

I18N



EXAM

- » The following component causes slow rerenders.
What can be done to improve the performance?
- » Add TS type annotations to the following function:
- » Write a test for the given React component which verifies that xyz
- » some theoretical questions i18n/perf...

NUMERONYM

- » Number based word
- » mostly used as a shortened form of a word
- » eg.
- » W3C (World Wide Web Consortium)
- » k8s (kubernetes)
- » g11n (globalization)
- » i18n (internationalisation)
- » a11y (accessibility)

I18N DEFINITION

“Internationalisation is the design and development of a product, application or document content that enables easy localisation for target audiences that vary in culture, region, or language. [\(W3C\)](#)”

I18N

- » Process of designing apps which can be localised later
- » use UTF-8 as encoding instead of latin-1
- » handling timestamps across different timezones

I18N

- » i18n might contain:
 - » Formatting (datetime/numeric/... values)
 - » Graphics which might be inappropriate in a given culture
 - » Changes due to legal requirements
 - » eg. a VAT-ID is required in certain countries on purchase

CHALLENGES

- » Text size differences
 - » eg. bezahlen -> pay
- » RTL vs. LTR
- » Different formatting rules
- » Country specific requirements
- » Pluralisation

I18N WHY

“Adding i18n early to a project is much easier than afterwards.”

- » Finding all strings afterwards is a huge task
- » wrap all hardcoded text with t function
- » const t = (text) => text;
- » use IDE to find all references afterwards

CLDR

- » Common locale data repository
- » Most extensive repository for locale-specific data
- » Developed/Maintained by the Unicode consortium
- » Pretty big 72mb of JSON (xml is bigger)

CLDR

- » certain translations
- » language names
- » territory country names
- » calendric names (weekdays, months, ...)
- » formatting/parsing numbers, dates
- » conversion rules
 - » numeral systems (eg. roman -> arabic numbers)
 - » calendar systems (eg. julian -> gregorian)



- » International Components for Unicode
- » OpenSource Project for internationalisation
- » Uses CLDR internally
- » Ported to many environments
 - » JS formatjs
 - » Java
 - » C++
 - » ...

ICU

- » Simple string translations: 'Hello everybody'
- » Simple string with placeholder: 'Hello {name}'
- » Formatters
 - » Number
 - » Date
 - » Time
 - » Select

ICU BASIC NUMBERS

» { count, number }

» en: 21,629,693

» ca: 21.629.693

» de: 21629693

ICU CURRENCY NUMBERS

```
» { count, number, currency }

» en: $1,693.10

» ca: 1.693,10 USD

» de: 1.693,10 $

» { count, number, currency:EUR }

» en: €1.693,10

» ca: 1.693,10 €

» de: 1.693,10 €
```

ICU DATE

» { count, date }

» en: May 1, 2019

» ca: 1 de maig de 2019

» de: 1. Mai 2019

ICU DATE MODIFIERS

» { count, date, short }

» en: 5/1/19

» ca: 1/5/19

» de: 1.5.19

ICU PLURAL

```
{ count, plural,  
  =0 {Zero}  
  =1 {One}  
  other {Many} }
```

ICU PLURAL

```
{ count, plural,
    zero { Zero items }
    one { One item }
    two { Two items }
    few { A couple of items }
    many { Many items }
    other { # items }
}
```

ICU SELECT

```
{ gender, select,  
    male {He avoids bugs}  
female {She avoids bugs}  
other {They avoid bugs} }
```

LOCALE

- » Dependent on language AND region
- » Language code + country code
 - » 'de-AT' === 'deu-AT'
 - » 'de-DE' === 'deu-DE'
 - » 'en-US'

WHY LANGUAGE AND REGION

- » Austria vs. Germany
 - » Jänner => Januar
 - » Erdapfel => Kartoffel
 - » Kassa => Kasse
 - » [https://de.wikipedia.org/wiki/
Liste_von_Austriazismen](https://de.wikipedia.org/wiki/Liste_von_Austriazismen)
- » England vs. America vs. Canada
- » 01/05/19 => 5/1/19 => 19-05-01

ISO-639 (LANGUAGE CODES)

- » character code to represent a language
- » ISO 639-1
 - » two character code, most major languages spoken today
 - » more restrictive, not every language is added
- » ISO 639-2
 - » ISO 639-1 still valid (with exceptions)
 - » three character code

ISO-3166 (COUNTRY CODES)

