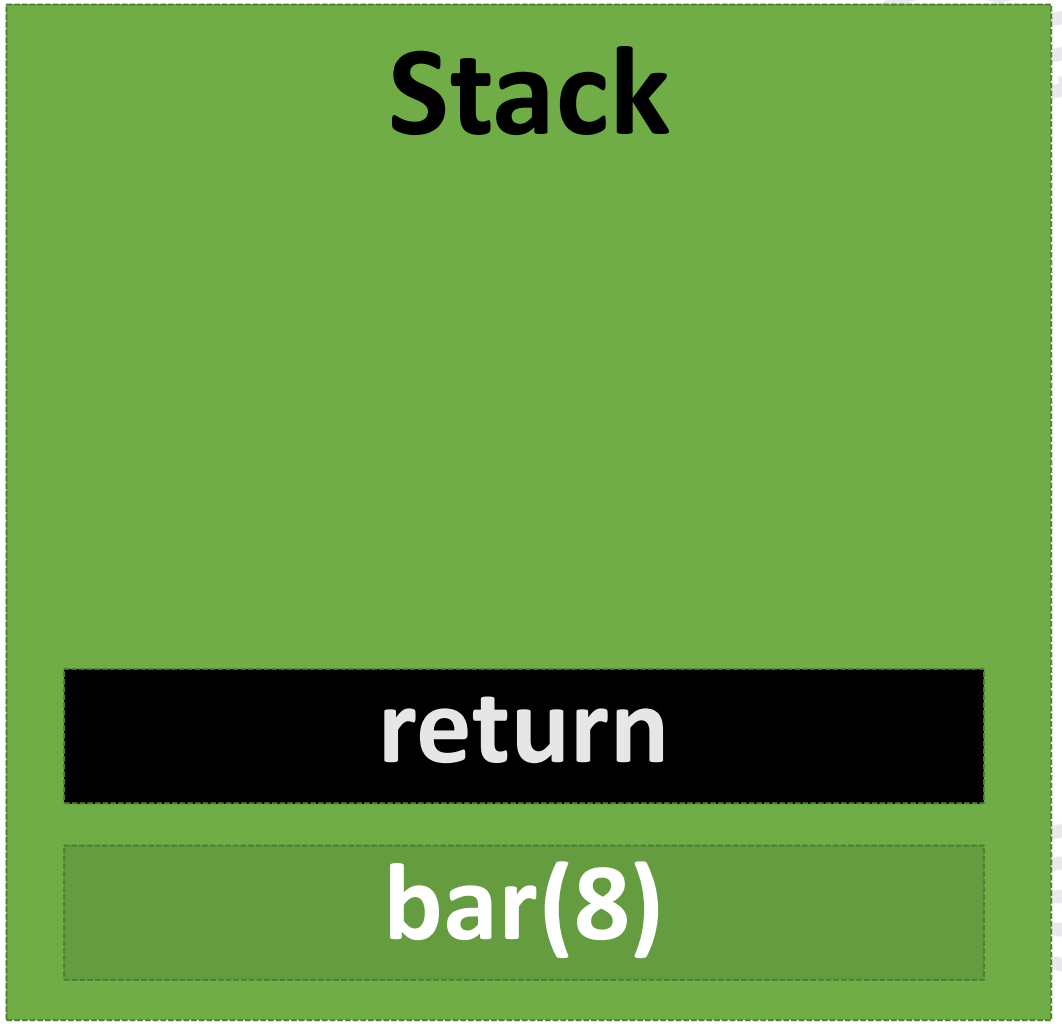

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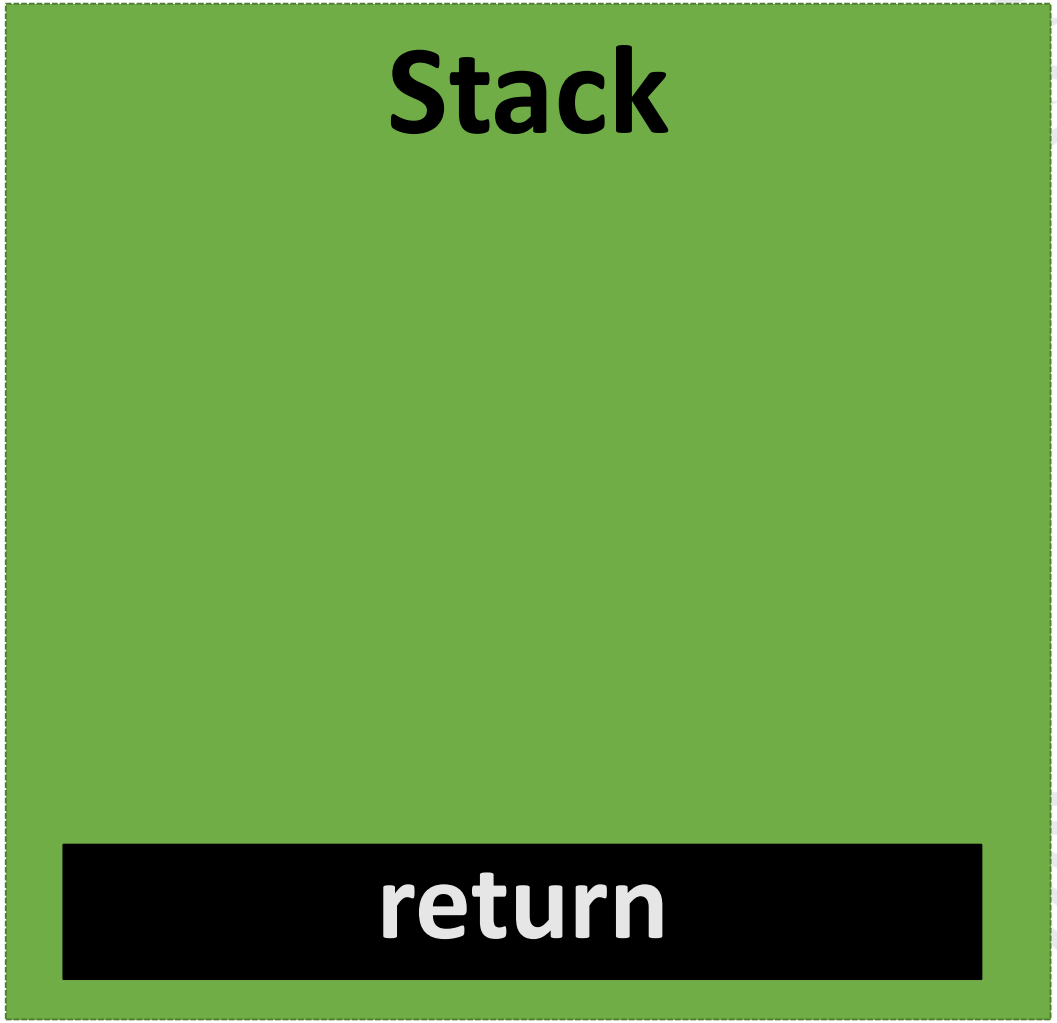

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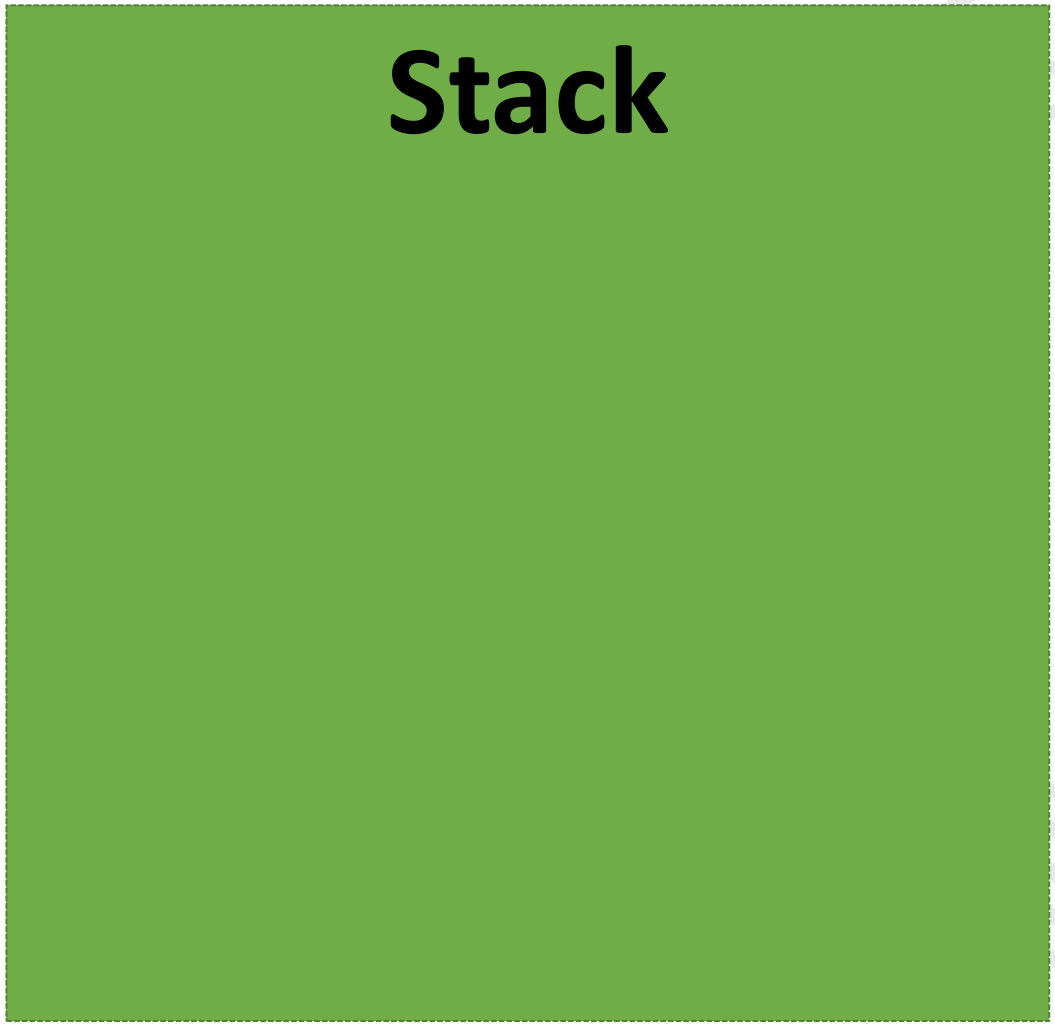


```
function init(el){
    el.addEventListener(
        "click",
        handler
    );
}
```

