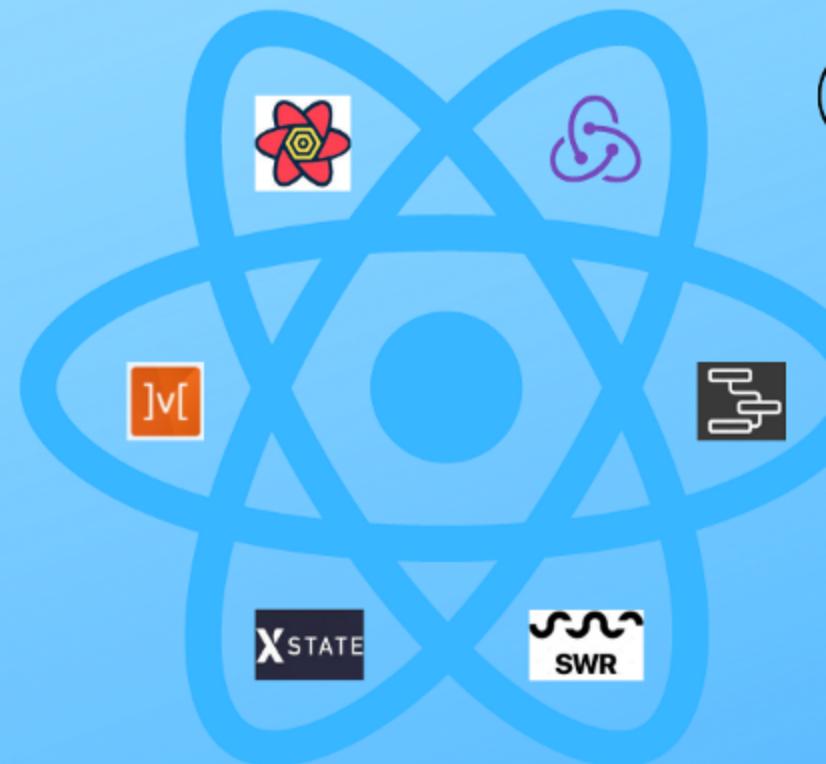


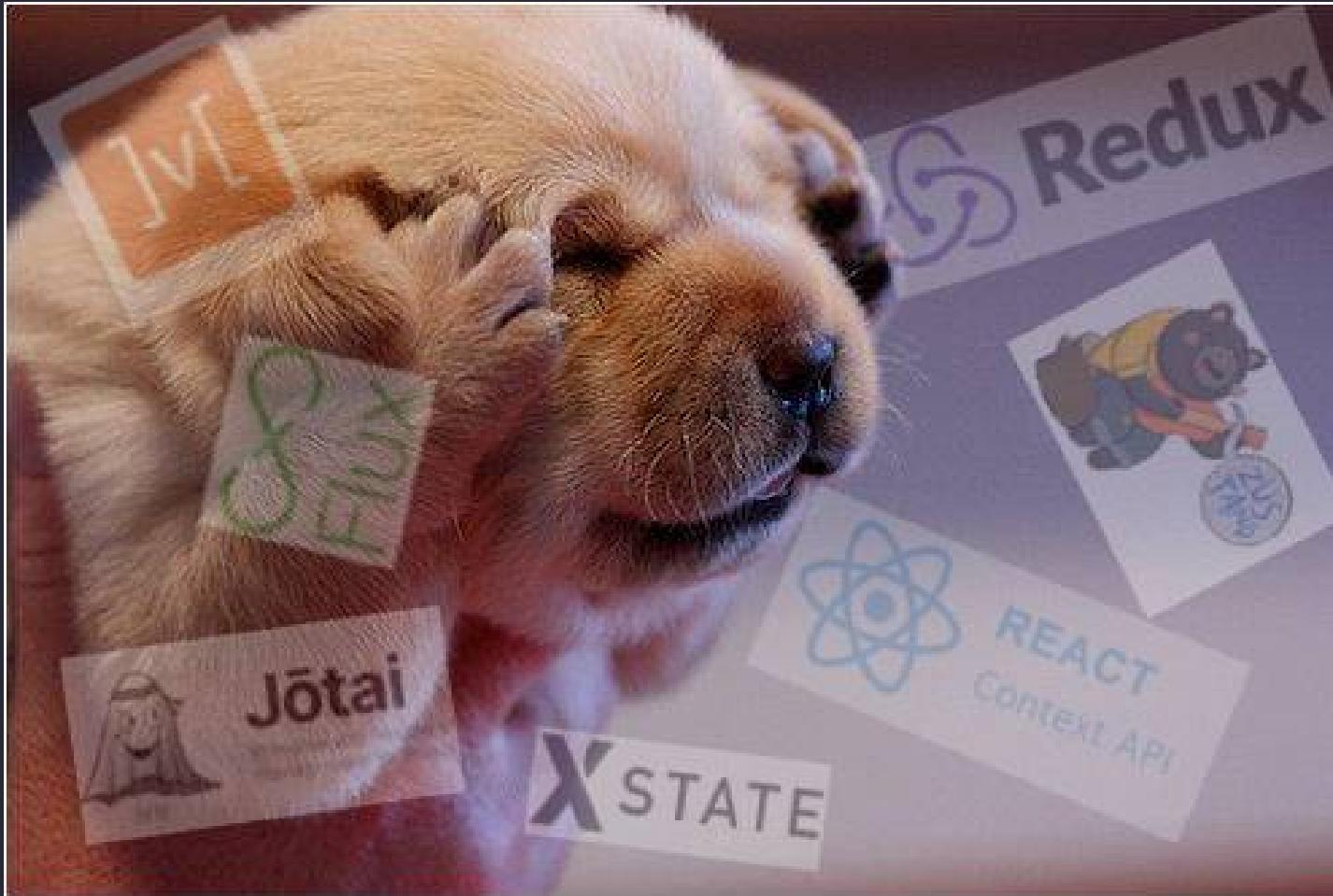
React의 차세대 상태관리, Jotai &

쇼핑검색 FE 서상혁

State Management



State Management

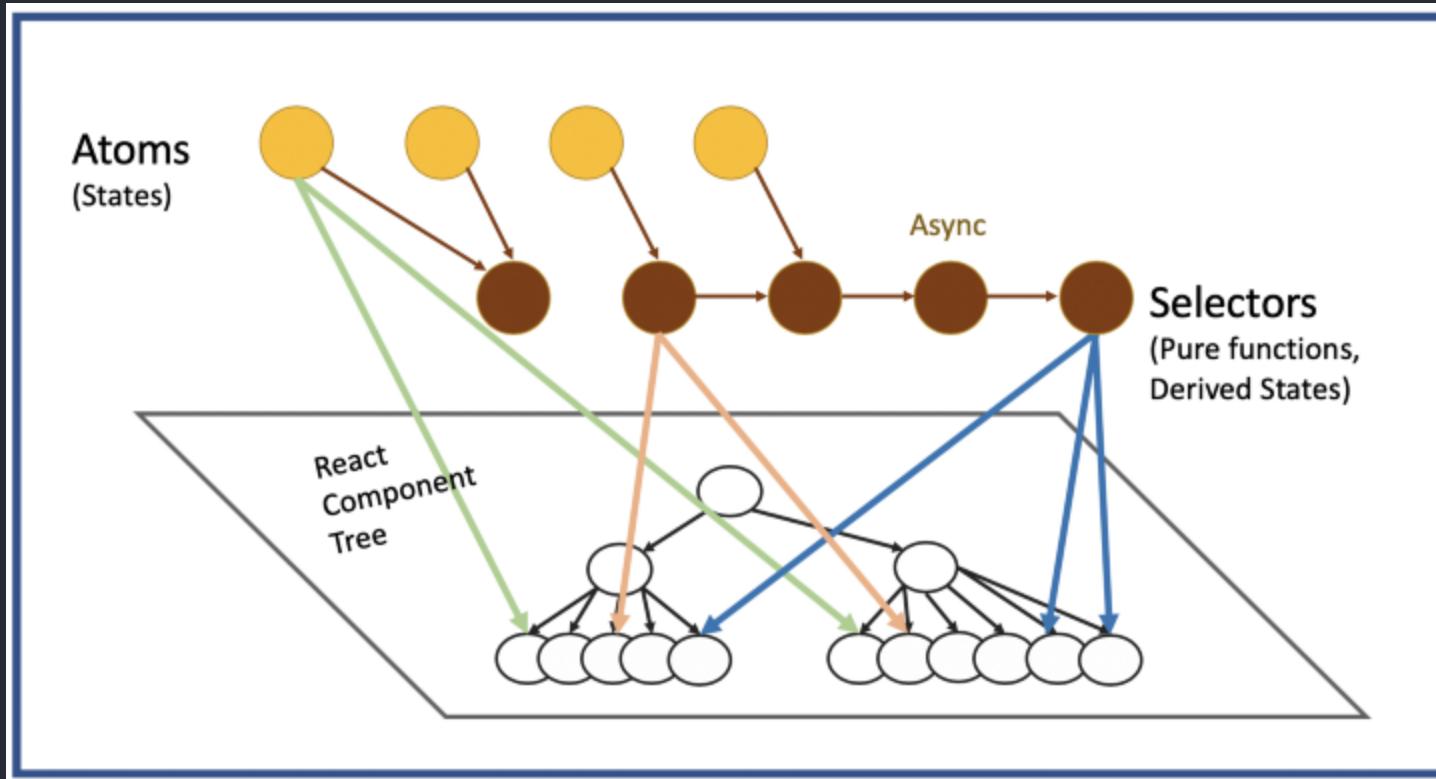


State Management

상태관리 라이브러리들의 역사

- 2013 - React 등장
- 2014 - Flux (다양한 라이브러리 등장)
- 2015 - Redux
- 2016 - MobX
- 2018 - Context
- 2019 - Hooks 등장 (+ React Query, SWR)
- 2019 - Zustand
- 2019 - xState
- 2020 - Recoil, Jotai, Valtio
- 2021 - use-context-selector

State Management



Jotai?



Jōtai

