



# Thing-sourcing

## First approach



# What is thing-sourcing?

# 0

“

*Taking a function once performed by employees and outsourcing it to an undefined network of people in the form of an open call*<sup>[1]</sup>

## Crowdsourcing

[1] Howe J., Robinson M, *Wired*, June 2006



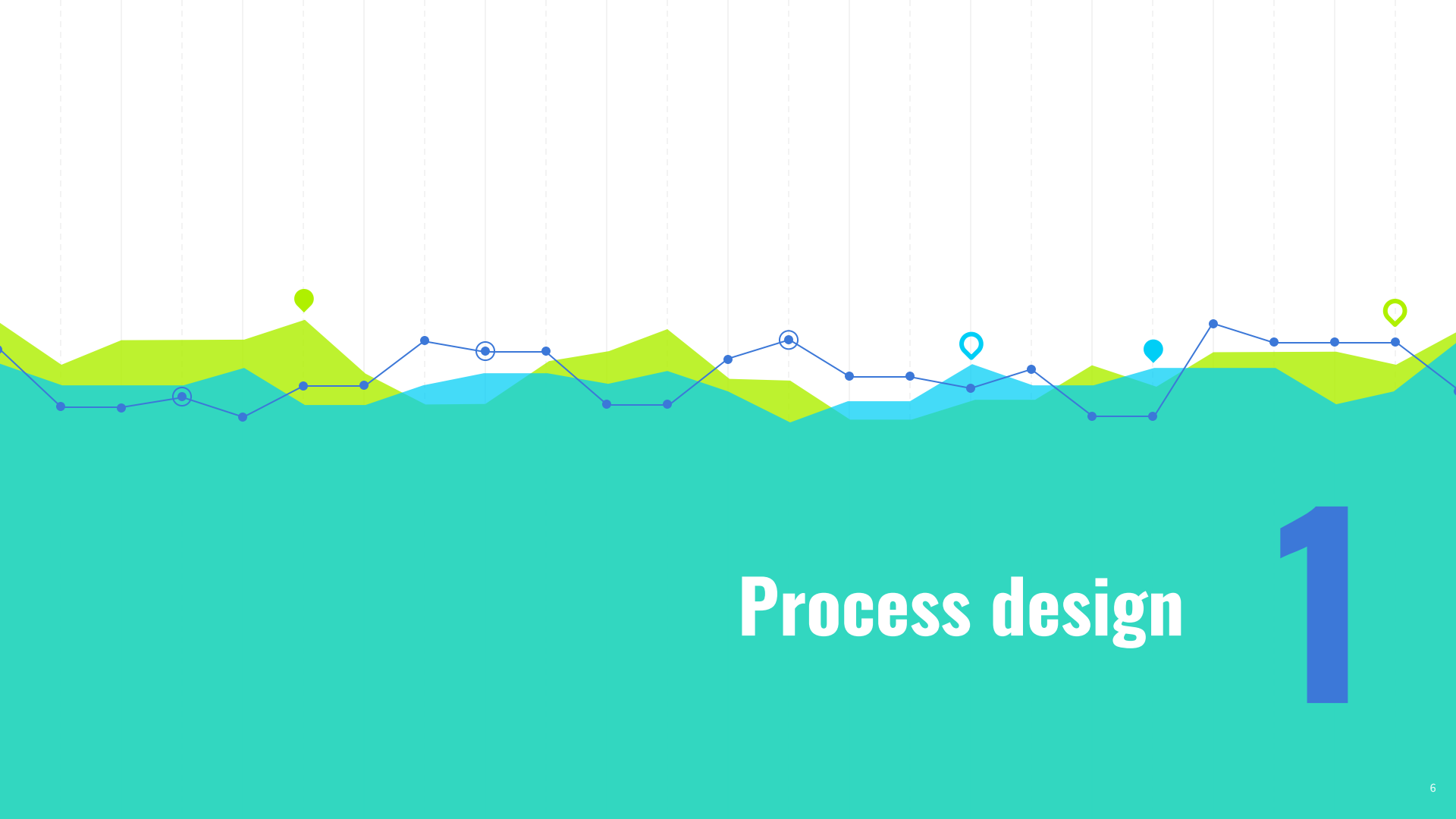


“

*Taking a function once performed by employees and outsourcing it to an undefined **collaborative** network of people **and things** in the form of an open call*