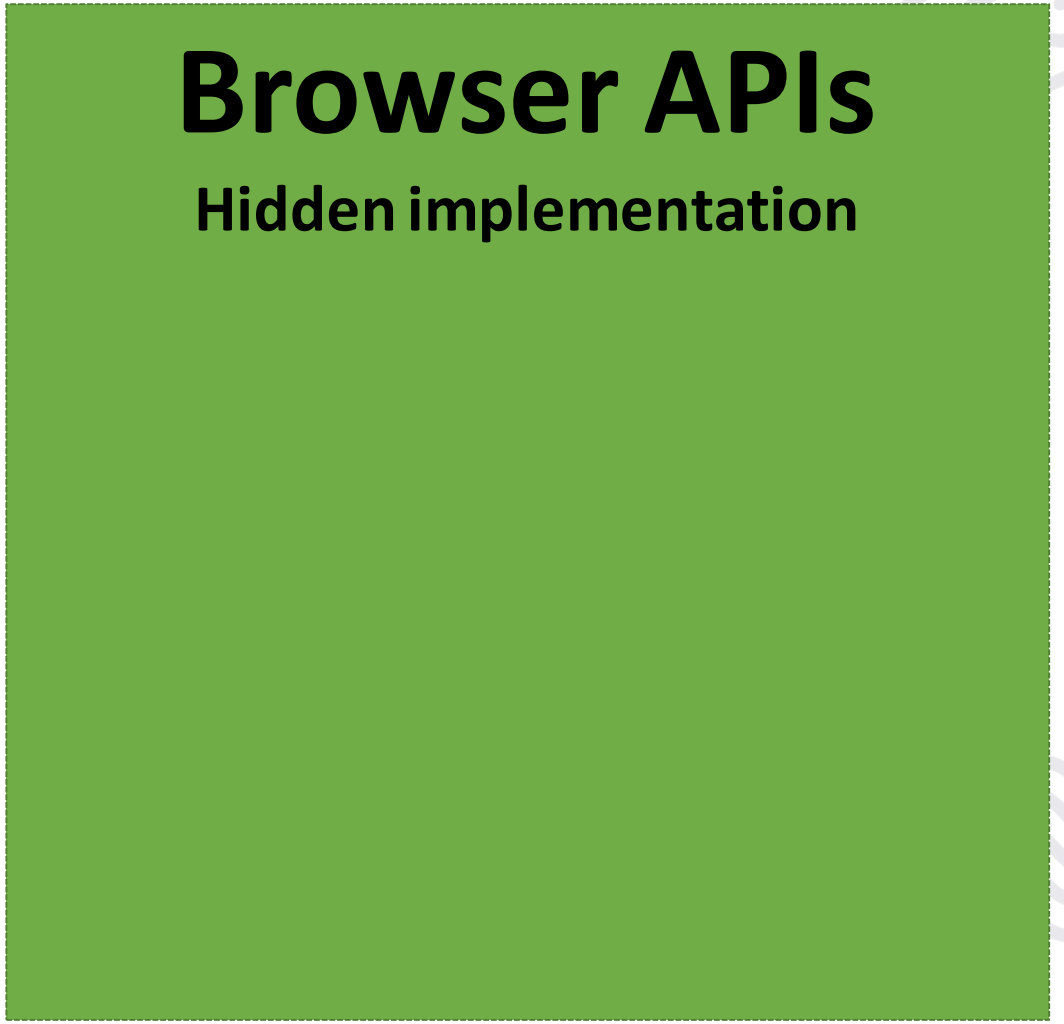
Stack calls

Stack

Browser APIs

Hidden implementation

Stack calls



Stack calls

Stack

addEventListener

init

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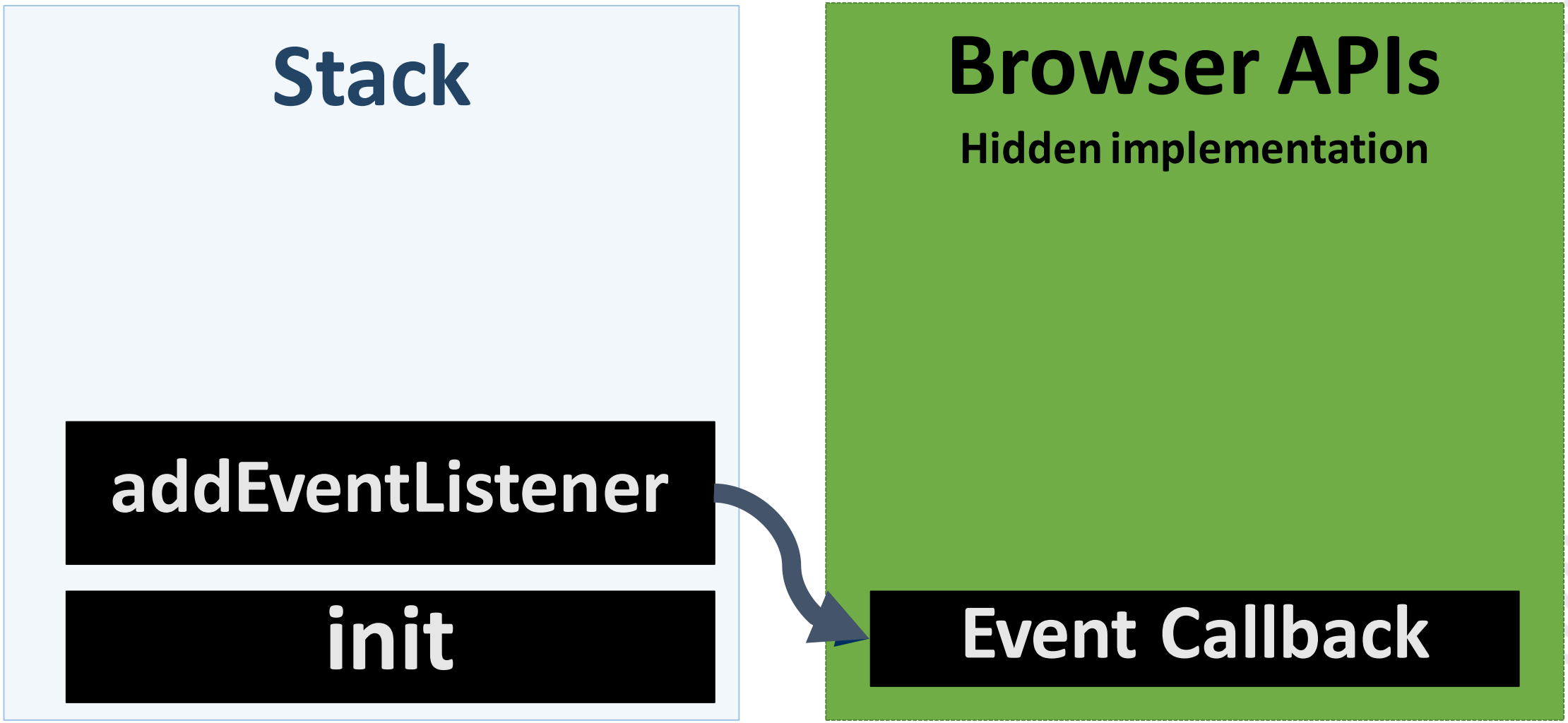
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init
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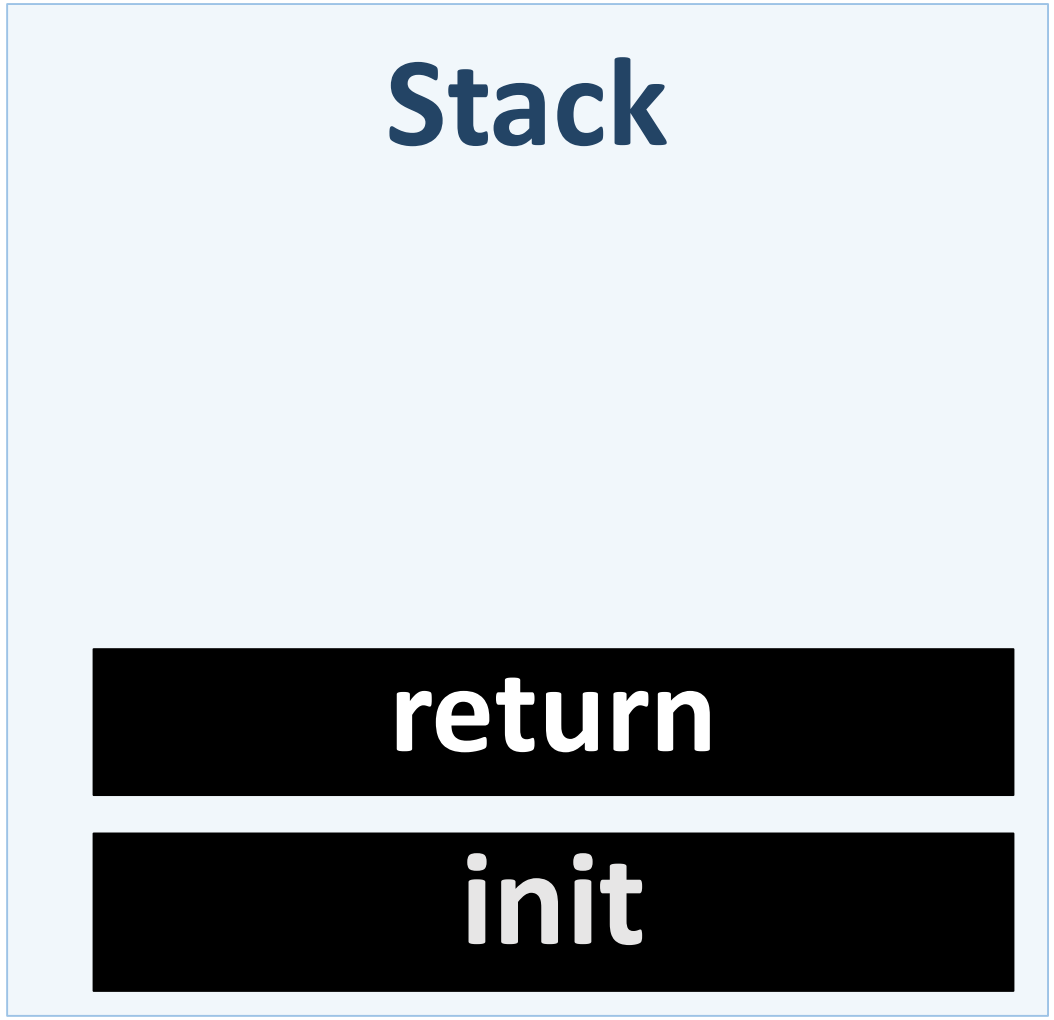
Stack calls


