

React Summit Remote 2021

Internationalizing (Internationalising)

React

About Me



Daria Caraway

@DariaCaraway 

Software Engineer @Workday
Boulder, Colorado, USA

My Language Journey

My Language Journey



English
1st Language

My Language Journey



English
1st Language



Chinese
4 years old

My Language Journey



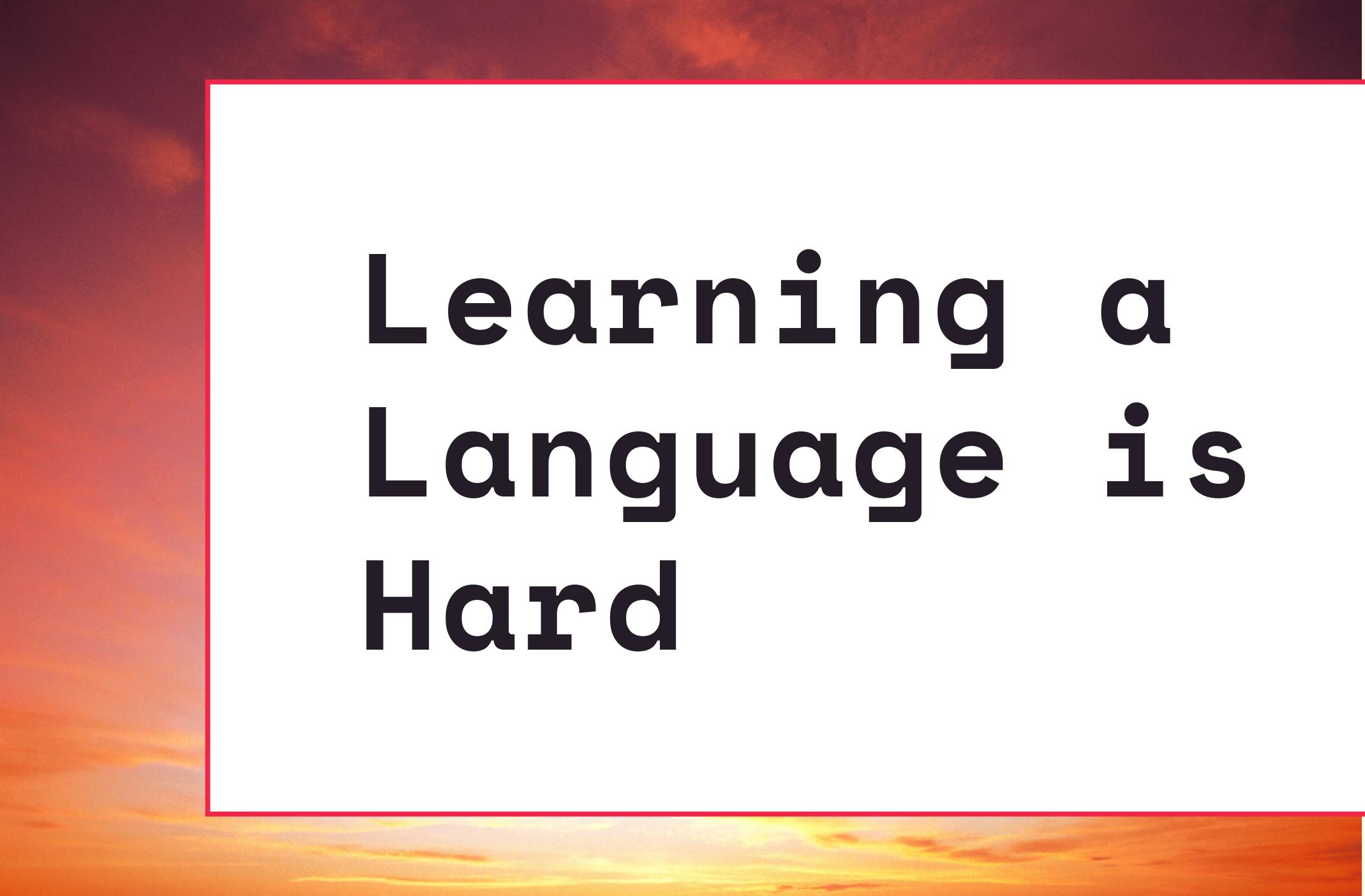
English
1st Language



Chinese
4 years old



Spanish
Grade 6-12



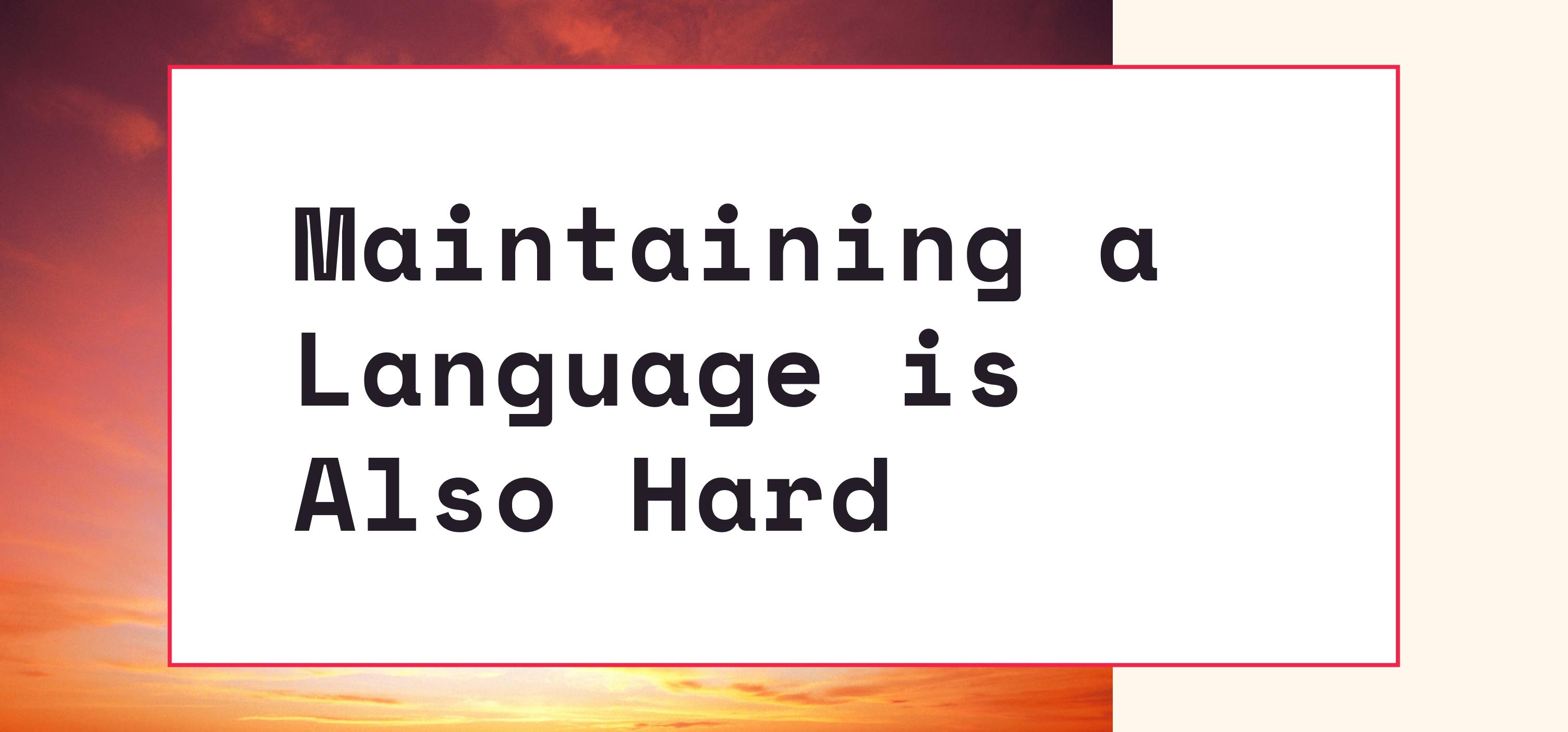
**Learning a
Language is
Hard**





Now . . .





**Maintaining a
Language is
Also Hard**

How can we design
our React
applications so
languages and
locales are easy to
add and Maintain?



Internationalization **i18n**

Architecting
your app so
when l10n
occurs things
work as
expected.

Localization **l10n**

Actually
making the
content and
experience for
a given
locale.

Localization Elements

LANGUAGE

Translations,
Direction,
Time & Date,
Sorting,
Plural

SYMBOLS & GRAPHICS

Icons, Colors, Images,
Cultural
Interpretations

CURRENCY

Formatting,
Processing,
Conversions

LEGAL REQUIREMENTS

Privacy Laws,
Data Handling Laws,
Hosting Laws

Et more . . .

React i18n Libraries

react-intl

formatjs / [formatjs](#)



react-i18next

i18next / [react-i18next](#)



**Let's Build
Some of It**



Virtual Moments

Watch a live sunset from somewhere around the world.

