

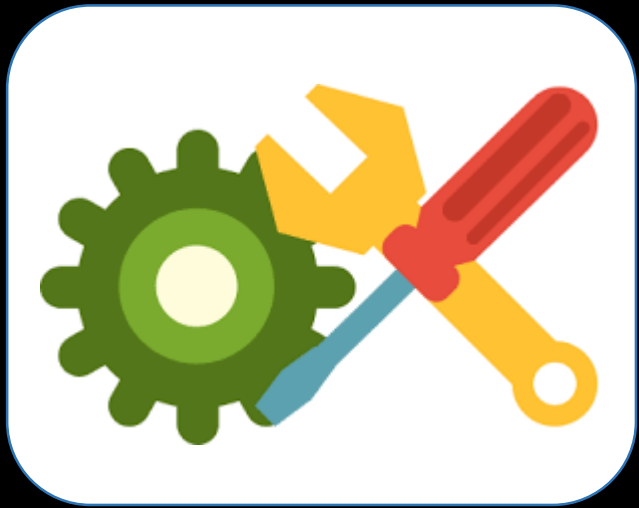
# Water Math Delivery: Experiment X





Why?

Delivery



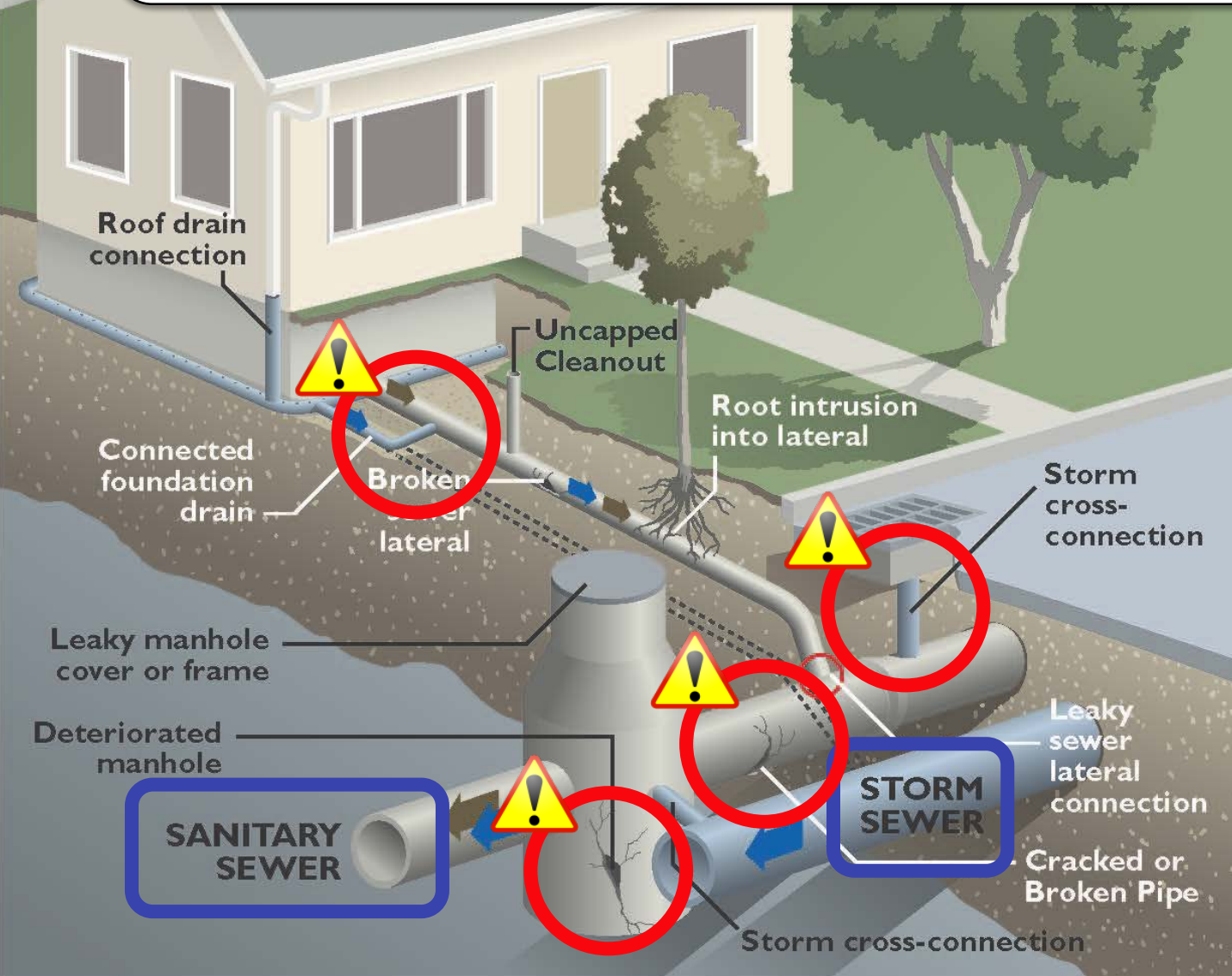






# Experiment X

# Inflow and Infiltration into Sanitary