Primitive and flexible state
management for React

- 원시적이고 유동적인 리액트의 상태관리
- Jotai = 일본어로 'State'

“ Jotai is pronounced "joe-tie" and means "state" in Japanese. ”

Jotai의 탄생

- recoil에 영감을 받아서 탄생
- 2020.08 에 `Pmdnrs` 에 의해 만들어진 상태관리 라이브러리
- Pmdnrs 란?
 - 자바스크립트 기반의 오픈소스 개발자 모임
 - `react-spring`, `react-three-fiber`, `zustand` 등

Why Jotai?



Rising Stars.js - Stage management

State Management

- | | | |
|---|---|--------|
| 1 |  Zustand | +6.6k★ |
| | Bear necessities for state management in React | |
| 2 |  XState | +4.2k★ |
| | State machines and statecharts for the modern web. | |
| 3 |  Jotai | +4.2k★ |
| | Primitive and flexible state management for React | |
| 4 |  Recoil | +4.2k★ |
| | An experimental state management library for React apps | |
| 5 |  Pinia | +2.9k★ |
| | Intuitive, type safe, light and flexible Store for Vue using the composition ap... | |

Jotai VS Recoil

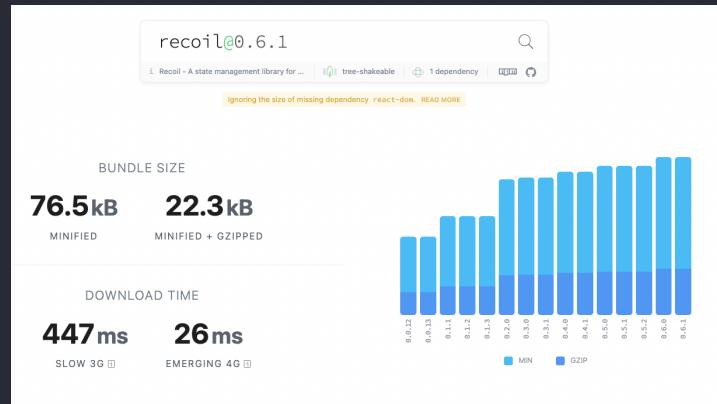
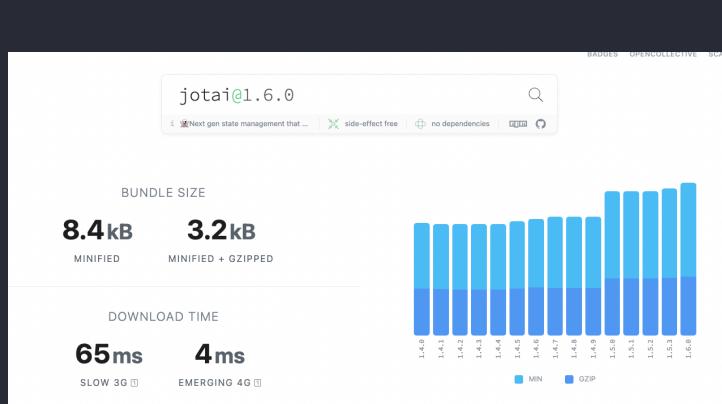
How does Jotai differ from Recoil?

