Managing React State

DECIDING HOW AND WHEN TO DECLARE STATE

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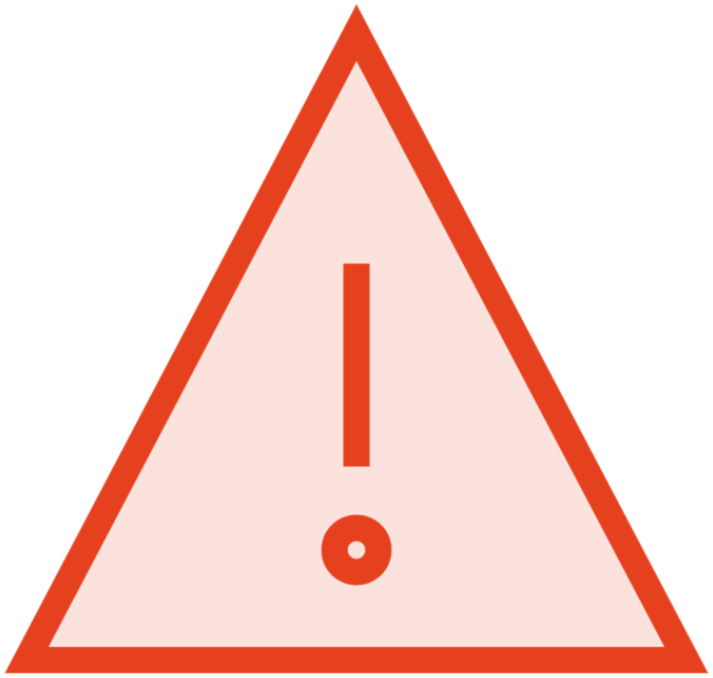
Target Audience

