

MEHRNAZ ATAIEI | CHRISTIAN KRAY

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## EPHEMERALITY IS THE NEW BLACK : A NOVEL PERSPECTIVE ON LOCATION DATA MANAGEMENT AND LOCATION PRIVACY IN LBS



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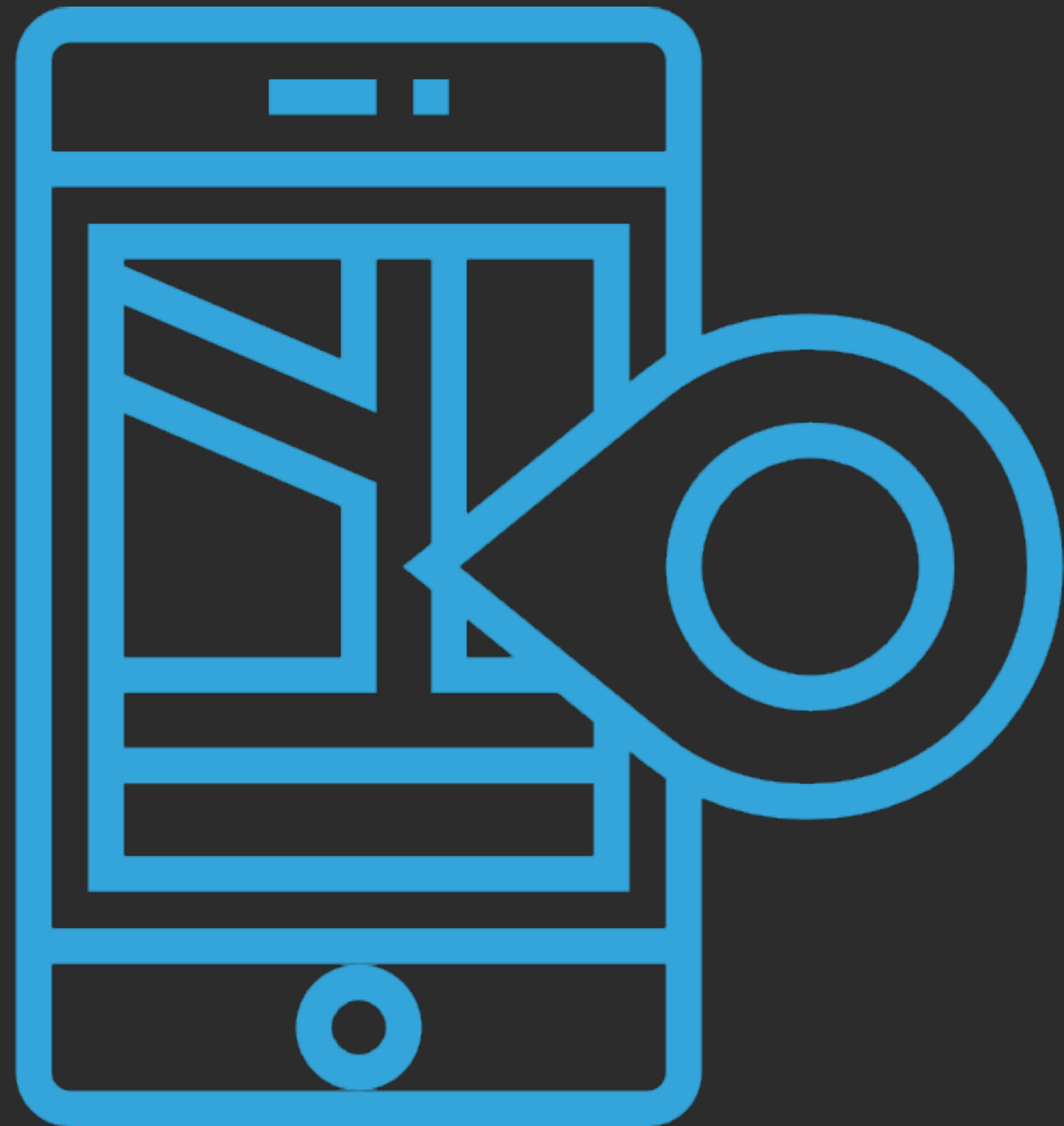


