



Nello Saulino

Media Applications Head of development

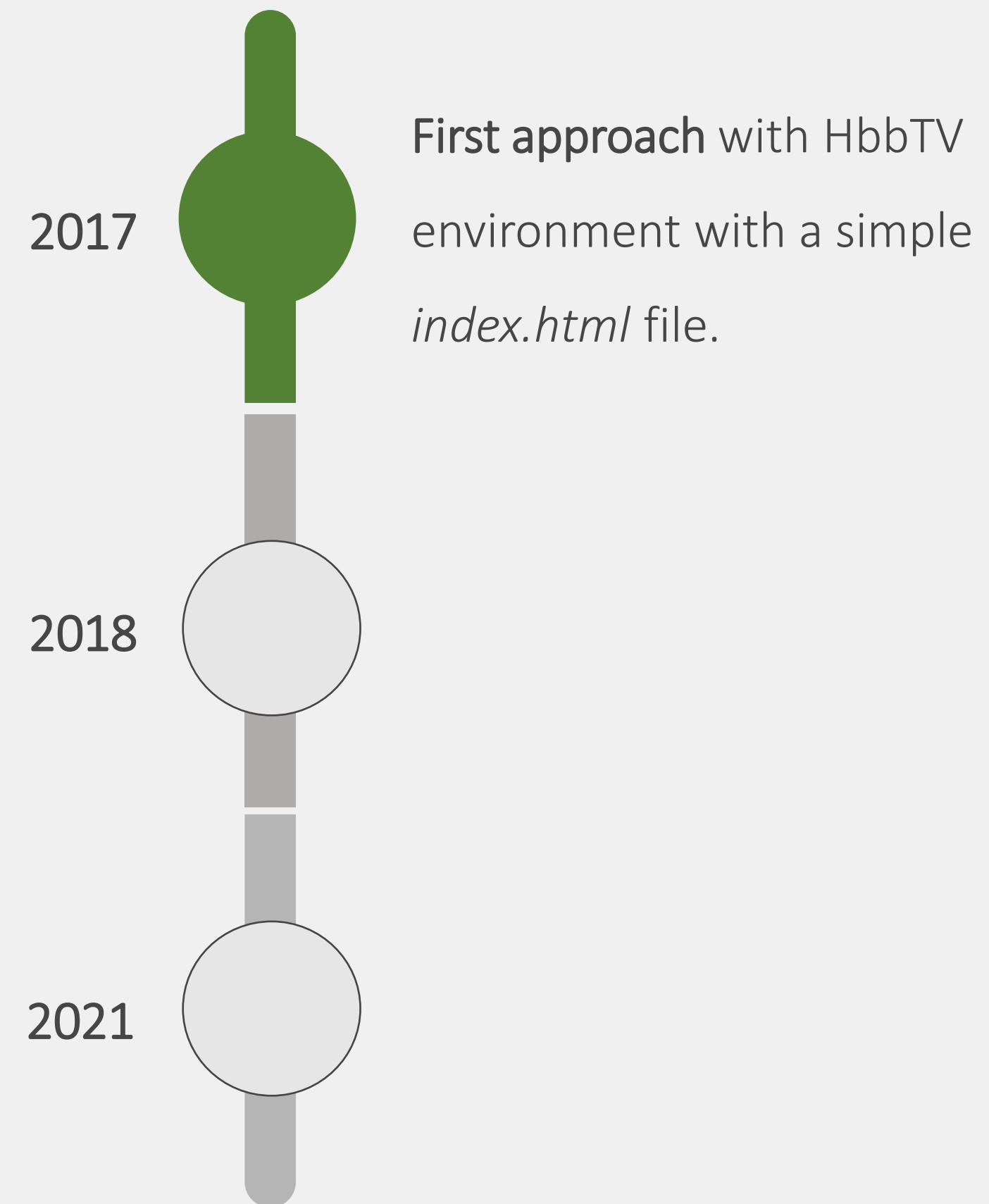


A LITTLE BIT OF HISTORY

Kineton HbbTV Development History

Kineton develops HbbTV
applications since 2017.