- Minimalistic API
- No string keys
- TypeScript oriented

Jotai VS Recoil

그 외에도

- recoil은 아직 v0.6.1 ([facebookexperimental/recoil](https://github.com/facebookexperimental/recoil))
- react-suspense 를 고려하여 설계됨
- recoil 은 javaScript로 작성, jotai는 typeScript로 작성
- bundle size의 큰 차이



Jotai VS Recoil

recoil

jotai

Version History		
Version	Downloads (Last 7 Days)	Published
0.6.1	76,106	2 months ago
0.6.0	4	2 months ago
0.5.2	45,821	4 months ago
0.5.1	151	4 months ago
0.5.0	380	5 months ago
0.4.1	28,034	7 months ago
0.4.0	3,628	8 months ago
0.3.1	13,392	10 months ago
0.3.0	206	10 months ago
0.2.0	6,501	a year ago
0.1.3	12,564	a year ago
0.1.2	5,180	a year ago
0.1.1	16	a year ago
0.0.13	3,244	2 years ago
Version History		
Version	Downloads (Last 7 Days)	Published
1.6.1	14,149	11 days ago
1.6.0	18,786	a month ago
1.5.3	12,254	2 months ago
1.5.2	1,700	2 months ago
1.5.1	117	2 months ago
1.5.0	2,524	3 months ago
1.4.9	938	3 months ago
1.4.8	493	3 months ago
1.4.7	1,388	3 months ago
1.4.6	2,860	4 months ago
1.4.5	599	4 months ago
1.4.4	926	4 months ago
1.4.3	1,378	4 months ago
1.4.2	852	5 months ago
1.4.1	14	5 months ago
1.4.0	2,210	5 months ago

Jotai VS Zustand

	Jotai	Zustand
Github Stars★	6.8k	12.7k
state 모델	primitive atoms 형태	단일 스토어 형태
형태	useState 의 인터페이스를 기반으로한 여러 util	useStore 로 거의 단일화됨
방식	Bottom-up	Top-down
Provider	일반적으로는 필요함	필요 없음
바닐라 JS	X (React 만 지원)	O
SSR	O	?
Suspense	O	?
devtool	O	O

Key Feature



Jōtai

Primitive and flexible state
management for React

- Primitive?
- Flexible?