## OVERVIEW

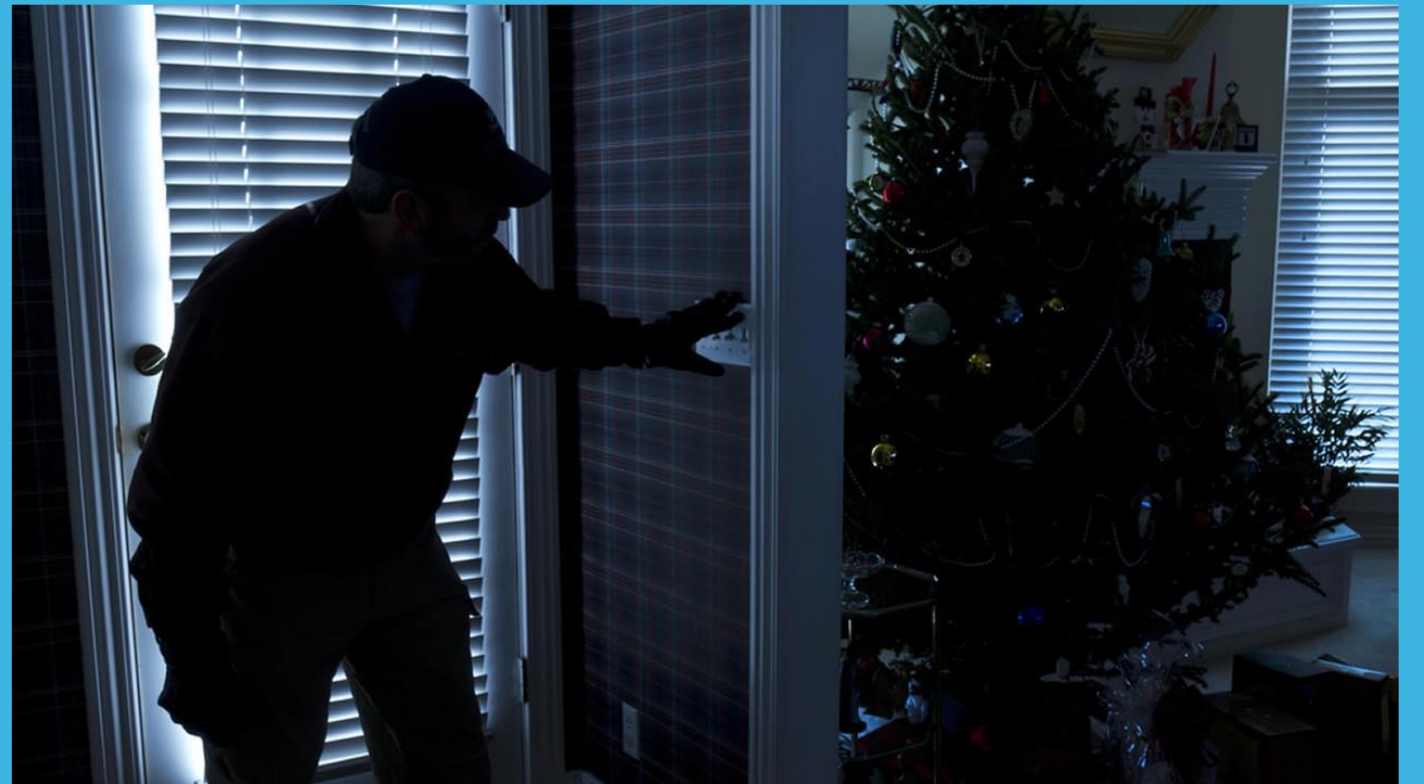
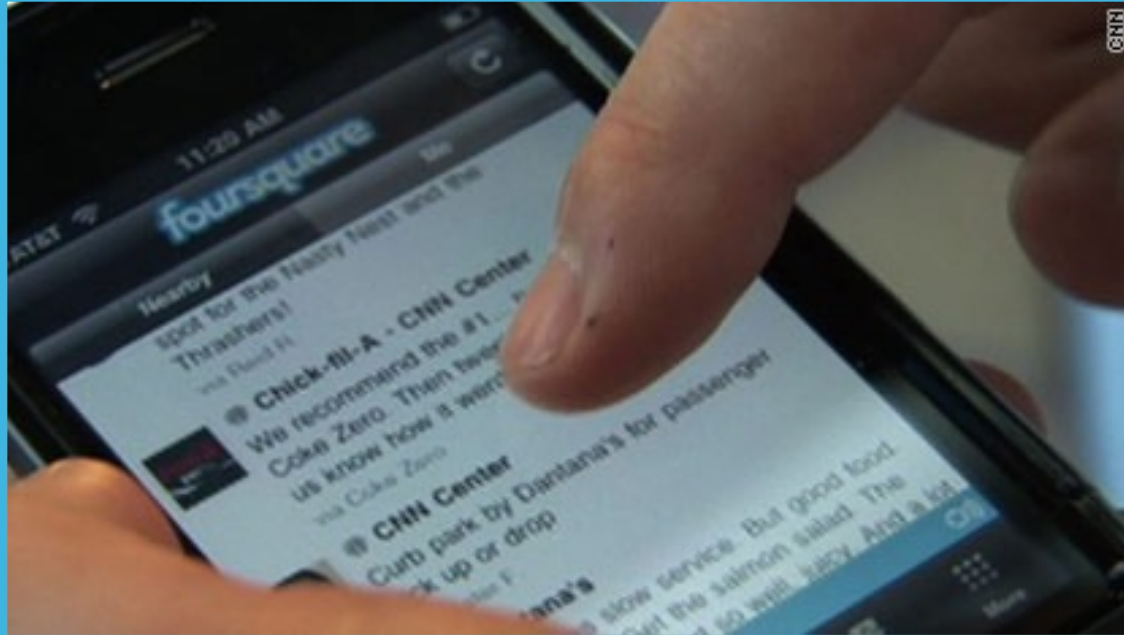
- ▶ how location privacy can be realised in the context of a location-based service
- ▶ discuss several measures to integrate location privacy into LBS
- ▶ investigate the role of location data management in the context of privacy preservation
- ▶ propose an approach based on privacy-by-design principles (ephemerality)
- ▶ introduce a conceptual model to facilitate the implementation of those principles