Sewers



## Problem:

- energy (pumping & treatment)
- pollution
- sewer backups

## Investment challenge:

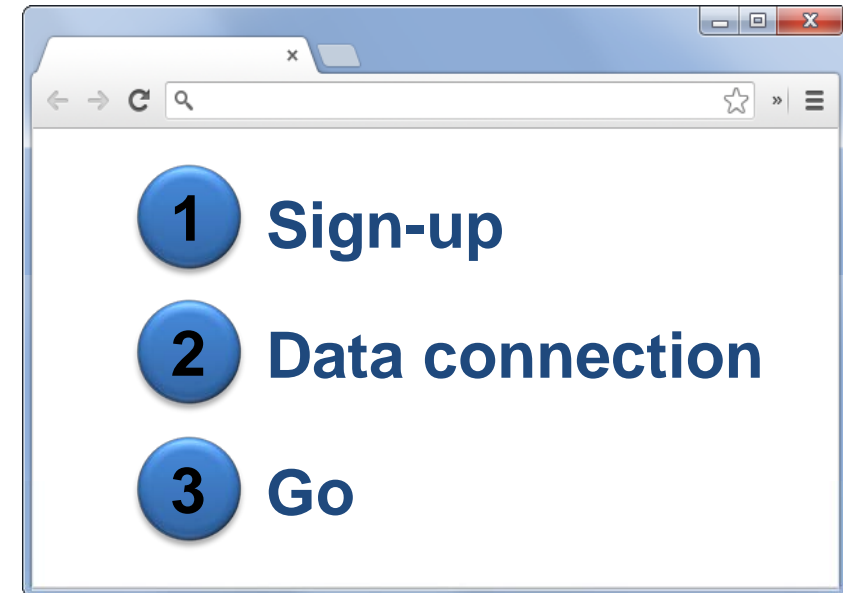
- Where?
- How much?
- Peak or volume?
- Investment impact?