Stack
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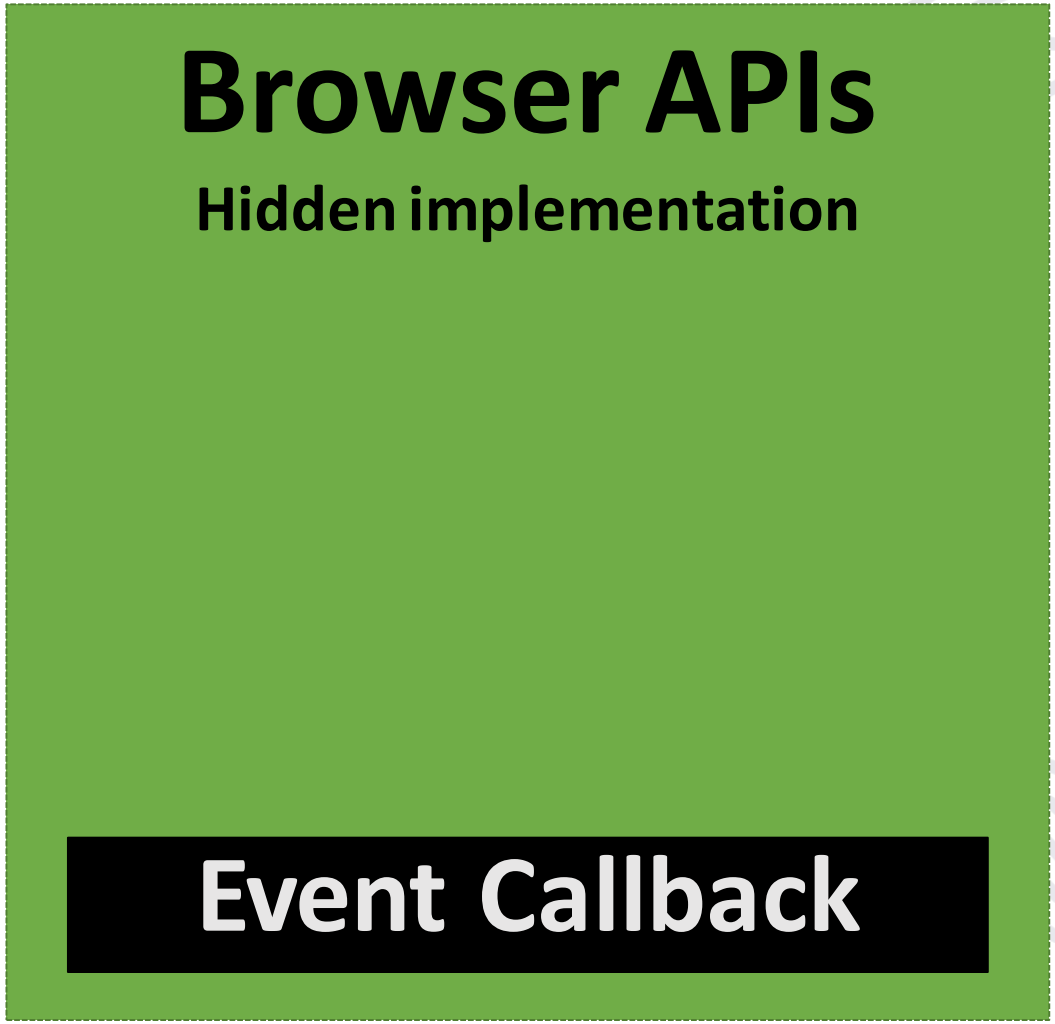
init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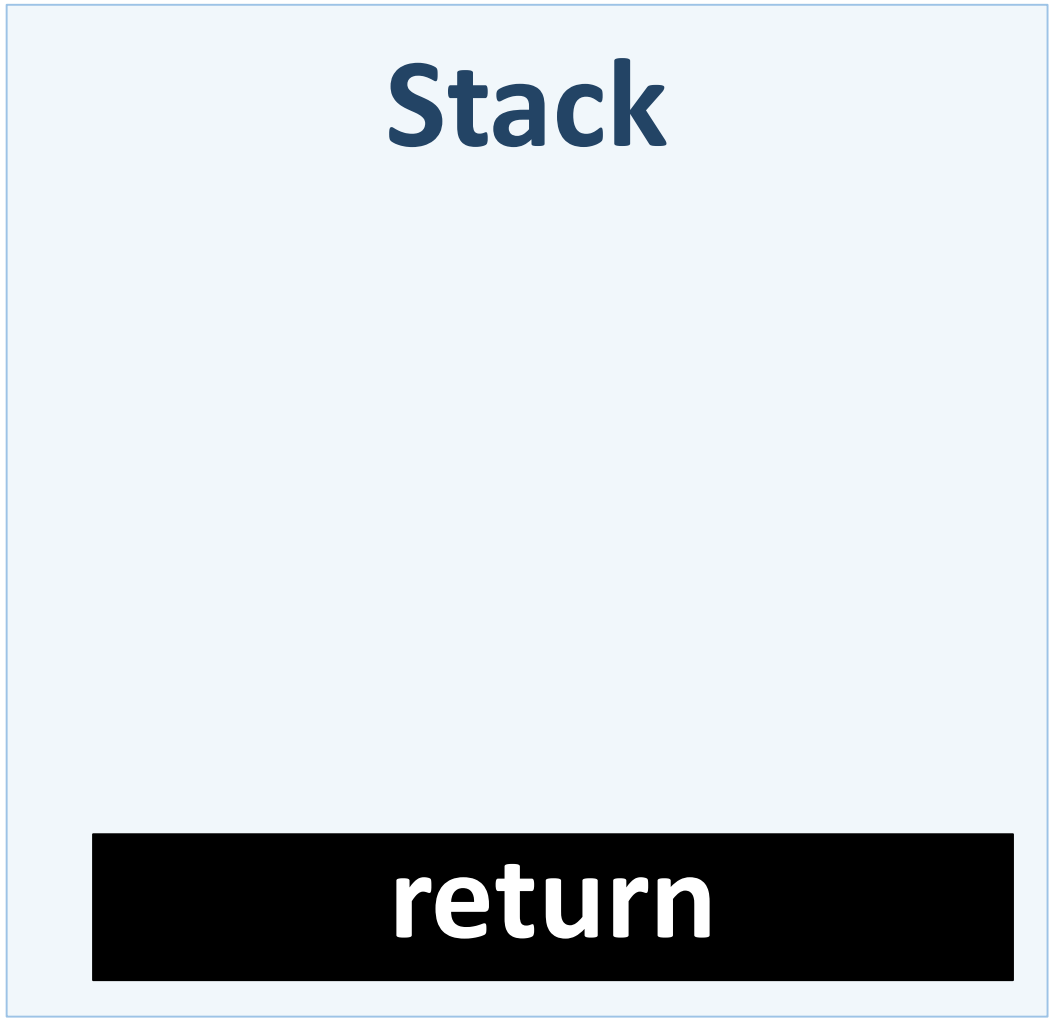
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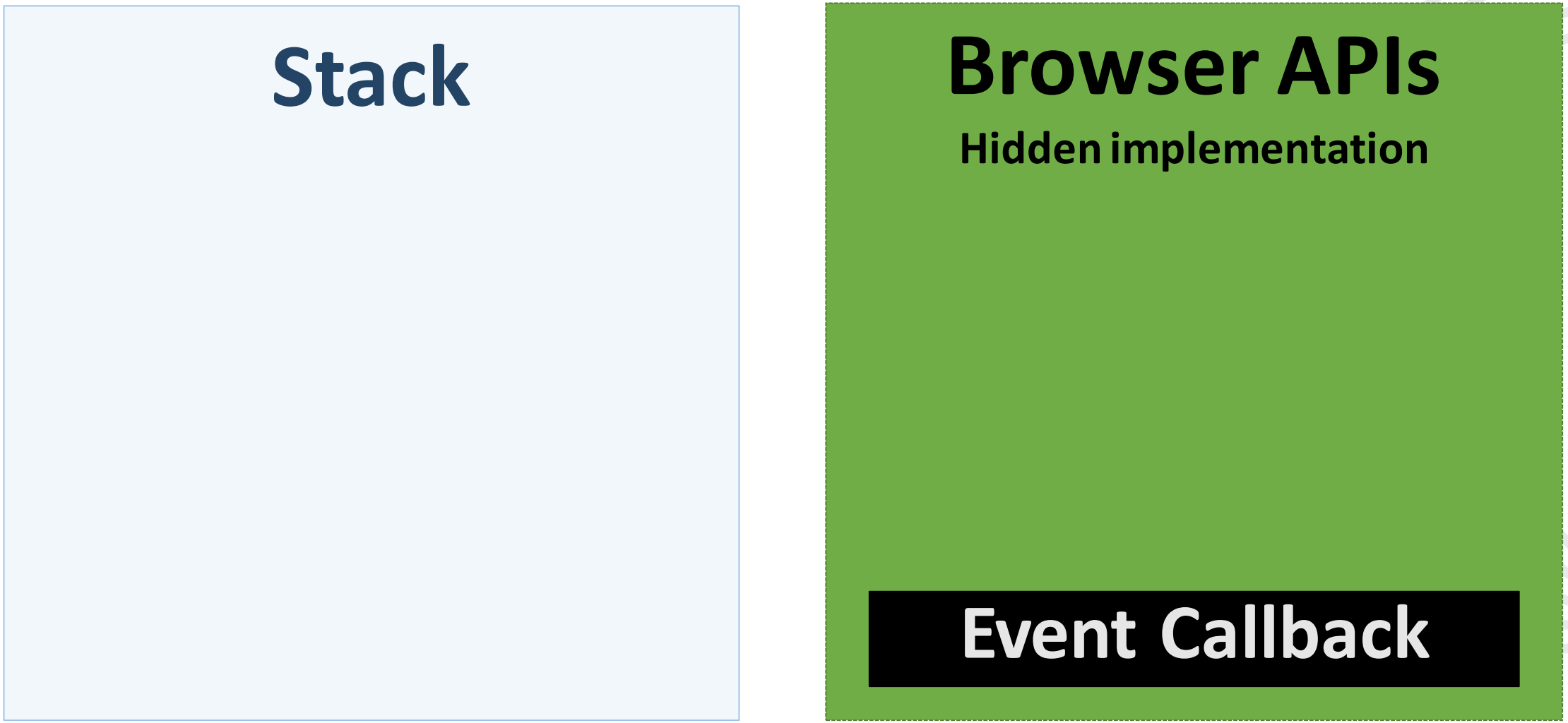