Sunset Central

▲ Mountain

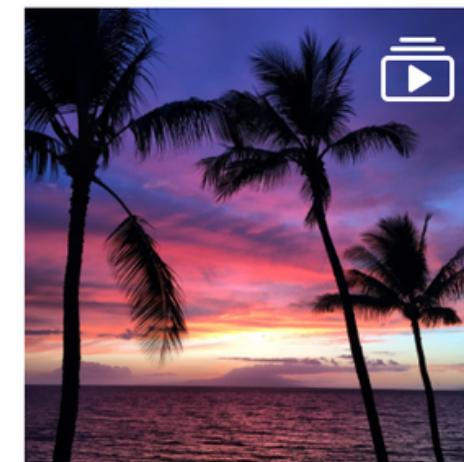
* Snow

❖ Beach

🏜 Desert

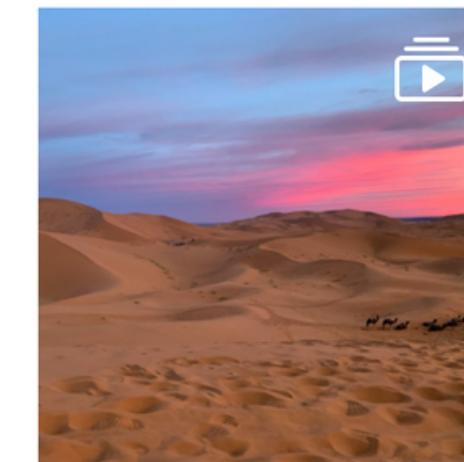
🏞 River

🏙 City



Maui, Hawaii, USA

Begins: 4/15/2021, 9:33 PM



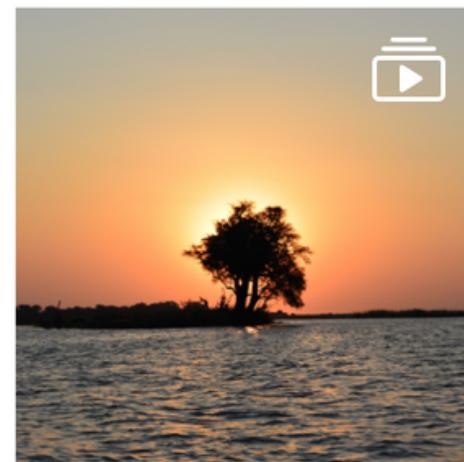
Merzouga, Morocco

Begins: 4/16/2021, 11:22 AM



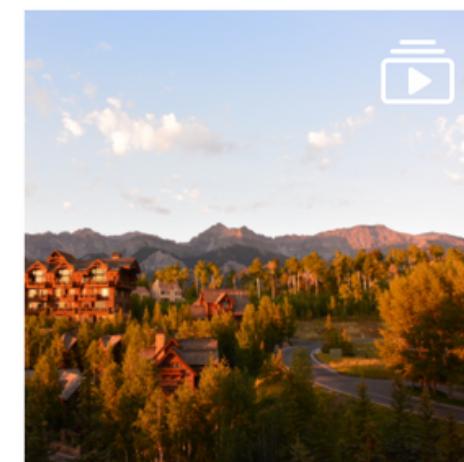
London, United Kingdom

Begins: 4/16/2021, 10:59 AM



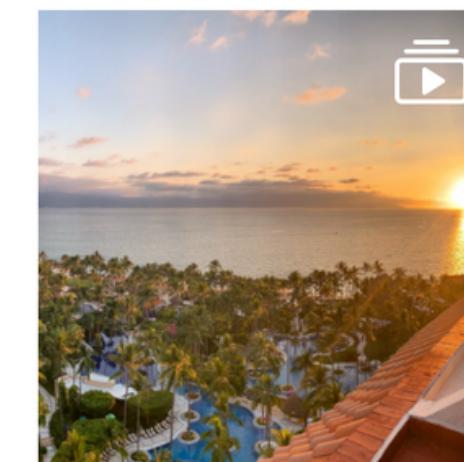
Okavango Delta, Botswana

Begins: 4/16/2021, 9:36 AM



Telluride, Colorado, USA

Begins: 4/15/2021, 6:15 PM



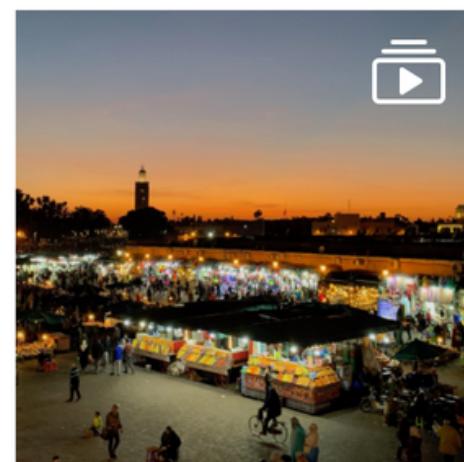
Puerto Vallarta, Mexico

Begins: 4/15/2021, 6:15 PM



Reykjavik, Iceland

Begins: 4/16/2021, 12:17 PM



Marakesh, Morocco

Begins: 4/16/2021, 11:37 AM

Sunset Central & i18n

Gaining
popularity in
other markets

First Target Regions



1. Spanish
Speakers in
Spain



2. Arabic
speakers in
Egypt

Sunset Central & i18n

Gaining
popularity in
other markets

Built a team of
translators and
locale experts

Parts of a Locale

language - script - country - variant - extension

language

(Spanish)

es - ES

country
(Spain)

language

(Arabic)

ar - EG

country
(Egypt)

Sunset Central & i18n

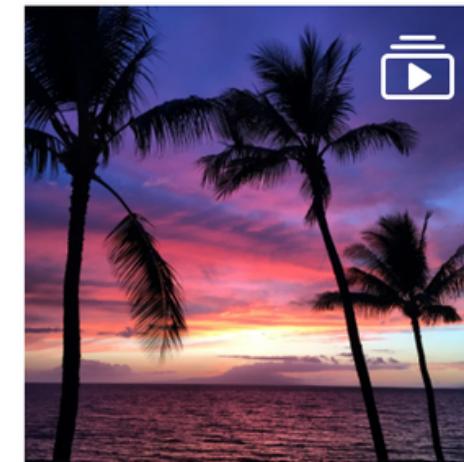
Gaining
popularity in
other markets

Built a team of
translators and
locale experts

Devs start i18n
work!

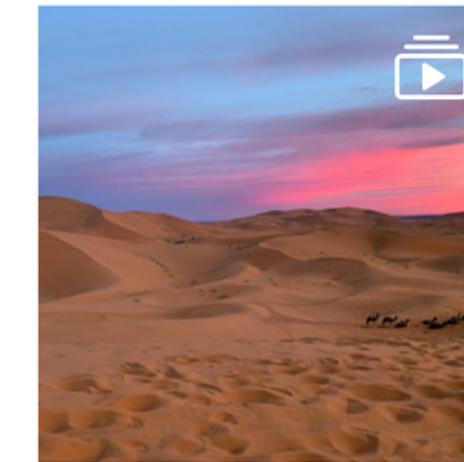
Sunset Central

-  Mountain
-  Snow
-  Beach
-  Desert
-  River
-  City



Maui, Hawaii, USA

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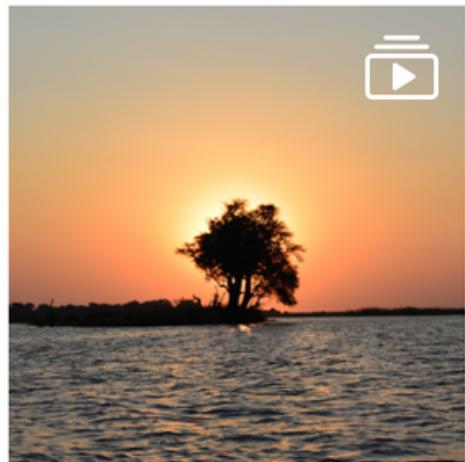
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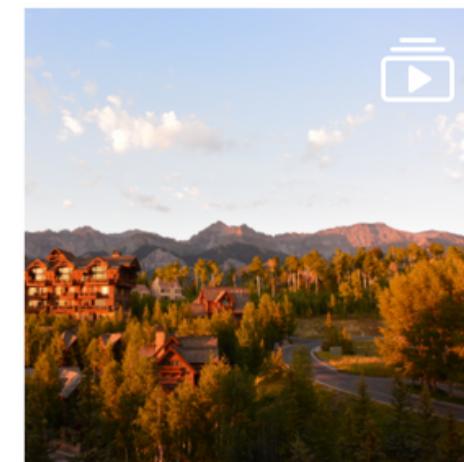
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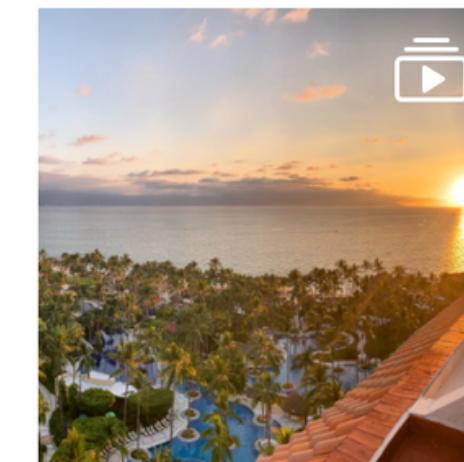
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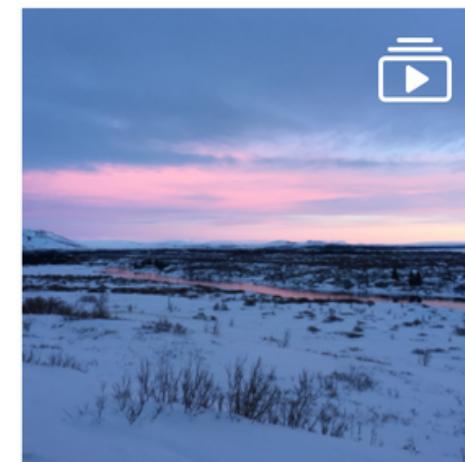
Telluride, Colorado, USA

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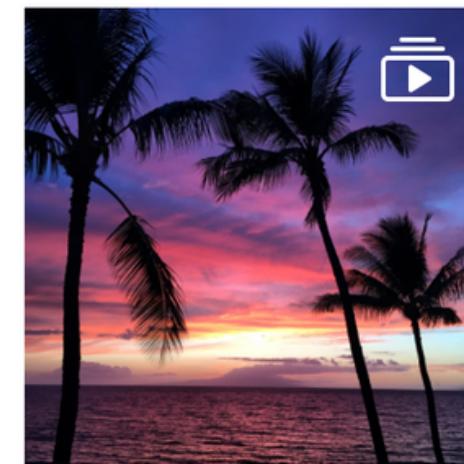


Marakesh, Morocco

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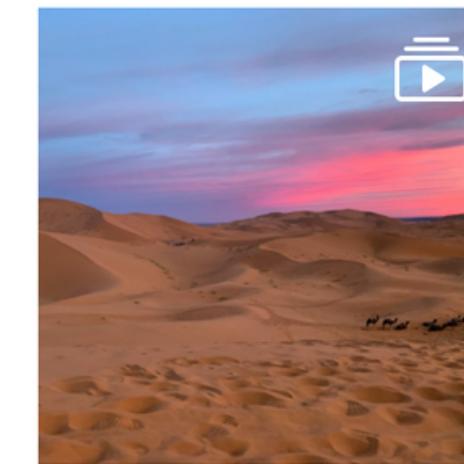
Sunset Central