Key Feature

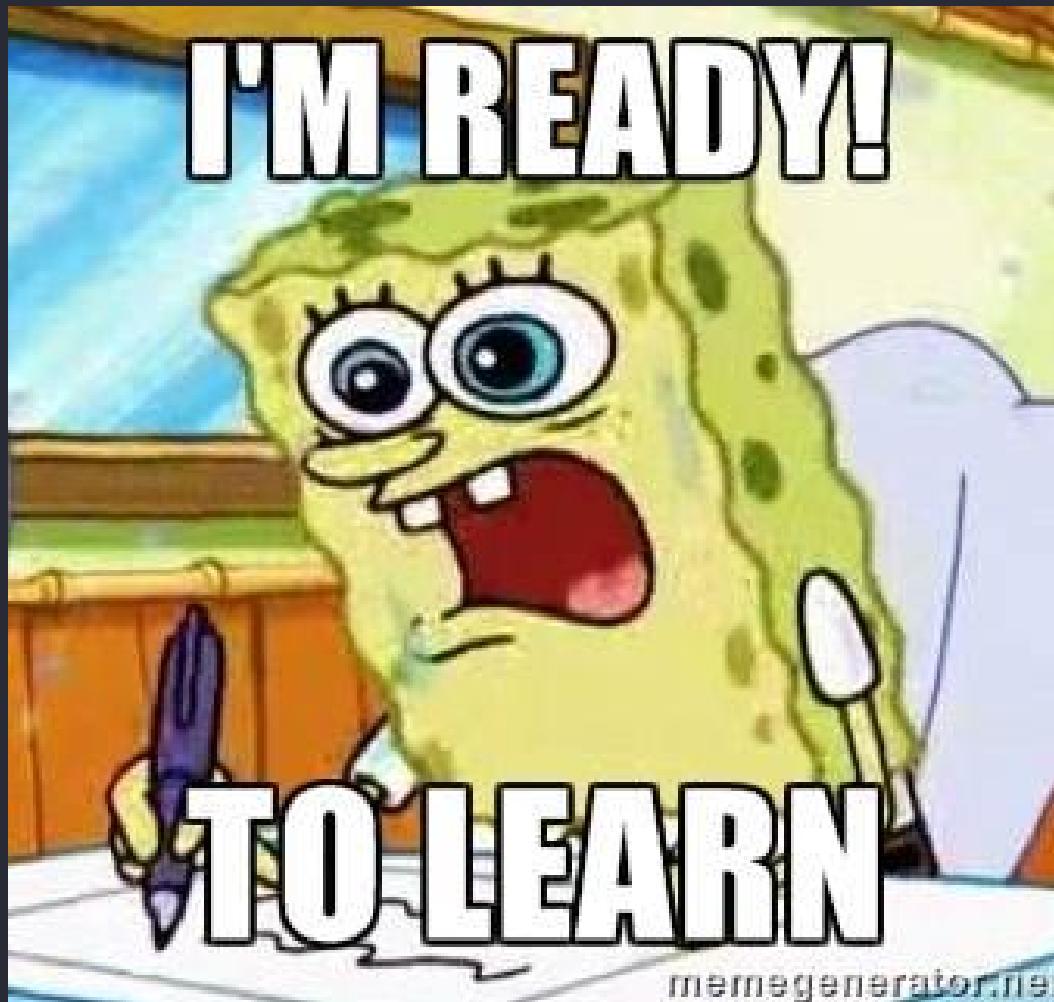


Jōtai

Primitive and flexible state
management for React

- Primitive :
 - atom 하나 하나가 각자의 개별 state
 - 리액트 기본 state 함수인 useState 와 유사한 인터페이스
- Flexible
 - atom들끼리 서로 결합 및 상태에 관여

How to?



atom

atom 선언

```
import { atom } from "jotai"

export const priceAtom = atom(10)
export const productAtom = atom<Product>({ id: 12, name: "good stuff" })
```

atom 사용

```
const Component = () => {
  const [price, setPrice] = useAtom(priceAtom) // .
  const [product, setProduct] = useAtom(productAtom)

  return <>...</>
}
```

readonly atom

선언

```
export const priceAtom = atom(1000)

// readOnly Atom
export const discountedPriceAtom = atom((get) => get(priceAtom) * 0.5)
```

사용

```
const Component = () => {
  const discountedPrice = useAtomValue(discountedPriceAtom)
  // const [discountedPrice, _] = useAtom(discountedPriceAtom)

  return <>{discountedPrice}</>
}
```

writeonly Atom

선언

```
// writeOnly Atom
export const increasePriceAtom = atom(null, (get, set, rate) => {
  const prevPrice = get(priceAtom)
  set(priceAtom, prevPrice * rate)
})
```

사용

```
const IncreasePriceButton = () => {
  const increasePrice = useUpdateAtom(increasePriceAtom) // .
  // const [_, increasePrice] = useAtom(increasePriceAtom)

  return <button onClick={increasePrice}>가격인상</button>
}
```

redux 예시

```
const initialState = {
  productList: [],
  selectedProduct: null
  selectedProductIndex: 0,
}

reducers: {
  // dependant한 state 또한 같이 변화시킴.
  setSelectedProductIndex(state, { payload }) {
    state.productIndex = payload.index
    state.selectedProduct = state.productList[payload.index]
  },
}
```

jotai 예시

```
const productListAtom = atom([])
const selectedProductIndexAtom = atom(0)

// state 자체가 dependant 하게 선언이 됨.
const selectedProductAtom = atom((get) => {
  const productList = get(productListAtom)
  const productIndex = get(selectedProductIndexAtom)
```

