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# Tracking People: Technical Challenges

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# Challenges



**“Tracking” isn’t a single technology:**

**Locating a Device**

**Locating a Person** – if it’s a person you’re after.

**Transmitting and Storing Location Details** – infrastructure!

**Providing Response** – since you track for a reason!

# Challenges



**“Tracking” isn’t a single technology:**

**Locating a Device**

Mobile Networks

WiFi

RFID

GNSS

**Locating a Person**

Attached to Device

Biometrics

Face Recognition

Gait Recognition

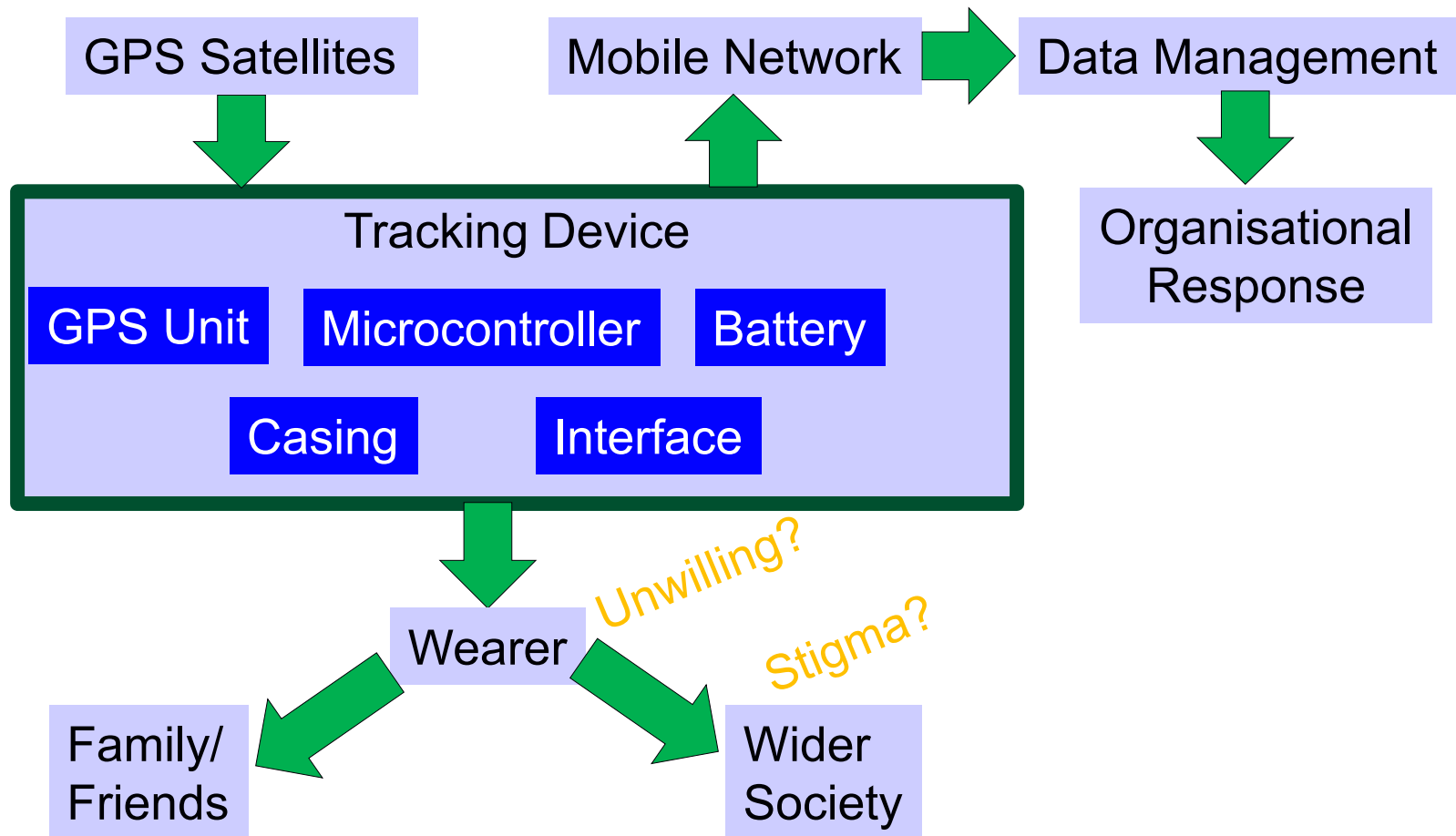
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# Challenges