**Thing-sourcing**

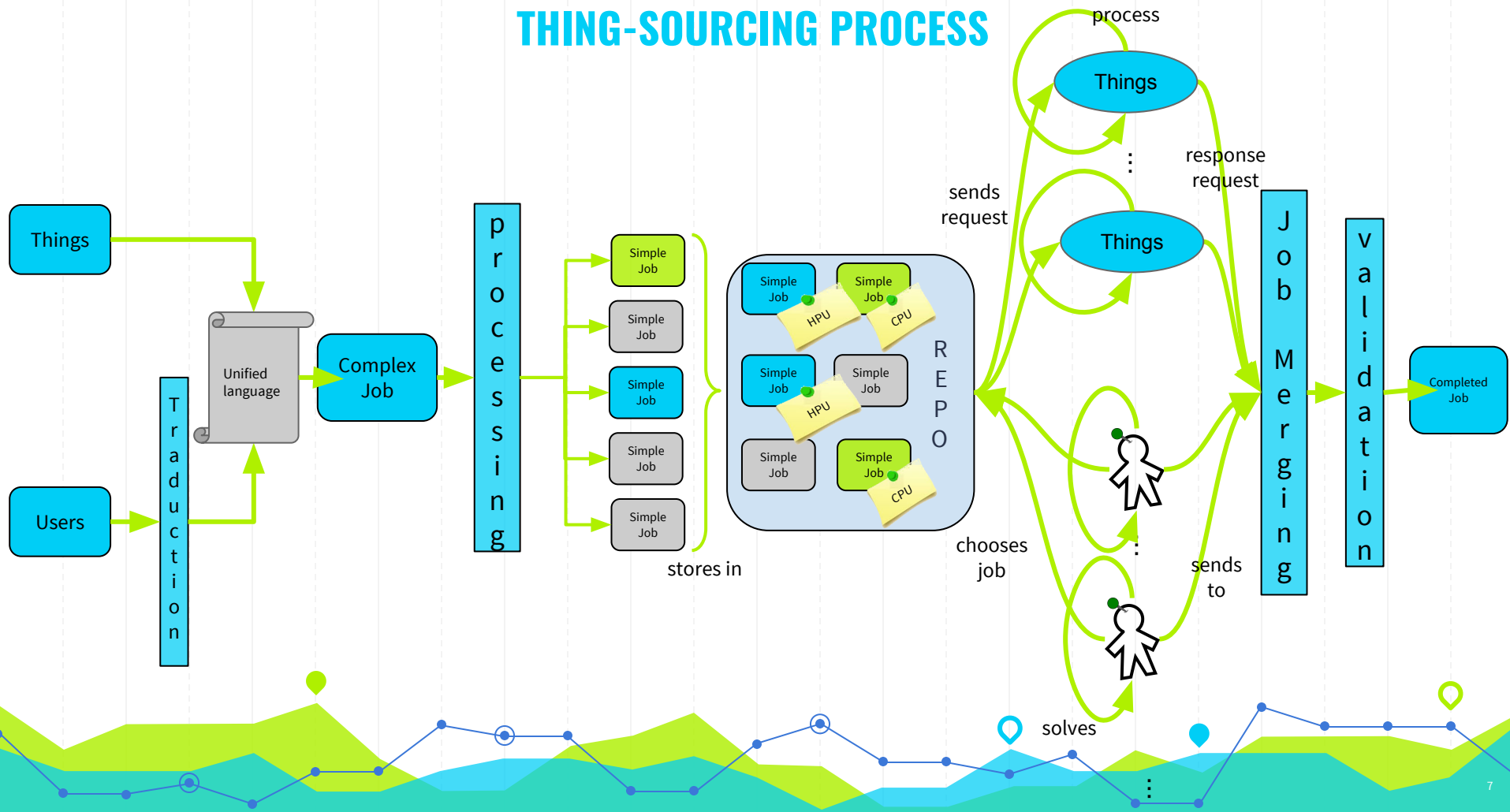




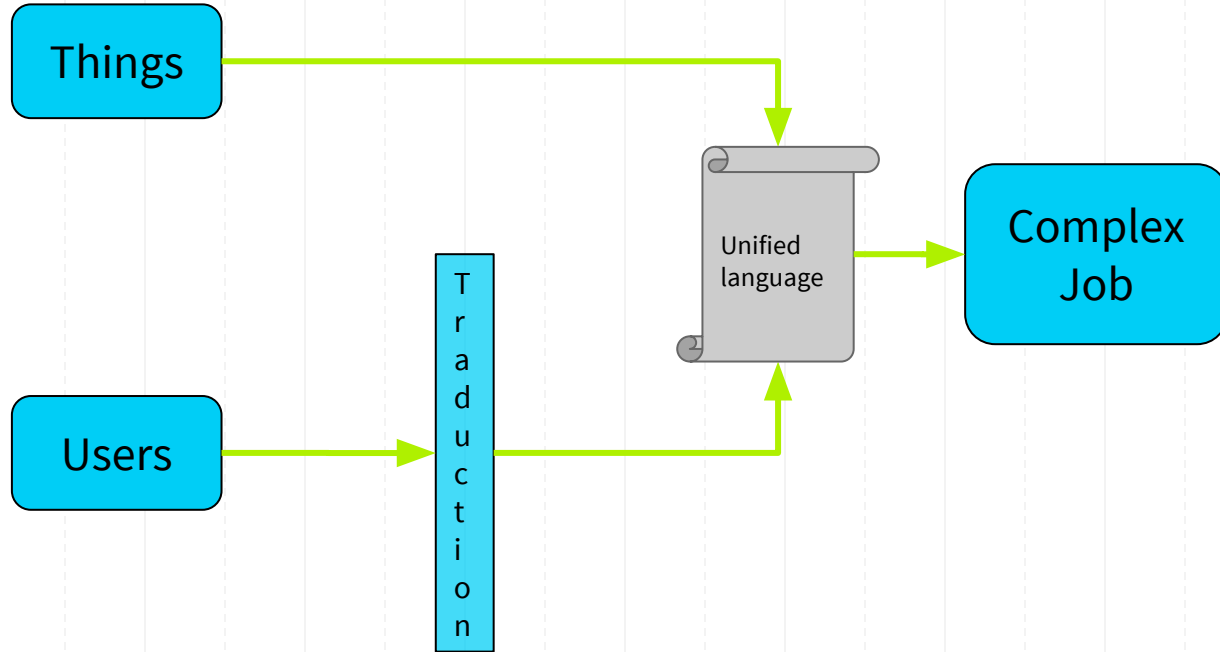
# Process design

1

# THING-SOURCING PROCESS



# JOB DEFINITION





# REQUIREMENTS

## Sistema de traducción

- El usuario debe poder expresar sus peticiones en un lenguaje definido
- Debe traducirse a un lenguaje unificado