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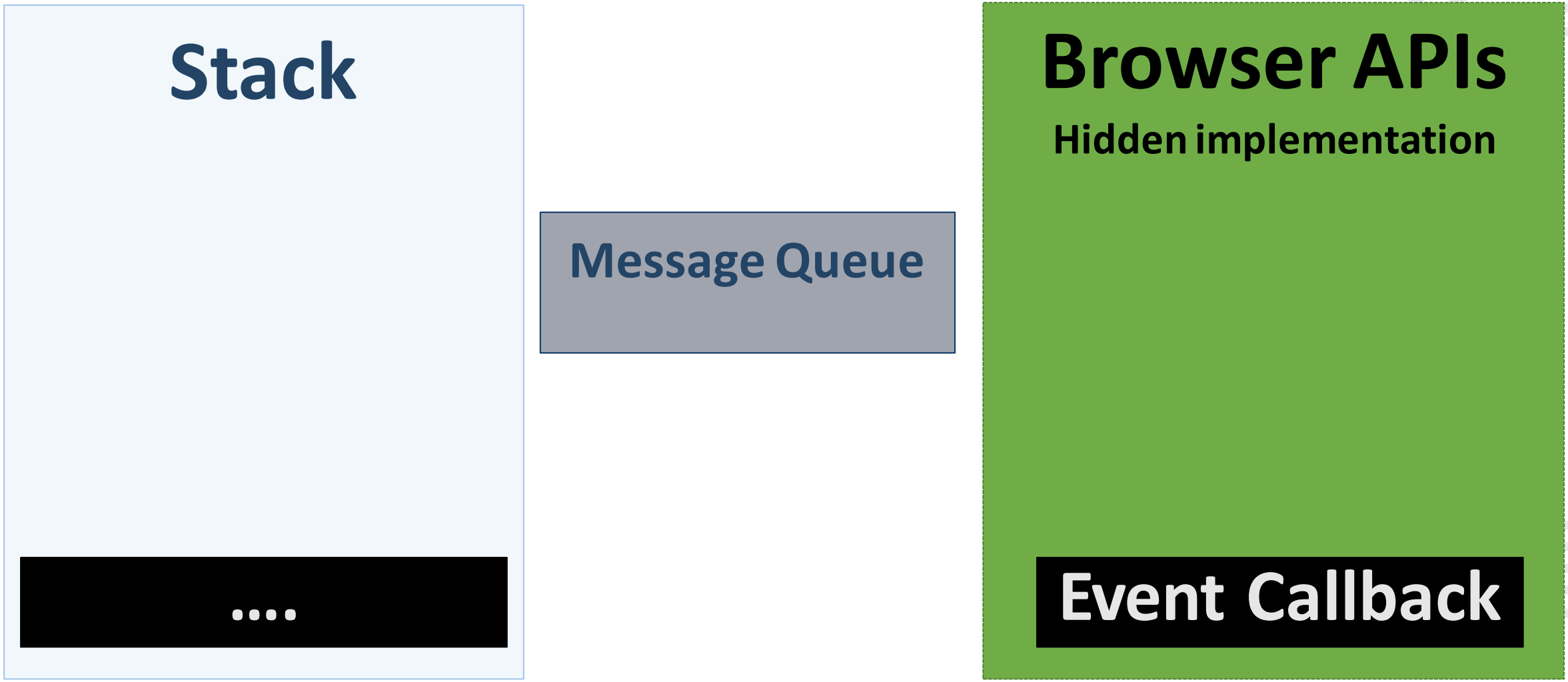
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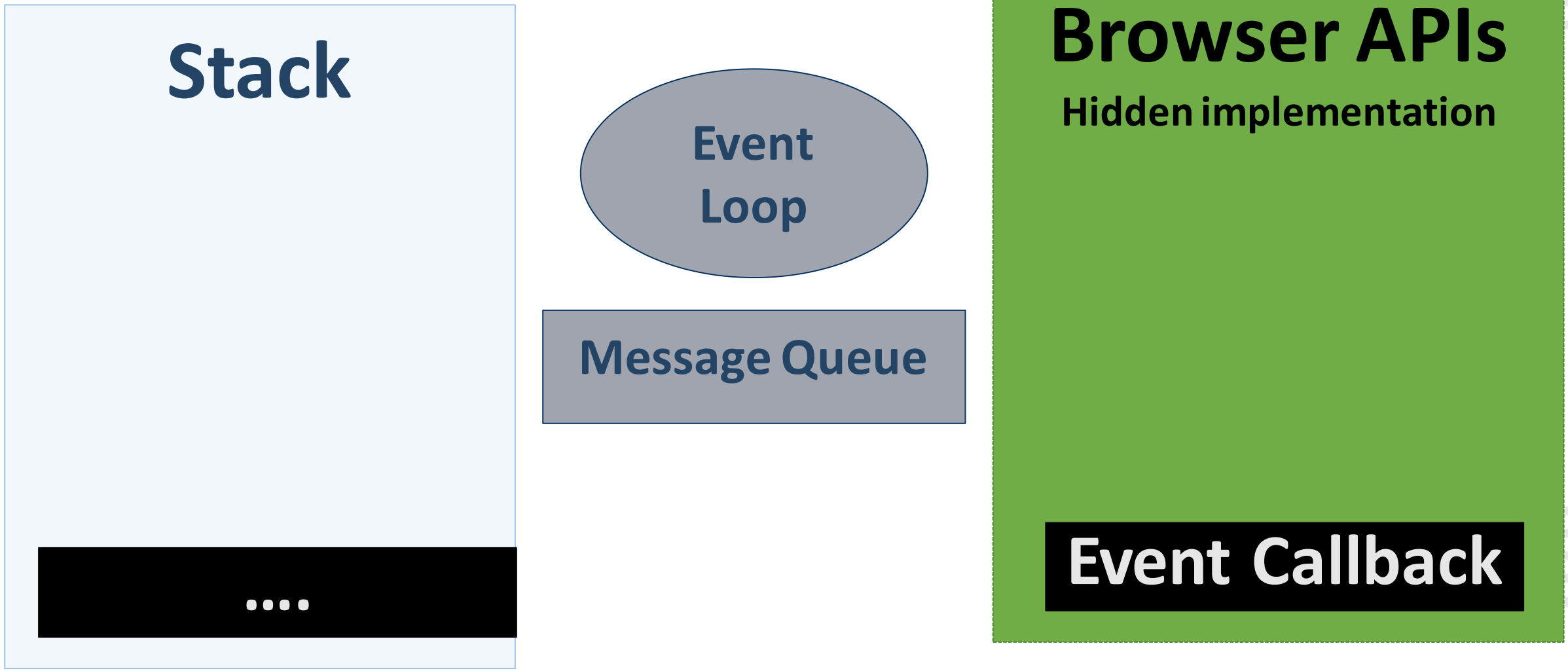