Provider 와 Scope

Provider

```
const Provider: React.FC<{
  initialValues?: Iterable<readonly AnyAtom, unknown>;
  scope?: Scope;
}>
```

- jotai 는 기본적으로 Provider가 Optional

Provider 와 Scope

initialValues

```
const TestRoot = () => (
  <Provider
    initialValues={ [
      [atom1, 1],
      [atom2, "b"],
    ] }>
  <Component />
</Provider>
)
```

- SSR 시에 이 initialValues에 넣어줌

scope

```
const myScope = Symbol()
const anAtom = atom("")

const LibraryRoot = ({ children }) => (
  <Provider scope={myScope}>{children}</Provider>
)

const LibraryComponent = () => {
  const [value, setValue] = useAtom(anAtom, myScope)
  // ...
}
```

- scope는 중복되지 않게 symbol로 선언
- 같은 atom도, scope에 따라 다른 값을 가짐

jotai/src/core

atom.ts

```
export function atom<Value, Update, Result extends void | Promise<void>>(
  read: Value | Read<Value>,
  write?: Write<Update, Result>
) {
  const key = `atom${++keyCount}`
  const config = {
    toString: () => key,
  } as WritableAtom<Value, Update, Result> & { init?: Value }
  if (typeof read === "function") {
    config.read = read as Read<Value>
  } else {
    config.init = read
    config.read = (get) => get(config)
    config.write = (get, set, update) =>
      set(config, typeof update === "function" ? update(get(config)) : update)
  }
  if (write) {
    config.write = write
  }
  return config
}
```

scope

```
const rootScope = Symbol()
const scopeA = Symbol()
const scopeB = Symbol()
const Root = ({ children }) => <Provider scope={rootScope}>{children}</Provider>
const A = ({ children }) => <Provider scope={scopeA}>{children}</Provider>
const B = ({ children }) => <Provider scope={scopeB}>{children}</Provider>

const App = () => {
  return (
    <>
      <Root>
        <A>
          <Component />
        </A>
        <B>
          <Component2 />
        </B>
      </Root>
    </>
  )
}
```

async

```
const dollarPriceAtom = atom(5) // 5달러

const koreanPriceAtom = atom(async (get) => {
  const dollarPrice = get(dollarPriceAtom)
  const exchangedRate = await getExchangedRate() // 외부에서 환율 정보를 가져온 뒤 계산
  return dollarPrice * exchangedRate
})

// async atom
const halfPriceAtom = atom((get) => get(koreanPriceAtom) / 2)

// 사용 예시
const Component = () => {
  const [koreanPrice] = useAtom(koreanPriceAtom)
  ...
}
```

Suspense

```
const App = () => (
  <Provider>
    <Suspense fallback='Loading...'>
      <Component />
    </Suspense>
  </Provider>
)
```

리렌더링 최소화

“ Jotai was born to solve extra re-render issue in React. Extra re-render is a render process that produces the same UI result, with which users won't see any differences. ”

jotai/src/core

context.ts

```
type ScopeContext = Context<ScopeContainer>

const ScopeContextMap = new Map<Scope | undefined, ScopeContext>()

export const getScopeContext = (scope?: Scope) => {
  if (!ScopeContextMap.has(scope)) {
    ScopeContextMap.set(scope, createContext(createScopeContainer()))
  }
  return ScopeContextMap.get(scope) as ScopeContext
}
```

useAtomValue.ts

```
export function useAtomValue<Value>(
  atom: Atom<Value>,
  scope?: Scope
): ResolveType<Value> {
  const ScopeContext = getScopeContext(scope) //
  const { s: store } = useContext(ScopeContext)
  .
```

리렌더링 최소화

큰 오브젝트 형태의 state가 있다고 가정

```
const defaultPerson = {  
  name: {  
    first: "Jane",  
    last: "Doe",  
  },  
  birth: {  
    year: 2000,  
    month: "Jan",  
    day: 1,  
    time: {  
      hour: 1,  
      minute: 1,  
    },  
  },  
}  
  
const personAtom = atom(defaultPerson)
```

리렌더링 최소화

selectAtom

```
const defaultPerson = {
  name: {
    ...
  },
  birth: {
    ...
  },
}

const personAtom = atom(defaultPerson)

const nameAtom = selectAtom(personAtom, (person) => person.name)
```