Relatively new to React

Want to improve state skills

Goal: Establish a clear mental framework for effectively handling state

Prerequisites



Understand JSX

Know how to declare a component

Mostly function components

- Patterns presented work in classes too
- Dedicated class component module

Agenda

Goal: Establish mental model

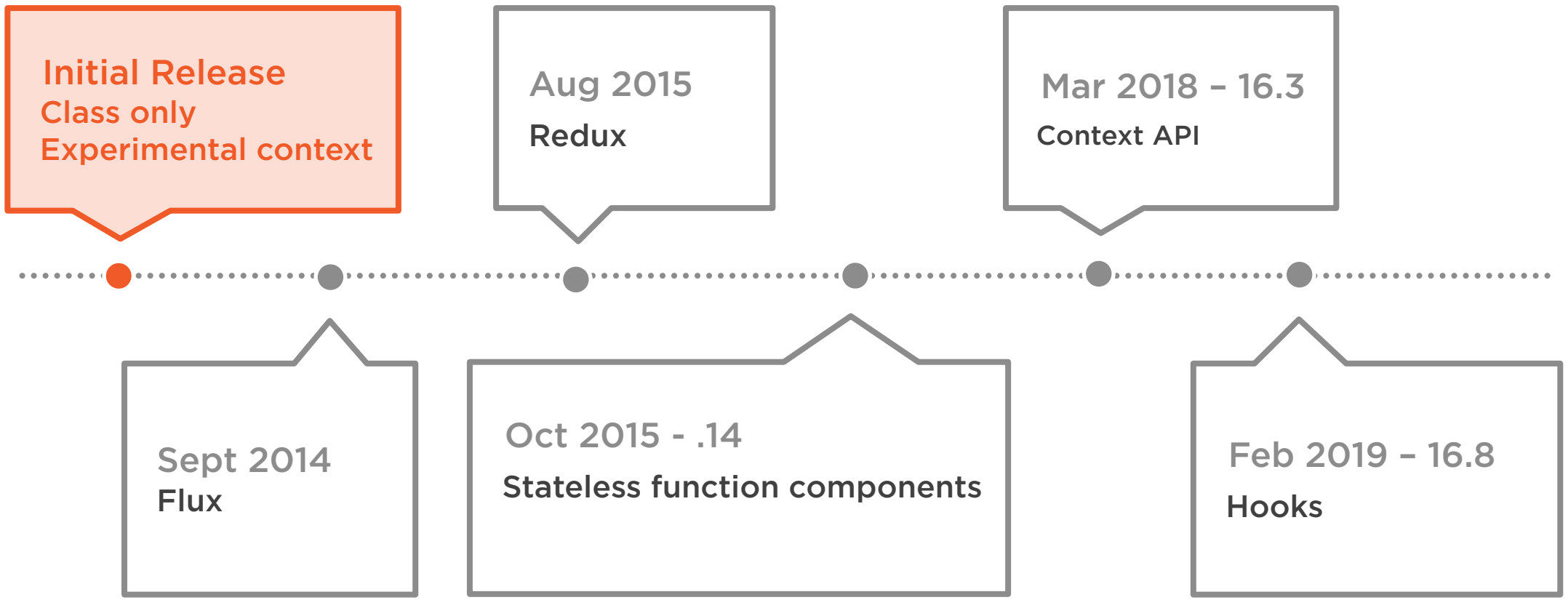
History of React State

Eight ways to handle state

- Deciding how to handle state

JavaScript data structures

A History of React State



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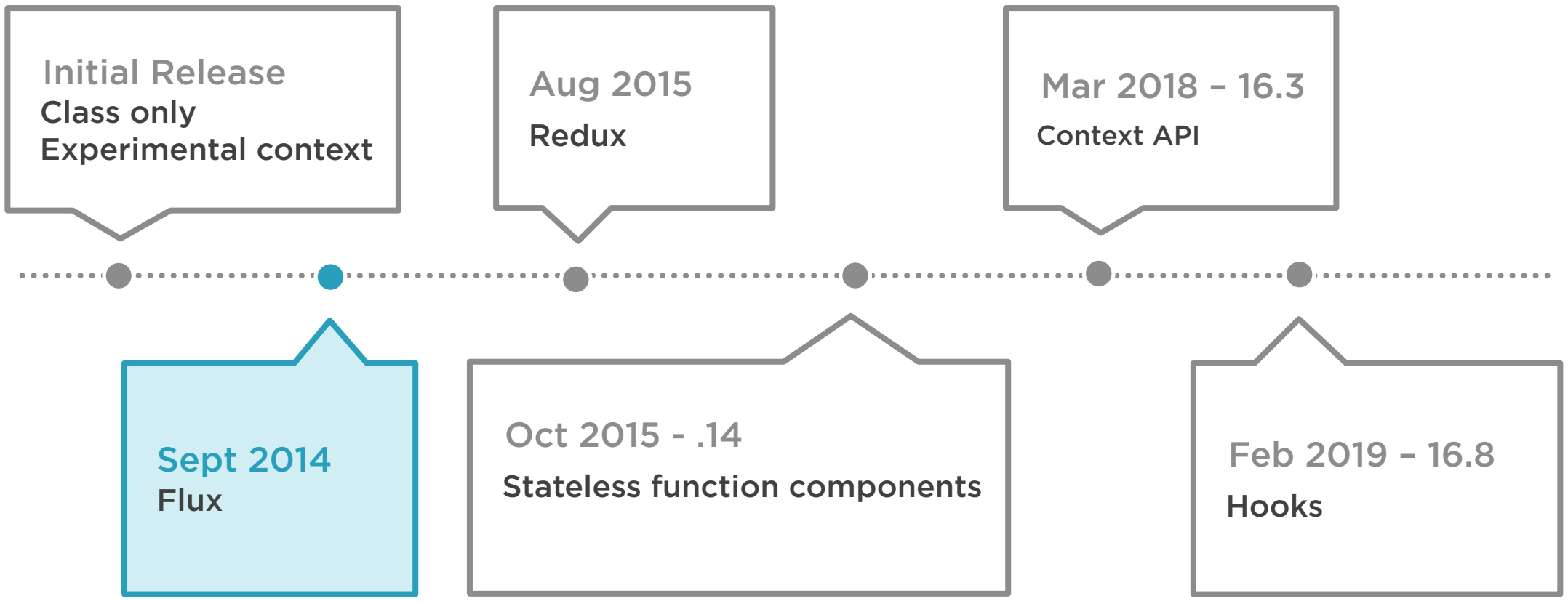

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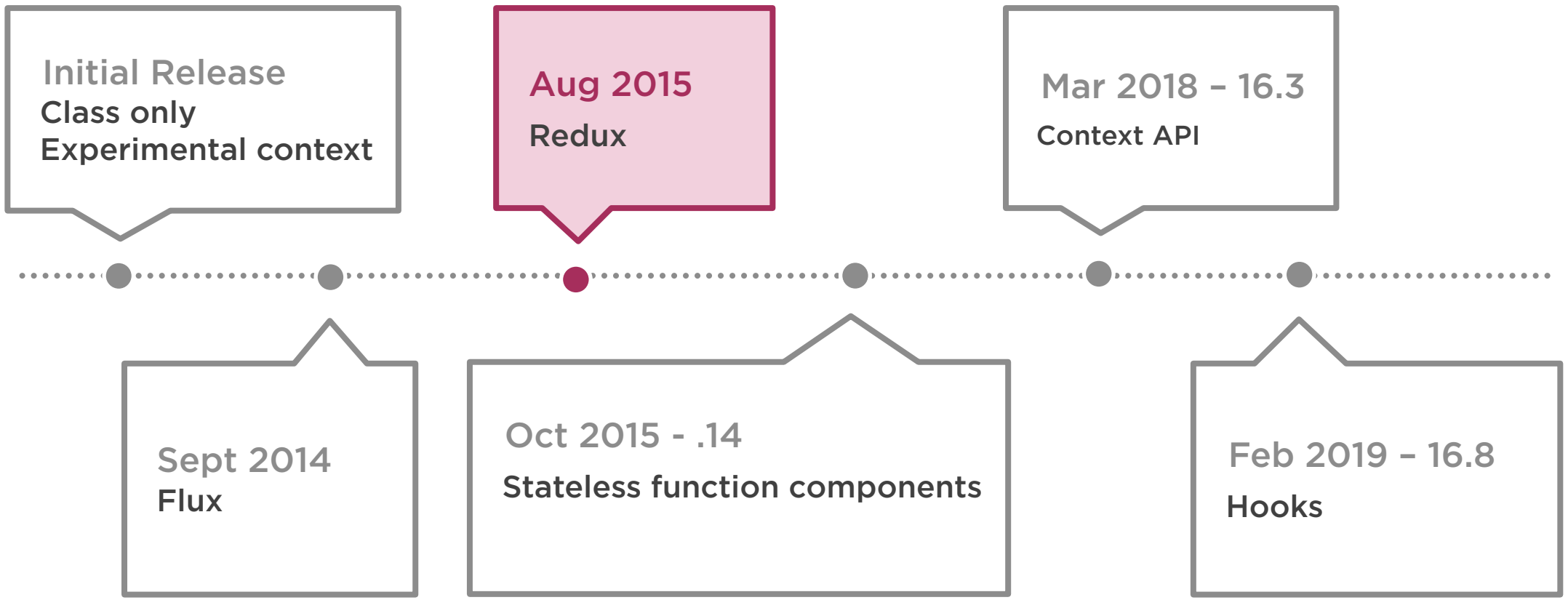

