Vue js optimixation

Tree shaking

It basic ally deals with the removing of unneccessary code .Try to shi as much less size possible

Tree Shaking vs Code Spiliting

Tree shaking means only bundling that code that is required example if you dont neesd xyz lib or component thats not shipped and code spilliting means that the code decide to be shipped is break down into smaller and smaller pieces called **chunks** so that browser one big file to load instead small parts are loaded **on demand parallel** if its properly used page can be quickly downloaded and the additional chunks (breaken down with the help of chunk) can be loaded later as per the requirement thus dealing with the size effectively .

For vue js components you can use Async Component

Bolated Bundles

If using a build step, prefer dependencies that offer ES module formats and are tree-shaking friendly. For example, prefer lodash-es over lodash.

Using sHALLOW ref to only track .value and not nested property

Virtualize Large Lists

Reduce Reactivity Overhead

So since the vue trackes the nested property of object and emaulates the behaviour of the reactivity and you mutate a nested object it re-render and tracks which seems great but can be a great performance issue as it creates too many overheads and because every property access trigger **proxy trap** and **dependency tracking** . To come out of thus use shallowRef as it commes out or removes the nested property tracking and you will need to create new copy

```
const shallowArray = shallowRef(
    [
        //big list of deep object
    ]
);


shallowArray.value.push() // will not trigger render

shallowArray.value = [
    ...shallowArray.value,
    {
        // it will work
    }
]
```

Avoid Unnecessary Component Abstractions

https://vuejs.org/guide/best-practices/performance.html#avoid-unnecessary-component-abstractions

Reactivity in Depth

In cases we want to check the detail which reactive value is being changes we can use **onRenderTracked, onRenderTriggered onRenderTracked, onRenderTriggered** and for computed and watch/watchEffect we use **onTrack and onTrigger Method**

Vue Rendering process

'https://vuejs.org/guide/extras/rendering-mechanism.html'
The vue uses **Virtual DOM** to do it and it a **concept** not qa tech pioneered by the **React** to keep the dom tree copy in memory and then locating where the changes to be done

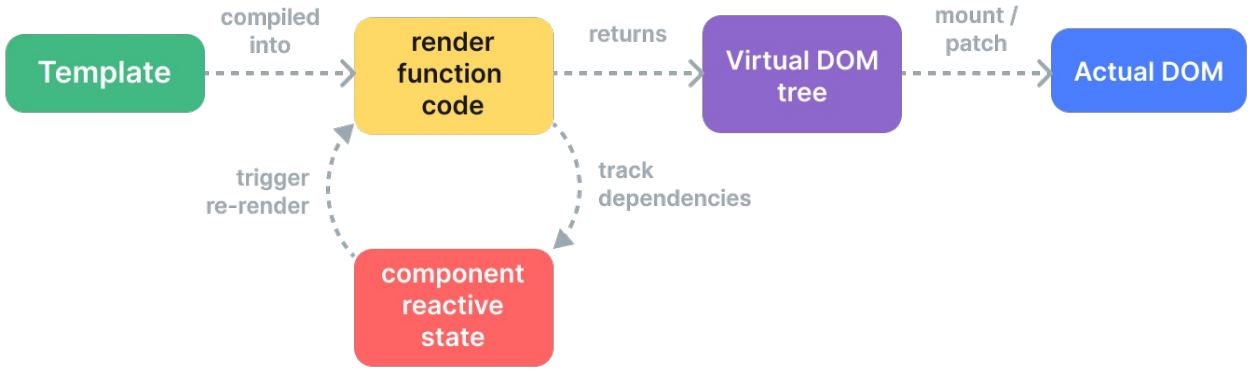
The templates are complied to the render function whic return dom tree

vnode is a virtual node for a respective **DOM NOde**

At runtime **Renderer** it will tranverse and accordindly build the **DOM NODES** were created

After the nodes are builded than the **Renderer** might find the difference between old and new dom tree as it will have to find out what part has been chnaged due to **Side Effects** like (Network call , callBack timers , update of state) and render accordindly according the place of change its called **patch or reconcilation**.

At high level this happens :



- Compile: Vue templates are complie into render function that return the vnode tree .It can be done complie time , build time , run time or ahead of time as well.
- Mount: These render method is invoked and actual dom Node is created.Here the reactivit dependy also tracked
- Patch: Whenever side effects happens or reatcivity depency triggers the render function is re run and new virtual DOM is created and compared with the old one

Template vs Render Function

You can skip the tempalte compalition and direxlty access render function api and they more flexible in nature for high dynamic sort of work and more dynamic logic can be written

So the virtual DOM implementation part happens only at the run time as the virtual dom can't predicated earlier and every time some changes happens a whole new dome tree is created and then the **recoil**(diff) algo is used but the extra memory space is used this is the most critized or drawback of this **Vurtual dom** . But vue js optimized it

Static Hoisting

The nodes that contain static content are hoisted i.e they are nodes are created outside the render function so that each time they run they are refer to same node and if they are used somewhere else they are **clone**

Patch Flag

For dynamic attribute the patch flag are used so to check whether a rework is required or not

Tree flatting

The vnode will have lots of children and each render ist will have to go through it but thanks to **createElementBlock** function and patch flag only those nodes who are using dynamic value / attribute and are returned as **flattened array** and the exact are vnodes to be target

Dom Updating nexttick

As soon as something is updated immedtaley all things are not pushed to the Dom node in synchholosuly mkanner Vue run a update cycle and all the changes are buffered and updated in that update cycle .To detect the cycle ` use **nextTick**

ref vs reactive

Shallow Reqactivity

Shallow ref

Automatically unwrapping ref

Downside withj reactivity

Computed property

It use for chching

- To update something use Writtable computation property.
- Avoid Mutation in the computed property .
- Avoid use asuync or network calls inside the the computred property these are to be done under the **watchers**

Teleport

Many a time by logical a componenet is a child of the parent component by in the tyerm or point of view it will have a different node like for example of a **modal** you use **<Teleport> component** you provide the **css selector DOM Nodes where you component needs to be injected visually outside the normal Dom**