- Mountain
- Snow
- Beach
- Desert
- River
- City



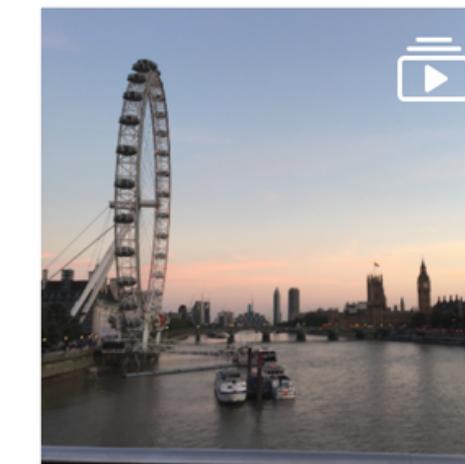
Maui, Hawaii, USA

Begins **4/15/2021, 9:33 PM**



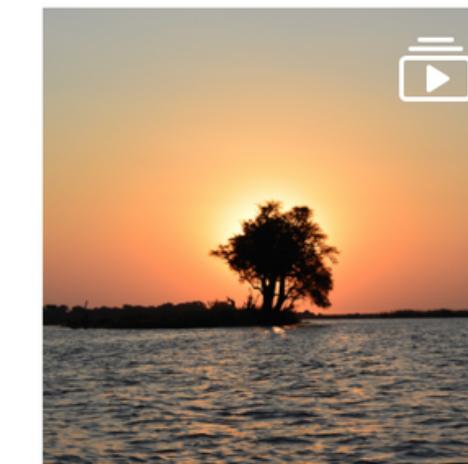
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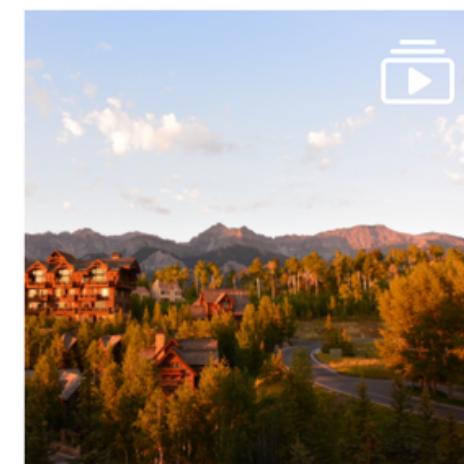
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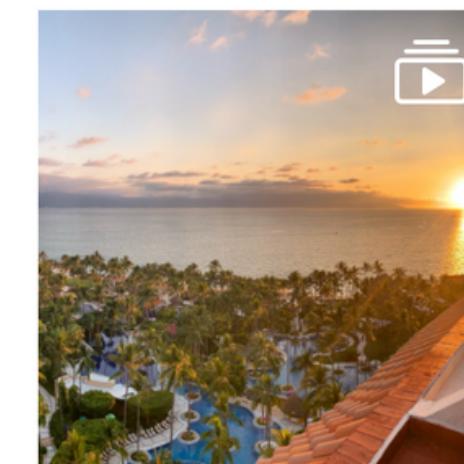
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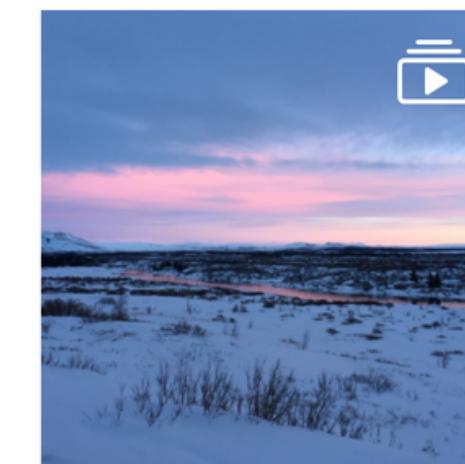
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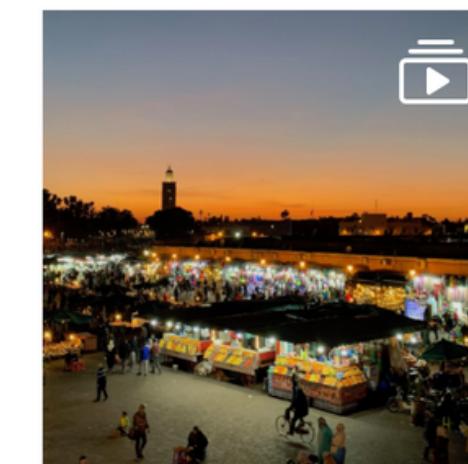
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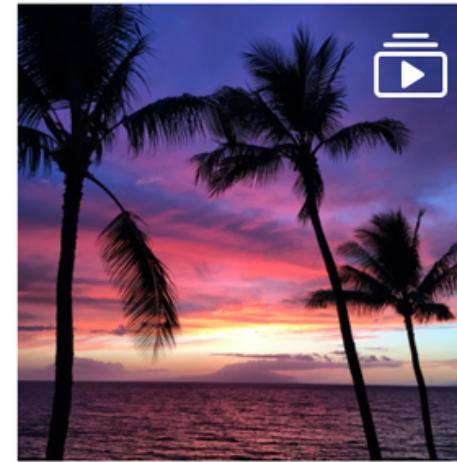


Marakesh, Morocco

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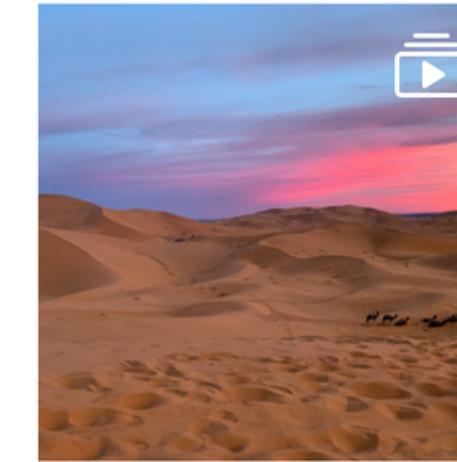
Sunset Central

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-  Snow
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-  City



Maui, Hawaii, USA

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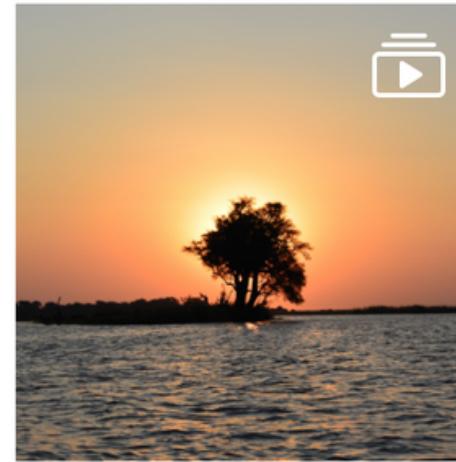
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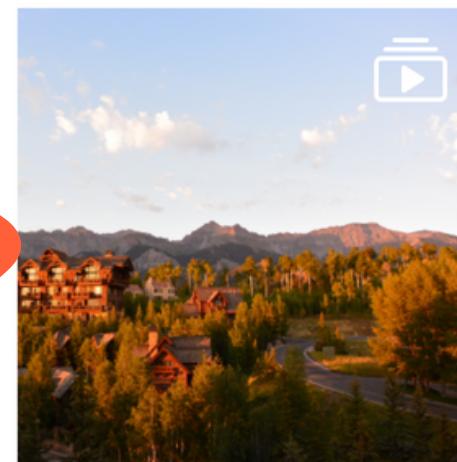
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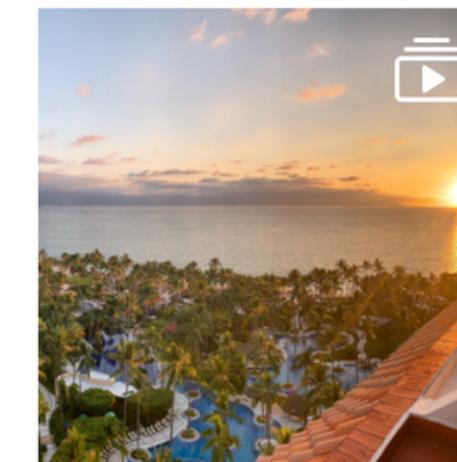
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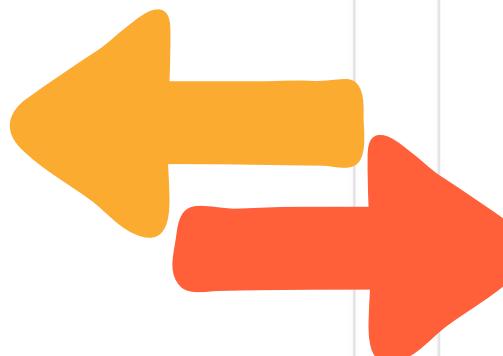
Reykjavik, Iceland

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Marakesh, Morocco

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Architecting a React App for . . .

Text Translations

Date Formatting

Language Directions

- this is not an extensive list of localization changes



Text Translations

```
● ● ●  
export const translations = {  
  'en-US': {  
    'SUNSET_CENTRAL.MOUNTAIN': 'Mountain',  
    'SUNSET_CENTRAL.SNOW': 'Snow',  
    'SUNSET_CENTRAL.BEACH': 'Beach',  
    'SUNSET_CENTRAL.DESERT': 'Desert',  
    'SUNSET_CENTRAL.RIVER': 'River',  
    'SUNSET_CENTRAL.CITY': 'City',  
    'SUNSET_CENTRAL.BEGINS': 'Begins:',  
  },  
  'es-ES': {...},  
  'ar-EG': {...},  
}
```

{string key: string value}

How are they stored in React?



```
const TranslationContext = createContext<TranslationContextProps>(translationContextDefault)

export function TranslationProvider({
  defaultLocale,
  translations,
  children,
}: TranslationProviderProps) {
  const [locale, setLocale] = useState(defaultLocale)

  const translate = (key: TranslationKey) => {
    return translations[locale][key]
  }

  return (
    <TranslationContext.Provider value={{ locale, setLocale, translate }}>
      {children}
    </TranslationContext.Provider>
  )
}

export function useTranslate(): TranslationFunction {
  return useContext(TranslationContext).translate
}
```

translation context and useTranslate hook

@dariacaraway

How do you use them in your components?



```
export function MountainSidebarItem() {
  const translate = useTranslate()

  return (
    <li key="Mountain" css={listItemStyle}>
      <MountainIcon />
      <span css={itemTextStyle}>{translate('SUNSET_CENTRAL.MOUNTAIN')}</span>
    </li>
  )
}
```

translate function from hook translates all strings

Sunset Central

▲ Montaña

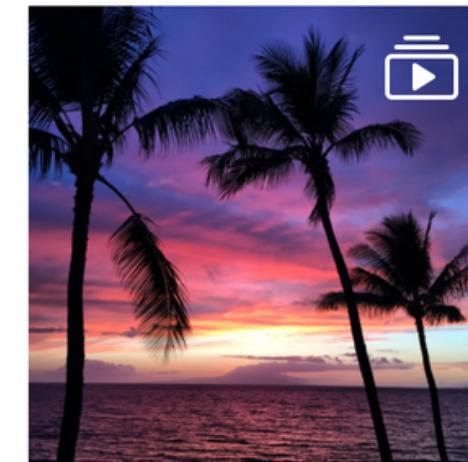
* Nieve

❖ Playa

🏜 Desierto

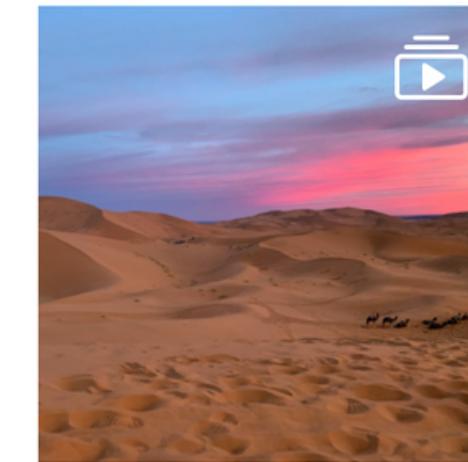
🏞 Río

🏙 Ciudad



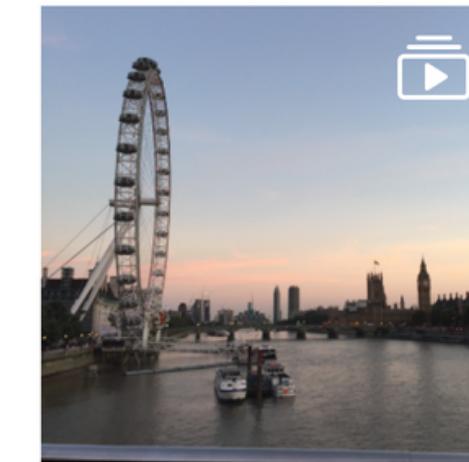
Maui, Hawái, EE. UU.