Here's how it is started, and
how is going...



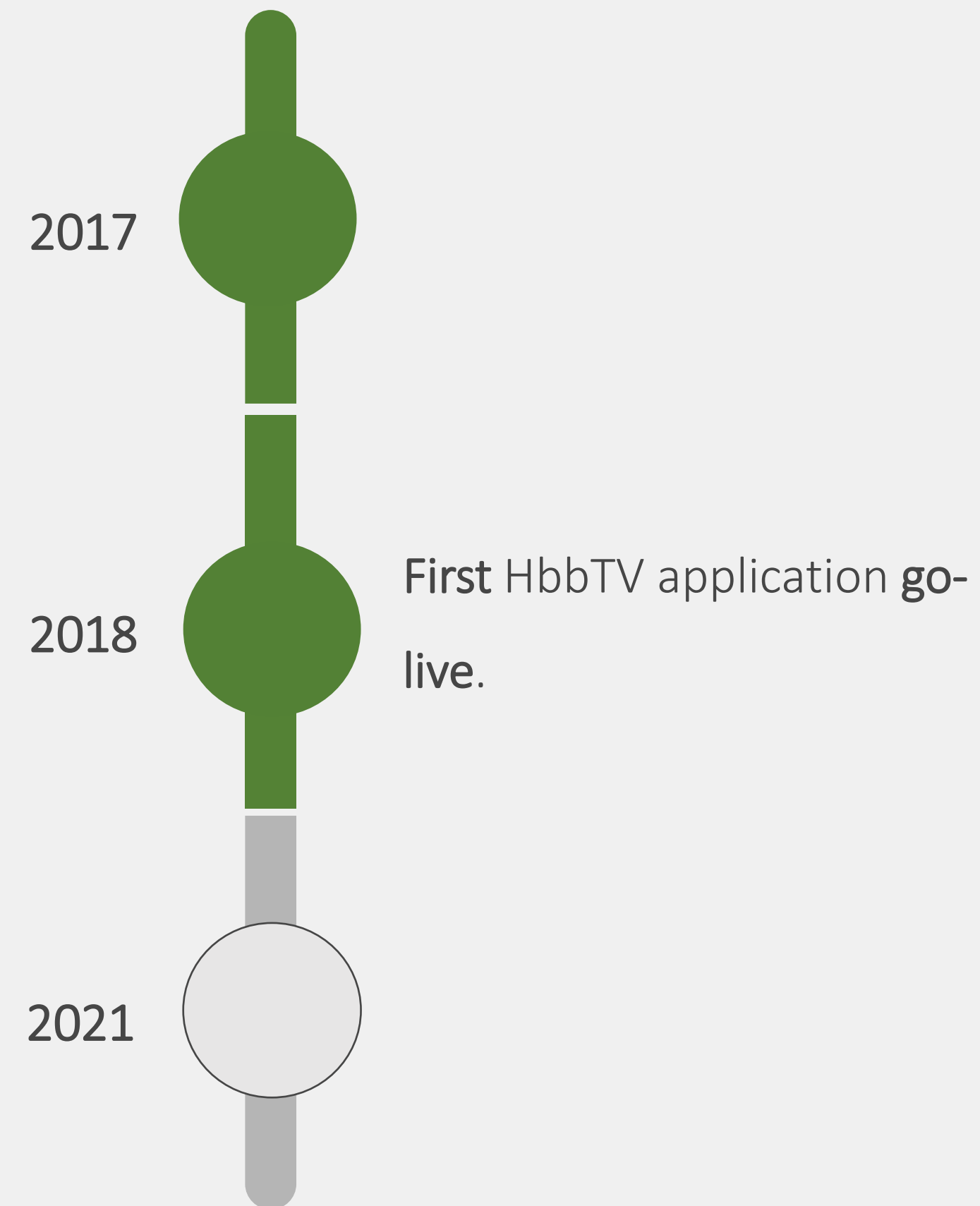