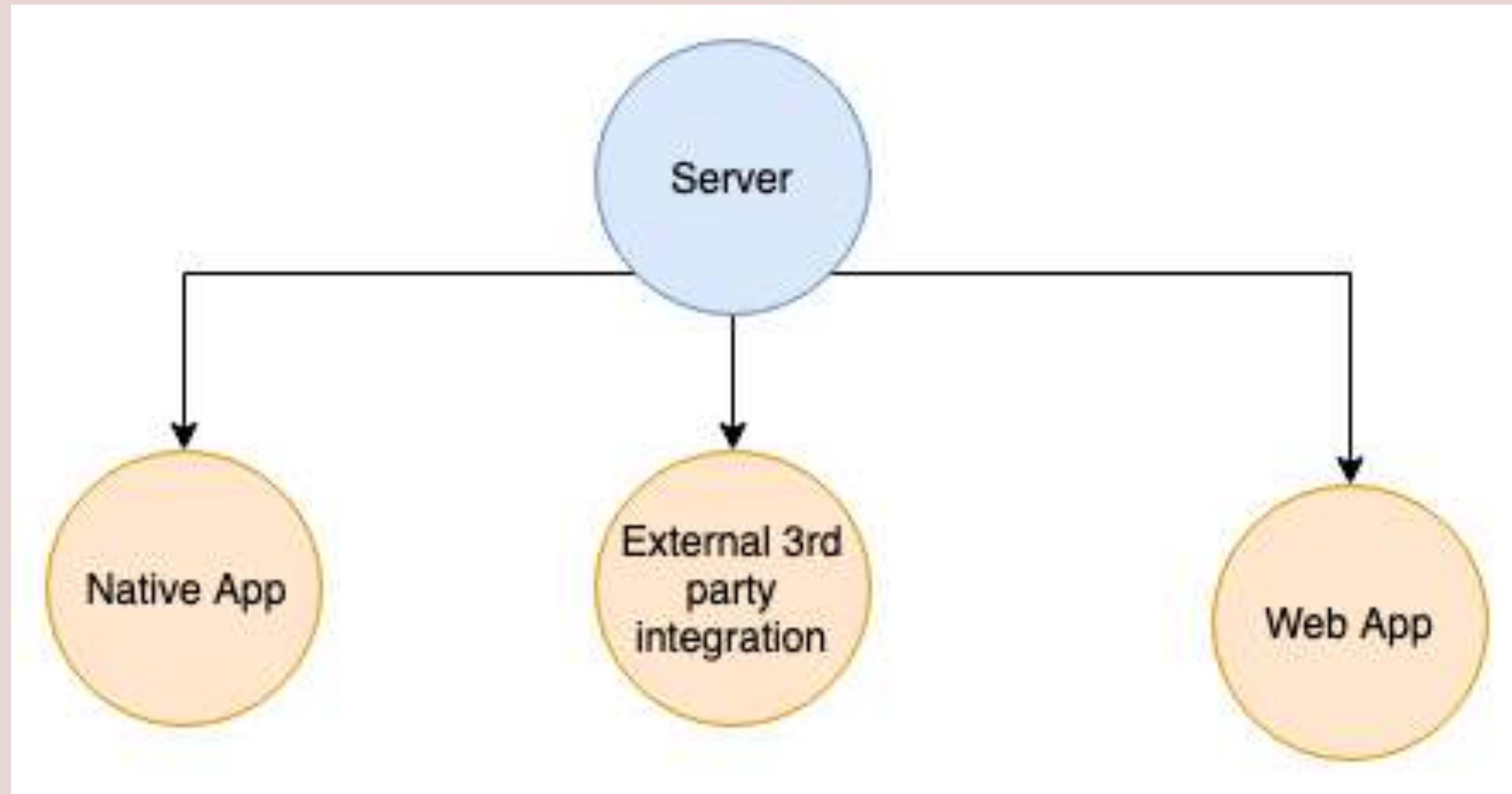
- » character code to represent countries
- » ISO-3166-1
 - » two character code
 - » used for country top level domains
 - » this should be used
- » ISO 3166-3
 - » Used for ancient countries (eg. DDR/UDSSR)

WHICH LOCALE

- » use system settings
- » (use custom user settings)
 - » when many people share the same device
- » use url parameter (mostly for debugging)

WHERE TO ADD TRANSLATIONS

DEPENDENCIES



USE CASE

- » A new server validation is added
 - » eg. email already taken
 - » all clients need to update locales
- » Recommendation:
 - » Add localisation as local as possible

SELECT SYSTEM LOCALE

- » on the client
 - » navigator.language || navigator.userLanguage
 - » 'de-AT' or 'de-DE'
- » on the server
 - » via HTTP Accept-Language header
 - » Accept-Language: en;q=0.8,es;q=0.6,fr;q=0.4

TASK

- » Add to project:
- » Simple translation
- » Pluralised translation
- » eg. No member in group/many members in group
- » <https://angular.io/guide/i18n>

TIME, TIMEZONES, DURATIONS

FALSEHOODS ABOUT TIME

- » There are always 24h a day
- » The system clock will be set to the correct time
- » A minute is always 60 seconds
- » A timestamp is unique
- » Weeks start on Monday
- » Time always goes forwards
- » Timezone offsets are always 1h

UTC

- » Coordinated Universal Time
- » Time standard how clocks are coordinated
- » Not adjusted by daylight saving
- » UTC has timezone offset +00:00

TIMEZONES

WHY ARE TIMEZONES HARD

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ZEITUMSTELLUNG

Libanon hat nach Regierungs-Farce aktuell zwei Uhrzeiten

Der geschäftsführende Premier Mikati wollte die Zeitumstellung kurzfristig verschieben. Manche halten sich daran, manche nicht

26. März 2023, 18:01, 137 Postings

Die Frage nach der aktuellen Uhrzeit ist normalerweise leicht zu beantworten. Im Libanon sorgt sie aber seit Sonntag für Stirnrunzeln. Denn im Land am Mittelmeer sind aktuell zwei Uhrzeiten gleichzeitig aktiv.