## LOCATION INFORMATION

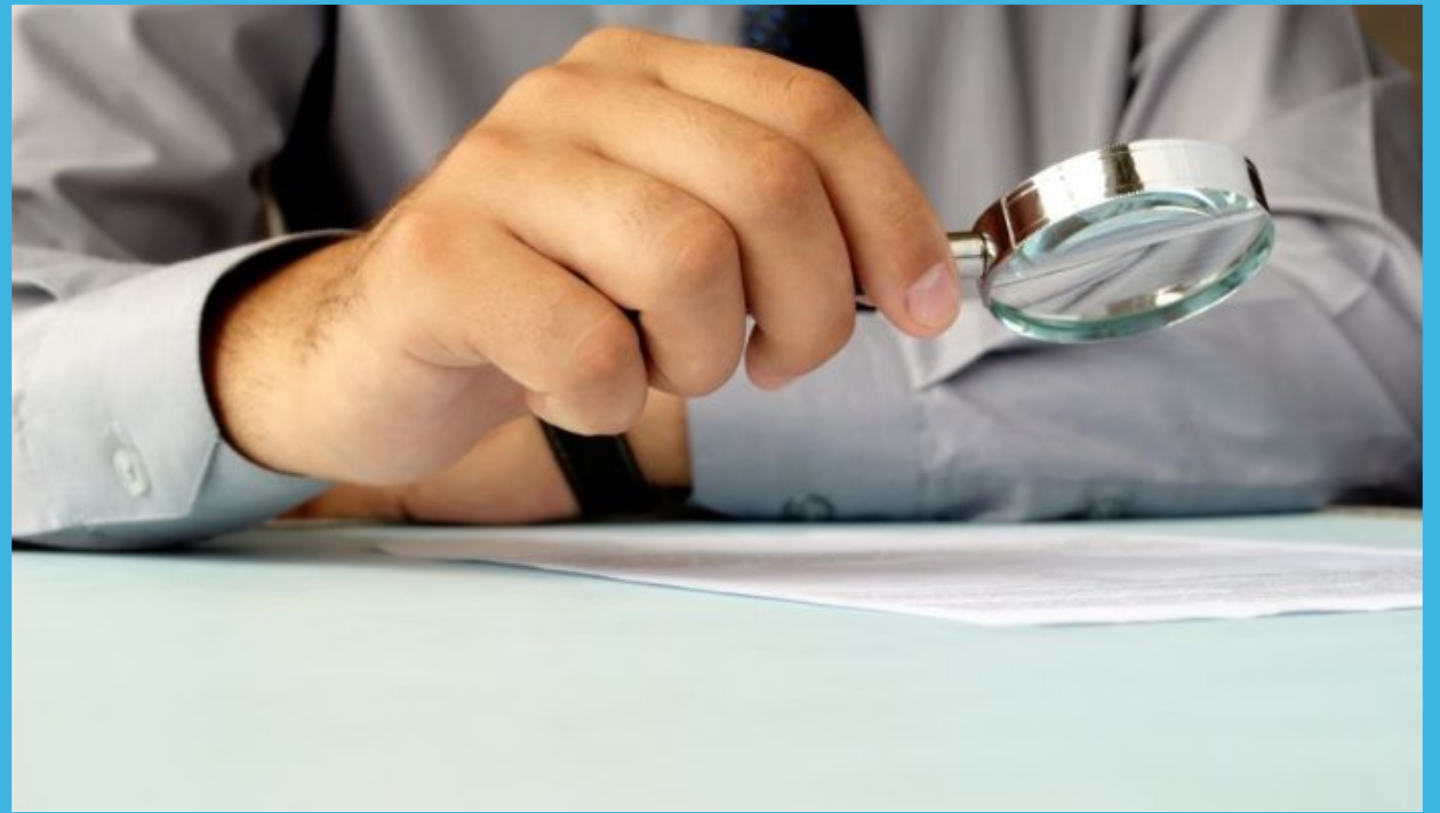
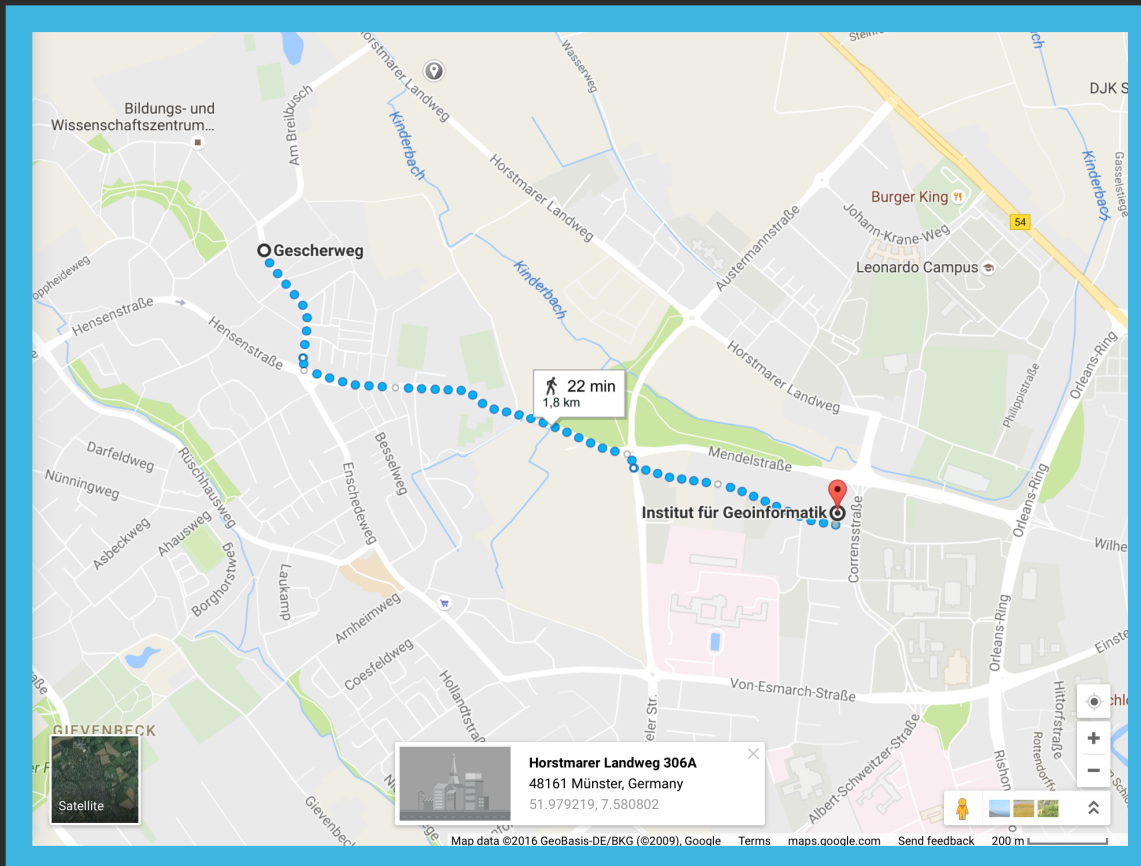
- ▶ share location data
- ▶ respond to the requests of users according to their physical location
- ▶ more user-friendly
- ▶ issues regarding location privacy