Comienza: 4/15/2021, 9:33 PM



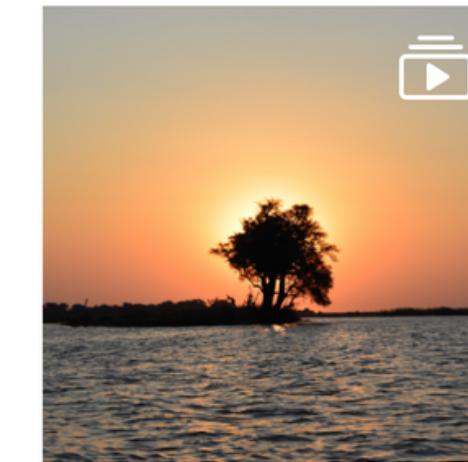
Merzouga, Marruecos

Comienza: 4/16/2021, 11:22 AM



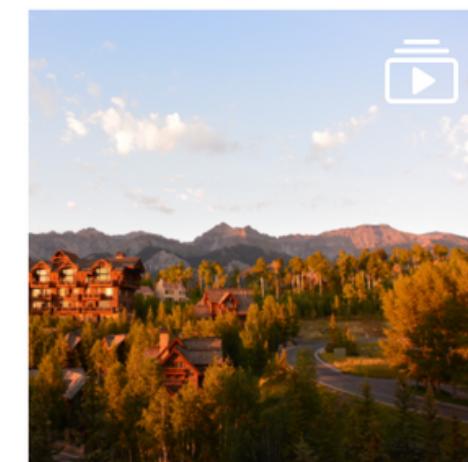
Londres, Reino Unido

Comienza: 4/16/2021, 10:59 AM



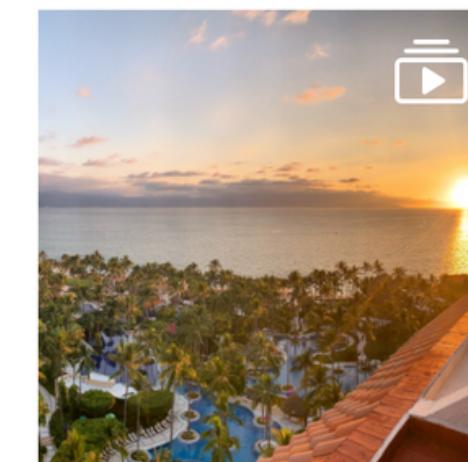
Delta del Okavango, Botswana

Comienza: 4/16/2021, 9:36 AM



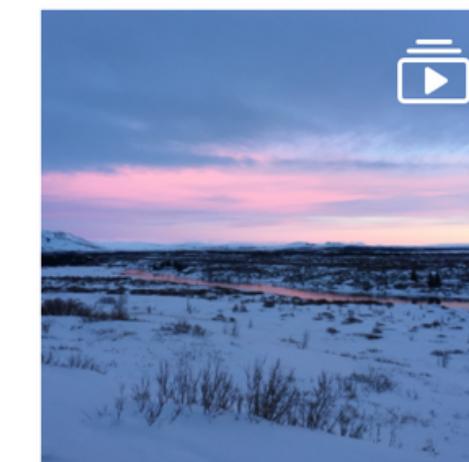
Telluride, Colorado, EE. UU.

Comienza: 4/15/2021, 6:15 PM



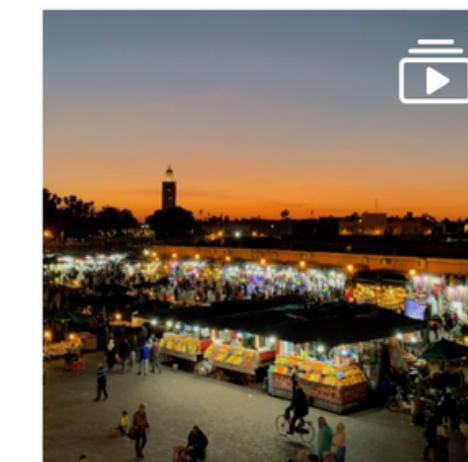
Puerto Vallarta, México

Comienza: 4/15/2021, 6:15 PM



Reykjavik, Islandia

Comienza: 4/16/2021, 12:17 PM



Marakesh, Marruecos

Comienza: 4/16/2021, 11:37 AM

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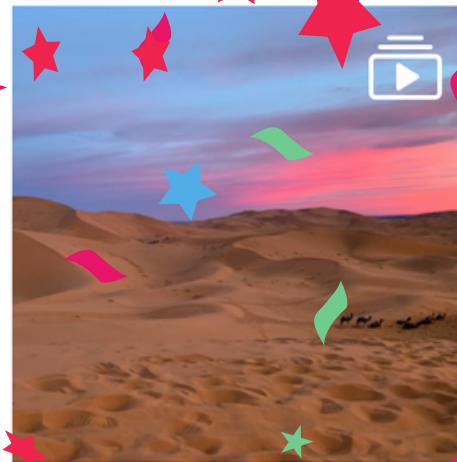
Sunset Central

- ▲ Montaña
- * Nieve
- ↗ Playa
- 沙漠 Desierto
- 🏞 Río
- 🏙 Ciudad



Maui, Hawái, EE. UU.

Comienza: 4/15/2021, 9:33 PM



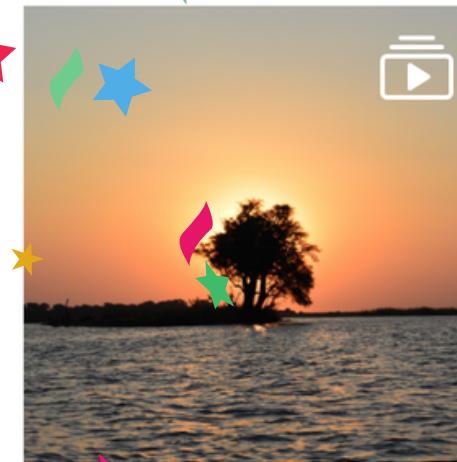
Merzouga, Marruecos

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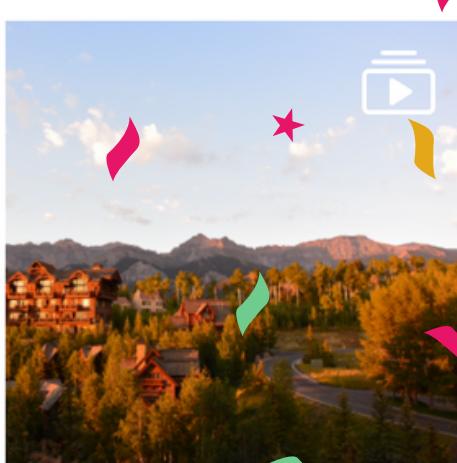
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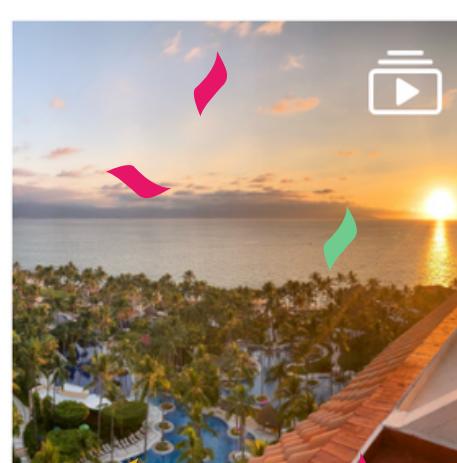
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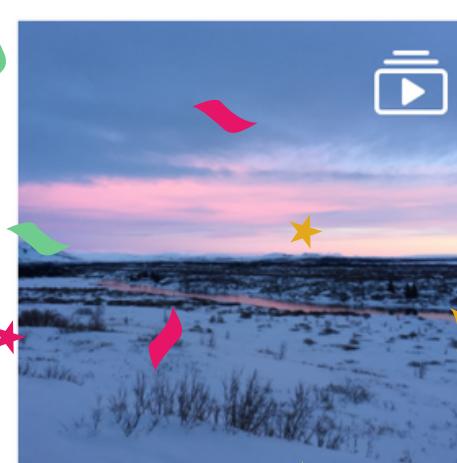
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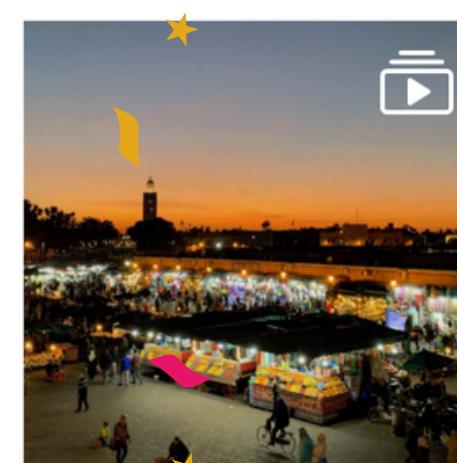
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Sunset Central

▲ Montaña

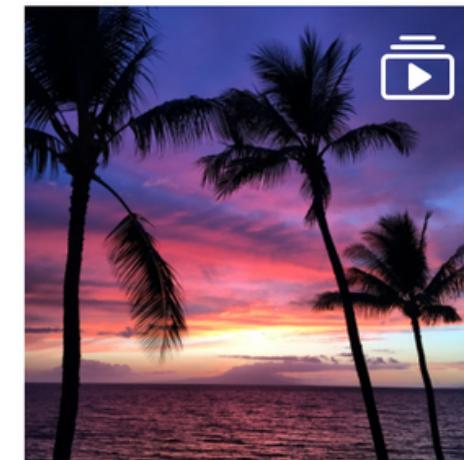
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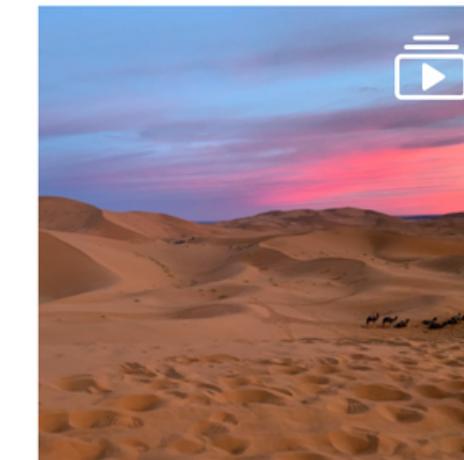
🏞 Río

🏙 Ciudad



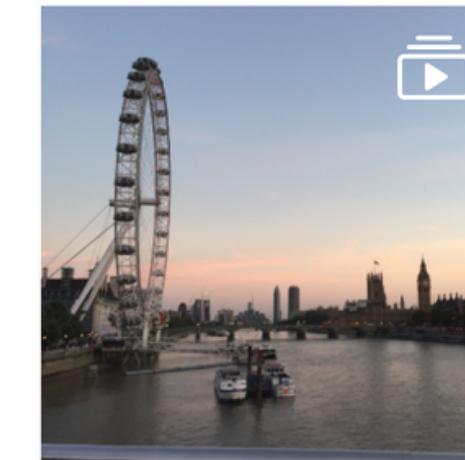
Maui, Hawái, EE. UU.