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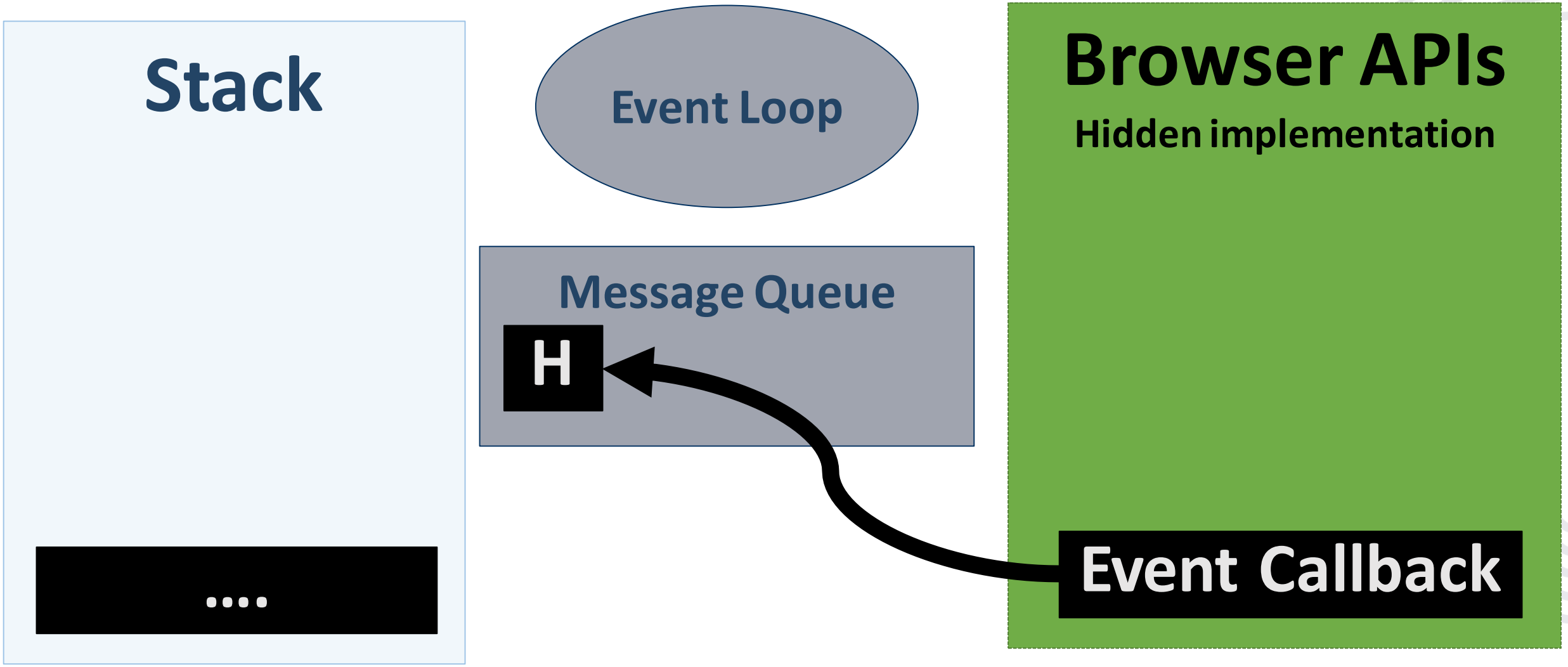
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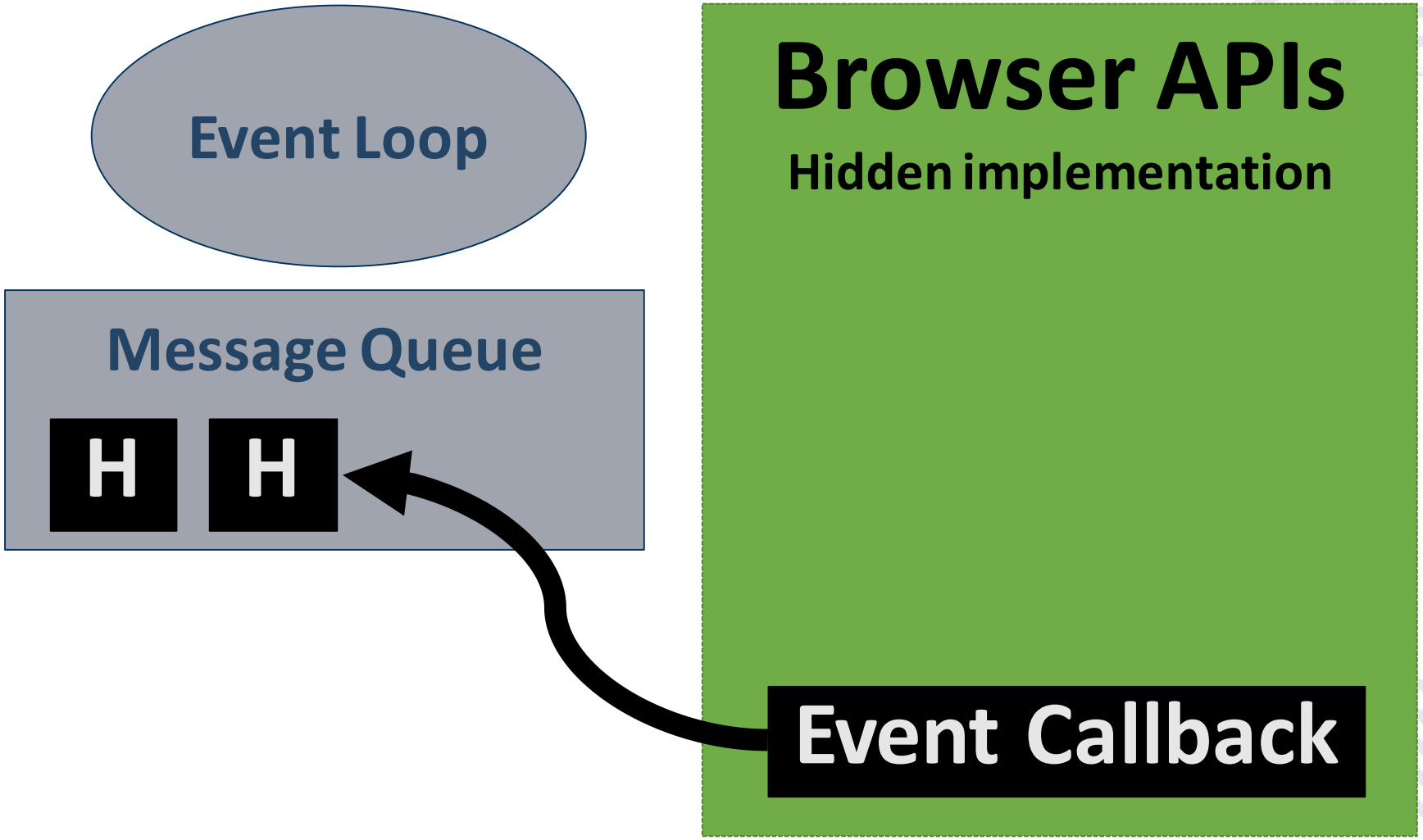