## REAL TIME



## PAST DATA



## COUNTERMEASURES

- ▶ regulatory strategies
- ▶ agreements
- ▶ encryption
- ▶ anonymization
- ▶ obfuscation





**WHY SHOULD WE STORE LOCATION DATA?**

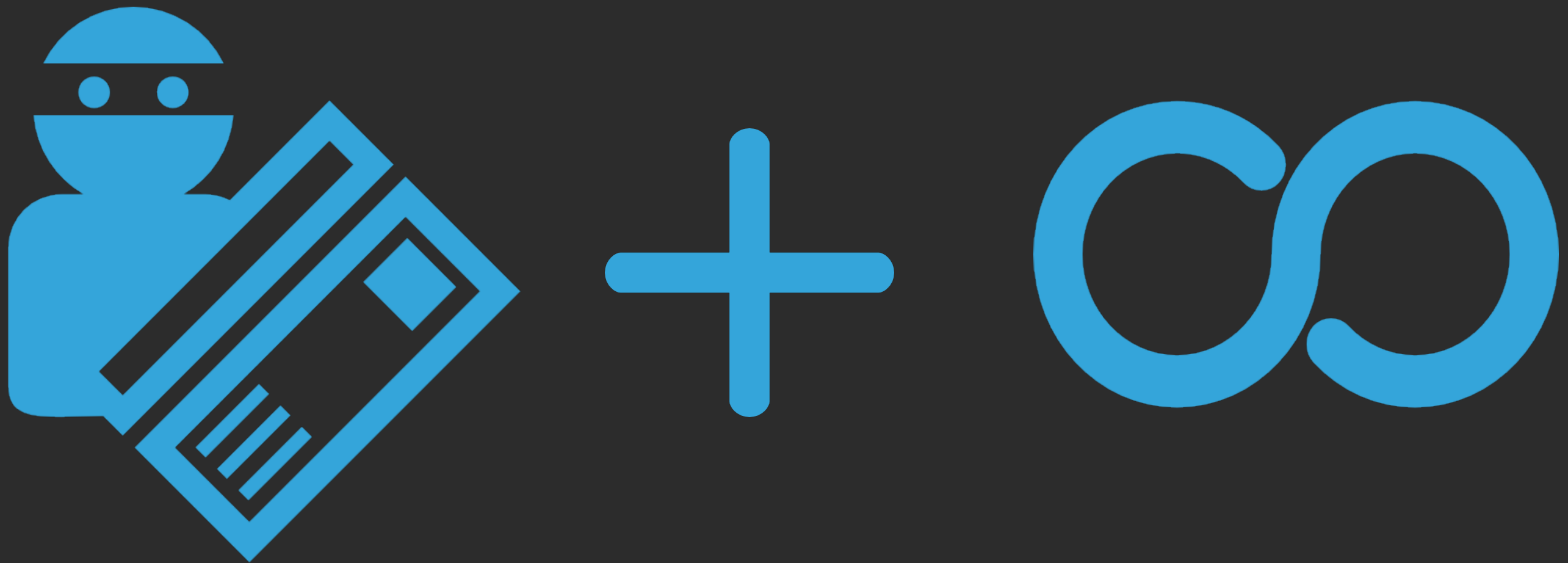
**FOREVER?**

## UNLIMITED STORAGE TIME OF LOCATION DATA

- ▶ legal requirements
- ▶ insight for improvement
- ▶ deep profiling



## UNRESTRICTED AMOUNT OF TIME TO CARRY OUT ATTACKS



HOW SHOULD LOCATION INFORMATION BE STORED?



## EPHEMERALITY

- ▶ from Greek *εφήμερος* - *ephemeros*, literally "lasting only one day"
- ▶ ephemeral location data
- ▶ existing only briefly