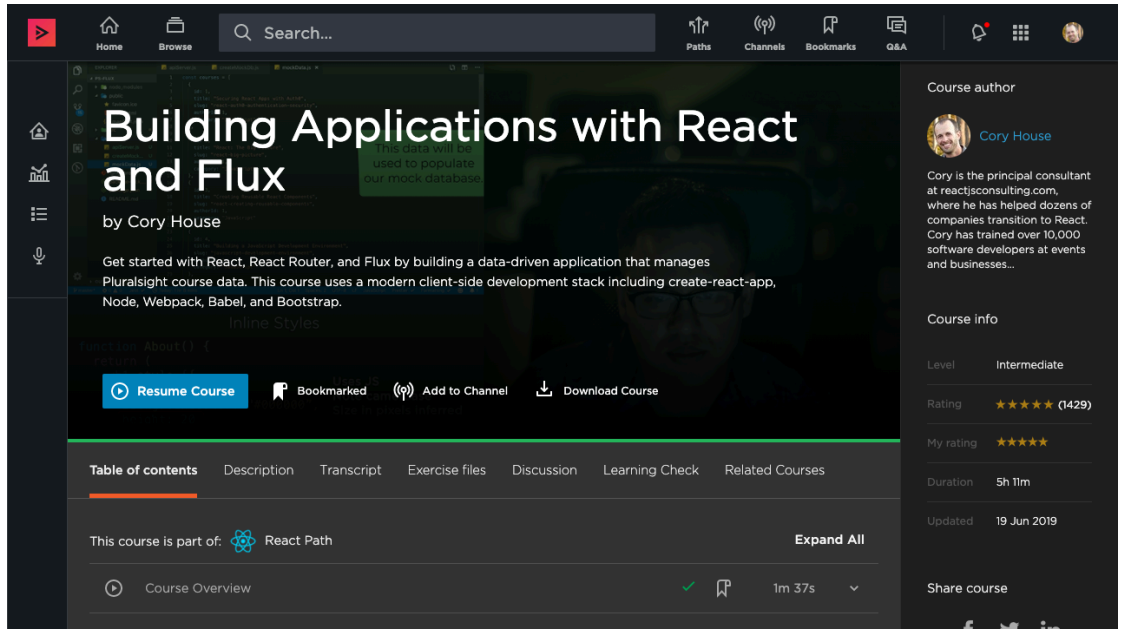
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by Cory House
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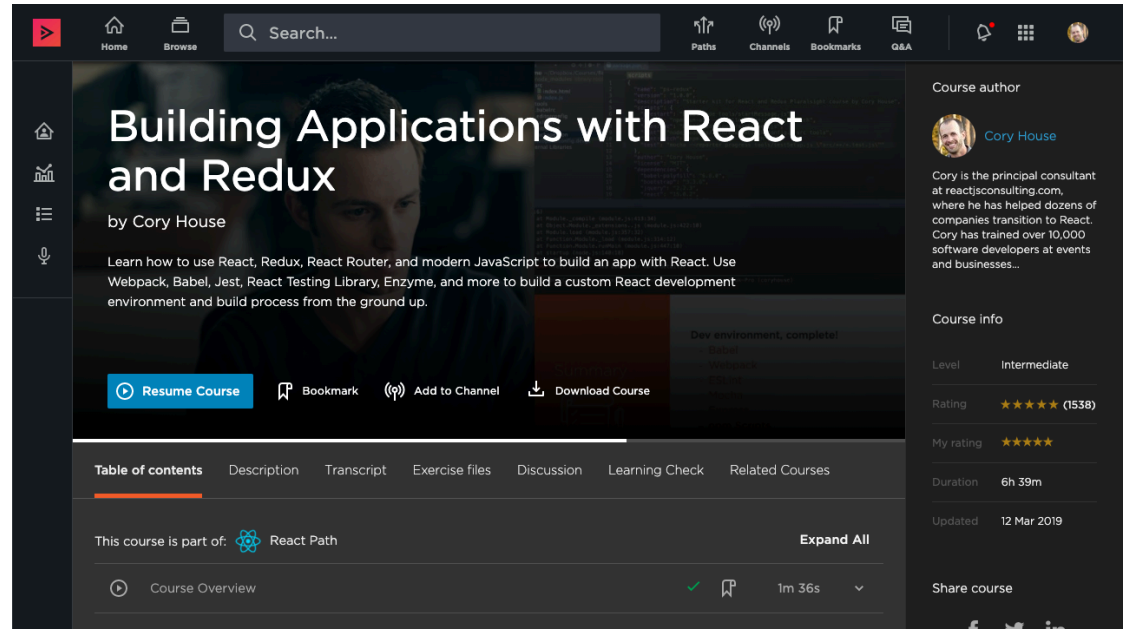
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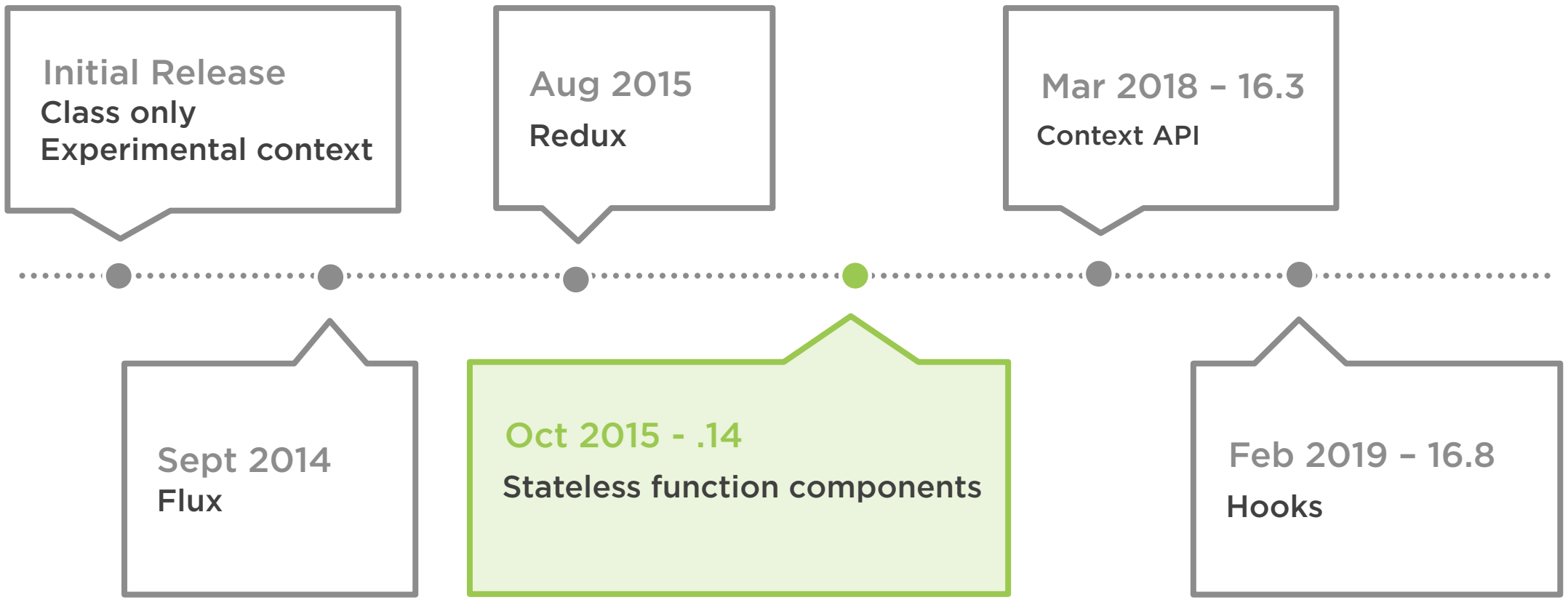