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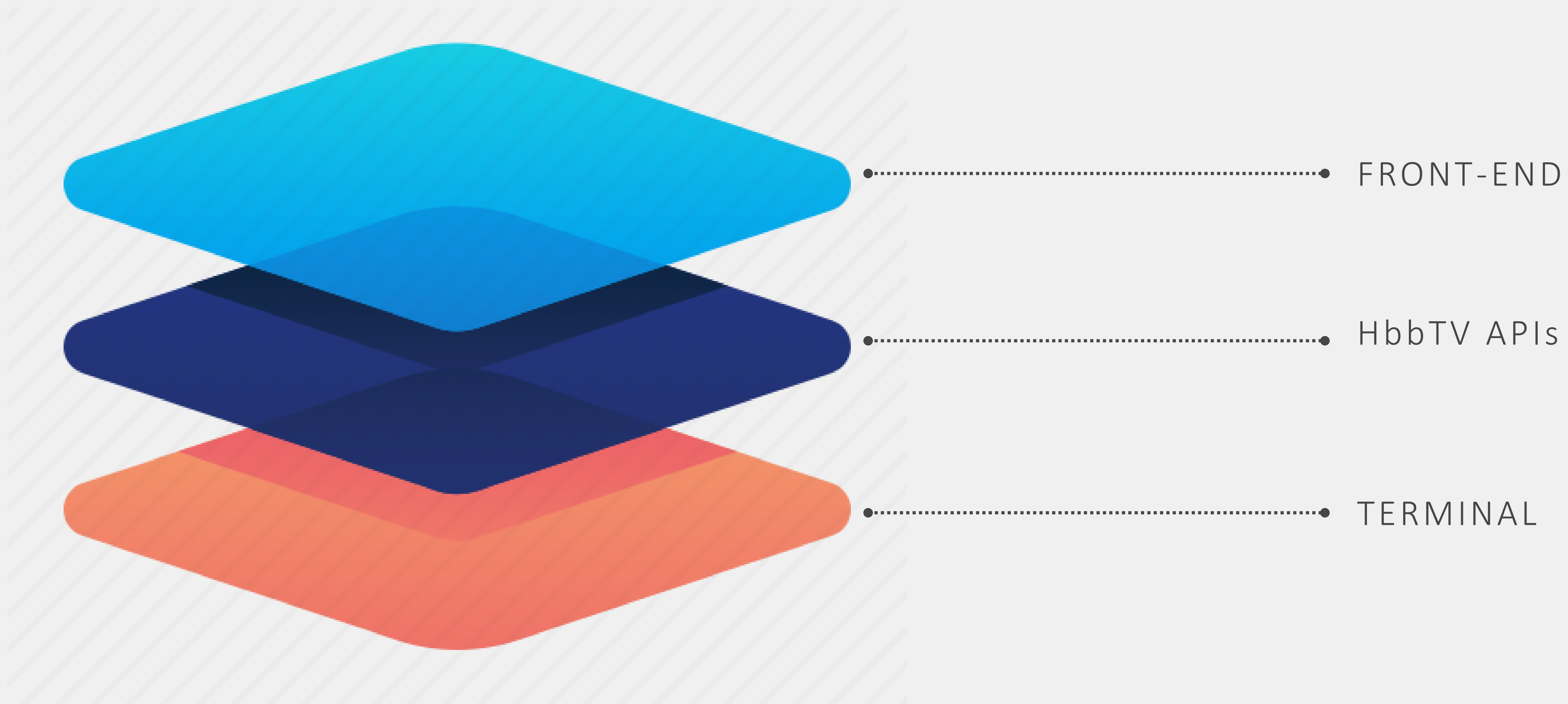


