

State Management

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Our small, read-only photo app is deceptively simple

- Model, View, Controller - All setup on startup and static
 - Can have a nice modular design of view components.
 - Each MVC unit independently fetches their model data.
 - Some duplicate model data fetches (e.g. UserDetails & UserList)
- Add in Session State and object creation and updating
 - Things get more complex for our single page app
- Examples:
 - User add new comments or photos - model data of one view changed by another view
 - Users logs out and logins into the app with a different login name - big change in model data

Session state shared between frontend and backend

- Must be kept in sync between the browser app and the server
 - Who, if anyone, is logged in?
- Server will need to reject any requests from users not logged in
 - Model fetching done only at view/controller startup might not work
- Consider transitions of your photo app
 - Login - Not logged in to logged in
 - At app startup most models are not available (e.g. sidenav user list) but become available after login is completed.
 - Logout - Logged in to not logged in
 - Requests to web server that worked before will now fail

Models updates

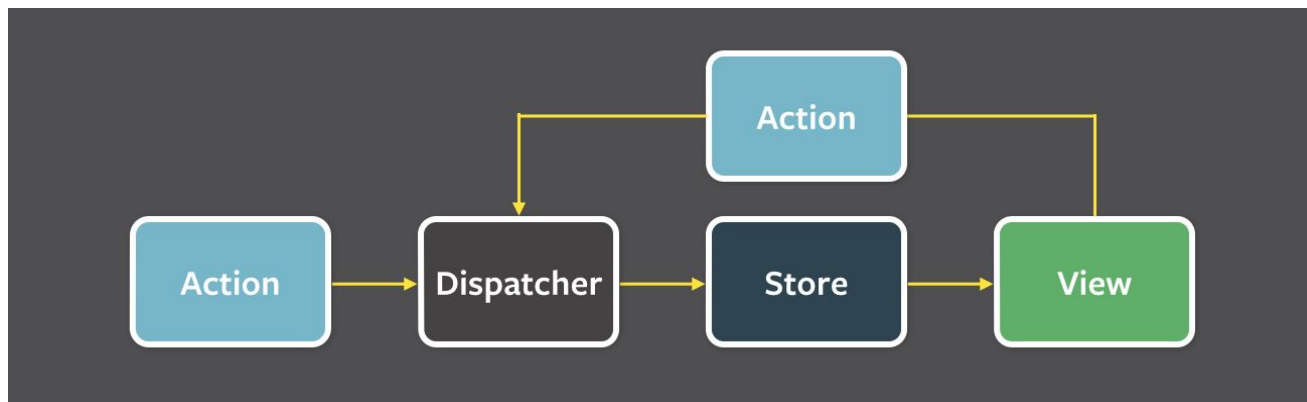
- Consider what happens when new objects like users, photos, or comments are added.
 - Models change
- Controller fetching model only at startup might not work
- Consider photo app adding a photo or comment
 - Model refresh needed

Components are interested in outside events

- How to keep a modular design but allow controllers to be notified of things happening outside of it?
 - Example: a view component and an add component
- One option: Explicit communication interfaces in components
 - ReactJS: Pass callback functions around to components
 - `<Component commInfo={this.callMeWithInfo.bind(this)} />`
- Better option: Listener/emitter pattern
 - Components registers interest (listen) and component detecting change signals (emit)

React listener/emitter pattern: No opinion

- FLUX - Facebook's Application Architecture For Building user interfaces
 - Store state in a "Store" - change with actions, notify view listeners



- Redux <https://redux.js.org/> - A predictable state container for JavaScript apps
- Relay <https://relay.dev/> - The production-ready GraphQL client for React