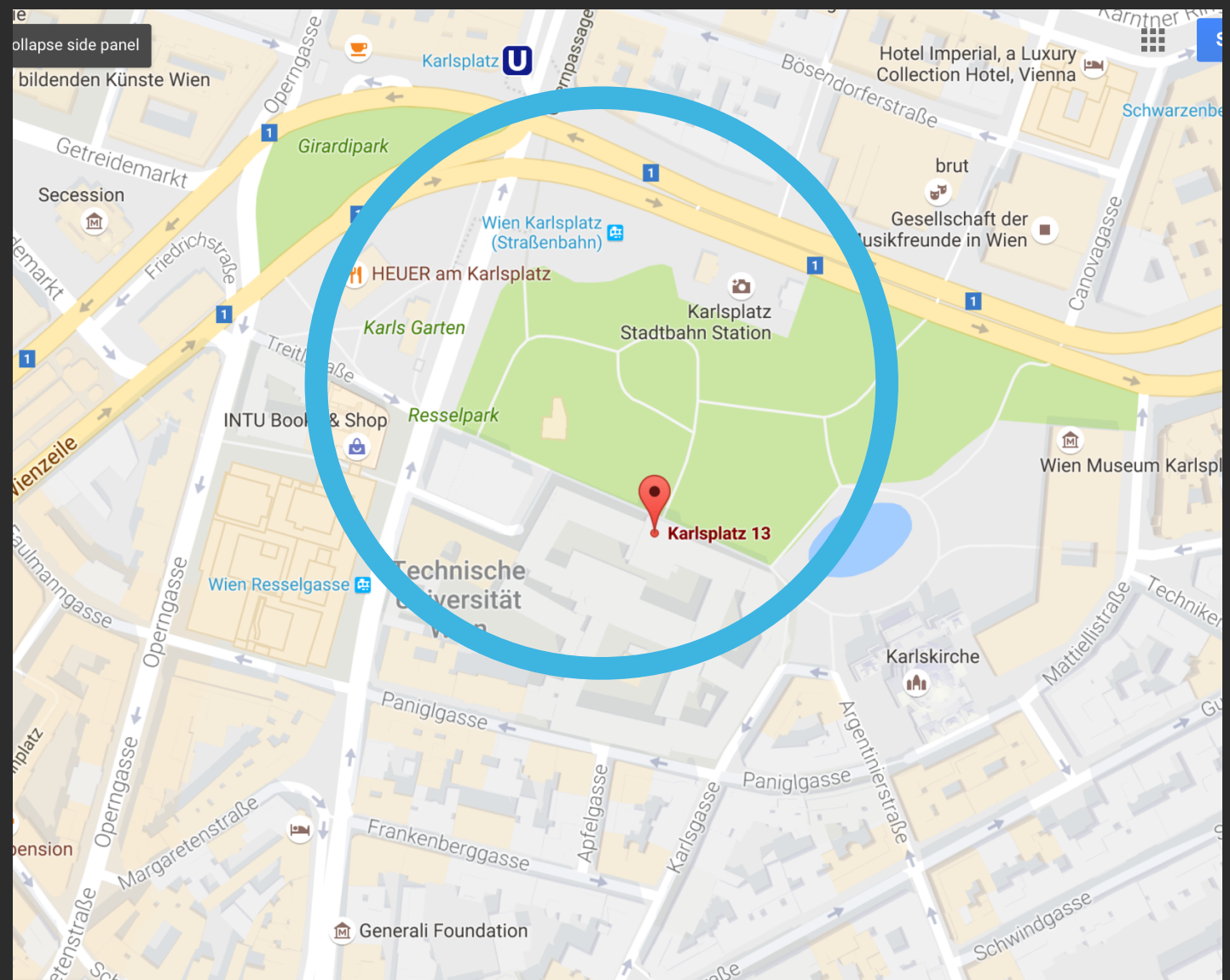
## TEMPORAL EPHEMERALITY

- ▶ consider how long location information is stored
- ▶ expiration time & discarding
- ▶ no future attack
- ▶ better protecting the location privacy