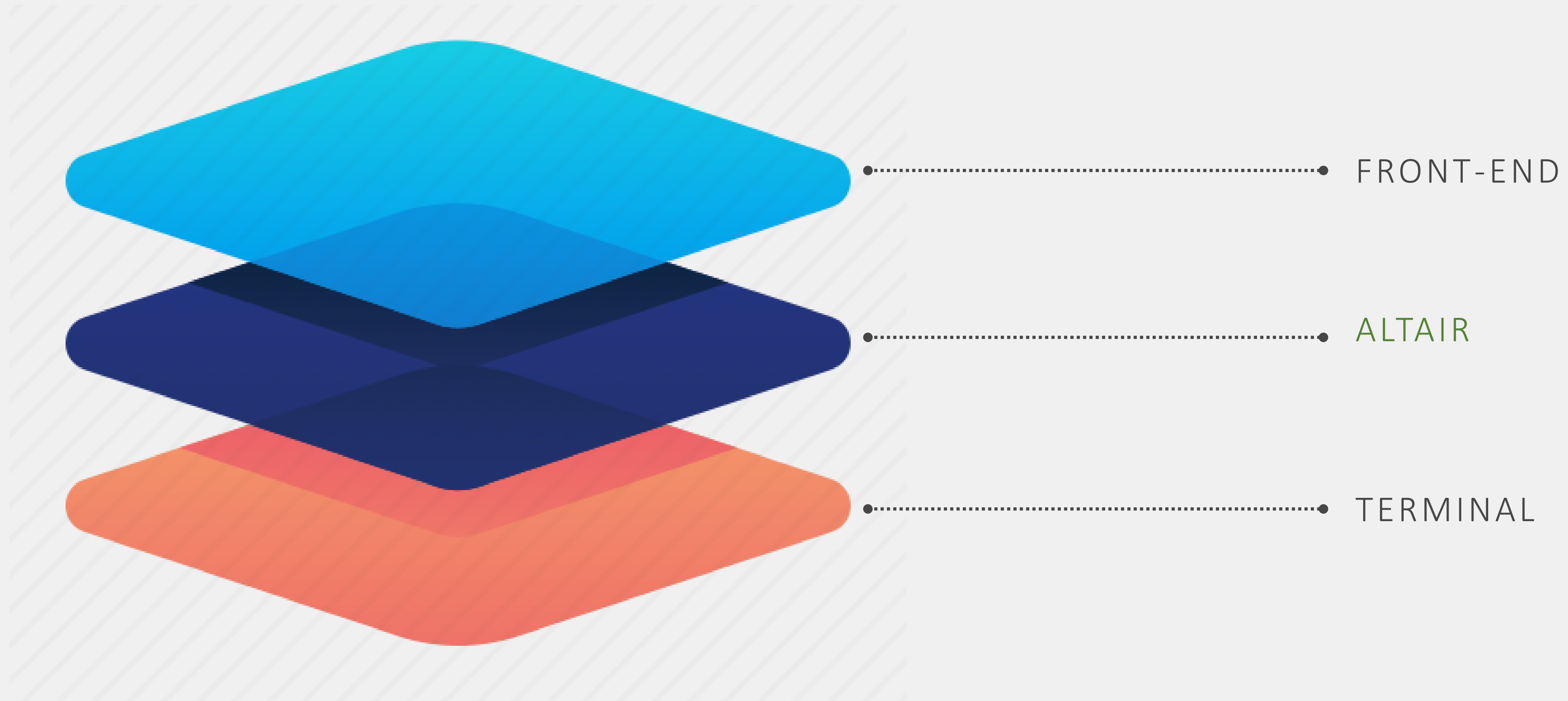
HbbTV is **not**
just a **standard**.