Photo App current Model Data Handling

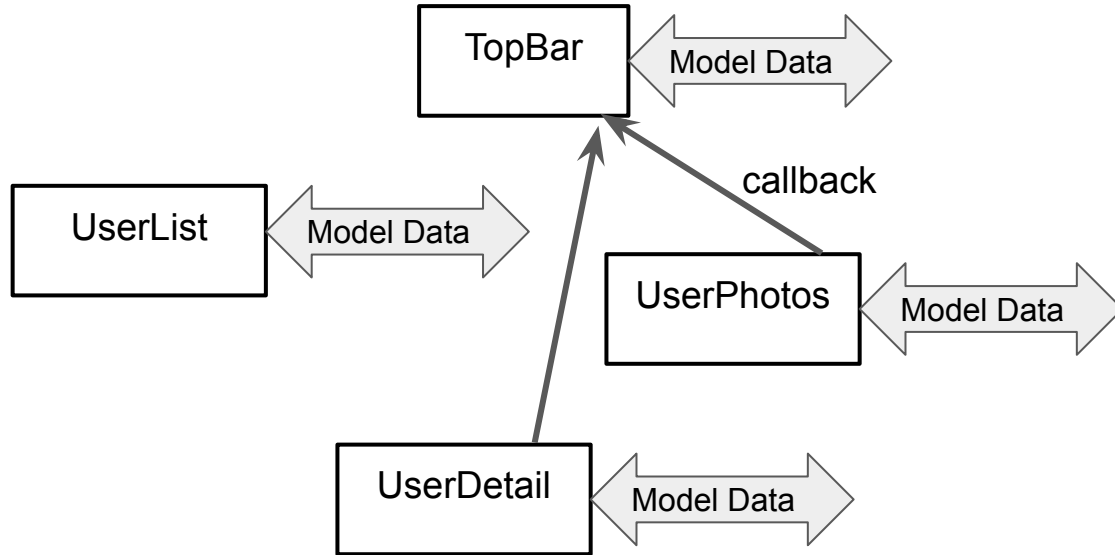


Photo App with state management

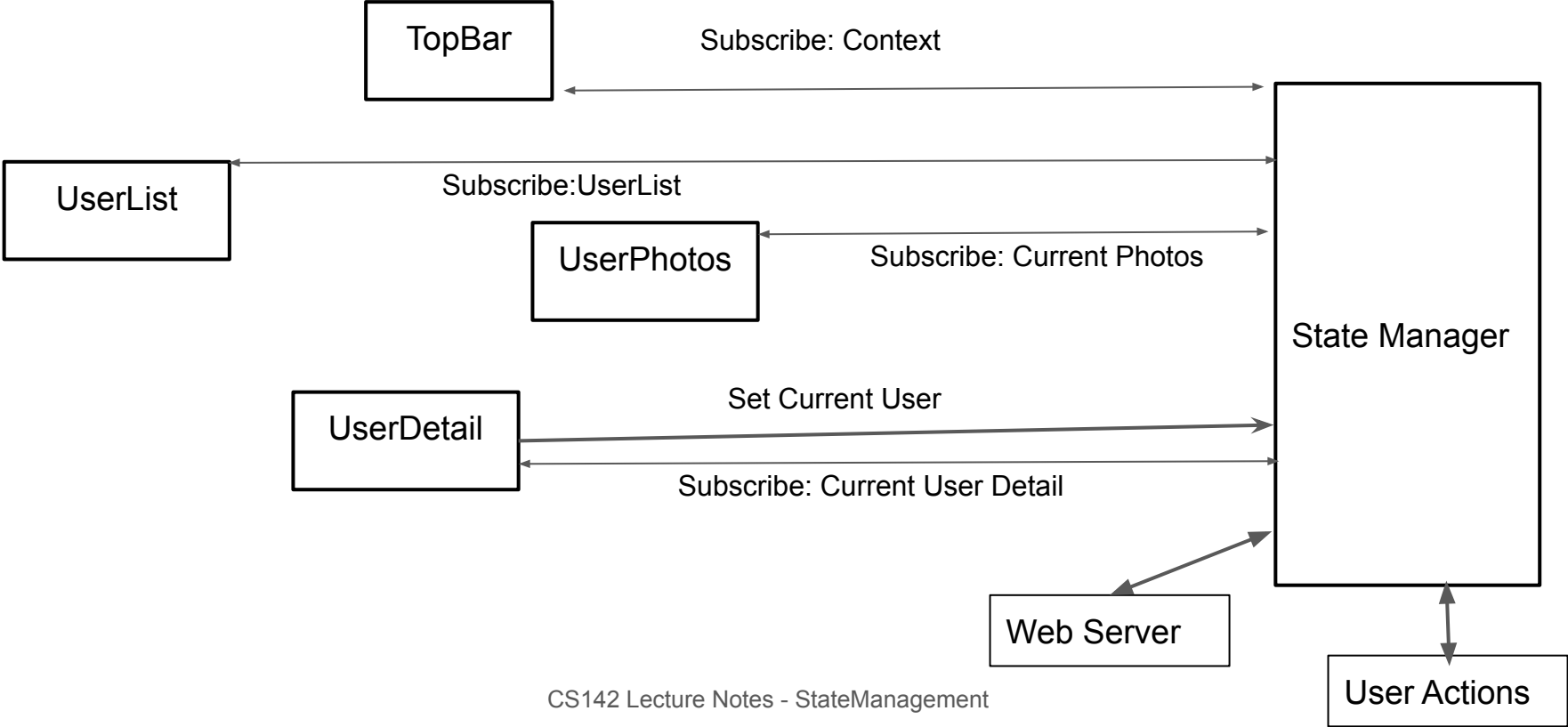
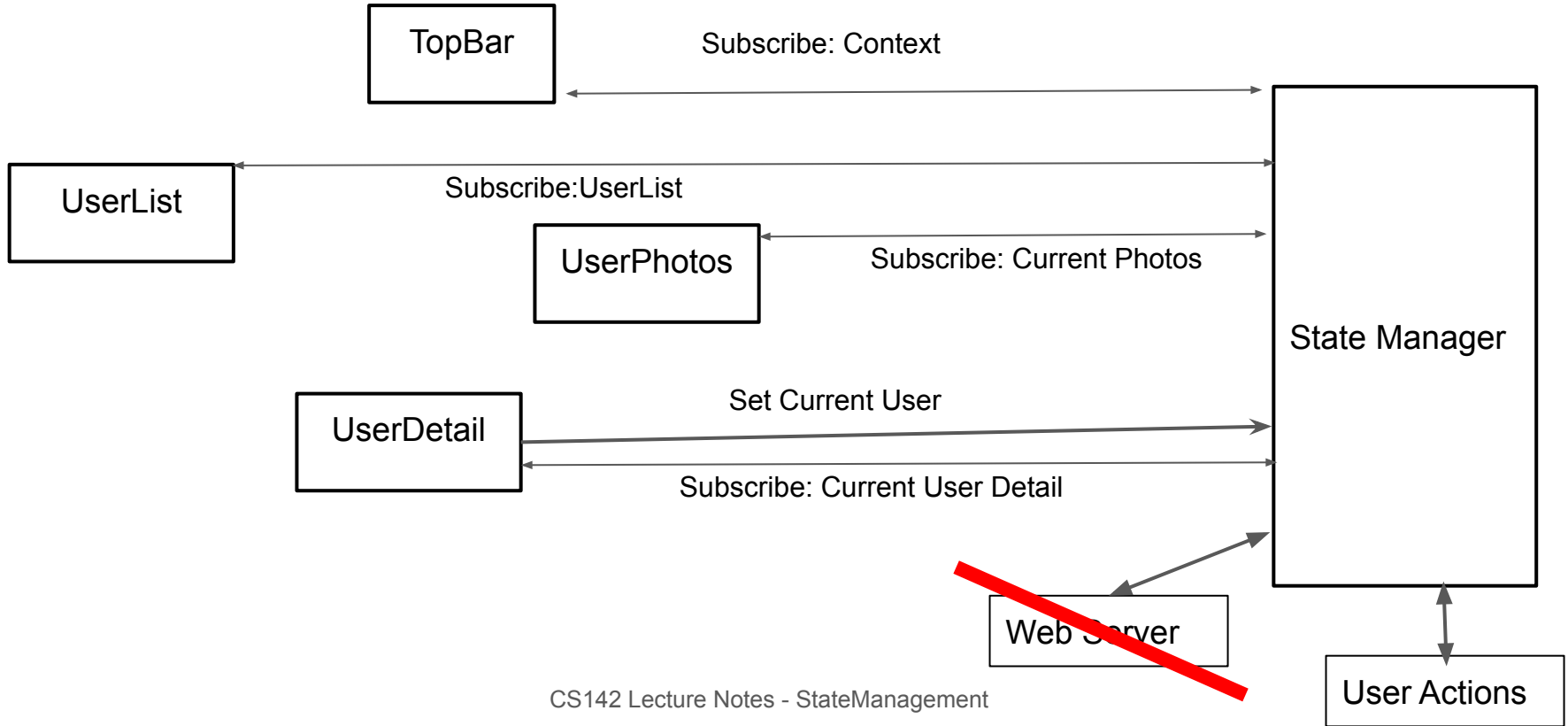


Photo App with offline support



Dealing with other model changes

What happens if another user adds a photo or comment? Options:

1. Do nothing: Easy!
 - User won't see new material until they do something that caused the model to be refreshed
 - Very disconcerting if they don't see their own changes
2. Poll: Periodically check for changes or just refetch the model
 - Can provide a UI widget to trigger model refresh
3. Server push: Have the server push model changes as soon as they occur
 - User sees updates as soon as possible
 - Might conflict with user changes or be disconcerting for the user
 - Implementation is easier with Web Sockets

ReactJS: Photo App with sessions and input

- App needs to track who (if anyone) is logged in
 - Ideally held in some state store
 - OK to keep in the PhotoShare component state (see [ReactJS Context](#) mechanism)
- Need to handle the no one logged-in case
 - Handling deep linking with React Router:

```
{
  this.userIsLoggedIn ?
    <Route path="/users/:id" component={UserDetail} />
  :
    <Redirect path="/users/:id" to="/login-register" />
}
```
- Need to inform component with to refresh their models
 - Again State management is ideal: OK to use callbacks