- personAtom 의 name 에 해당하는 개별 atom
- nameAtom 은 person.name 이 바뀌었을때만 리렌더링.
(예를들어 birth 가 바뀌었을 때는 리렌더 x)

리렌더링 최소화

selectAtom

```
const birthAtom = selectAtom(personAtom, (person) => person.birth, deepEquals)
```

- `deepEquals` 옵션
- 위의 케이스는 오브젝트의 참조값을 가지고 비교를 했다면
- `deepEquals` 옵션을 이용하면 직접 타고들어가 값 자체를 비교해서 리렌더링 여부를 결정

리렌더링 최소화

focusAtom

```
import { atom } from "jotai"
import { focusAtom } from "jotai/optics"

const objectAtom = atom({ a: 5, b: 10 })
const aAtom = focusAtom(objectAtom, (optic) => optic.prop("a"))
const bAtom = focusAtom(objectAtom, (optic) => optic.prop("b"))

const Controls = () => {
  const [a, setA] = useAtom(aAtom)
  const [b, setB] = useAtom(bAtom)
  return (
    <div>
      <span>Value of a: {a}</span>
      <span>Value of b: {b}</span>
      <button onClick={() => setA((oldA) => oldA + 1)}>Increment a</button>
      <button onClick={() => setB((oldB) => oldB + 1)}>Increment b</button>
    </div>
  )
}
```

리렌더링 최소화

splitAtom

```
import { splitAtom } from "jotai/utils"

const peopleAtomsAtom = splitAtom(peopleAtom)

const People = () => {
  const [peopleAtoms] = useAtom(peopleAtomsAtom)
  return (
    <div>
      {peopleAtoms.map((personAtom) => (
        <Person personAtom={personAtom} key={`${personAtom}`} />
      )))
    </div>
  )
}
```

- 각 Person 컴퍼넌트에 전달된 값들은 서로 다른 personAtom 으로 만들어진다.

그 외

atomWithStorage

```
import { useAtom } from "jotai"
import { atomWithStorage } from "jotai/utils"

const darkModeAtom = atomWithStorage("darkMode", false)

const Page = () => {
  const [darkMode, setDarkMode] = useAtom(darkModeAtom)

  return (
    <>
      <h1>Welcome to {darkMode ? "dark" : "light"} mode!</h1>
      <button onClick={() => setDarkMode(!darkMode)}>toggle theme</button>
    </>
  )
}

}
```

- localStorage, sessionStorage, AsyncStorage 모두 지원
- SSR 불가능

그 외

atomWithQuery

```
import { useAtom } from "jotai"
import { atomWithQuery } from "jotai/query"

const idAtom = atom(1)
const userAtom = atomWithQuery((get) => ({
  queryKey: ["users", get(idAtom)],
  queryFn: async ({ queryKey: [, id] }) => {
    const res = await fetch(`https://jsonplaceholder.typicode.com/users/${id}`)
    return res.json()
  },
})) 

const UserData = () => {
  const [data, dispatch] = useAtom(userAtom)
  return (
    <div>
      <button onClick={() => dispatch({ type: "refetch" })}>refetch</button>
      <span>{JSON.stringify(data)}</span>
    </div>
  )
}
```

그 외

redux 와 함께 사용 : atomWithStore

```
import { useAtom } from "jotai"
import { atomWithStore } from "jotai/redux"
import { createStore } from "redux"

const initialState = { count: 0 }
const reducer = (state = initialState, action: { type: "INC" }) => {
  if (action.type === "INC") {
    return { ...state, count: state.count + 1 }
  }
  return state
}
const store = createStore(reducer) // redux store
const storeAtom = atomWithStore(store)

const Counter: React.FC = () => {
  const [state, dispatch] = useAtom(storeAtom)

  return (
    <>
      count: {state.count}
      <button onClick={() => dispatch({ type: "INC" })}>button</button>
    </>
  )
}
```

Flexible

INTEGRATIONS

Immer

Optics

Query

XState

Valtio

Zustand

Redux

URQL



- jotai 공식문서
- 카카오 스타일 Jotai 적용 사례
- 화해팀 jotai 적용 사례

감사합니다.