But it's surely a way
to implement the
brilliant idea behind
this technology:
***watching TV
differently.***



The market fragmentation, not just for
specific manufacturers but mostly for the
different families of devices of the same
manufacturer, has given rise to a need: **a
single way of creating HbbTV
applications.**







ANTARES

ALTAIR

TERMINAL



FOCUS MANAGEMENT

01

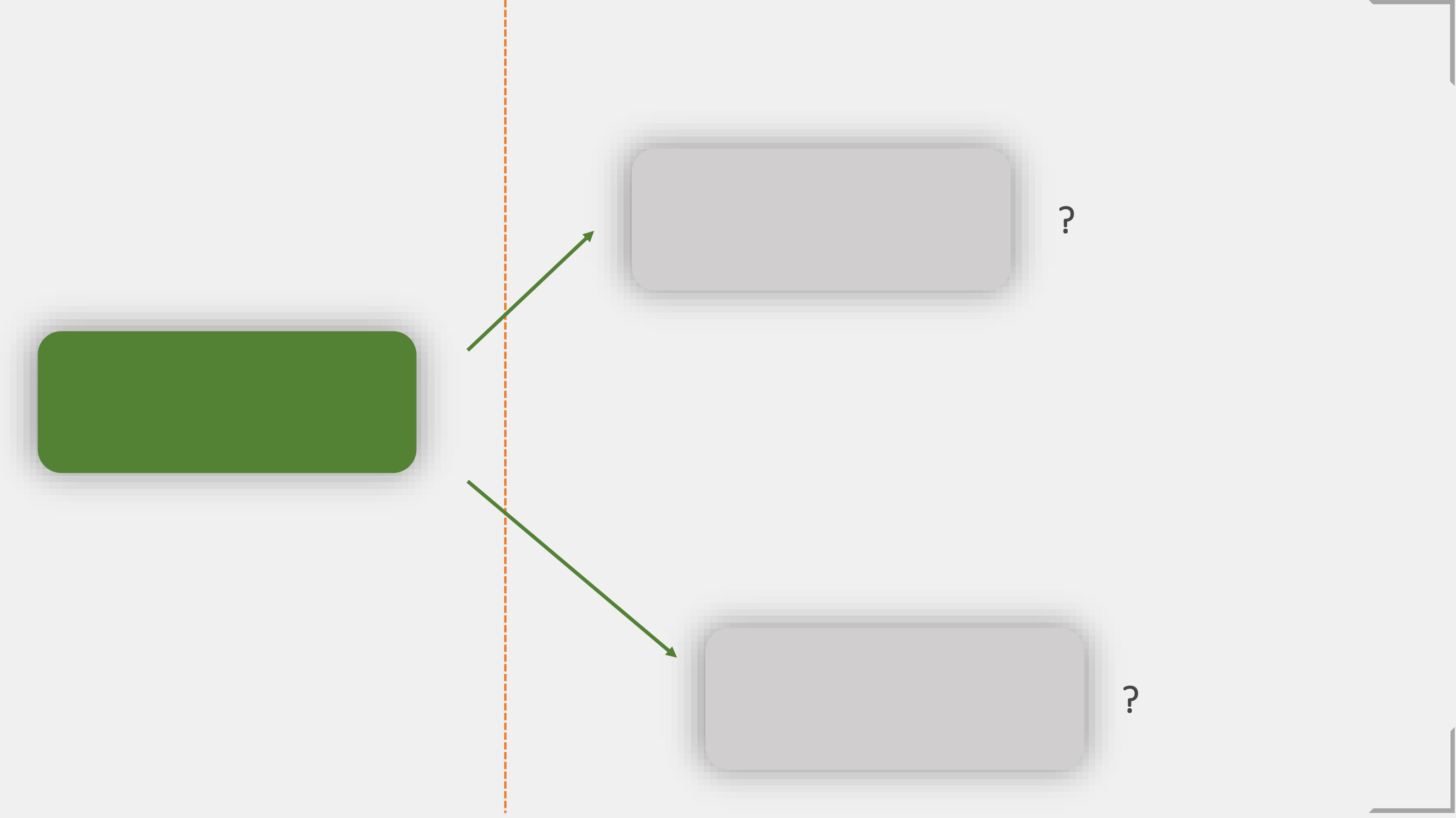
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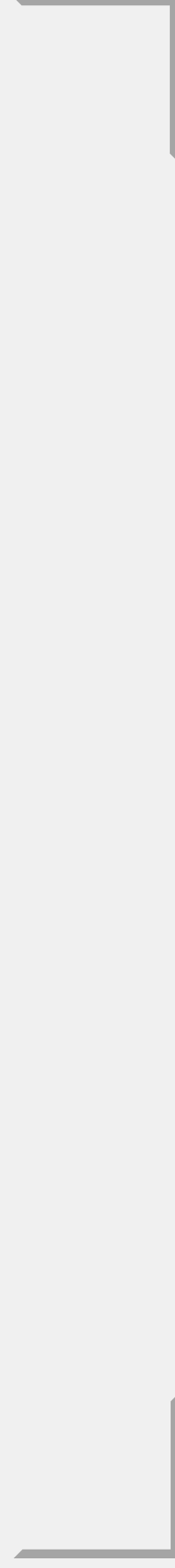
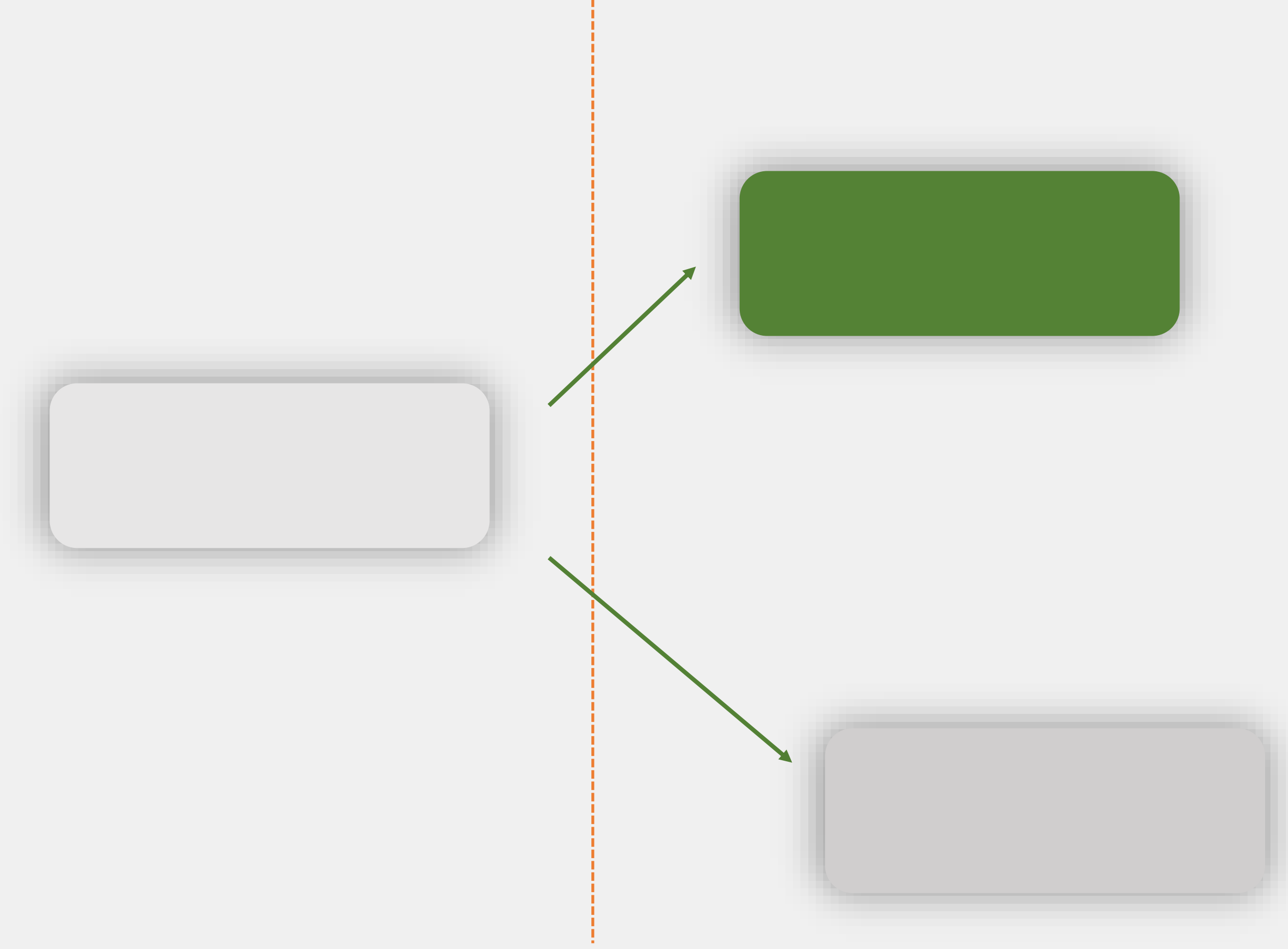


