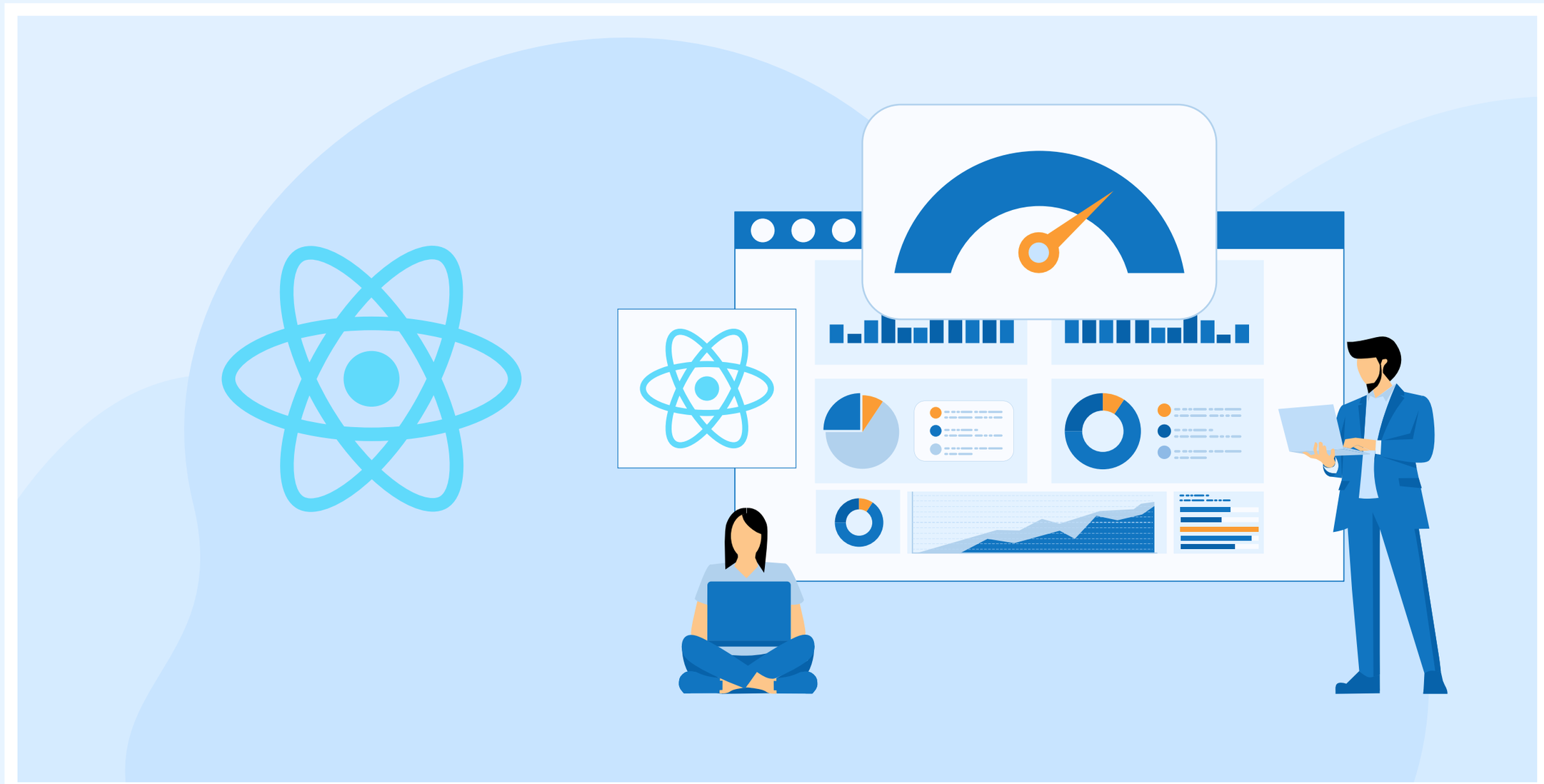
ReactJS Performance Optimization Techniques



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Lazy Loading Images

Implement lazy loading to improve loading time by loading images only when they appear on the user's screen. Use libraries like react-lazy-load-image-component.

```
import { LazyLoadImage as LazyImage } from "react-lazy-load-image-component";
import "react-lazy-load-image-component/src/effects/blur.css";
export default function App() {
  return (
    <div className="App">
      <LazyImage
        src={"https://placedog.net/500/300"}
        alt="lazyimage alt"
        effect="blur"
      />
    </div>
  );
}
```

Reduce Unnecessary Renders

Utilize React.memo and useCallback to reduce unnecessary re-renders and improve performance.

```
const MemoizedComponent = React.memo(ComplexComponent);
```

```
const memoizedCallback = useCallback(
  () => {
    doSomething(a, b);
  },
  [a, b],
);
```

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Avoid Spreading Props on DOM Elements

Avoid unknown HTML attributes by specifying only necessary attributes.

Avoid:

```
<MessageLabel { ... props}>
```

Use:

```
const MessageText = props ⇒ {
  return (
    <MessageLabel specificAttr={props.specificAttr}>
      {props.message}
    </MessageLabel>
  );
};
```

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Server-Side Rendering (SSR)

- Implement SSR to deliver content faster and improve SEO.
- Consider using frameworks like Next.js to simplify SSR setup.

Dependency Optimization

- Analyze dependencies to reduce bundle size by removing unused code.
- Use plugins like moment-locales-webpack-plugin and lodash-webpack-plugin.

Avoid Props in Initial States

Do not initialize the state with props in the constructor. Use props directly in the render method instead.

```
class MessageComponent extends Component {
  constructor(props) {
    super(props);
    this.state = { isEnabled: true };
  }

  render() {
    return <div>{this.props.messageText && <>Enter Message:
    <Input type="text" name="message" /></>}</div>;
  }
}
```

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Memoize React Components

Use memoization to cache expensive function calls and prevent unnecessary re-renders.

```
import moize from 'moize';
const UserDetails = ({user, onEdit}) =>{
    const {titleText, fullName, profileImg} = user;
    return (
        <div className="user-detail-wrapper">
            <img src={profileImg} alt={fullName} />
            <span>{fullName}</span>
            <span>{titleText}</span>
        </div>
    )
}
export default moize(UserDetails,{
    isReact: true
});
```

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React.PureComponent

- Optimize component updates by using PureComponent for shallow prop comparisons.
- Ensure state/props are immutable and not deeply nested.

```
class Greeting extends PureComponent {
  render() {
    return <h1>Hello World, {this.props.name}!</h1>;
  }
}
```

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Avoid Inline Functions

Avoid using inline functions in render methods to prevent unnecessary re-renders.

```
class MessageList extends React.Component {
  onMessageClick = (messageId) => {
    this.setState({ selectedMessageId: messageId });
  }

  render() {
    return messages.map((message) => (
      <Message onClick={this.onMessageClick} message={message}
       key={message.id} />
    ));
  }
}
```

Use a Function in setState

Use a function in setState to ensure state updates are correctly based on previous state.

```
this.setState((prevState) ⇒ ({ correctData: !prevState.correctData }));
```

List Virtualization in React Applications

- Implement list virtualization to render only visible items, improving performance.
- Leverage libraries like react-virtualized or react-window.

CSS Animations Instead of JS Animations

- Prefer CSS animations for simple, state-based animations.
- Reserve JS animations for complex effects requiring fine control.

Want to add your insights?

Leave your optimization strategies in the comments.

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