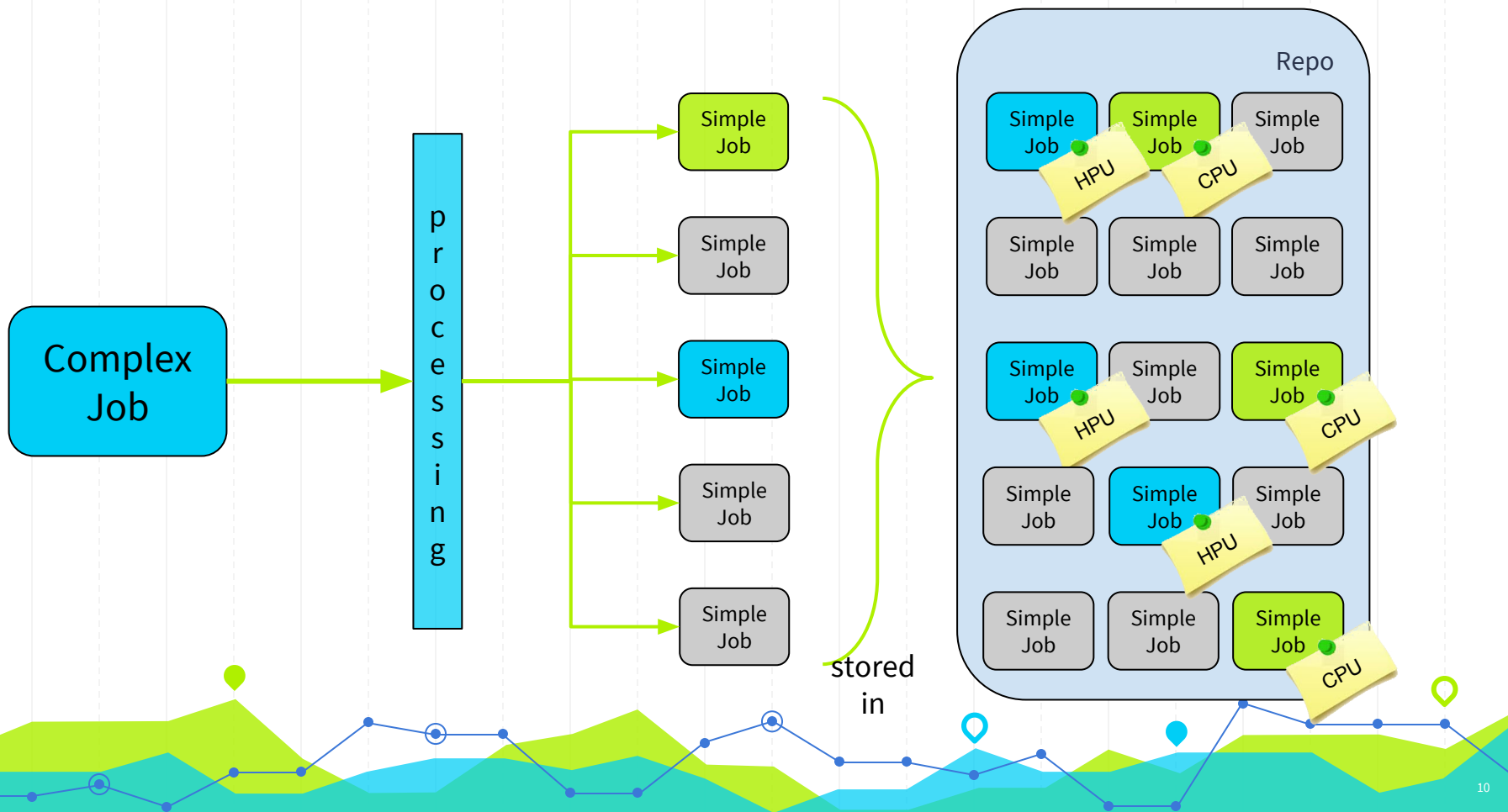
## Lenguaje unificado

- Permita especificar el objetivo
- Permita especificar los requisitos (capacidades, tiempo...)
- Permita especificar el resultado esperado

## Posibles enfoques

- Etiquetas
- Lenguaje de alto nivel
- Lenguaje natural
- Lenguaje de comunicación entre agentes (KQML)