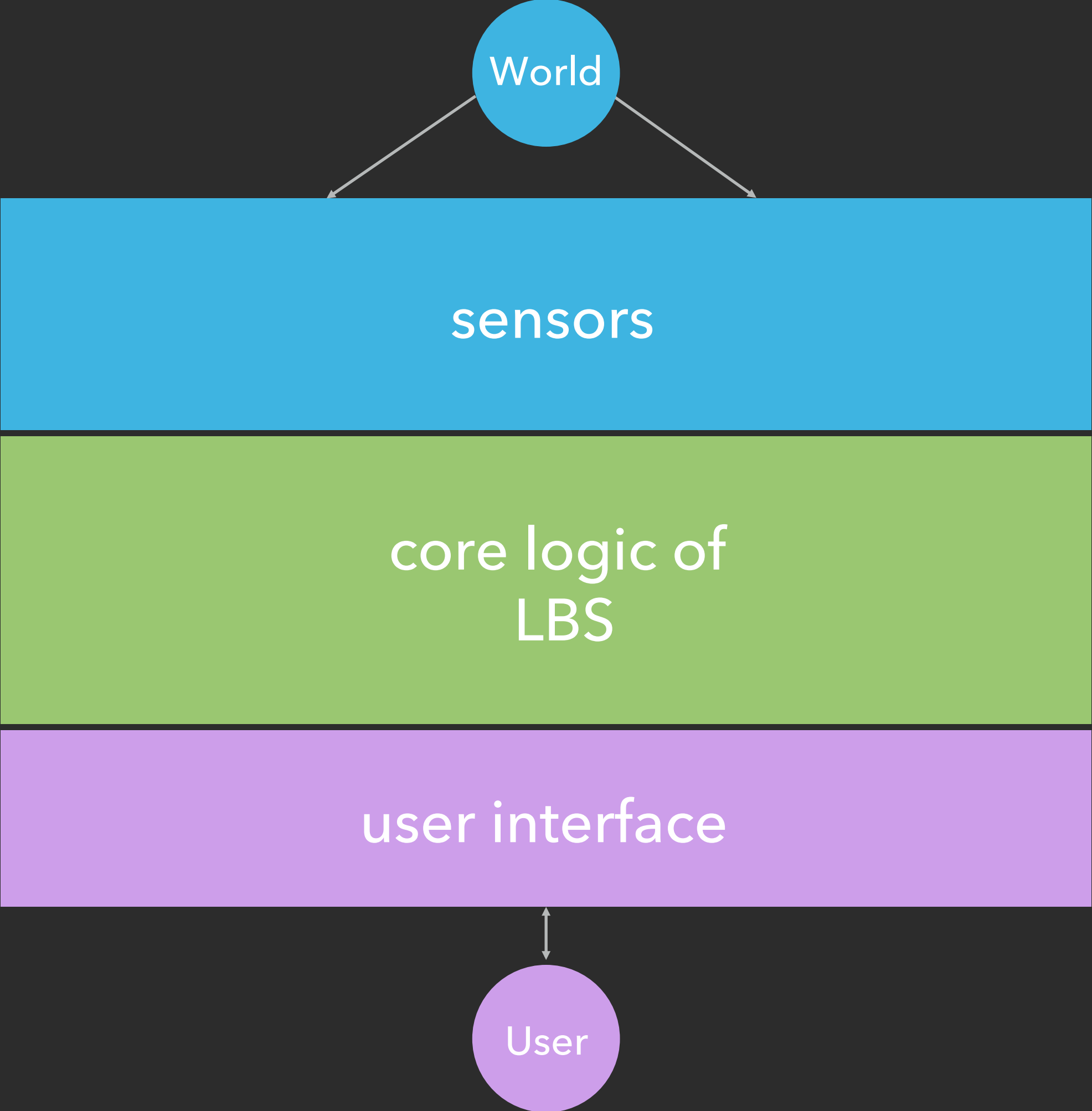


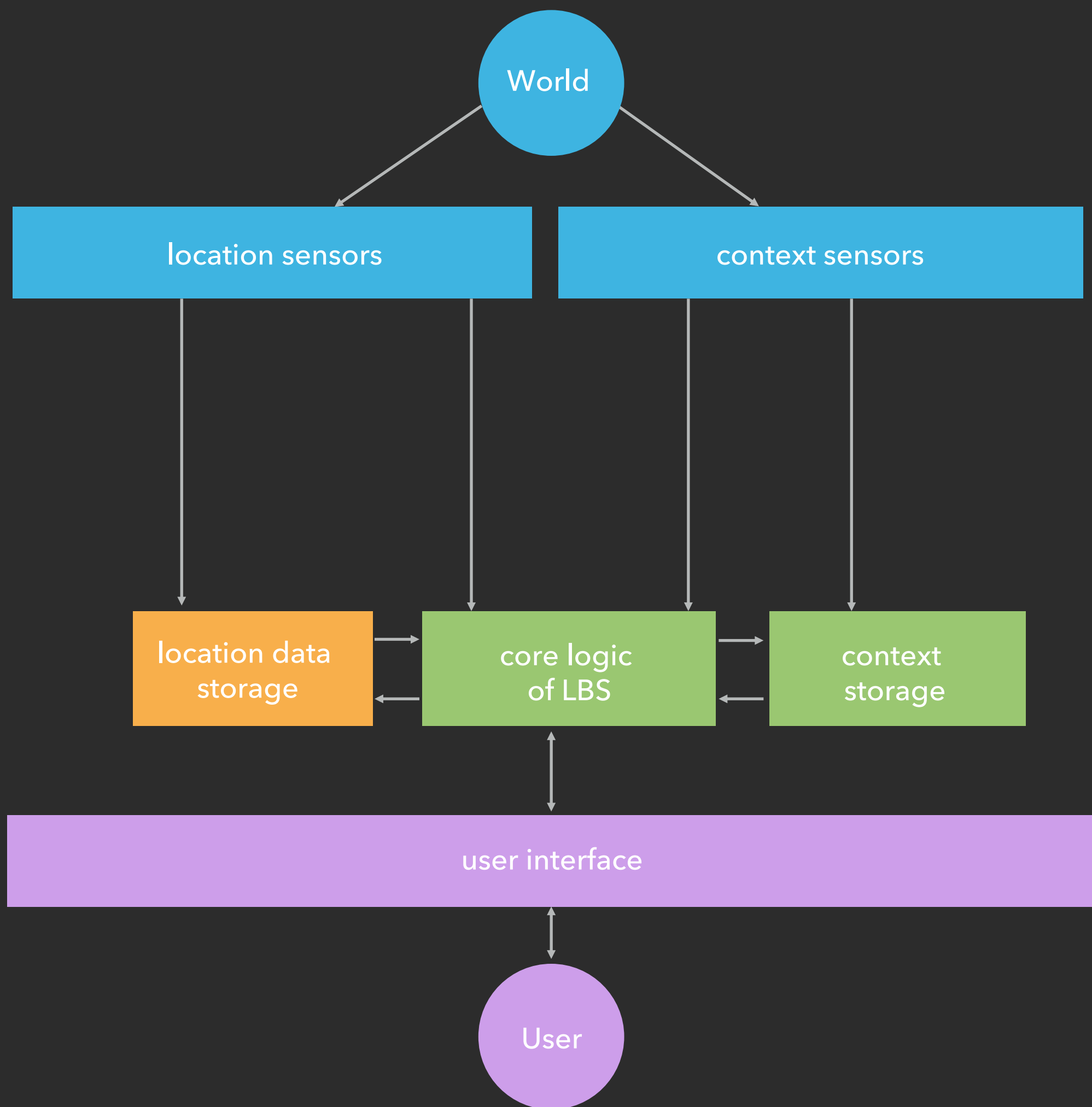
## SPATIAL EPHEMERALITY

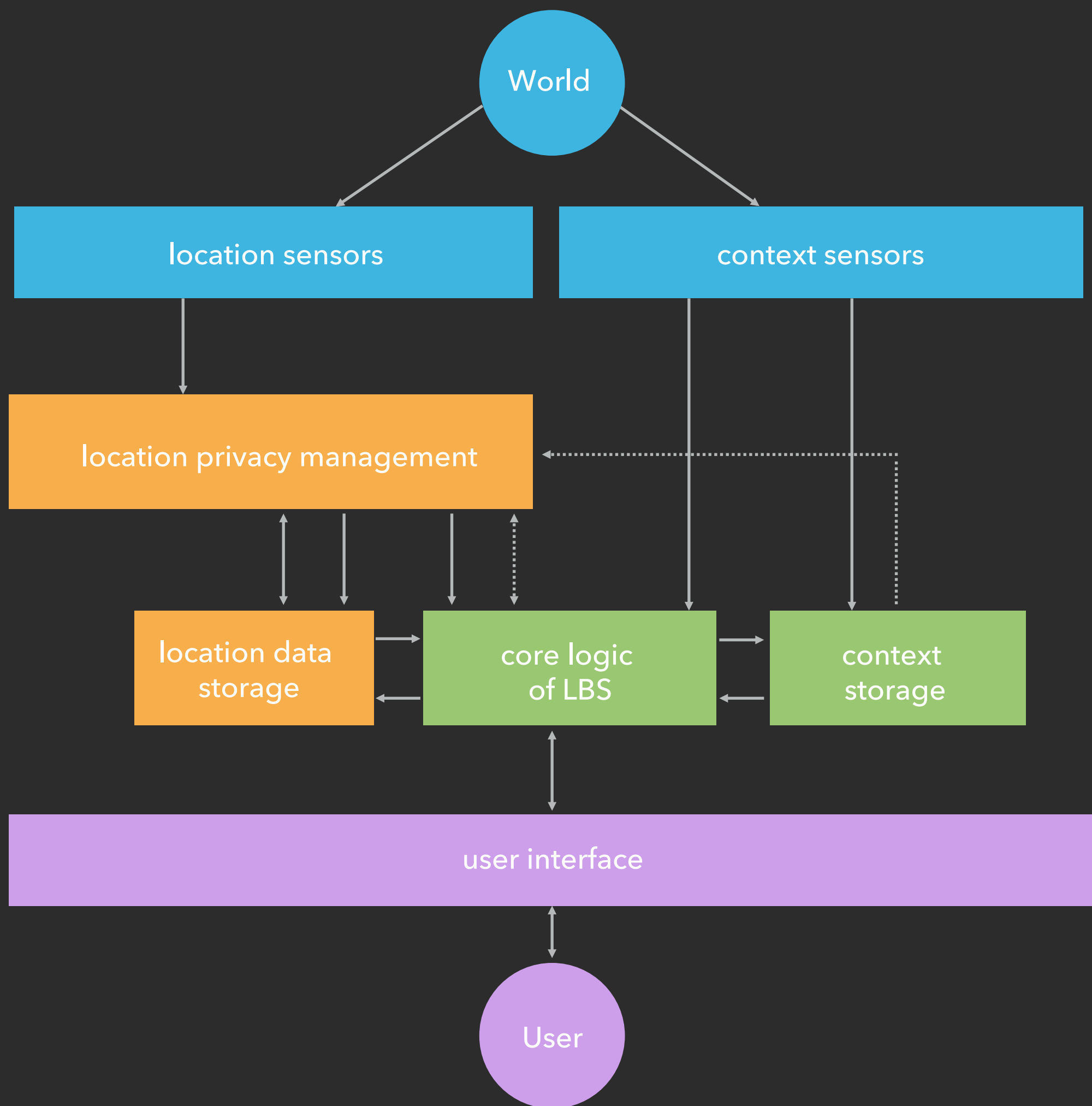
- ▶ where location information is stored
- ▶ well-defined spatial area
- ▶ needs the presence of attackers or their proxies