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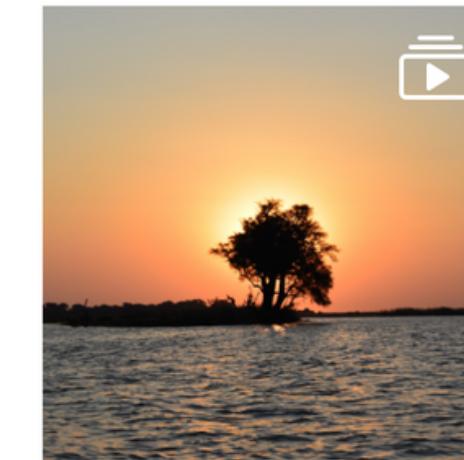
Merzouga, Marruecos

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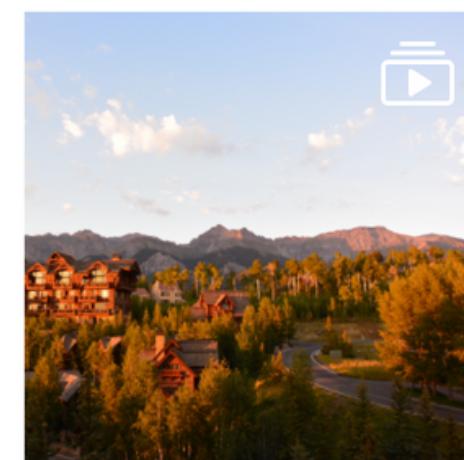
Londres, Reino Unido

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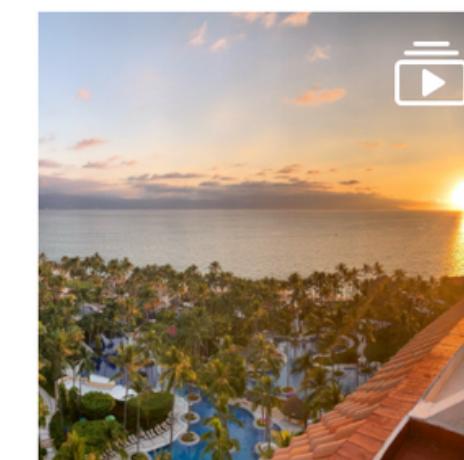
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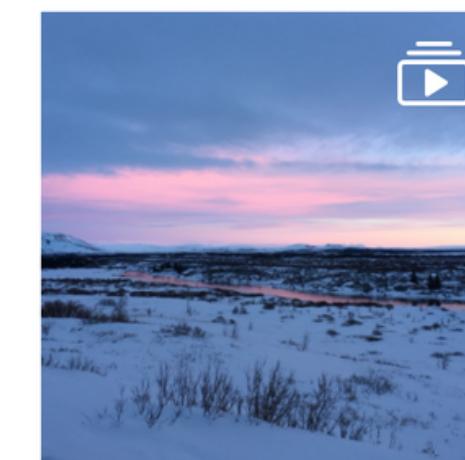
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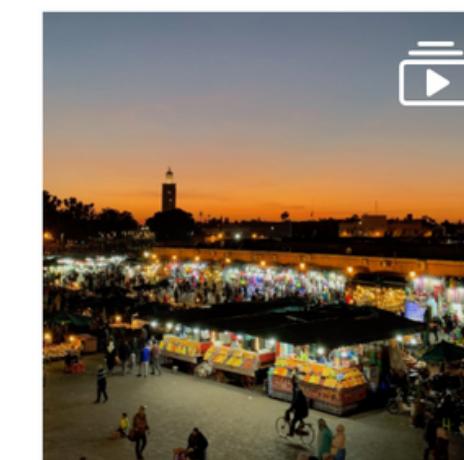
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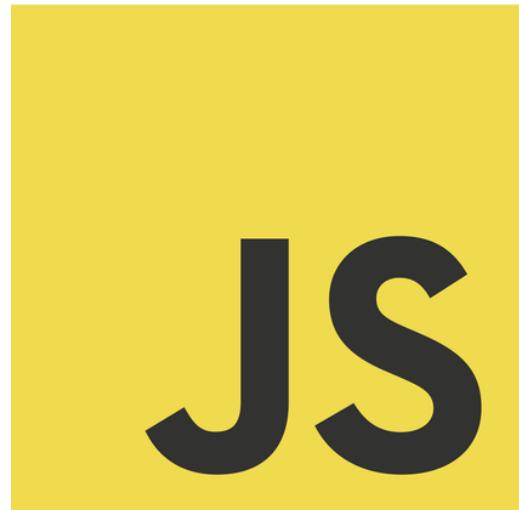


Marakesh, Marruecos

Comienza: 4/16/2021, 11:37 AM

@dariacaraway

Date Formatting



JavaScript Intl

Luxon

(v) date-fns

Moment/Luxon

Date-fns

Date Time Formatting with JS Intl

```
● ● ●

const dateOptions = {
  year: 'numeric',
  month: 'numeric',
  day: 'numeric',
  hour: 'numeric',
  minute: 'numeric',
}

export const SunsetCard = ({ location, time, image }: SunsetCardProps) => {
  const locale = useLocale()
  const formattedTime = new Intl.DateTimeFormat(locale, dateOptions).format(new Date(time * 1000))

  return (...)
}
```

DateTimeFormat function with provided options

Sunset Central

▲ Montaña

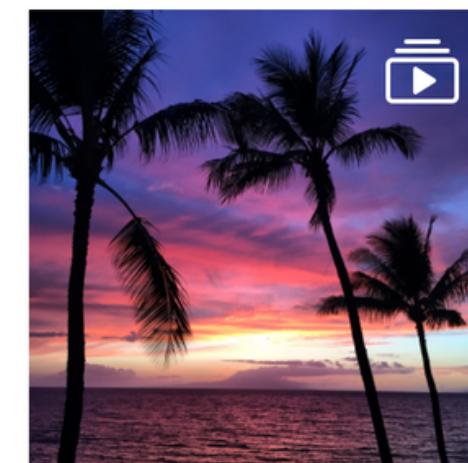
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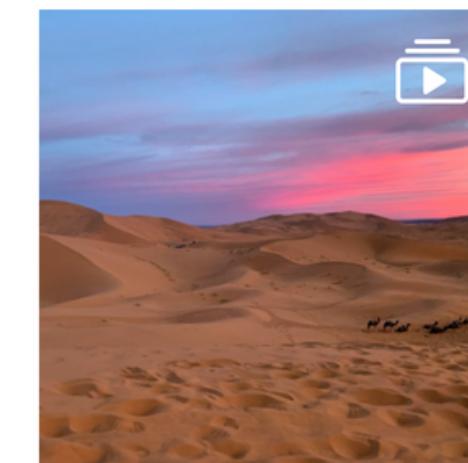
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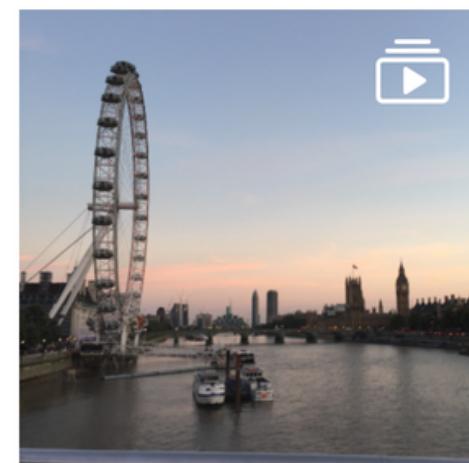
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Comienza: 15/4/2021 21:33



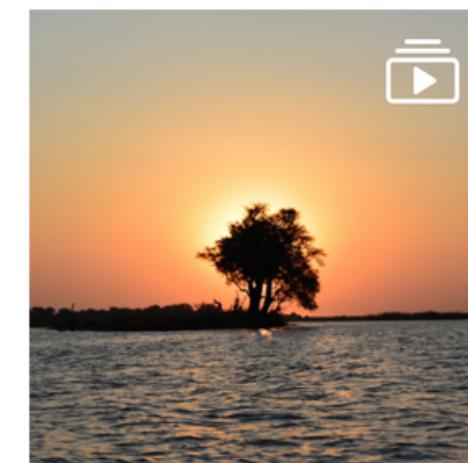
Merzouga, Marruecos

Comienza: 16/4/2021 11:22



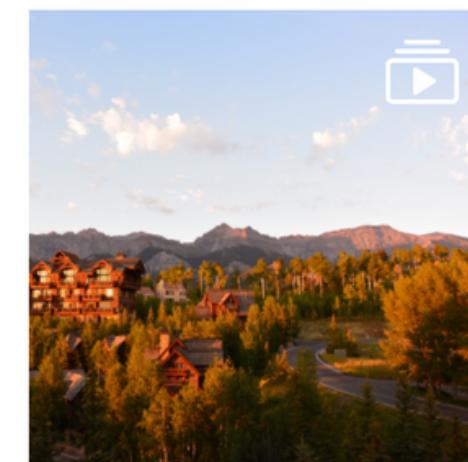
Londres, Reino Unido

Comienza: 16/4/2021 10:59



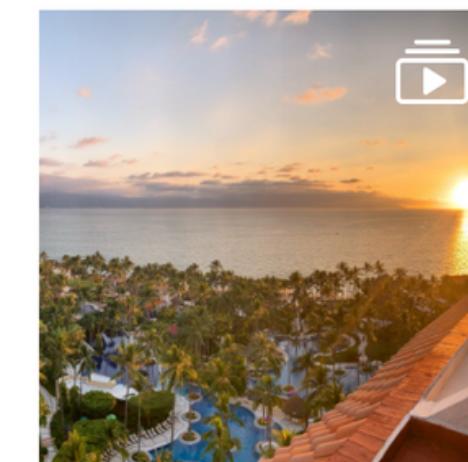
Delta del Okavango, Botswana

Comienza: 16/4/2021 9:36



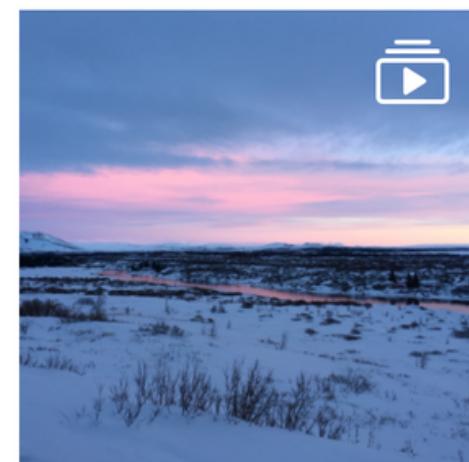
Telluride, Colorado, EE. UU.

Comienza: 15/4/2021 18:15



Puerto Vallarta, México

Comienza: 15/4/2021 18:15



Reykjavik, Islandia

Comienza: 16/4/2021 12:17



Marakesh, Marruecos

Comienza: 16/4/2021 11:37

Sunset Central

▲ Montaña

* Nieve

❖ Playa

🏜 Desierto

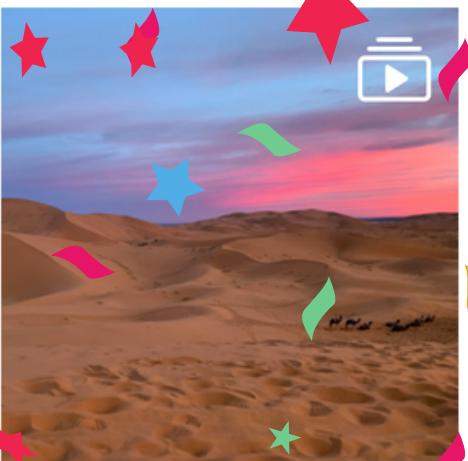
🏞 Río

🏙 Ciudad



Maui, Hawái, EE. UU.