COMPONENTS

02

There are a lot of ready-to-use components which helps developers to create applications faster.







01

FOCUS MANAGEMENT

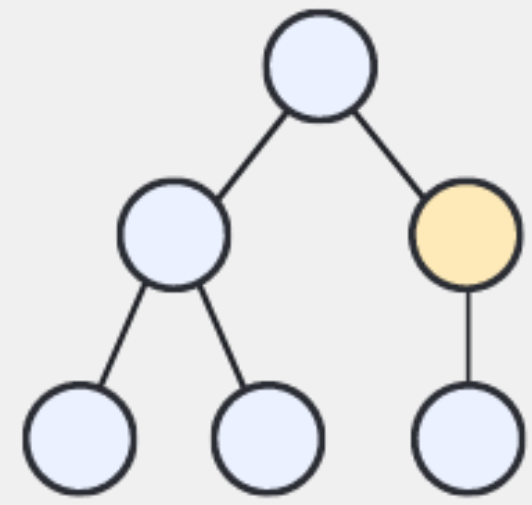
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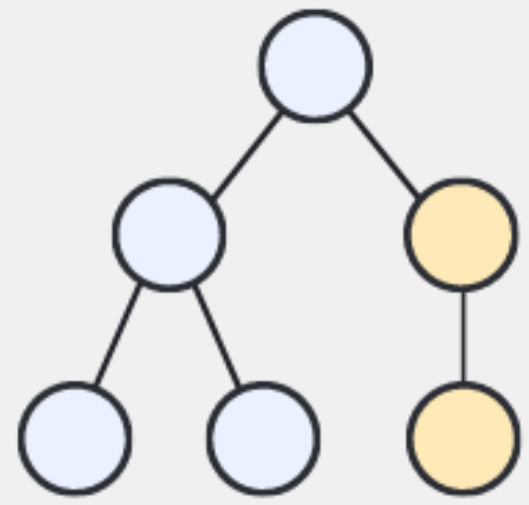
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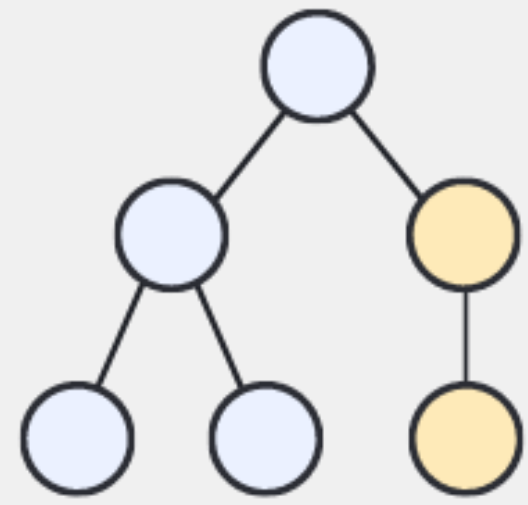
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State Change