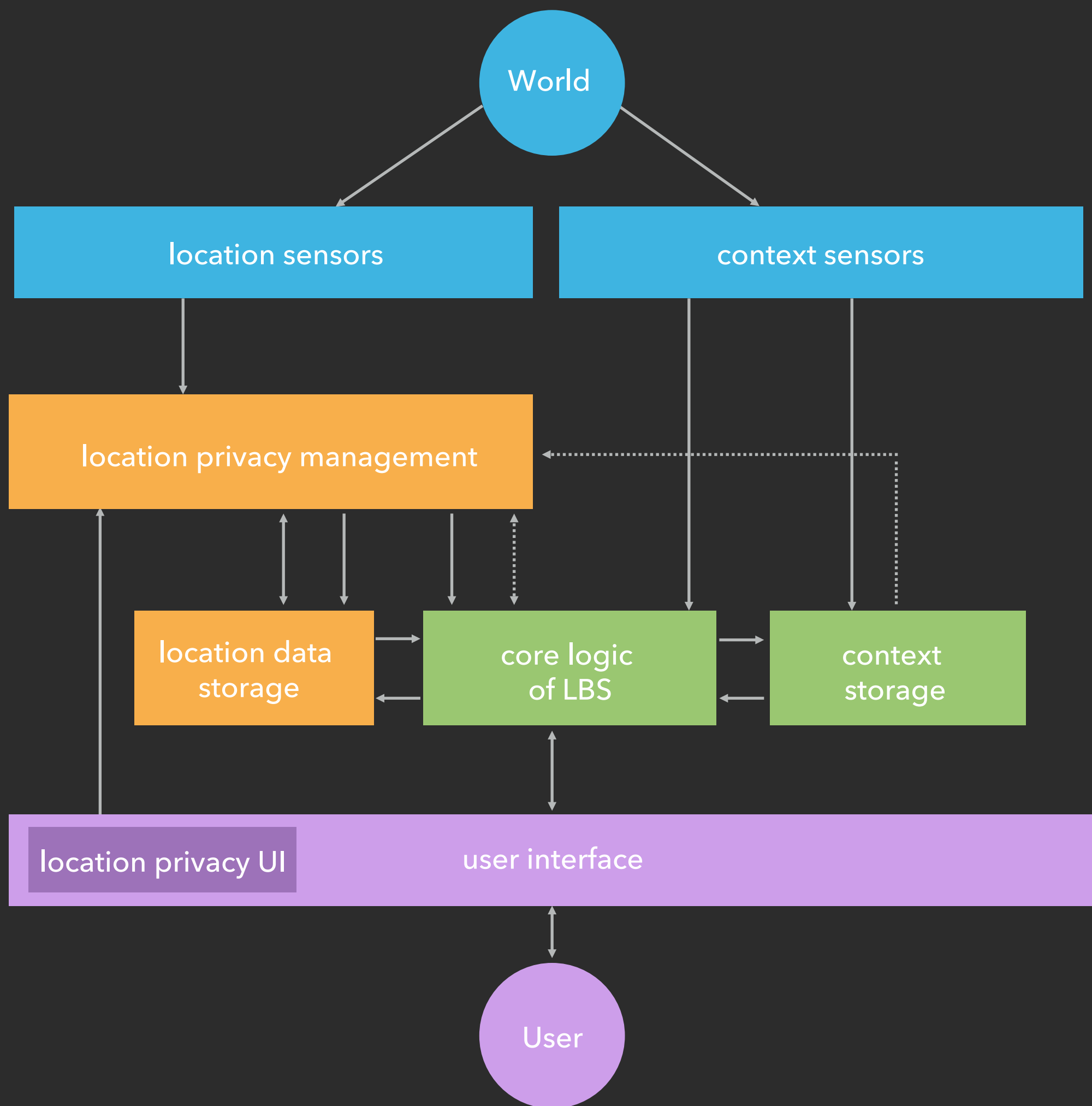


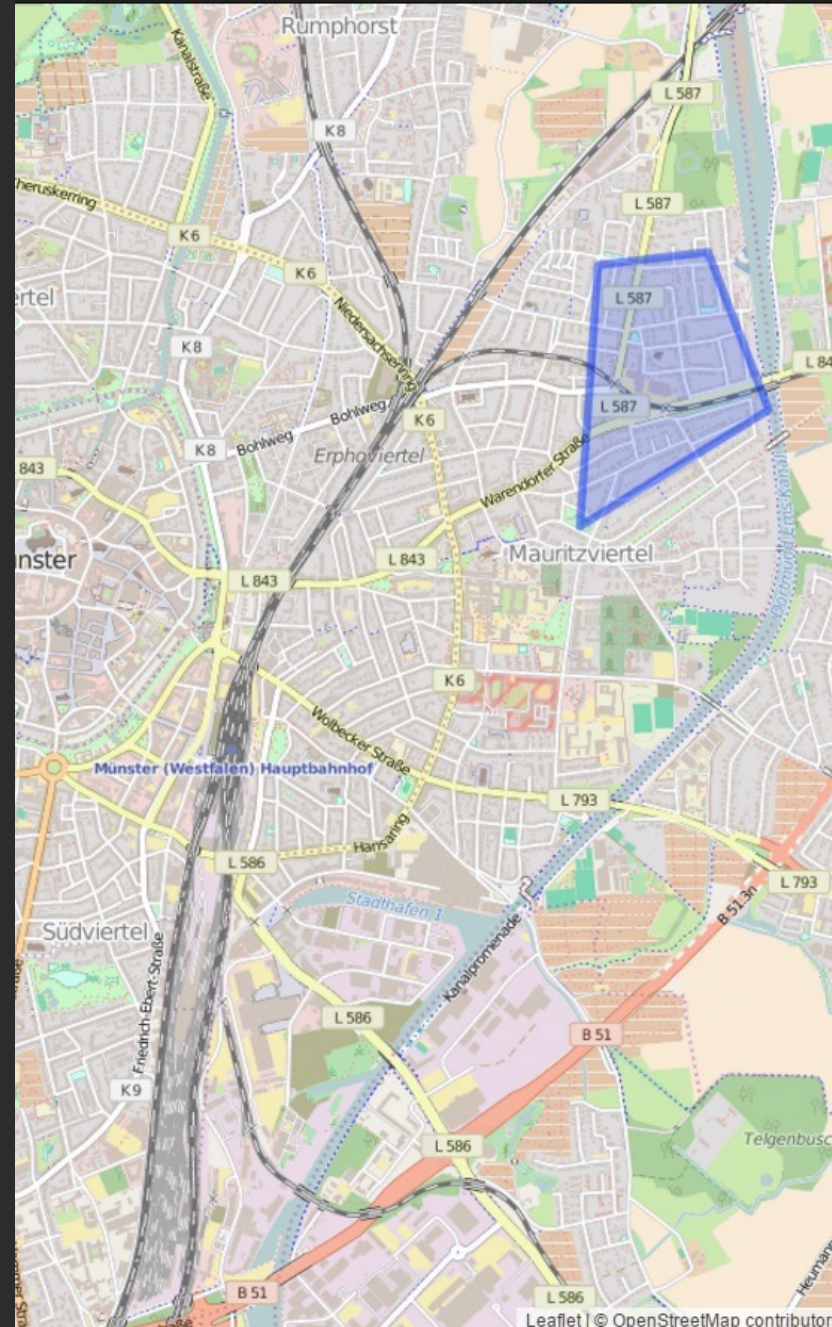












Find help in the bar above!

## pros

## cons

increases the control over user's location privacy

challenges advance analysis

flexible to combine with other methods

business related implication

no modification

negative effect on commercial values

would **users** be willing to **pay** for a service with  
increased **privacy** to compensate for reduced  
revenues of **service providers?**

## CONCLUSIONS

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- ▶ model supports the realisation of different privacy protection mechanisms and enables an explicit and fine-grained control of location data management in the context of privacy preservation

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- ▶ role of location data management in the context of privacy preservation
- ▶ concept of temporal and spatial ephemerality as a means to improve location privacy in the context of a location-based service
- ▶ model supports the realisation of different privacy protection mechanisms and enables an explicit and fine-grained control of location data management in the context of privacy preservation

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THANK YOU!

# IMAGE SOURCES

- ▶ Icons made by <[www.flaticon.com](http://www.flaticon.com)>
- ▶ [http://litstack.com/wp-content/uploads/2013/06/1984\\_poster.jpg](http://litstack.com/wp-content/uploads/2013/06/1984_poster.jpg)
- ▶ <http://weeksmd.com/2016/02/where-do-you-keep-your-cell-phone/>
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