Comienza: 15/4/2021 21:33



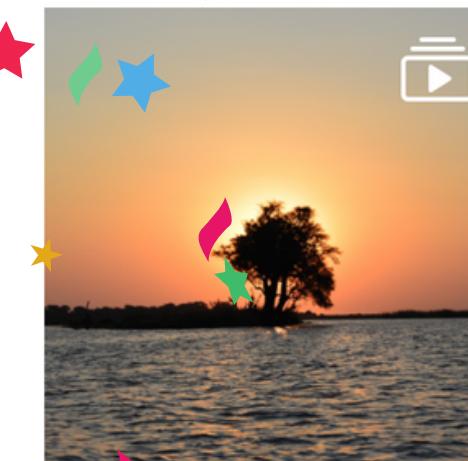
Merzouga, Marruecos

Comienza: 16/4/2021 11:22



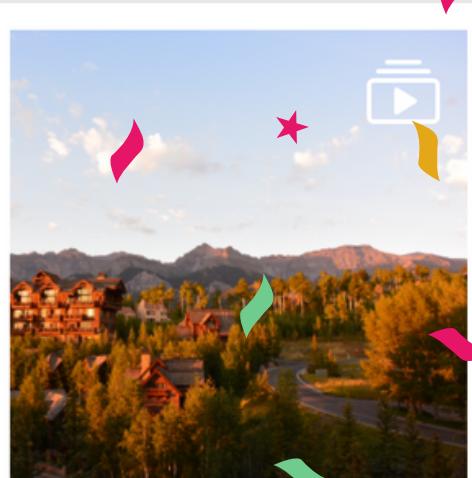
Londres, Reino Unido

Comienza: 16/4/2021 10:59



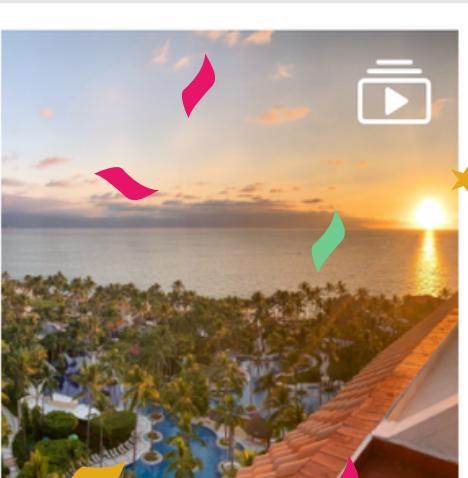
**Delta del Okavango,
Botswana**

Comienza: 16/4/2021 9:36



**Telluride, Colorado,
EE. UU.**

Comienza: 15/4/2021 18:15



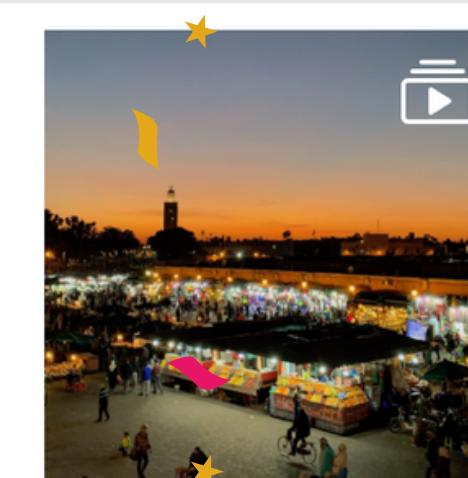
**Puerto Vallarta,
Méjico**

Comienza: 15/4/2021 18:15



Reykjavik, Islandia

Comienza: 16/4/2021 12:17



Marakesh, Marruecos

Comienza: 16/4/2021 11:37

Sunset Central

جبل ⛰

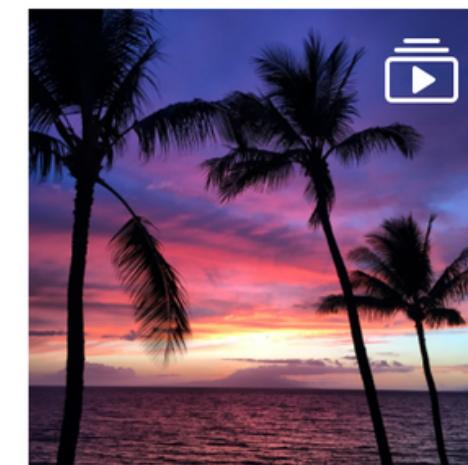
ثلج *

شاطئ بحر 🌊

صحراء ⚡

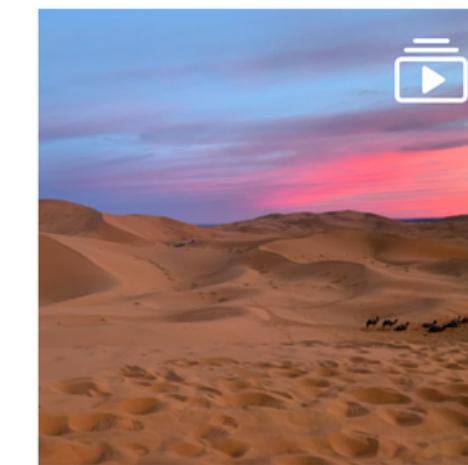
نهر 🌈

مدينة 🏙



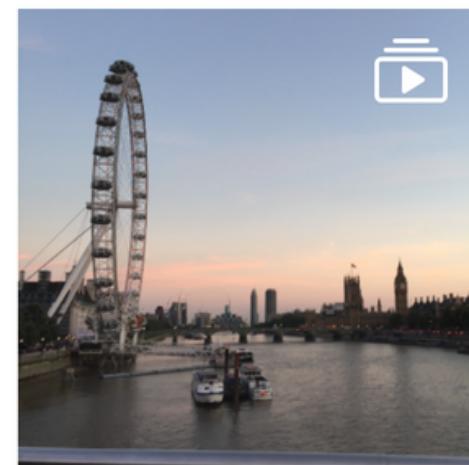
ماوي ، هاواي ، الولايات المتحدة

يبدأ: ٩:٣٣ , ٢٠٢١/٤/١٥ م



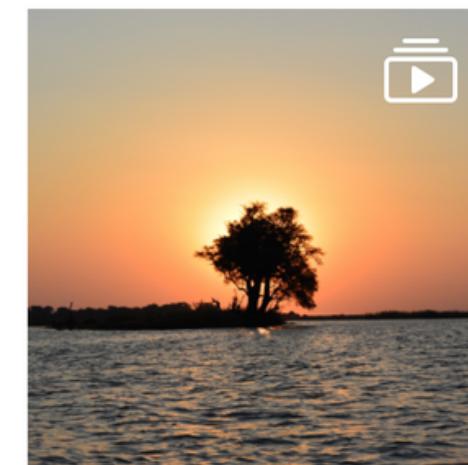
مرزوقة ، المغرب

يبدأ: ١١:٢٢ , ٢٠٢١/٤/١٦ ص



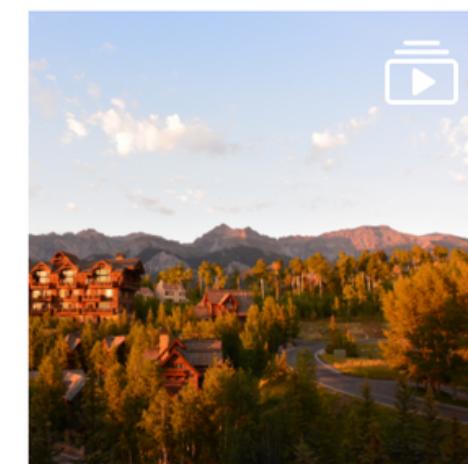
لندن، المملكة المتحدة

يبدأ: ١٠:٥٩ , ٢٠٢١/٤/١٦ ص



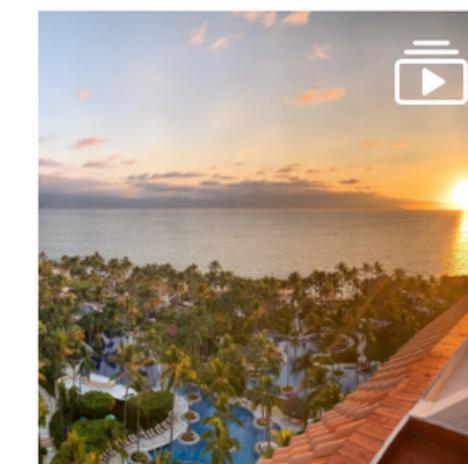
دلتا أوكافانغو ، بوتسوانا

يبدأ: ٩:٣٦ , ٢٠٢١/٤/١٦ ص



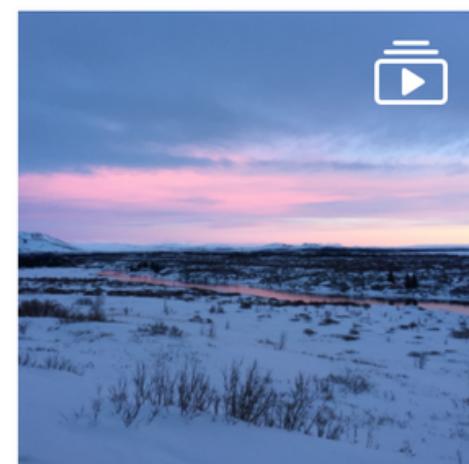
تيلورايد ، كولورادو ، الولايات المتحدة

يبدأ: ٦:١٥ , ٢٠٢١/٤/١٥ م



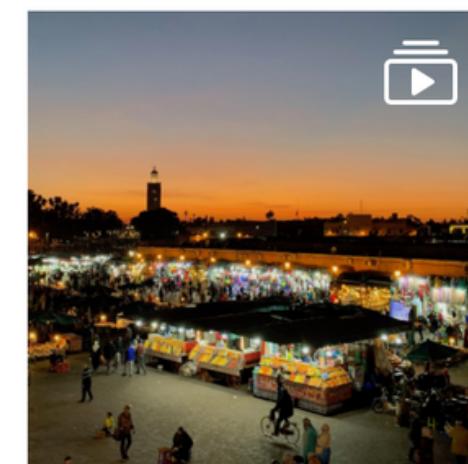
بويرتو فالارتا ، المكسيك

يبدأ: ٦:١٥ , ٢٠٢١/٤/١٥ م



ريكيافيك ، أيسلندا

يبدأ: ١٢:١٧ , ٢٠٢١/٤/١٦ م



مراكش ، المغرب

يبدأ: ١١:٣٧ , ٢٠٢١/٤/١٦ ص

Bidirectionality

LEFT TO RIGHT (LTR)