Eigentlich hätten die Uhren am Sonntag wie in Österreich und anderen Staaten um eine Stunde nach vorne gestellt werden sollen. Am Donnerstag gab der geschäftsführende Premierminister Najib Mikati aber bekannt, dass die Zeitumstellung auf 20. April verschoben werde. Die Vorgabe wurde nicht begründet, allerdings tauchte ein Video eines Gesprächs zwischen Mikati und Parlamentssprecher Nabih Berri auf. Darin bittet Letzterer, die Sommerzeit bis zum Ende des Ramadans zu verschieben.

Mikati folgte dem Wunsch. Es wird vermutet, dass er damit bei der muslimischen Bevölkerung punkten will. Denn im Ramadan sind Muslime angehalten, von Sonnenaufgang bis Sonnenuntergang zu fasten. Weil die Uhr nicht nach vorne gestellt wird, können sie bereits gegen 18 Uhr ihr Fasten brechen. Mit Zeitumstellung wäre dies erst gegen 19 Uhr der Fall gewesen.



Auf dem Handy ist es 13 Uhr, auf der Armbanduhr 12 Uhr.

Foto: REUTERS/Mohamed Azakir



TIMEZONE VS. TIMEZONE OFFSET

- » Offset

- » difference between UTC and a place with time
 - » mostly written as +00:30, +14:00

- » Timezone

- » a region which use the same time
 - » might add daylight saving time

TZ ENTRY FROM AUSTRIA

#	Rule	NAME	FROM	TO	TYPE	IN	ON	AT	SAVE	LETTER/S
Rule	Austria	1920		only	-	Apr	5	2:00s	1:00	S
Rule	Austria	1920		only	-	Sep	13	2:00s	0	-
Rule	Austria	1946		only	-	Apr	14	2:00s	1:00	S
Rule	Austria	1946	1948		-	Oct	Sun>=1	2:00s	0	-
Rule	Austria	1947		only	-	Apr	6	2:00s	1:00	S
Rule	Austria	1948		only	-	Apr	18	2:00s	1:00	S
Rule	Austria	1980		only	-	Apr	6	0:00	1:00	S
Rule	Austria	1980		only	-	Sep	28	0:00	0	-
#	Zone	NAME		GMTOFF	RULES	FORMAT	[UNTIL]			
Zone	Europe/Vienna			1:05:21	-	LMT	1893 Apr			
				1:00	C-Eur	CE%ST	1920			
				1:00	Austria	CE%ST	1940 Apr 1	2:00s		
				1:00	C-Eur	CE%ST	1945 Apr 2	2:00s		
				1:00	1:00	CEST	1945 Apr 12	2:00s		
				1:00	-	CET	1946			
				1:00	Austria	CE%ST	1981			
				1:00	EU	CE%ST				

ISO-8601

- » Standard for representing times and durations
- » First published 1988
- » Dates 2000-02-01
- » Times 10:11:05
- » Datetime 2000-02-01T10:11:05+06:45
- » Durations P1DT10M => 1 Day and 10 Minutes

WHY OWN DURATION FORMAT

- » Add one week to a date?
 - » Adding $(60 * 60 * 24 * 7)$ might be wrong
 - » Time of the day might change
- » How many hours does a week have?
 - » Duration depends on the start/end date?
- » How to represent half days with time?
 - » Not every day has 24 hours

SHAMELESS SELF PROMOTION

Pomeranian Durations

WHY USE DATES

```
const validityStart = new Date('2016-10-01') // Converts date to datetime
const validityEnd = new Date('2016-11-08')
const isWithinValidity = aDate => (aDate >= validityStart && aDate <= validityEnd)
const applicationTime = new Date('2016-11-08 08:00')
```

Source

SOME ADVICE FROM MY SIDE

- » Don't use JS Date object
 - » <https://github.com/tc39/proposal-temporal> will come
- » Store dates in UTC
- » Store in appropriate data type
 - » Date for birthdates, etc.
 - » Datetime where the time is relevant
 - » eg. `createdat`, `updatedat`

FEEDBACK

- » Questions: tmayrhofer.lba@fh-salzburg.ac.at
- » <https://s.surveyplanet.com/xlibwm85>