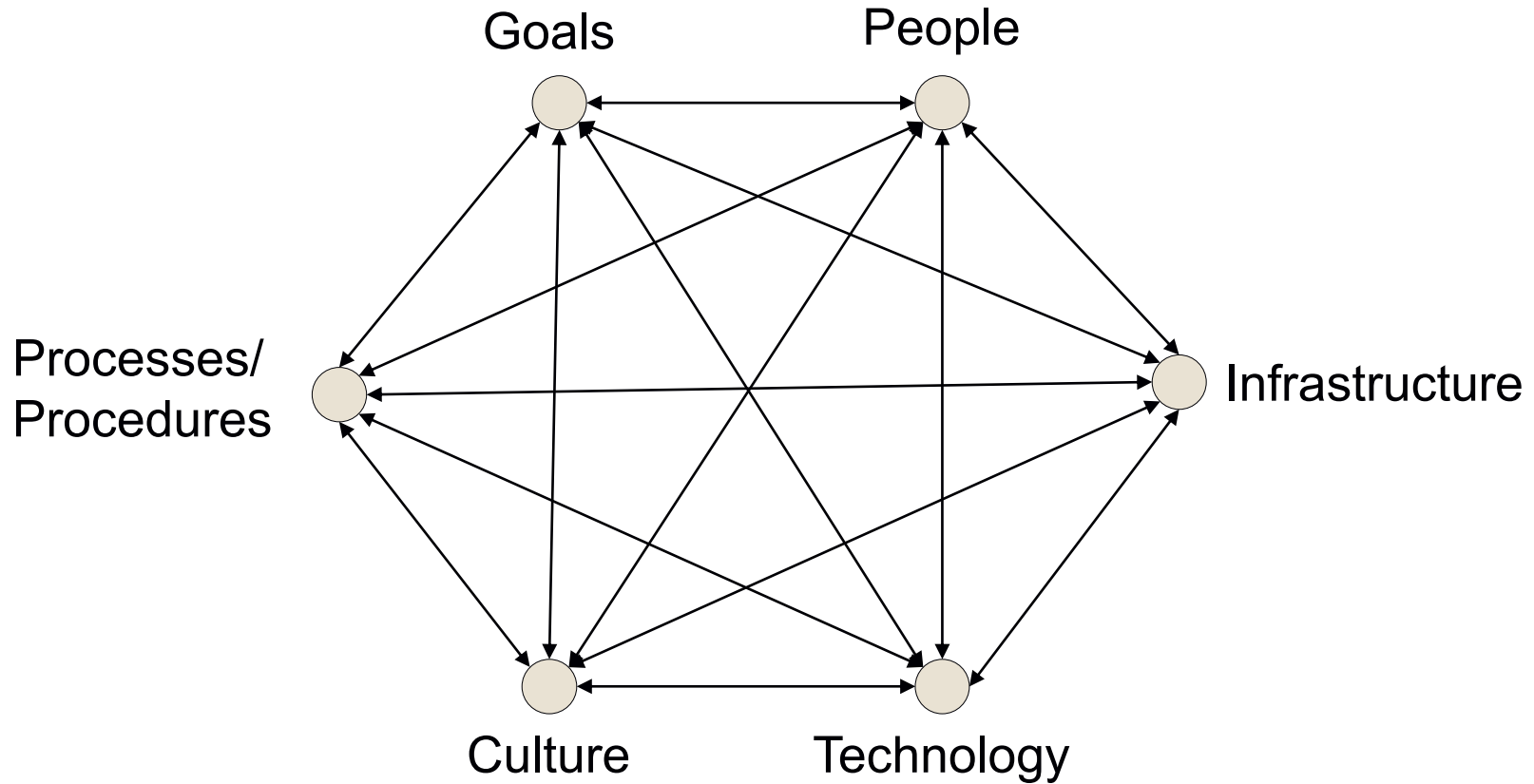


## Tracking Technologies Exist in Complex and Dynamic Systems



# Challenges

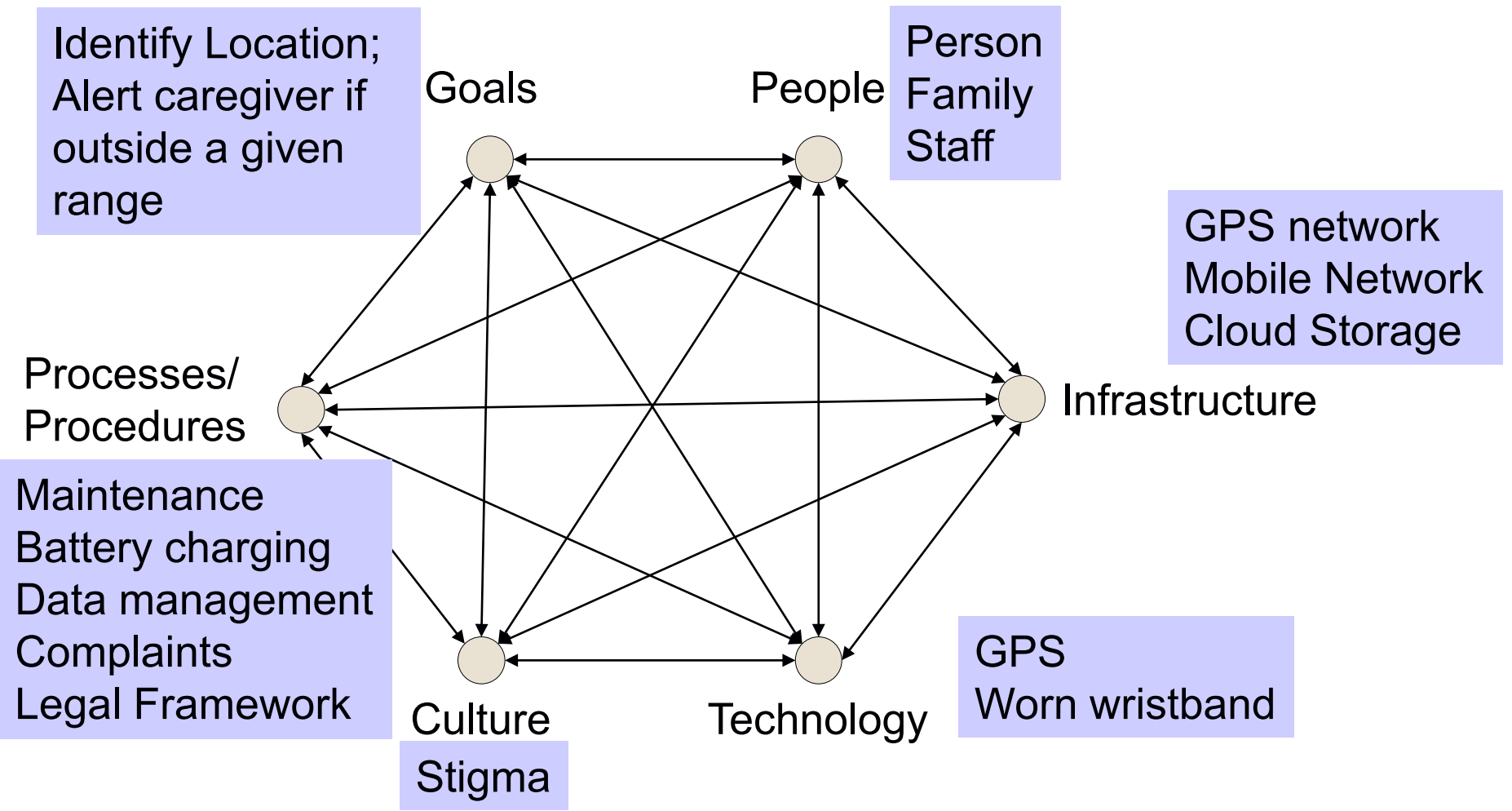
## Tracking is Sociotechnical:



Challenger R.& Clegg CW (2011) Crowd disasters: a socio-technical systems perspective  
Contemporary Social Science 6(3)

# Challenges

## Tracking is Sociotechnical:



# Challenges

**Tracking Systems exist at the boundaries of several complex Interacting technical and social domains.**

Part of the challenge is how to manage that complexity and the (conflicting) needs of different stakeholders.

Difficult to talk generally.

# Challenges

## **Ergonomics/Human Factors:**

Need to fit different body types and sizes.

Not just physical – convenience, fit with social situation and relationships.

Improve compliance: uncomfortable/inconvenient tracking is an incentive to remove.

Trades off with functionality and power source.



# Challenges

## **Data Security:**

Who owns the data – practically, as well as legally?

Use of “internet of things” makes hacking more significant (e.g. Spiral Toys, Baby monitors)

How do we ensure data isn't accessed by outside parties?

Do users know what data might be stored?

# Challenges

## **Spatial Resolution:**

Location algorithms and technologies are improving, but they are still a “best guess” – some uncertainty.

How “imprecise” is acceptable?

How confident must we be with judgement?

# Challenges

## **Temporal Resolution:**

How often does location need to be communicated to the system? Once an hour? Every second?

Trade-off with battery life.

# Challenges

## **Black Box Algorithms:**

Machine Learning and predictions often lack transparency.

Not clear how a result was arrived at, or when an error has been made.

Difficult to critique: do users understand?

# Challenges

## **Infrastructure and Organisational Systems:**

The technology is only as useful as the system set up to use and maintain it.

Who keeps device in order?

The organisational response needs to be appropriate to the technology

Tracking is redundant if it lacks purpose.

# Challenges

## **Colingridge's Dilemma:**

When a system is being developed and (relatively!) easy to change, its consequences are uncertain.

Once the system is in use and its consequences become clear, it is very difficult to change.