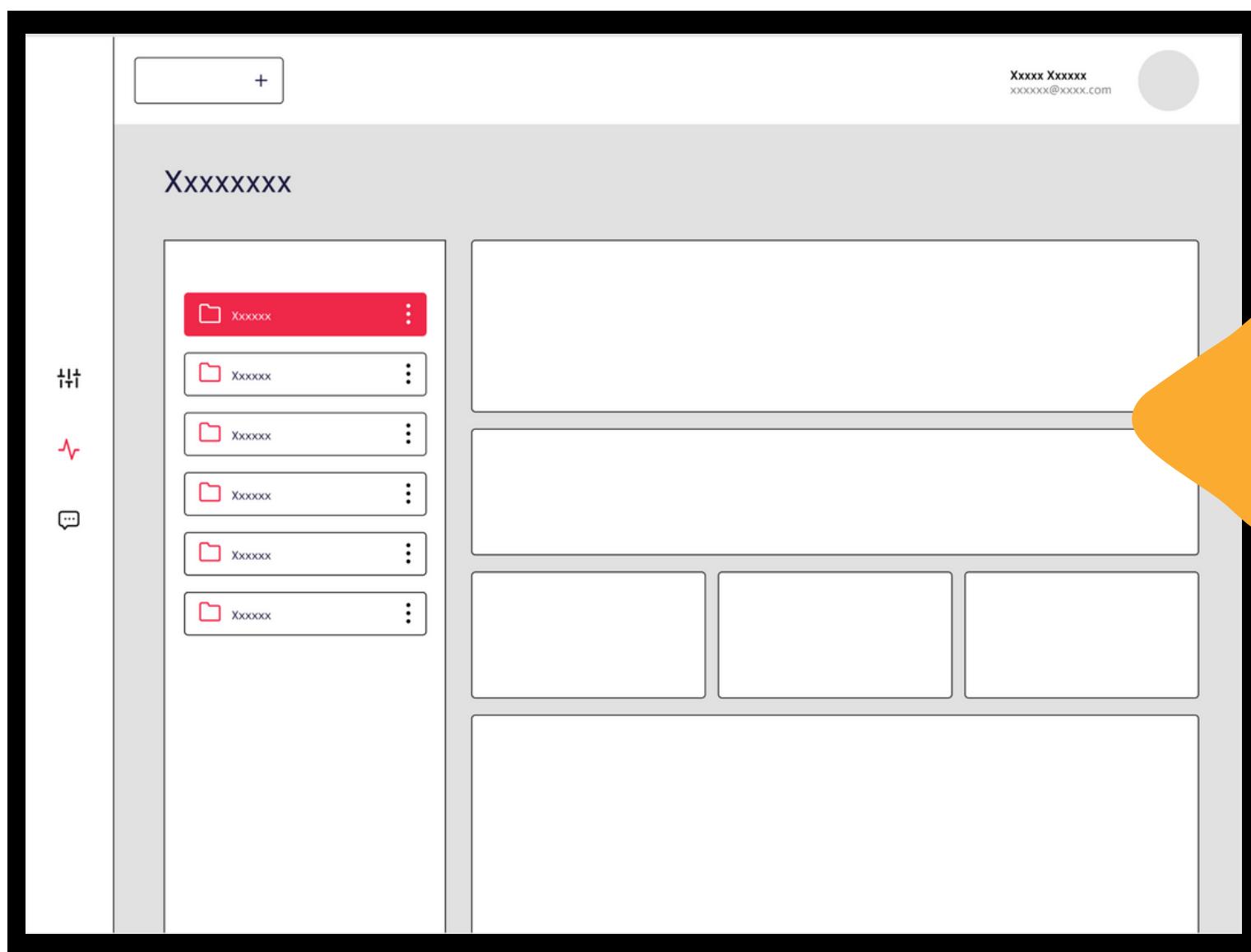


RIGHT TO LEFT (RTL)

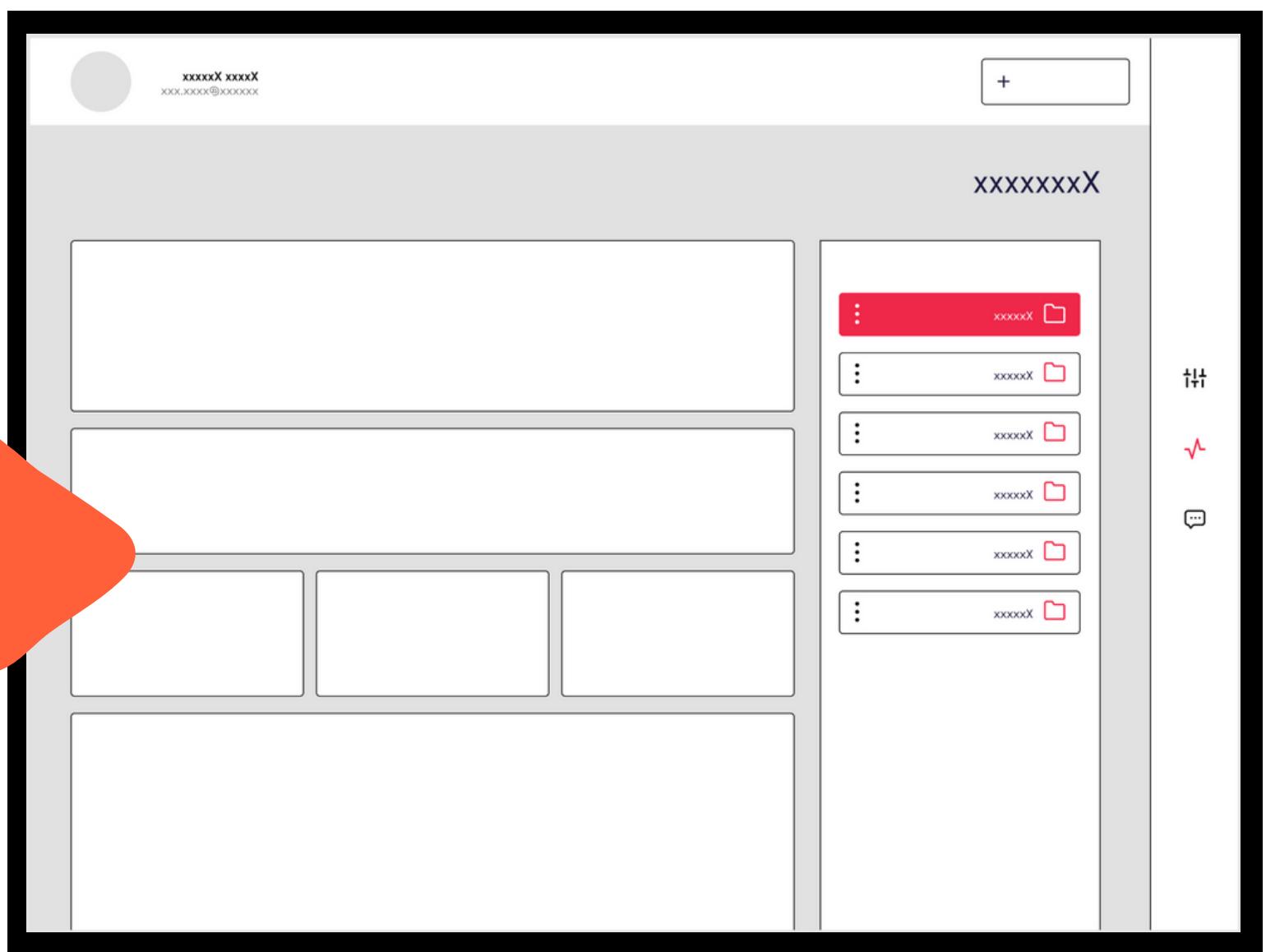


Bidirectionality

LEFT TO RIGHT (LTR)



RIGHT TO LEFT (RTL)



Bidirectionality



```
* {  
  direction: rtl;  
}
```

CSS Direction Property

Flips any **non-direction** specific CSS, like text, flex-box or css-grid styles.

Bidirectionality



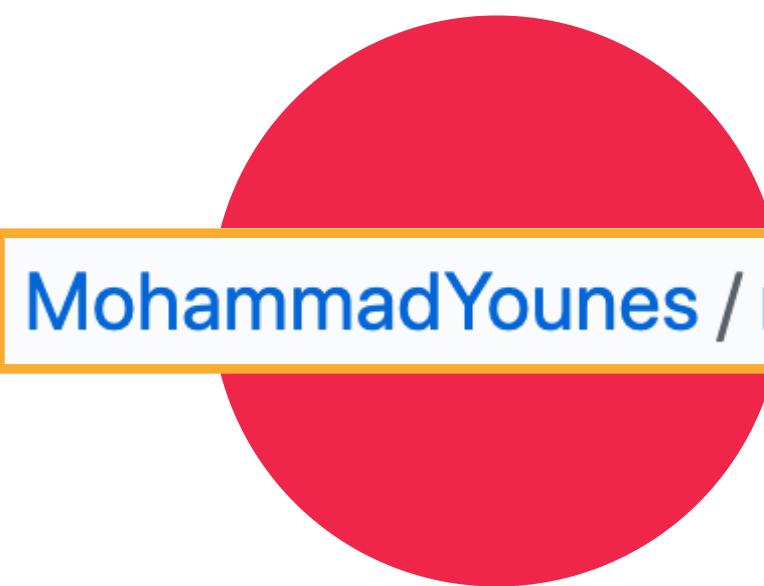
```
{  
  padding-right: 12px;  
}  
...  
{  
  padding-left: 12px;  
}
```



CSS Utility Libraries

Helps flip **direction** specific CSS like padding-right or border-left.