# Infiltration



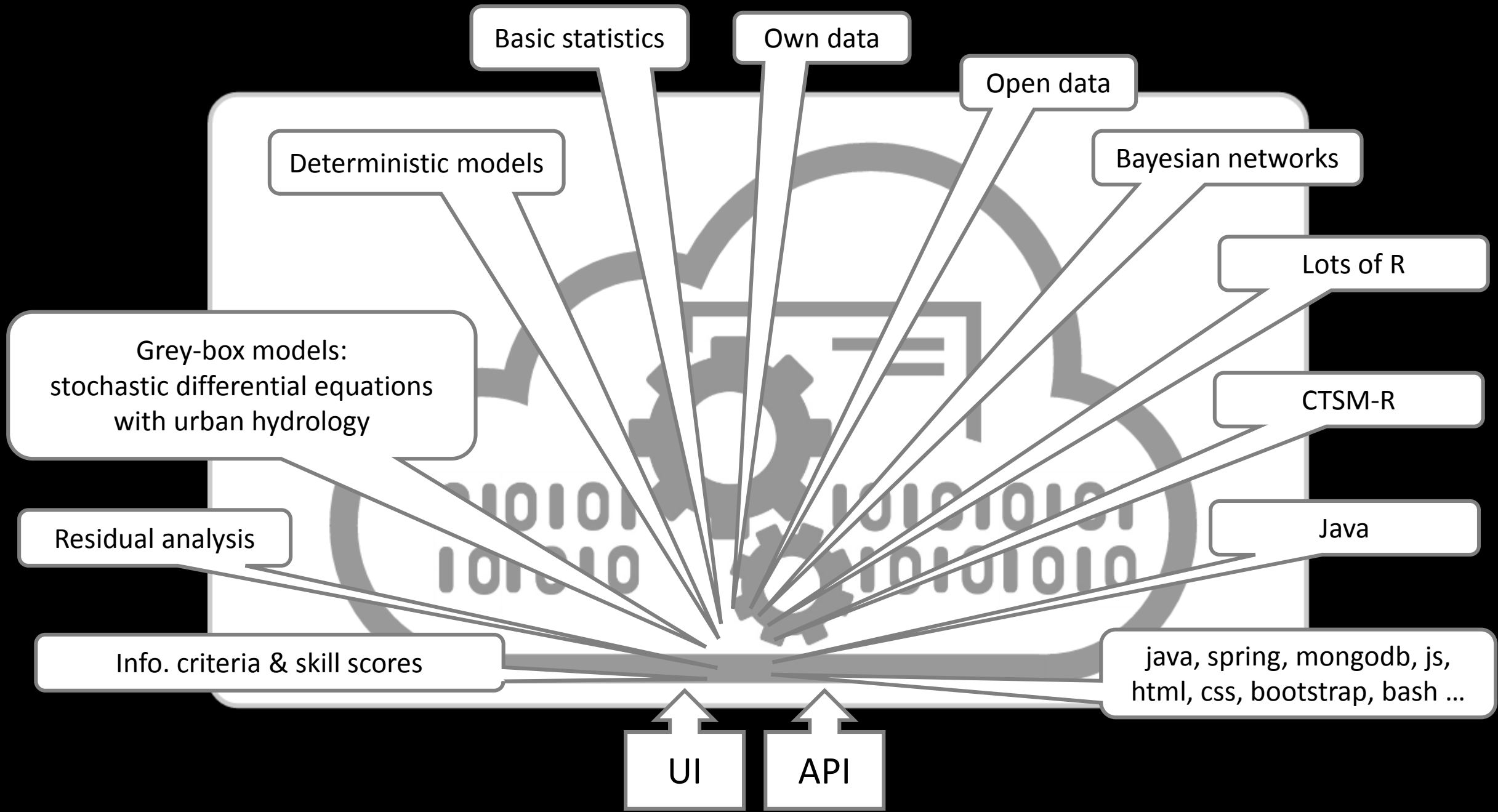
0001.2μm

# Today's Inflow and Infiltration Studies



- ▶ Continuous updates
- ▶ Monthly reports





Basic statistics

Own data

Open data

Deterministic models

Bayesian networks

Grey-box models:  
stochastic differential equations  
with urban hydrology

Lots of R