# JOB PROCESSING



# REQUIREMENTS

## Job processing

- Clasificar tareas según criterios/requisitos
- Fragmentar las tareas complejas en tareas más simples
- Crear tareas de validación en función del tipo de tarea
- Identificar dependencias entre tareas

## Job repository

- Permitir accesos concurrentes
- Distribuida y escalable
- Heterogeneidad de datos

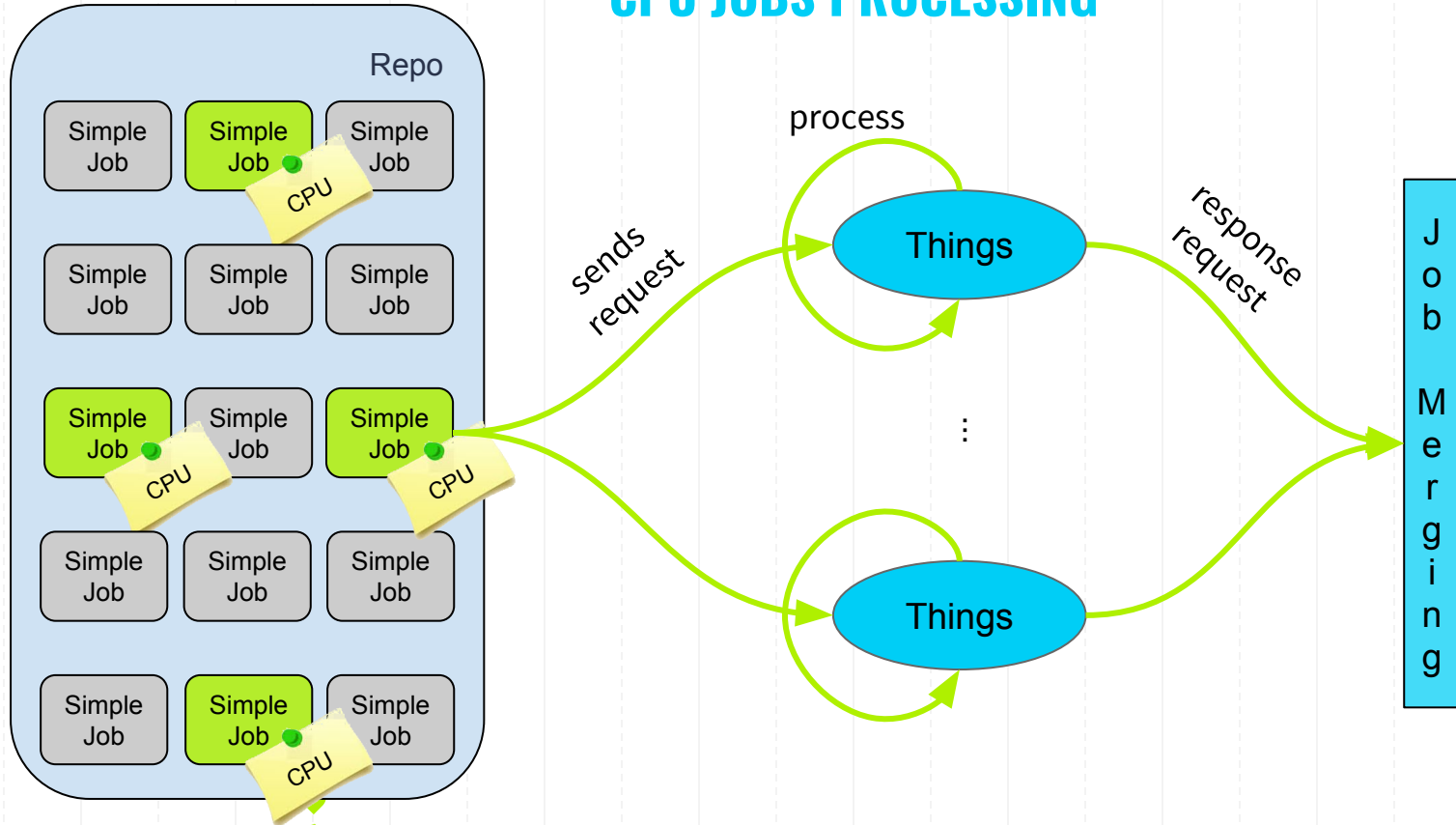