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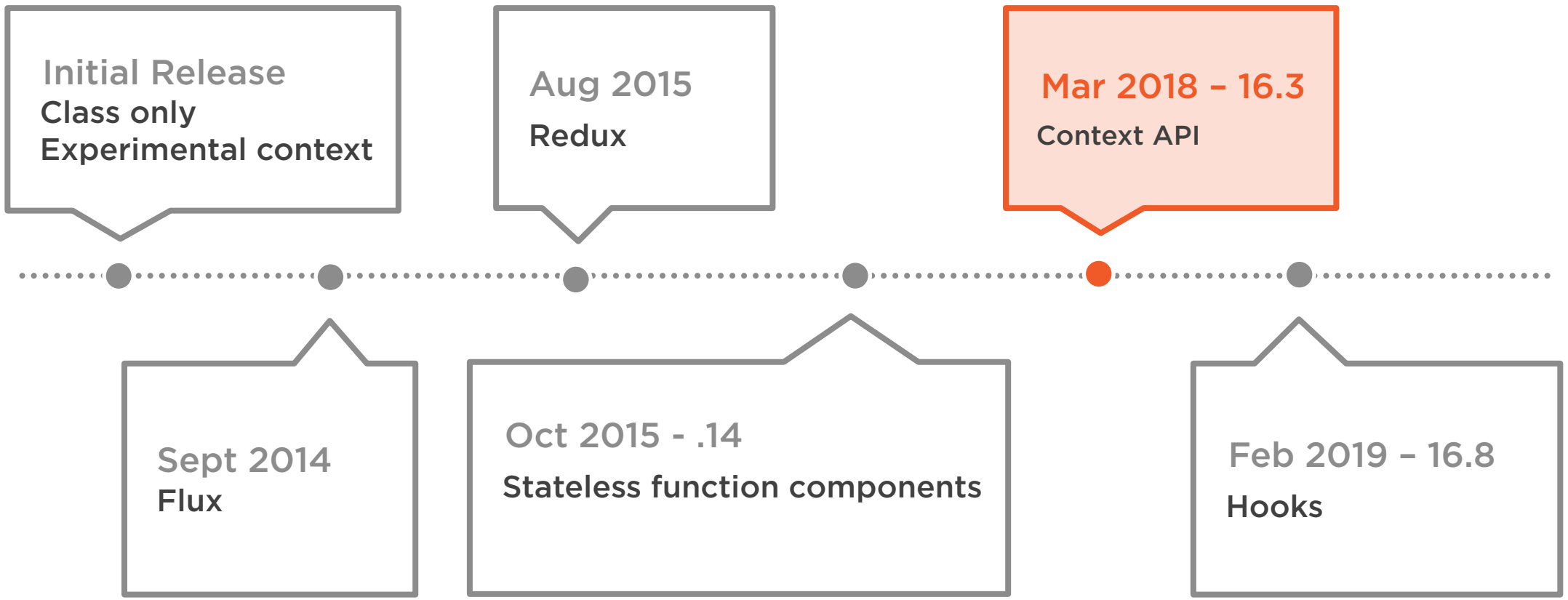