CSS RTL Utility



[MohammadYounes / rtlcss](#)

CSS Utility



[kentcdodds / rtl-css-js](#)

CSS JS Object
Utility



[alitaheri / jss-rtl](#)

JSS Utility

Bidirectionality in React



```
const ThemeContext = createContext<ThemeContextProps>(themeContextDefault)

export function ThemeProvider({ defaultDirection, children }: ThemeProviderProps) {
  const [direction, setDirection] = useState(defaultDirection)

  return (
    <ThemeContext.Provider value={{ direction, setDirection }}>{children}</ThemeContext.Provider>
  )
}

export function useThemeDirection(): ContentDirection {
  return useContext(ThemeContext).direction
}
```

ThemeContext and useDirection hook

Bidirectionality in React

```
● ● ●  
  
export function useStyles() {  
  const direction = useThemeDirection()  
  
  const applyStyles = (styles: CSSObject) => {  
    if (direction === 'rtl') {  
      return css(rtlCSSJS(styles))  
    }  
    return css(styles)  
  }  
  
  return applyStyles  
}  
  
● ● ●
```

utility hook that returns applyStyles function

CSS RTL Utility Usage

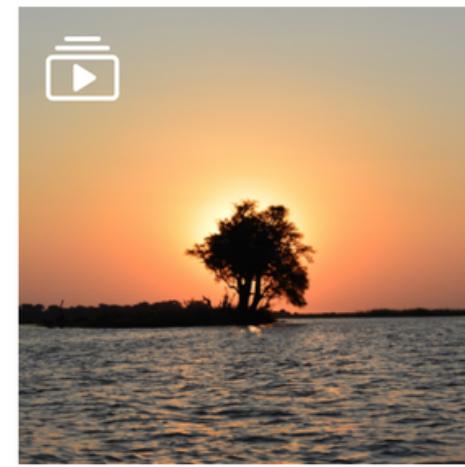


```
export function MountainSidebarItem() {
  const translate = useTranslate()
  const applyStyles = useStyles()

  return (
    <li key="Mountain" css={applyStyles(listItemStyle)}>
      <MountainIcon />
      <span css={itemTextStyle}>{translate('SUNSET_CENTRAL.MOUNTAIN')}</span>
    </li>
  )
}
```

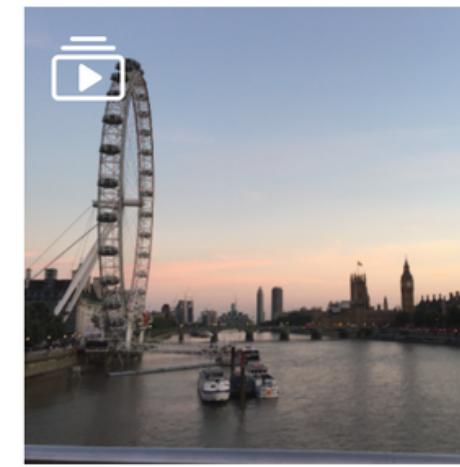
css goes through applyStyles function

Sunset Central



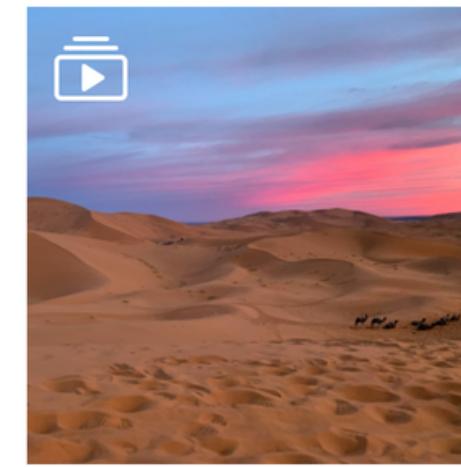
دلتا أوكافانغو ، بوتسوانا

يبدأ: ٩:٣٦, ٢٠٢١/٤/١٦ ص



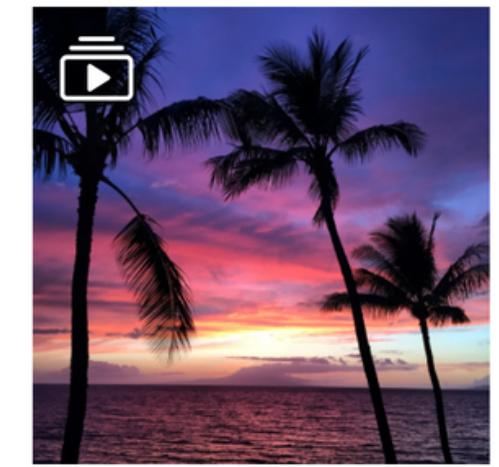
لندن، المملكة المتحدة

يبدأ: ١٠:٥٩, ٢٠٢١/٤/١٦ ص



مرزوقه ، المغرب

يبدأ: ١١:٢٢, ٢٠٢١/٤/١٦ ص



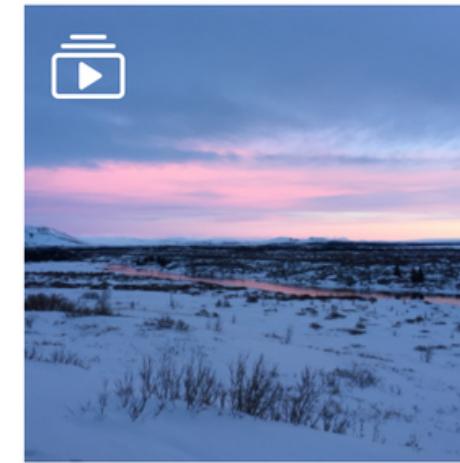
ماوي ، هواي ، الولايات المتحدة

يبدأ: ٩:٣٣, ٢٠٢١/٤/١٥ م



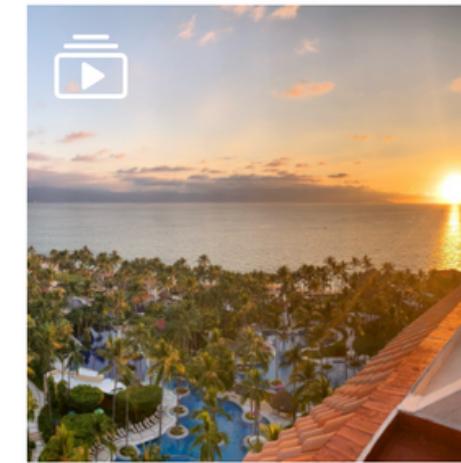
مراكش ، المغرب

يبدأ: ١١:٣٧, ٢٠٢١/٤/١٦ ص



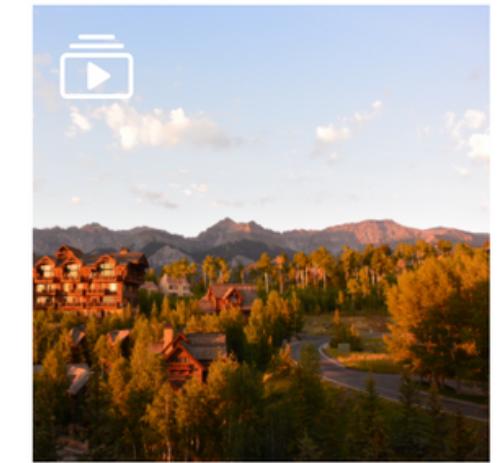
ريكيافيك ، أيسلندا

يبدأ: ١٢:١٧, ٢٠٢١/٤/١٦ م



بويرتو فالارتا ، المكسيك

يبدأ: ٦:١٥, ٢٠٢١/٤/١٥ م



تيلورايد ، كولورادو ، الولايات المتحدة

يبدأ: ٦:١٥, ٢٠٢١/٤/١٥ م

جبل

ثلج

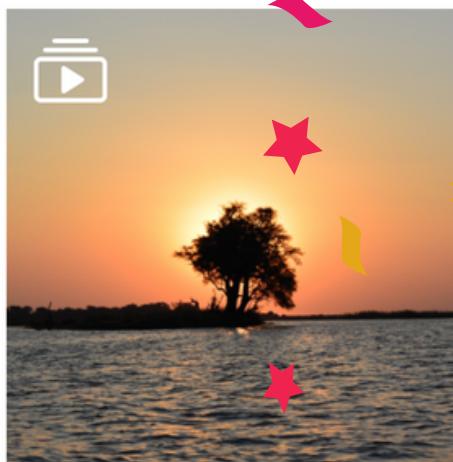
شاطئ بحر

صحراء

نهر

مدينة

Sunset Central



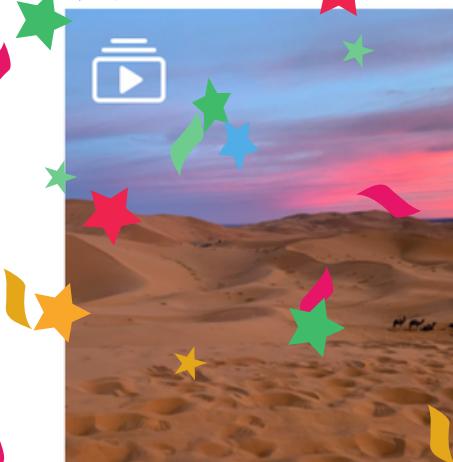
دالا أوكافانغو ، بوتسوانا

يبدأ: ٢٠٢١/٤/١٦، ٩:٣٦ ص



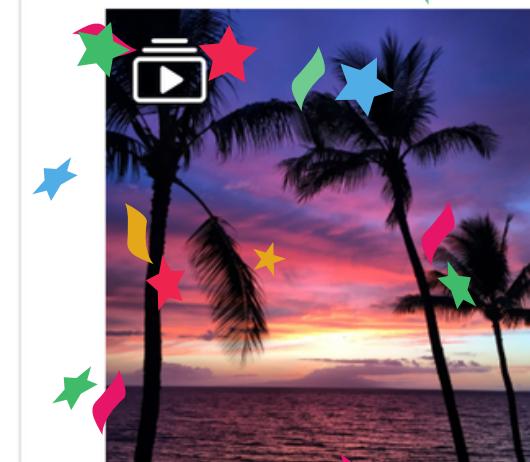
لندن، المملكة المتحدة

يبدأ: ٢٠٢١/٤/١٦، ١٠:٥٩ ص



مرزوقه ، المغرب

يبدأ: ٢٠٢١/٤/١٦، ١١:٢٢ ص



ماوي ، هواي ، الولايات المتحدة

يبدأ: ٢٠٢١/٤/١٥، ٩:٣٣ م



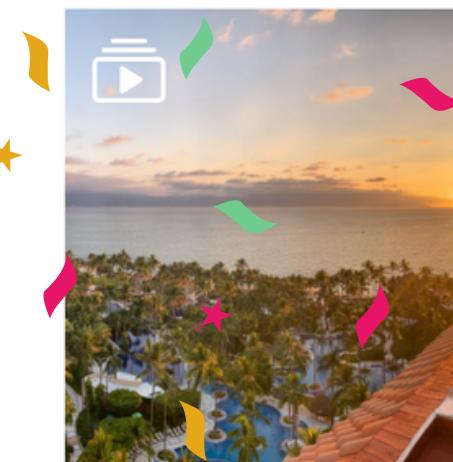
مراكش ، المغرب

يبدأ: ٢٠٢١/٤/١٦، ١١:٣٧ ص



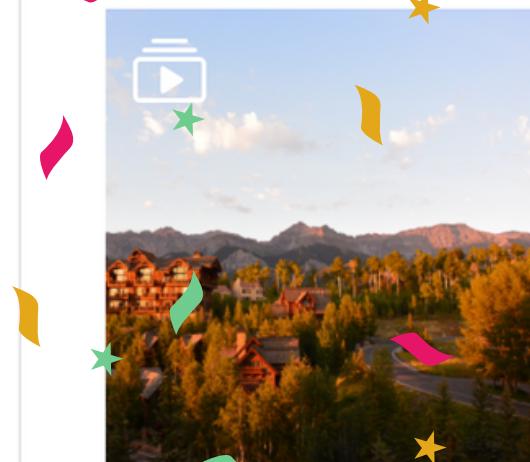
ريكيافيك ، أيسلندا

يبدأ: ٢٠٢١/٤/١٦، ١٢:١٧ م



بويرتو فالارتا ، المكسيك

يبدأ: ٢٠٢١/٤/١٥، ٦:١٥ م



تيلورايد ، كولورادو ، الولايات المتحدة

يبدأ: ٢٠٢١/٤/١٥، ٦:١٥ م

جبل

ثلج

شاطئ بحر

صحراء

نهر

مدينة

Internationalization

18



i18n

Architecting your app so when i18n occurs things work as expected.

Learning and
maintaining languages
is hard... but
architecting your
react app to support
multiple locales
doesn't have to be.

THANK YOU

@DariaCaraway 