## Posibles enfoques

- Bases de datos No-SQL

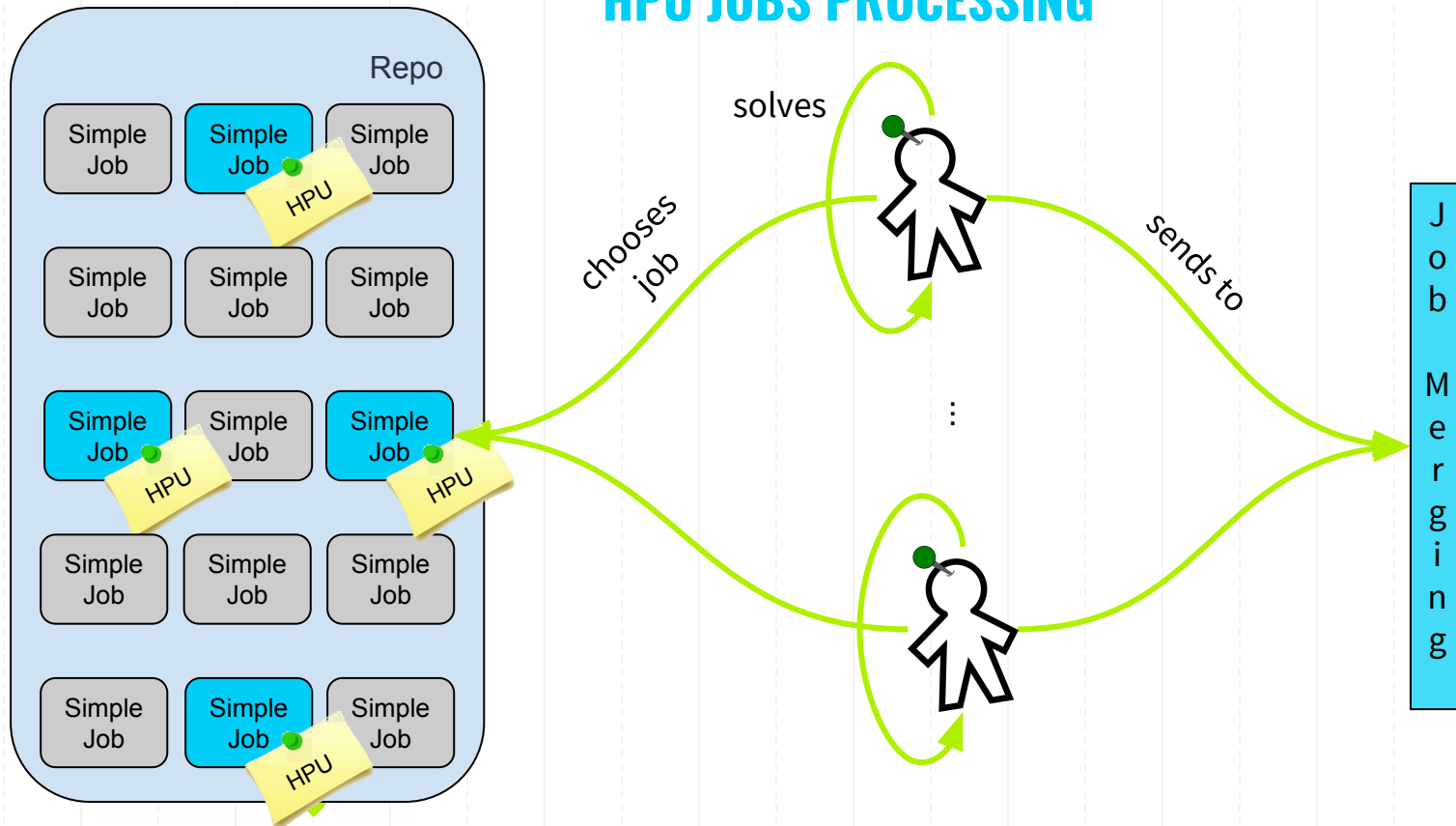
## Posibles enfoques

- Distinción entre HPU y CPU

# CPU JOBS PROCESSING



# HPU JOBS PROCESSING



# REQUIREMENTS

## Scheduler

- Enviar una tarea a diferentes *things*
- Proporcionar tareas para que puedan ser aceptadas por *workers* (HPU o CPU)
- Múltiples *workers* por tarea simple