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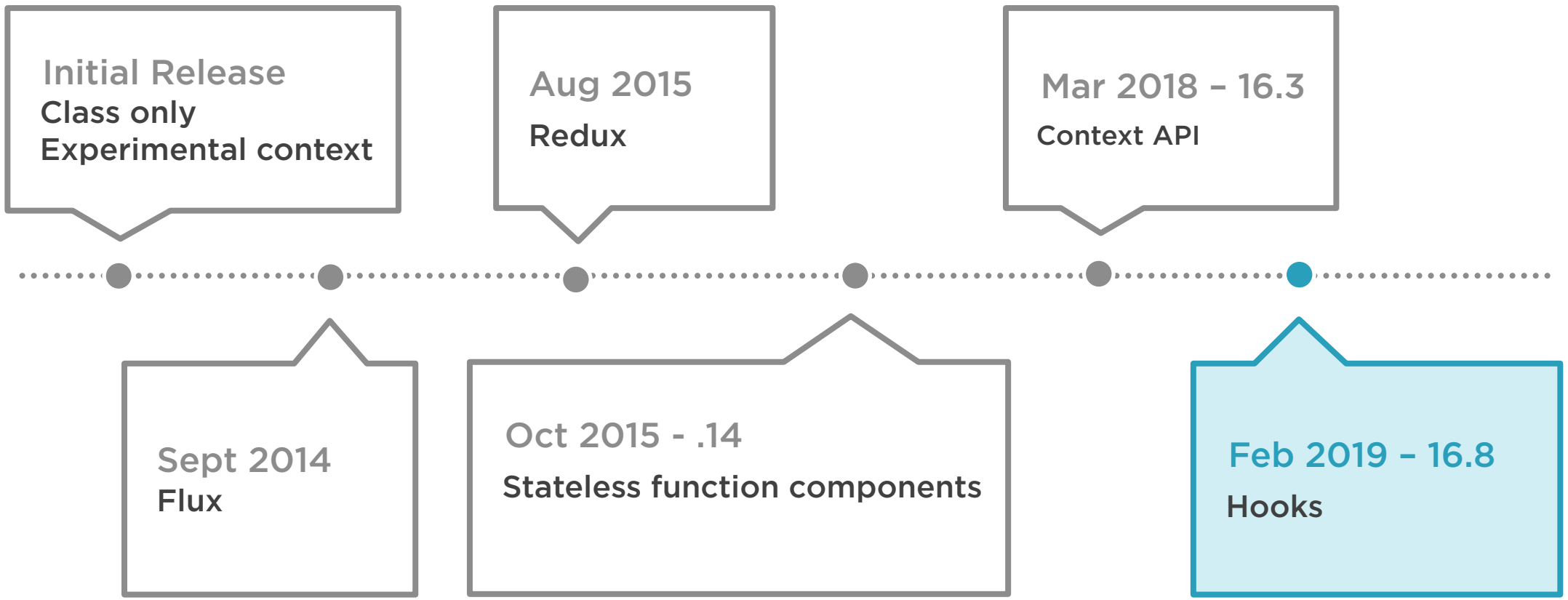

