

# WEB APP DEVELOPMENT WITH REACTJS (INT252)

## Lecture 4: SPA vs MPA & React Philosophy

### Unit I – JavaScript Refresher & React Foundations

#### Syllabus Mapping:

- Single Page Application (SPA)
- Multi Page Application (MPA)
- React philosophy & declarative UI
- Virtual DOM (conceptual)

**Target Learner:** Beginner (HTML, CSS, JavaScript knowledge)

# Why This Lecture Matters

Before writing React code, you must understand:

- **What kind of application React builds**
- **Why React behaves differently from normal websites**

This clears 80% beginner confusion

# What is a Multi Page Application (MPA)?

Traditional websites are MPAs:

- Each page = new HTML file
- Browser reloads on every navigation

Examples:

- `home.html`
- `about.html`
- `contact.html`

# MPA Navigation Flow

Click Link



Request new HTML



Server responds



Full page reload

## Problems with MPA

- ✗ Slower navigation
- ✗ Full page reload
- ✗ Poor user experience
- ✗ State lost on reload

# What is a Single Page Application (SPA)?

SPA:

- Only one HTML file
- JavaScript controls UI
- No full page reload

React builds **SPAs**

# SPA Navigation Flow

Click Link



JavaScript updates UI



No page reload

## Key Difference: MPA vs SPA

Feature	MPA	SPA
Pages	Many HTML	One HTML
Reload	Yes	No
Speed	Slower	Faster
UX	Basic	Smooth



# How React Achieves SPA Behavior

React:

- Loads app once
- Updates only required parts
- Uses JavaScript to control UI

## React Philosophy (Core Idea)

UI is a function of state

Change state → React updates UI

# Imperative vs Declarative UI

## Imperative (Vanilla JS)

```
document.getElementById('title').innerText = 'Hello';
```

You tell *how* to change UI

## Declarative (React Way)

```
<h1>{title}</h1>
```

You tell *what* UI should look like

React handles the changes

## Why Declarative UI Is Better

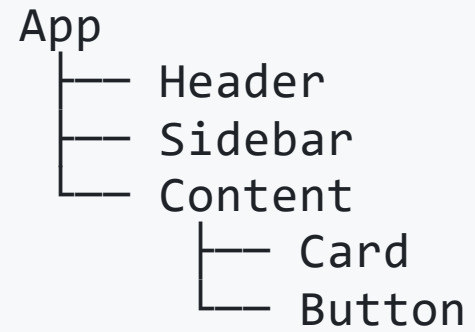
- Less code
- Fewer bugs
- Easier to understand
- Easier to maintain

# Component-Based Architecture

React apps are built using:

- Small reusable components
- Each component has single responsibility

## Example Component Breakdown



## Benefits of Components

- Reusability
- Easy testing
- Easy maintenance
- Clear structure



# What is Virtual DOM? (Beginner View)

Virtual DOM:

- Lightweight copy of real DOM
- Stored in memory

React uses it for efficiency

# Why Virtual DOM Exists

Updating real DOM is slow

React:

1. Updates Virtual DOM
2. Compares with previous version
3. Updates only changed parts

## Virtual DOM Flow (Simplified)

State Change



Virtual DOM Update



Diffing



Minimal Real DOM Update

## Important Clarification

! Virtual DOM is not magic

It just:

- Reduces unnecessary DOM updates
- Improves performance

## Common Beginner Misunderstandings

- ✗ React replaces entire page
- ✗ Virtual DOM is faster than DOM always
- ✗ React manipulates DOM directly

## Practice Exercises

1. List 2 differences between SPA & MPA
2. Explain declarative UI in your words
3. Why Virtual DOM is needed?

## Answers – Practice Exercises

### 1. SPA vs MPA

- SPA has one HTML, MPA has many
- SPA has no reload, MPA reloads

## **Answers – Continued**

### **2. Declarative UI**

We describe what UI should look like.  
React updates it automatically.



## Answers – Continued

### 3. Virtual DOM

It reduces direct DOM updates and improves performance.

## Key Takeaways

- React builds Single Page Applications
- Declarative UI simplifies development
- Components are core building blocks
- Virtual DOM optimizes updates

## Next Lecture

Lecture 5: React Tooling & Project Setup

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