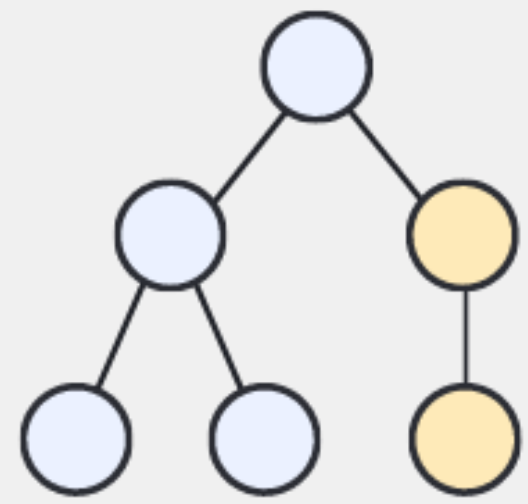
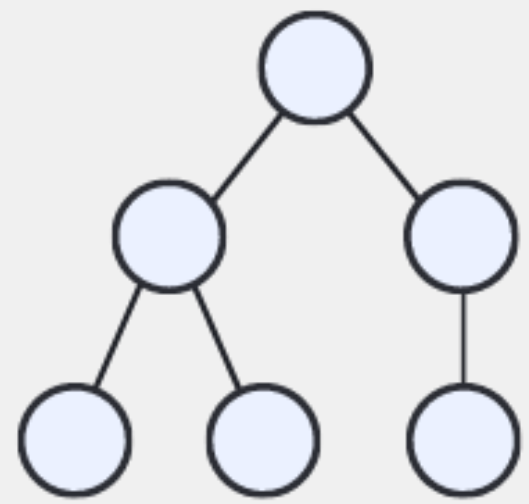
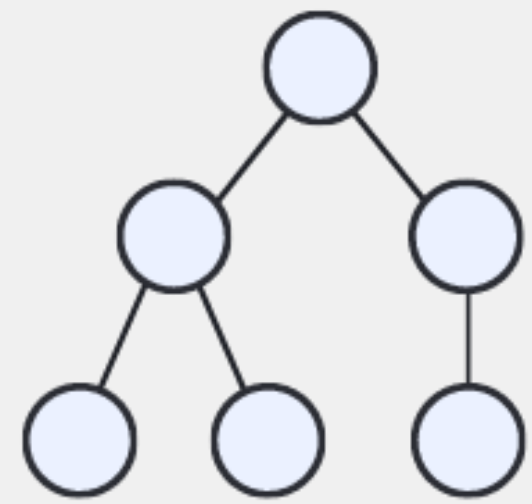


Compute Diff



Re-render

Virtual
DOM



Browser
DOM





BUILDING PHASE

03

React is based on JSX files. Under the hood, uses `React.createElement()` function, which is very heavy at runtime.



FEDERATION

04

Every element is a component. A button is a component, its container is a component and so on...also the application itself is a component.



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Module Federation

Paradigm: *write once,
use every time.*

A particular application called **Container** is responsible to load applications through scripts loader. These applications are called **Growlers**, and we created them fully customizable. The purpose is, clearly: “write once, use everytime”.



CSS PERFORMANCE STUDY

One of the most important study we conducted has been the animation performances.



PARALLELIZATION

JavaScript is single threaded, and the UI takes the CPU almost entirely. When an animation is performed, how can we do it smoother?



COMPOSITING

This technique leaves the CPU do its job and prepares the GPU to perform animations

COMPOSITE PROPERTIES

The key is the using of two main properties:

- *transform;*
- *will-change.*



HOW BROWSER RENDERING WORKS?



01

DOM CREATION

The DOM + CSS are combined and generates what is called **RENDER TREE** or **CSSOM** that only contains elements that will be displayed on the page

02

LAYOUT CREATION

The browser begins to calculate the necessary space and the position of each node of the DOM. Some elements influence the positioning of others (**REFLOWS**)

03

PAINT AND COMPOSITING

The browser literally “Paint” the elements and put them on “layers. The layers are placed together and finally shown on the screen (**COMPOSITING**).



ANIMATION QUEUE

Animations will be handled by creating and adding them in a priority queue.

BOTTLENECKS AVOID

Use a “separate thread” so that the main JavaScript thread is free to execute “just” the application rendering tasks.





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