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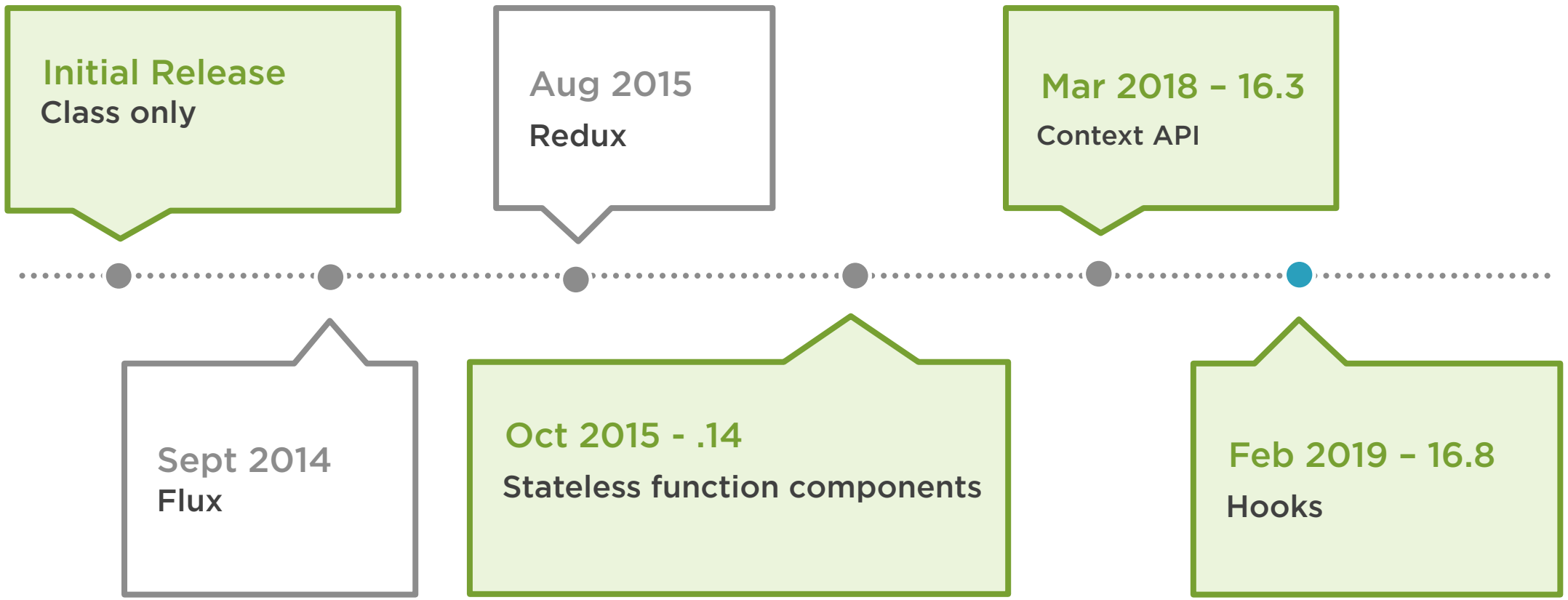
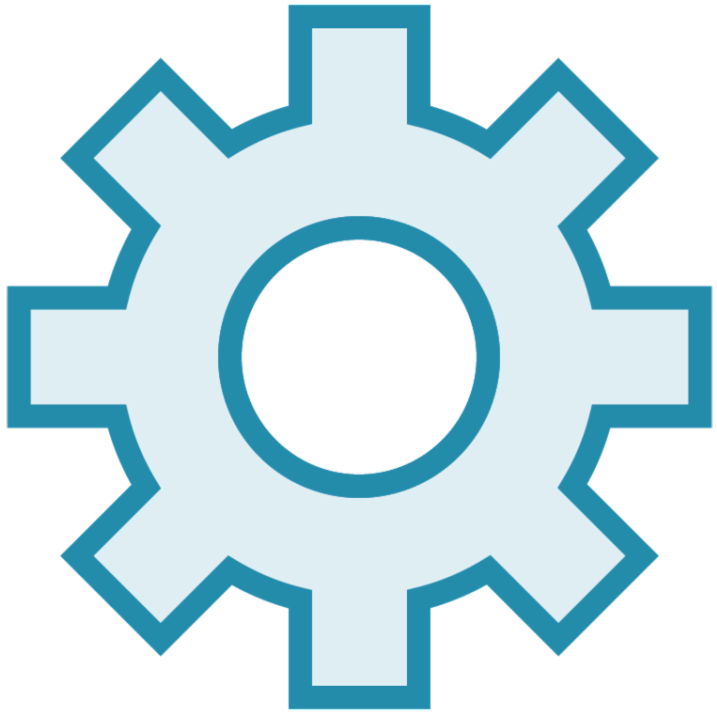