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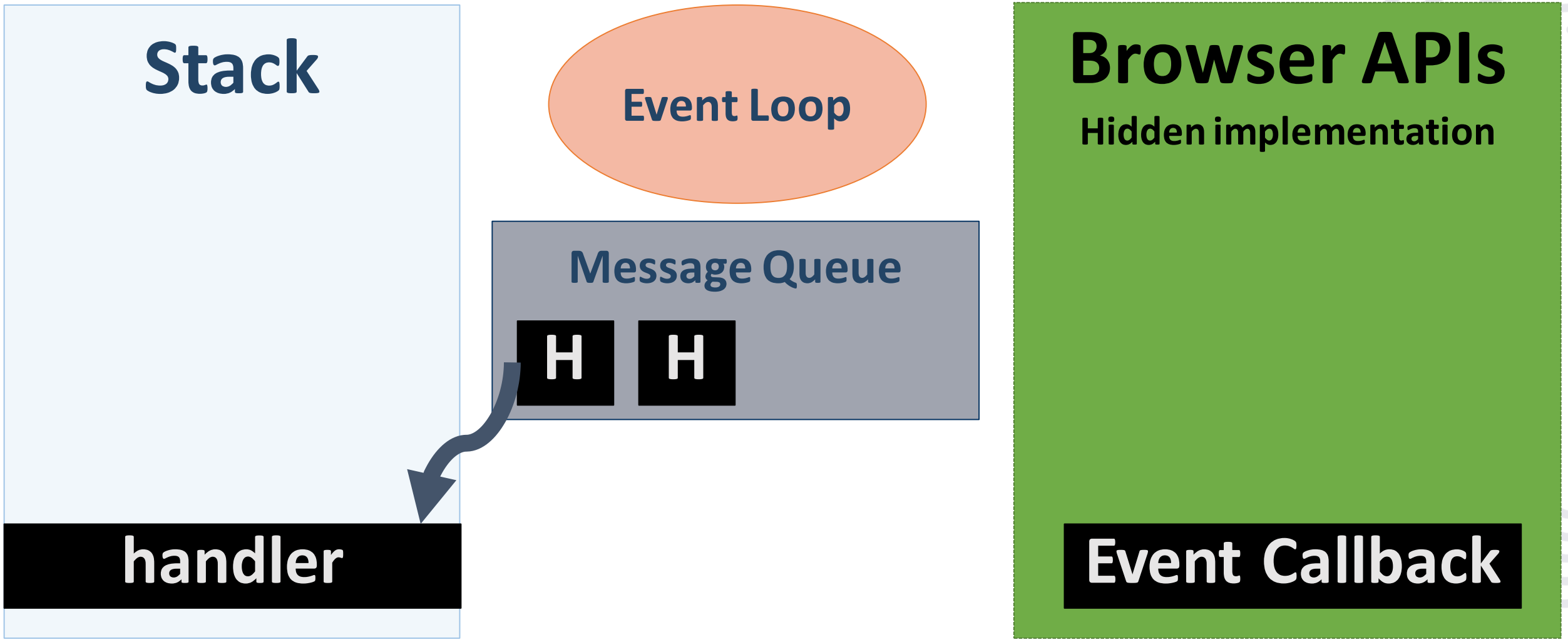
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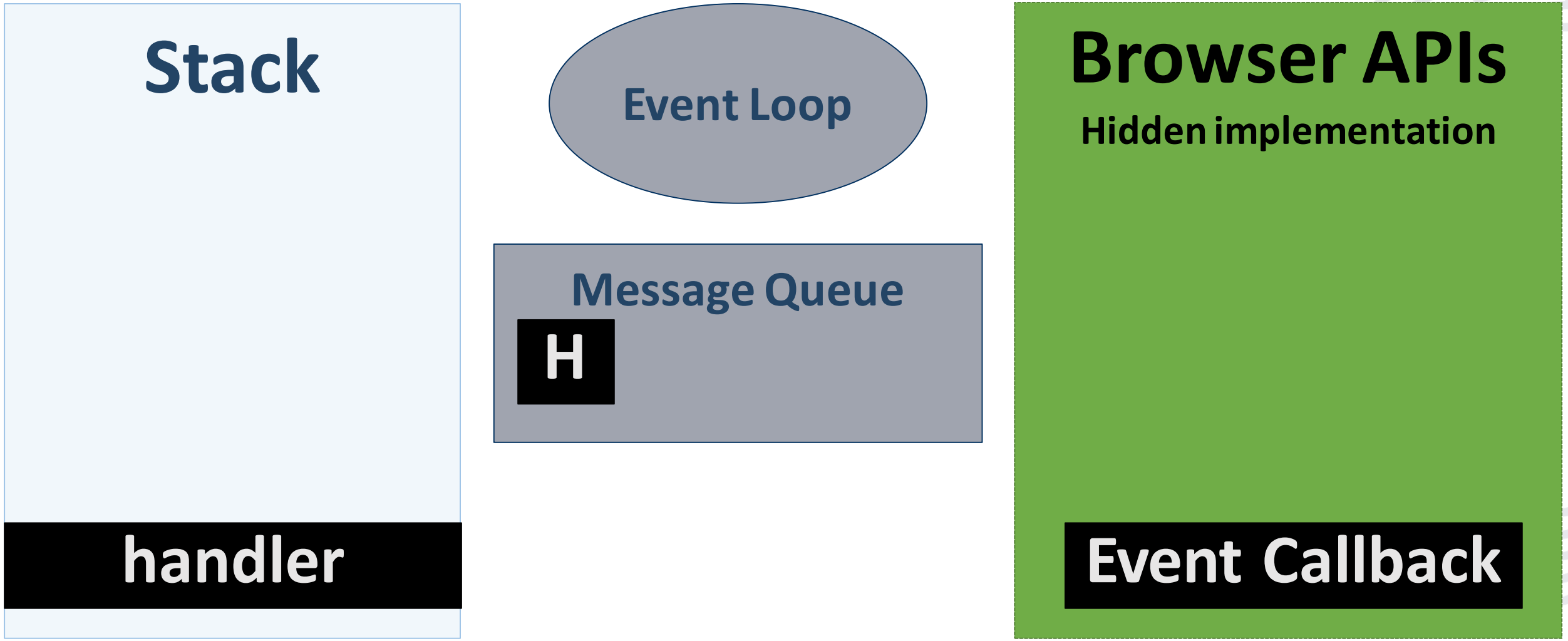
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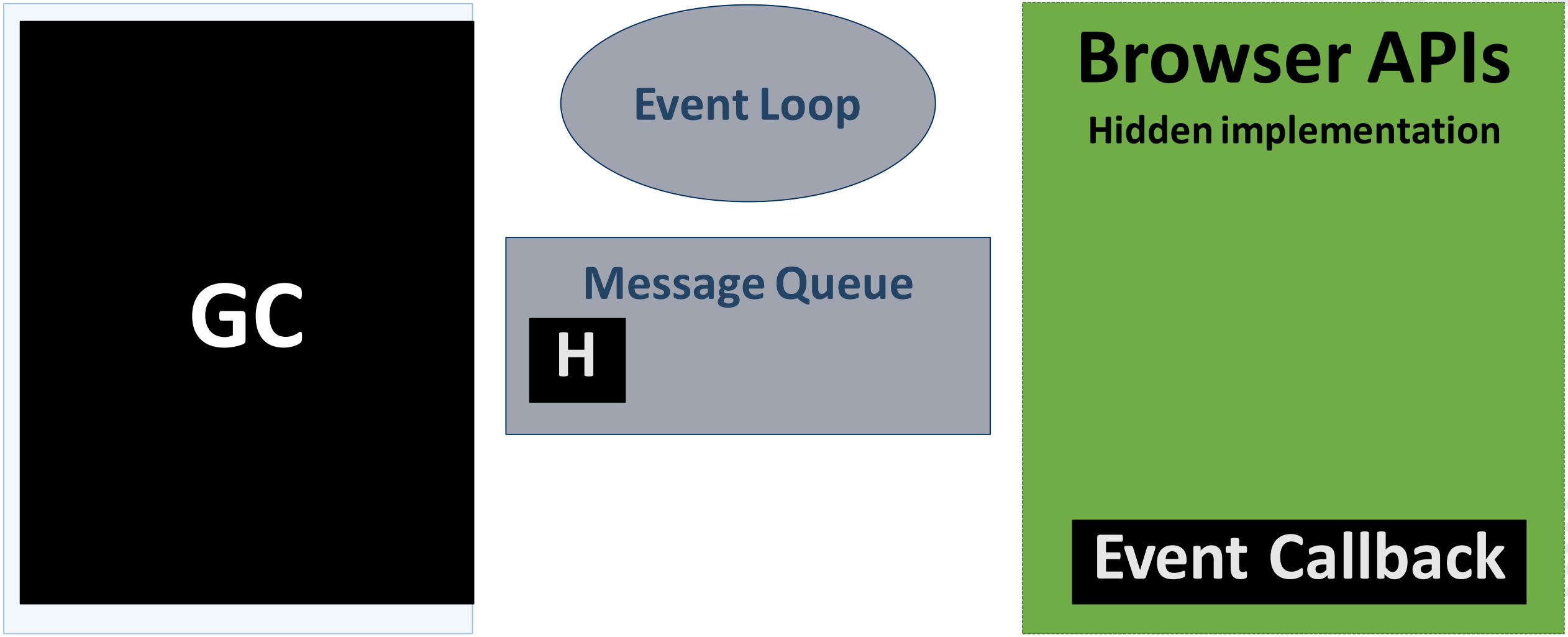
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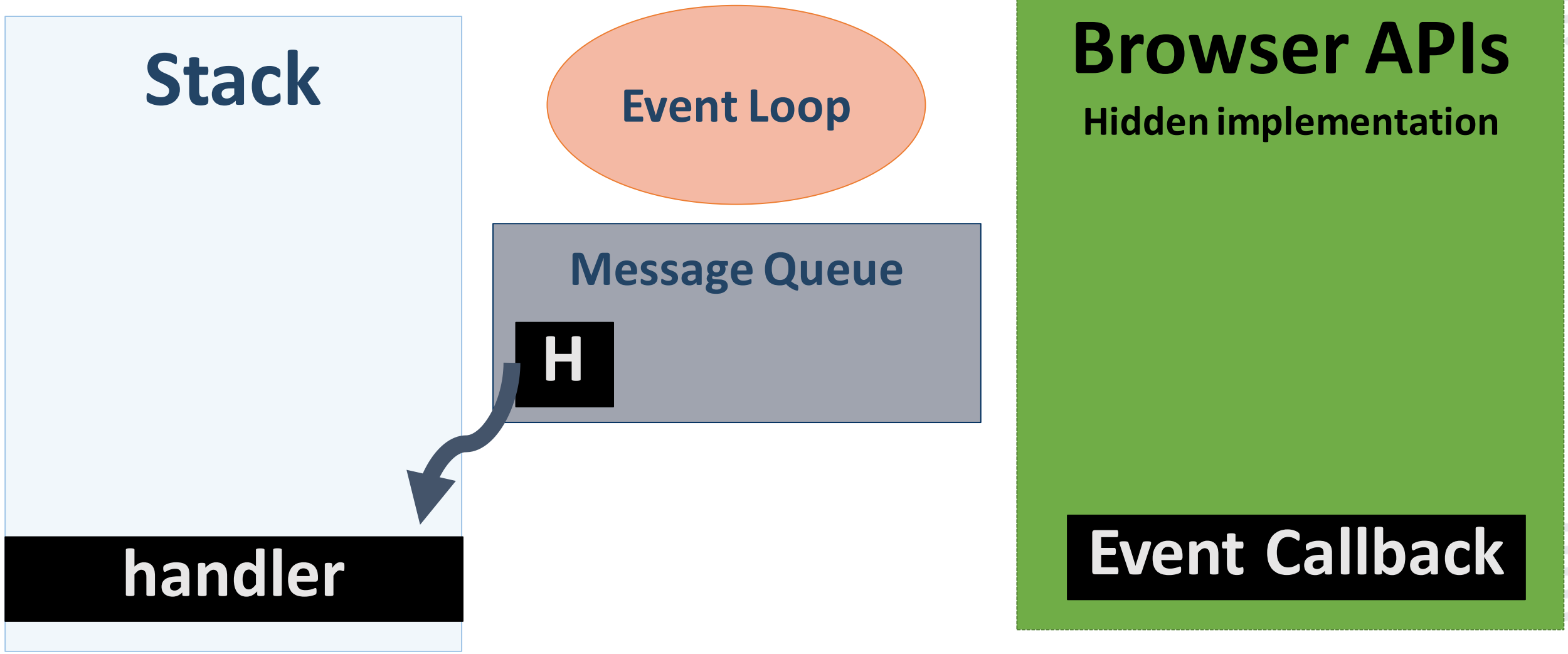