CTSM-R

Residual analysis

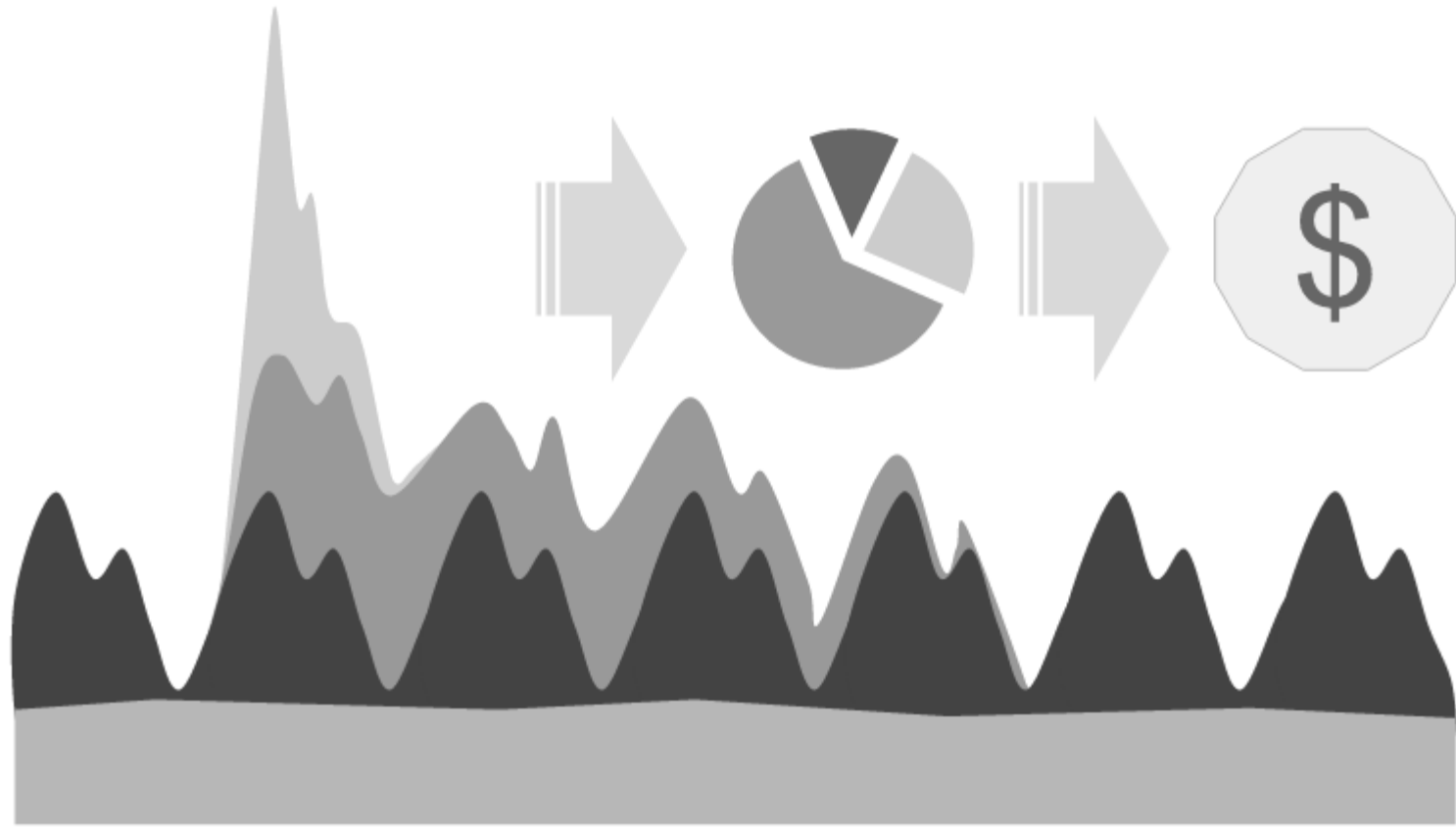
Java

Info. criteria & skill scores

java, spring, mongodb, js,  
html, css, bootstrap, bash ...

UI

API







# Riding waves

Smart Water  
Management

20%  
pa.

Government  
Cloud (US)

45%  
pa.

Internet of  
Things

4%  
pa.

Big-Data

26%  
pa.