State

App data that may change

Eight Ways to Handle State

Side Note: Environment Variables



Store environment-specific settings

Don't change at runtime

Supported on all operating systems

Built into create-react-app

- REACT_APP_BASE_URL
- REACT_APP_ENABLE_FEATURE_X

Examples

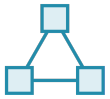
- Base URLs
- Feature toggles

Eight Ways to Handle State in React Apps


URL


Web storage


Local state


Lifted state


Derived state


Refs


Context


Third party library

Option 1: URL

Current app location/settings

- Current item
- Filters
- Pagination
- Sorting

Supports deep linking

Avoid redundantly storing in your app

Consider React Router

Option 2: Web Storage

Persist state between reloads

- cookies, localStorage, IndexedDB

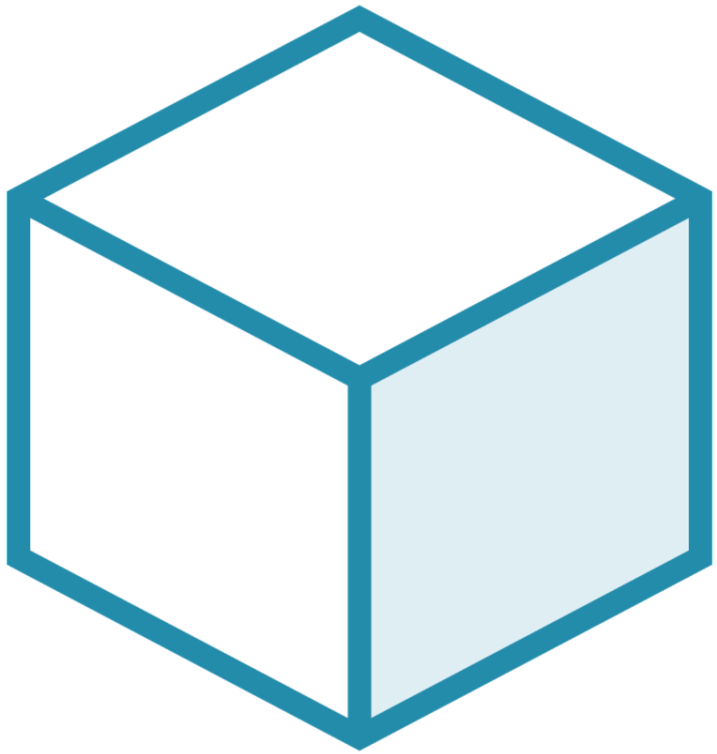
Watch out

- Tied to a single browser
- Avoid storing sensitive data

Examples

- Items in shopping cart
- Partially completed form data

Option 3: Local State



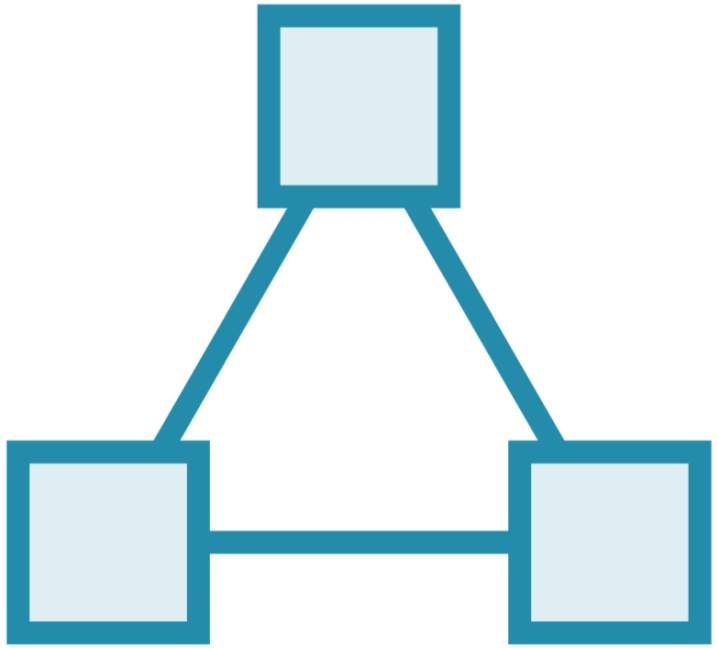
Store state inside a React component

- Useful when one component needs it

Example

- Forms
- Toggles
- Local lists

Option 4: Lifted State

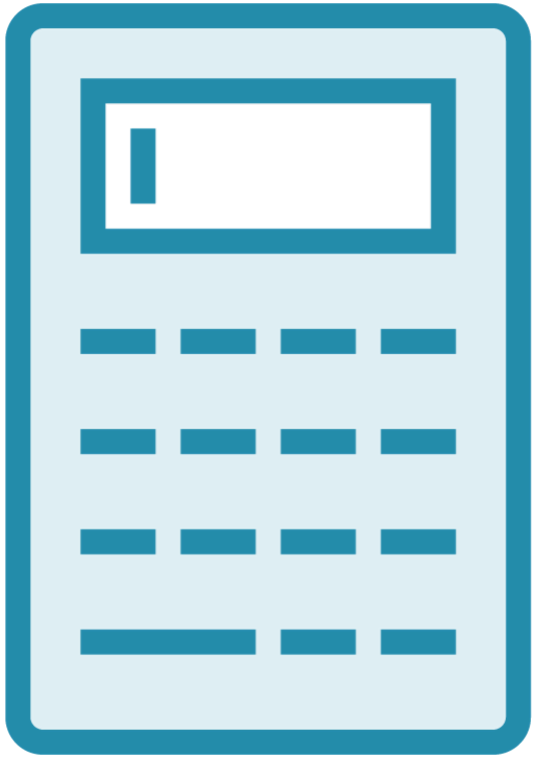


Lift state to a common parent

- Declare state in a parent component
- Pass state down via props

Use: Related components need same state

Option 5: Derived State



Derive state from existing state/props

Examples

- Call .length on an array in render
- Derive errorsExist by checking if the errors array is empty.

Why derive?

- Avoids out of sync bugs
- Simplifies code

Option 6: Refs

1. DOM reference

- Uncontrolled components
- Interfacing with non-React libraries

2. State that isn't displayed

- Track if component is mounted
- Hold timer
- Store previous state value

Option 7: Context

Global / broadly used state and functions

- Avoids “prop drilling”

Examples

- Logged in user
- Authorization settings
- Theming
- Internationalization settings

Option 8: Third Party State

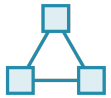
General options

- Redux
- Mobx
- Recoil

Remote State

- react-query
- Swr
- Relay
- Apollo

Eight Ways to Handle State in React Apps

	When to use it
 URL	Sharable app location
 Web storage	Persist between sessions, one browser
 Local state	Only one component needs the state
 Lifted state	A few related components need the state
 Derived state	State can be derived from existing state
 Refs	DOM reference, state that isn't rendered
 Context	Global or subtree state
 Third party library	Global state, Remote state

JavaScript Data Structures

Primitives

Immutable

Boolean	true/false
String	text
Number	numbers
BigInt	big numbers
Symbol	unique id

Collections

Mutable reference

Objects	properties
Array	list
Map	key/value pairs
Set	unique values

Type	Value Range	Size in bytes	Description
`Int8Array`	`-128` to `127`	1	8-bit two's complement signed integer
`Uint8Array`	`0` to `255`	1	8-bit unsigned integer
`Uint8ClampedArray`	`0` to `255`	1	8-bit unsigned integer (clamped)
`Int16Array`	`-32768` to `32767`	2	16-bit two's complement signed integer
`Uint16Array`	`0` to `65535`	2	16-bit unsigned integer
`Int32Array`	`-2147483648` to `2147483647`	4	32-bit two's complement signed integer
`Uint32Array`	`0` to `4294967295`	4	32-bit unsigned integer
`Float32Array`	1.2×10^{-38} to 3.4×10^{38}	4	32-bit IEEE floating point number (7 significant digits e.g., `1.1234567`)
`Float64Array`	5.0×10^{-324} to 1.8×10^{308}	8	64-bit IEEE floating point number (16 significant digits e.g., `1.123...15`)
`BigInt64Array`	-2^{63} to $2^{63}-1$	8	64-bit two's complement signed integer
`BigUint64Array`	`0` to $2^{64}-1$	8	64-bit unsigned integer

JavaScript data types and data structures

Programming languages all have built-in data structures, but these often differ from one language to another. This article attempts to list the built-in data structures available in JavaScript and what properties they have; these can be used to build other data structures. Wherever possible, comparisons with other languages are drawn.