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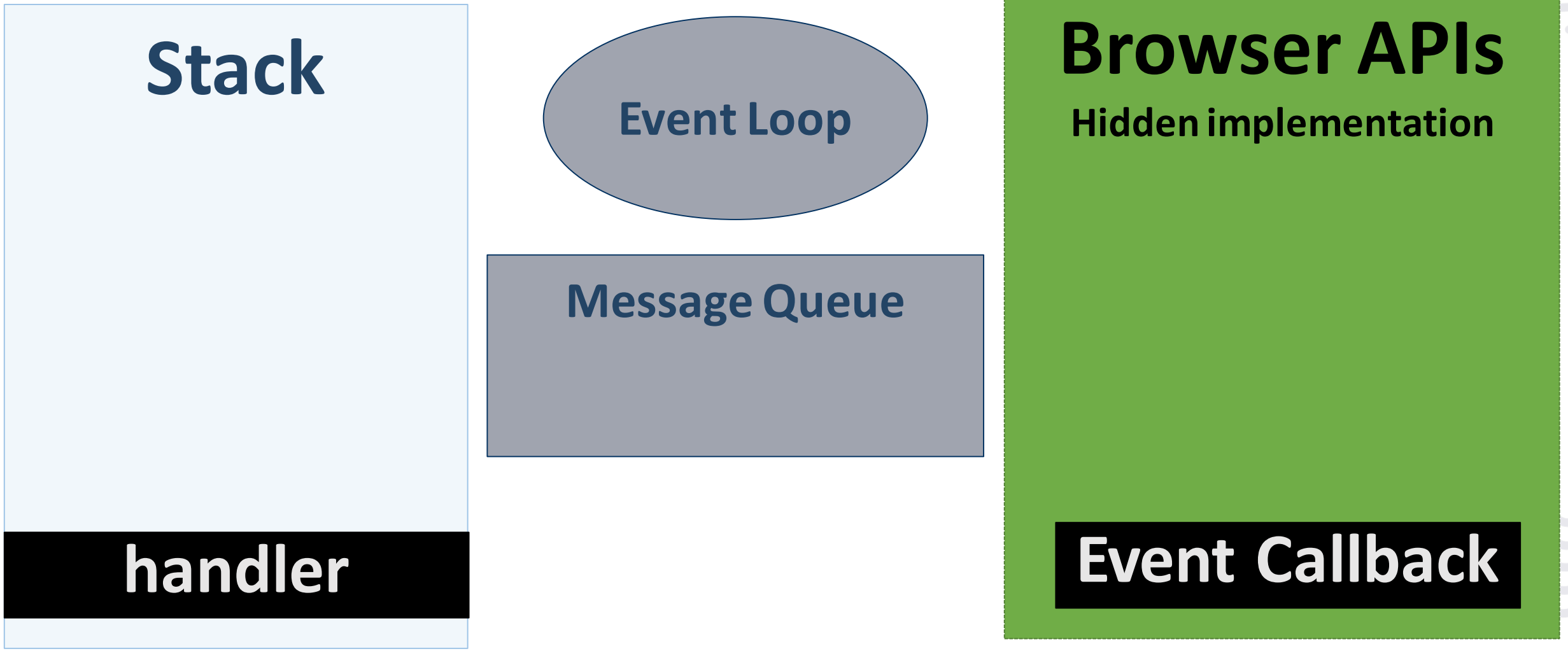
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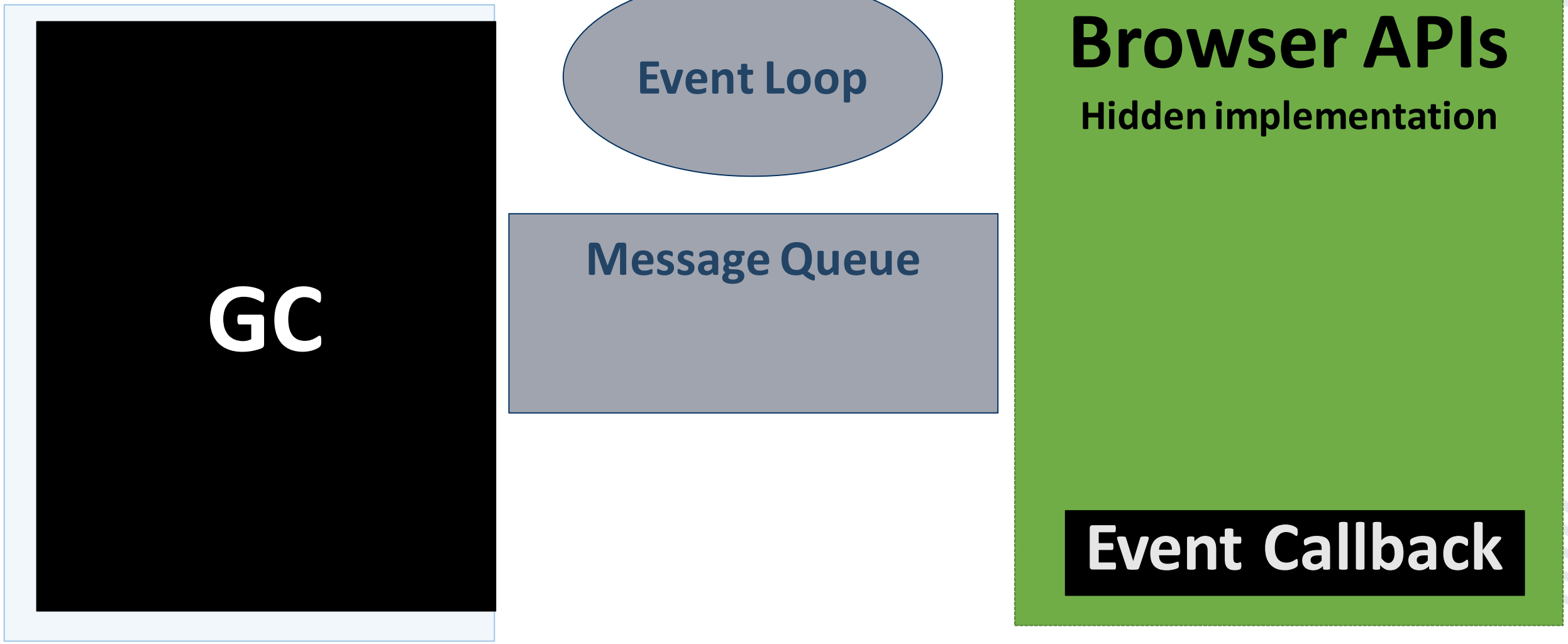
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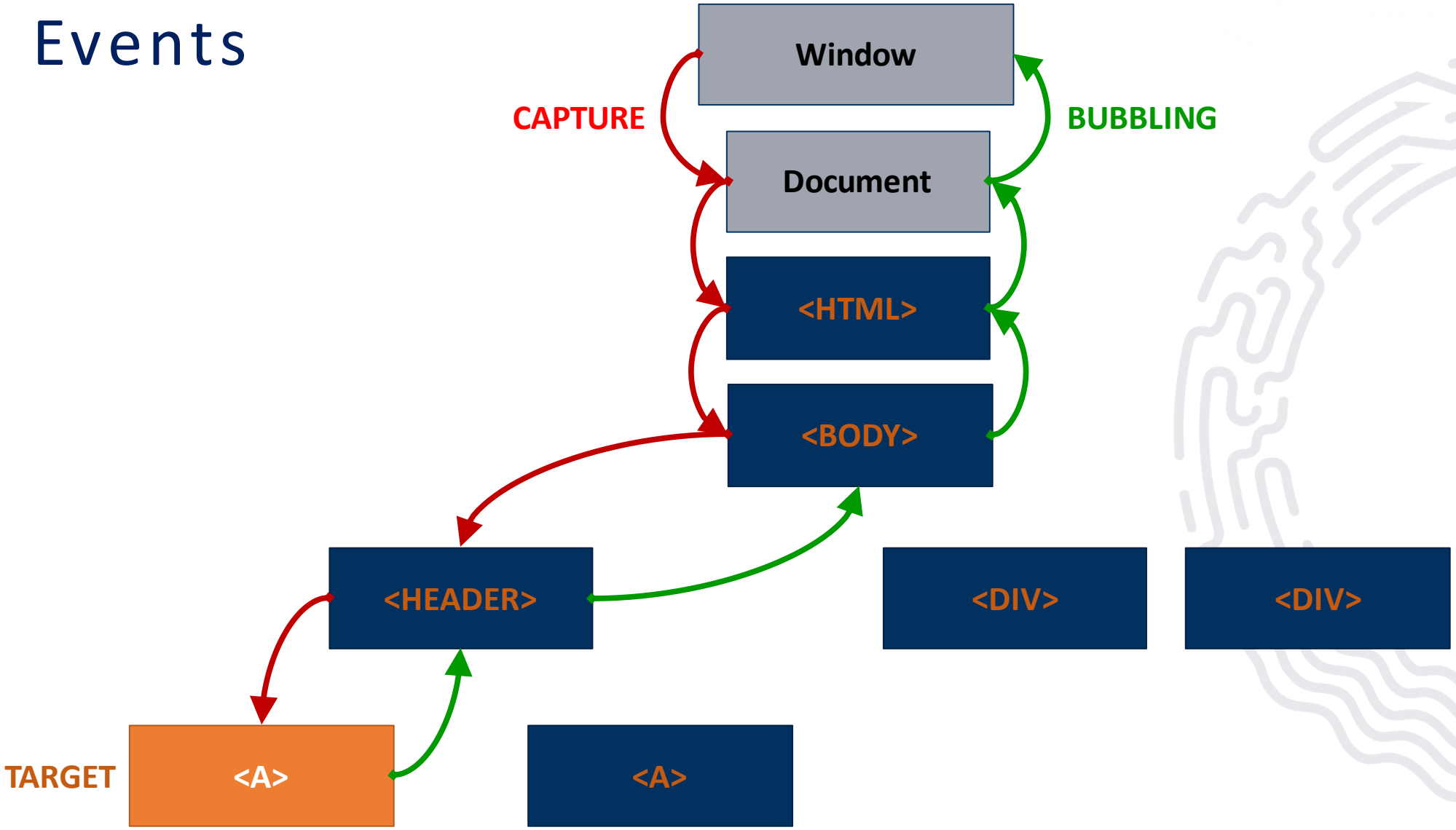
Handling DOM Events