Sensors

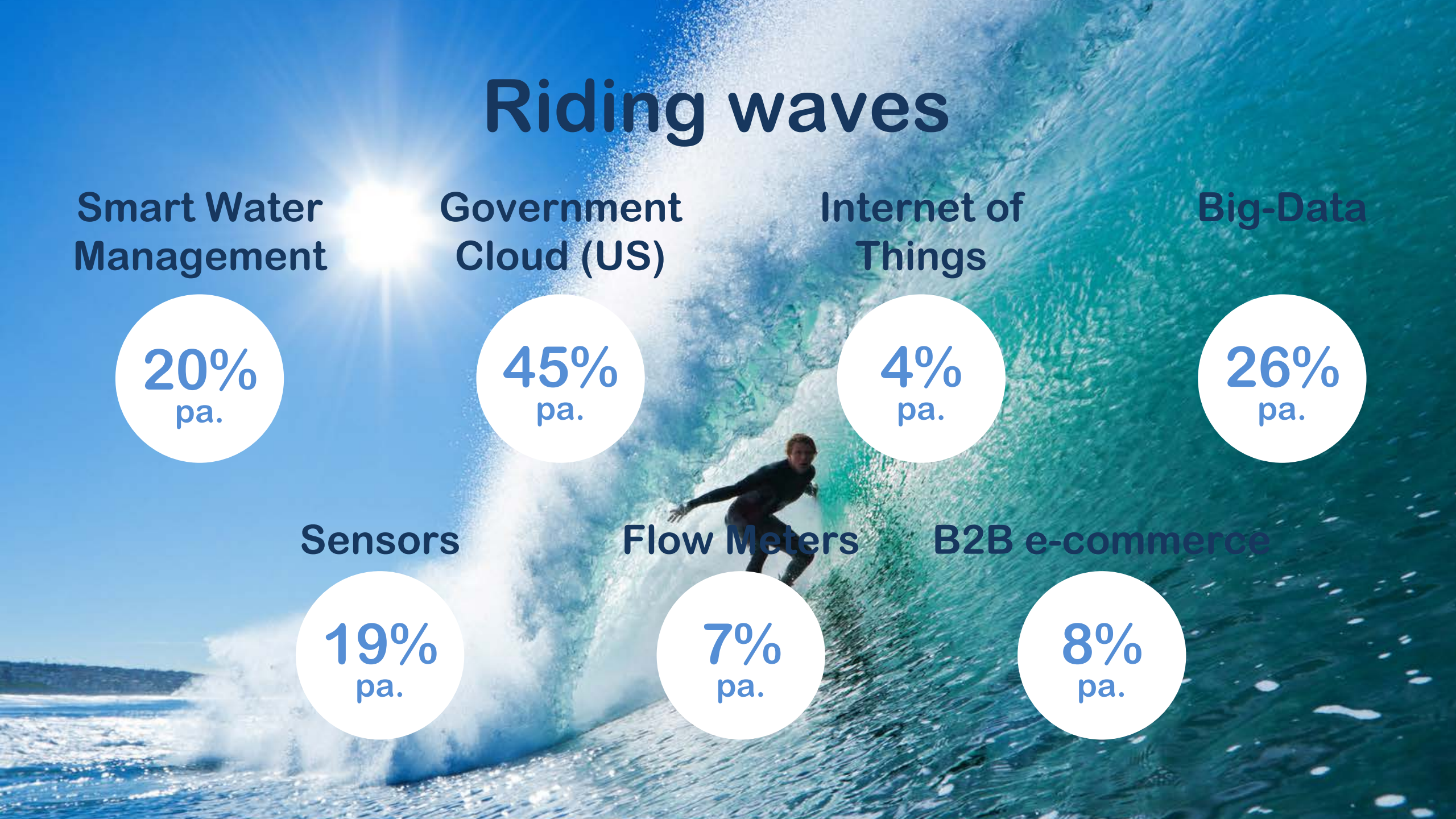
19%  
pa.

Flow Meters

7%  
pa.

B2B e-commerce

8%  
pa.





Thanks and any questions?