Dynamic typing

JavaScript is a *loosely typed* and *dynamic* language. Variables in JavaScript are not directly associated with any particular value type, and any variable can be assigned (and re-assigned) values of all types:

```
let foo = 42;    // foo is now a number
foo     = 'bar'; // foo is now a string
foo     = true;  // foo is now a boolean
```

Data and Structure types

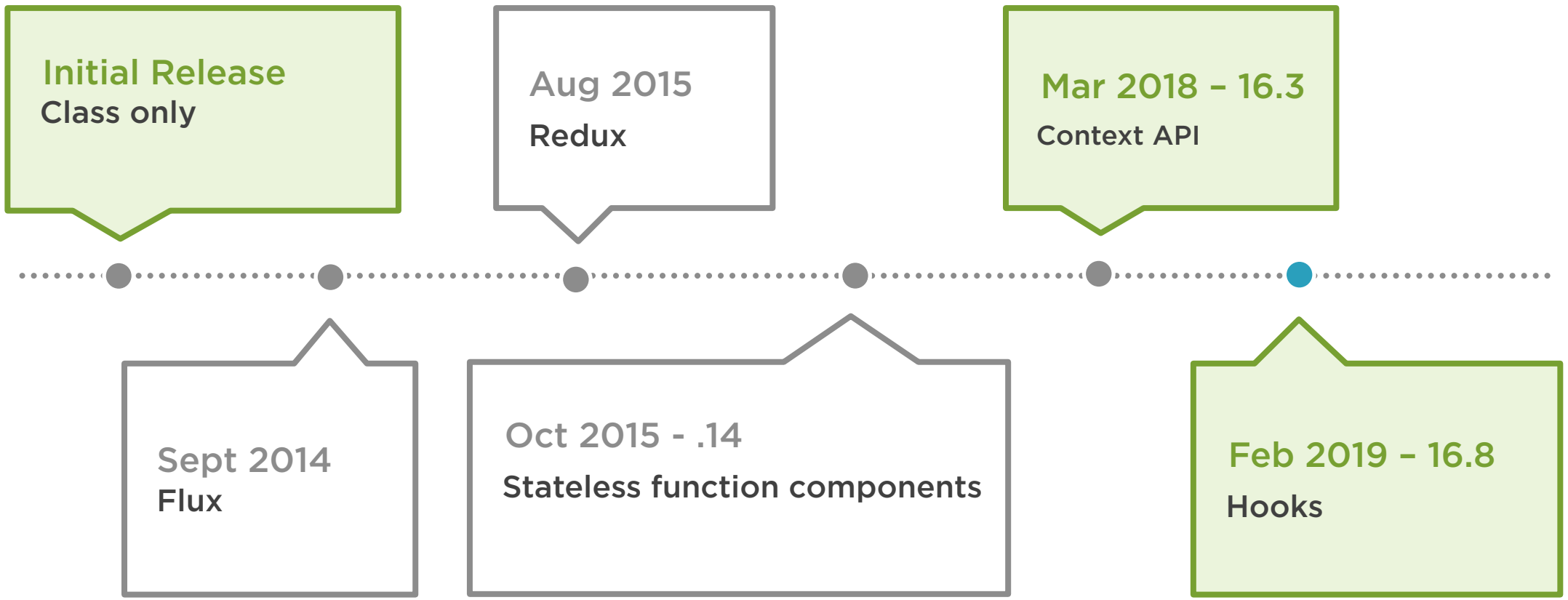
The latest ECMAScript standard defines nine types:

- Six **Data Types** that are primitives, checked by typeof operator:

Summary

History of React State

A History of React State



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Eight ways to handle state

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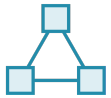 Lifted state	A few related components need the state
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Where to Store State in React Apps

1. **Does it belong in the URL? (current page, current record, sorting, scroll location…)**
   Keep URL-related state in the URL.
2. **Want to persist data across sessions or make data available offline?**
   Consider localStorage/sessionStorage/IndexedDB/Cache Storage API.
3. **Is it server cache data?**
   Try react-query or swr. Using GraphQL? Then also consider Relay / Apollo.
4. **Is it a DOM element reference, state that doesn't change, or not rendered at all?**
   Use a ref.
5. **Can it be derived from existing props, state, URL, etc?**
   Derive it "on-the-fly" as part of each render (memoize if expensive).
6. **Does only one component use the data?**
   Use local state.
7. **Do a few related components use it?**
   Store state in a common parent.
8. **Is it "global" data? Consider, *in order*:**
   Store in App's root component, context, or separate library (Redux, Recoil, etc).

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Next up: Let's code!

- Demo introduction
- Managing state in functions