DOM Events

DOM Events


Window
CAPTURE
BUBBLING
Document
<HTML>
<BODY>
<HEADER>
<DIV>
<DIV>
TARGET
<A>
<A>

Event Types in DOM API

- **Mouse** events

```
click
mouseover
mouseout
mousedown
mouseup
```

- **Keyboard** events

```
keydown
Keypress
keyup
```

- **Touch** events

```
touchstart
touchend
touchmove
touchcancel
```

- **Focus** events

```
focus (got focus)
blur (lost focus)
```

- **DOM / UI** events

```
load
unload
resize
dragstart / drop
```

- **Form** events

```
input
change
submit
reset
```

Event Object

- Calls its **associated function**
- Passes a **single argument** to the function - a **reference** to the event object
- Contains a **number of properties** that describe the event that occurred

Event Object Properties and Methods

- **Properties**
  - target
  - timeStamp
  - isTrusted
  - clientX/Y
- **Methods**
  - preventDefault
  - stopPropagation
  - stopImmediatePropagation

Live Exercises

Event Handling

Event Handler

- Event registration is done by providing a **callback function**
- Three ways to register for an event:
  - With **HTML Attributes**
  - Using **DOM element properties**
  - Using **DOM event handler**

```
function handler(event){
    this => object, html reference
    event => object, event configuration
}
```

Event Listener

- addEventListener();

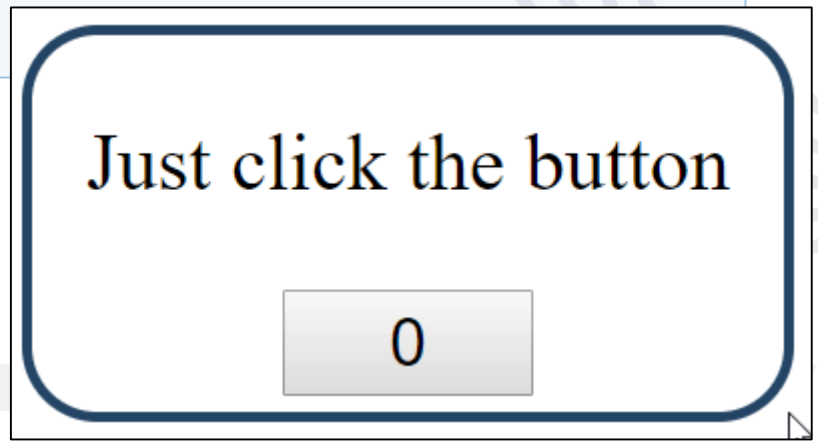
```
htmlRef.addEventListener( 'click' , handler , false );
```

- removeEventListener();

```
htmlRef.removeEventListener( 'click' , handler);
```

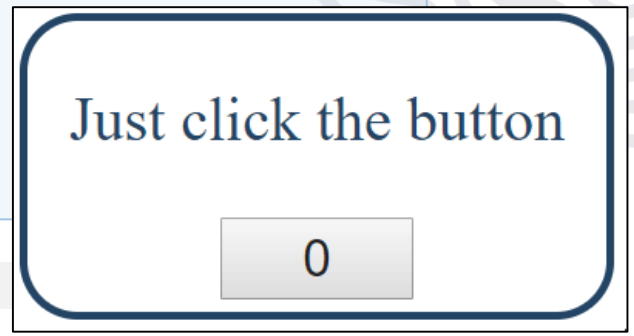
Attaching Click Event

```
const button = document.getElementsByTagName('button')[0];

button.addEventListener('click', clickMe);

function clickMe(e) {
  const target = e.currentTarget;
  const targetText = target.textContent;
  target.textContent = (+targetText) + 1;
}
```



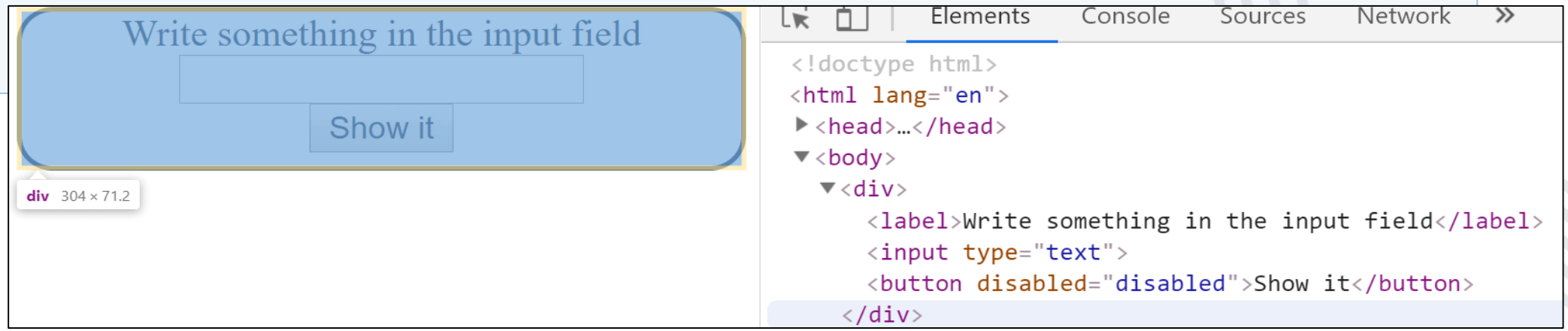
Attaching Hover Event

```
const button = document.getElementsByTagName('div')[0];
button.addEventListener('mouseover', function (e) {
    const style = e.currentTarget;
    const { backgroundColor } = style;

    if(backgroundColor === 'white'){
        targetStyles.backgroundColor = '#234465';
        targetStyles.color = 'white';
    } else {
        targetStyles.backgroundColor = 'white';
        targetStyles.color = '#234465';
    }}
);
```



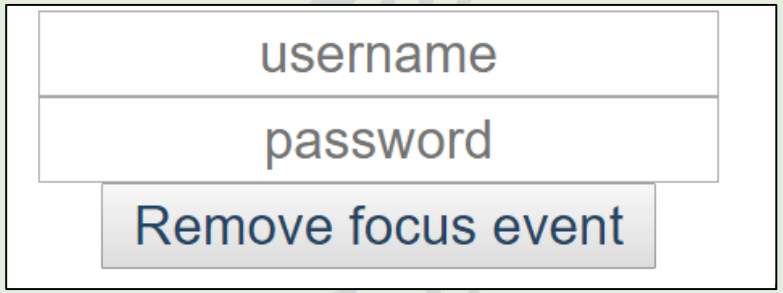
Attaching Input Event

```
const inputField = document.getElementsByTagName('input')[0
];
const button = document.getElementsByTagName('button')[0];

inputField.addEventListener('input', function () {
    button.setAttribute('disabled', 'false')
});
```



Remove Events

```
const password = document.querySelector('input[type="password"]');
const button = document.querySelector('button');
password.addEventListener('focus', focusEvent);

function focusEvent (){
    event.target.style.background = '#234465';
}

password.addEventListener('blur', (event) => {
    event.target.style.background = '';
});

button.addEventListener('click', () => {
    password.removeEventListener('focus', focusEvent);
});
```



Multiple Events

- The **`addEventListener()`** method also allows you to add many events to the same element, without overwriting existing events:

```
element.addEventListener("click", function);
element.addEventListener("click", myFunction);
element.addEventListener("mouseover", mySecondFunction);
element.addEventListener("mouseout", myThirdFunction);
```

*Note that you don't use the "**on**" prefix for the event use "**click**" instead of "**onclick**"*

SetInterval() / ClearInterval()

- In JS we can start / stop timers (intervals)

```
let intervalID = setInterval(
  function() {
    console.log("1 sec. passed");
  },
  1000
); // Delay = 1000 ms = 1 second
```

- Remove (cancel) existing timer

```
clearInterval(intervalID); // Stop the timer
```

Live Exercises

Event Delegation

DOM Event Delegation

- Allows you to **avoid** adding event listeners to specific nodes
- Event listener is assigned to a **single ancestor**

```
<ul id="parent-list">
    <li id="post-1">Item 1</li>
    <li id="post-2">Item 2</li>
</ul>
```

```
document.getElementById("parent-list")
  .addEventListener("click", function(e) {
    if(e.target && e.target.nodeName == "LI") {
        console.log(
          "List item ", e.target.id.replace("post-", ""),
          " was clicked!");
    }
});
```

Pros and Cons

- **Benefits**
  - Simplifies initialization
  - Saves memory
  - Less code
- **Limitations**
  - Event must be bubbling
  - May add CPU load

Live Exercises

Summary

- Event Loop
- Event Types
- Event Object Properties and Methods
  - preventDefault
  - stopPropagation
- Handling Events
  - Attach
  - Remove

Questions?

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