## Posibles enfoques

- Comunicación entre *things* mediante protocolo unificado

## Job merging

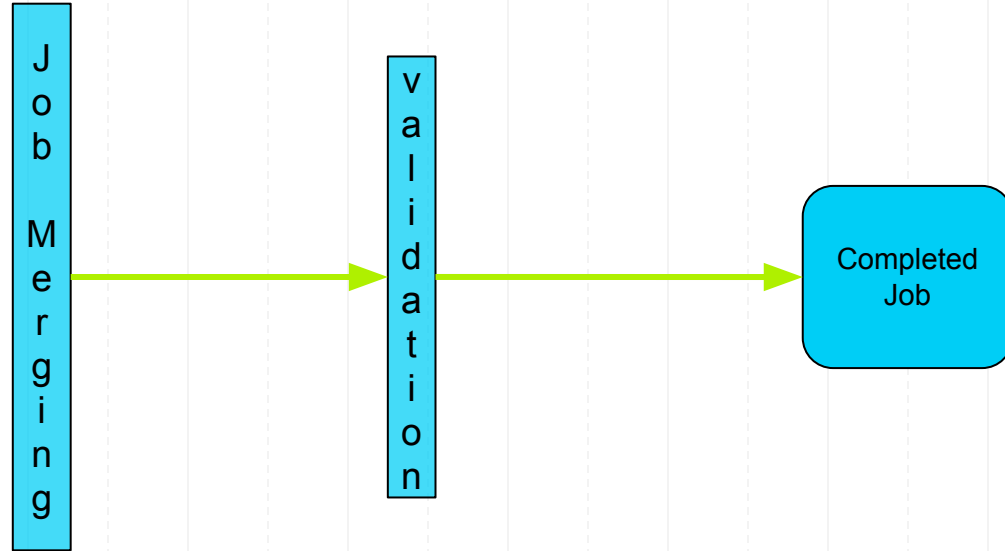
- Conocer las tareas simples de una tarea compleja
- Reconocer cuando una tarea está completada

## Posibles enfoques

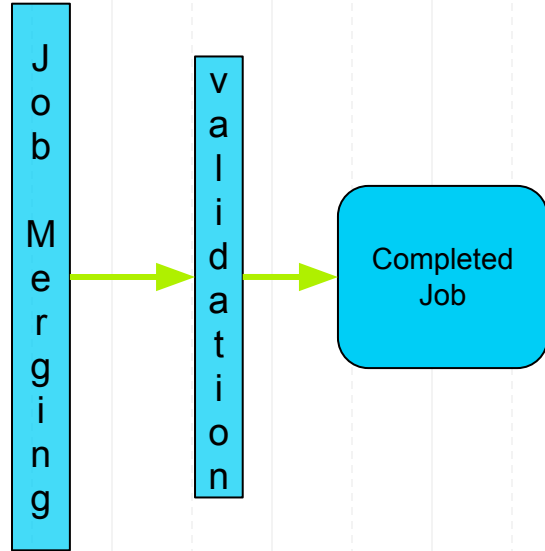
- *Topological sort*



# JOB VALIDATION



# REQUIREMENTS



## Validation

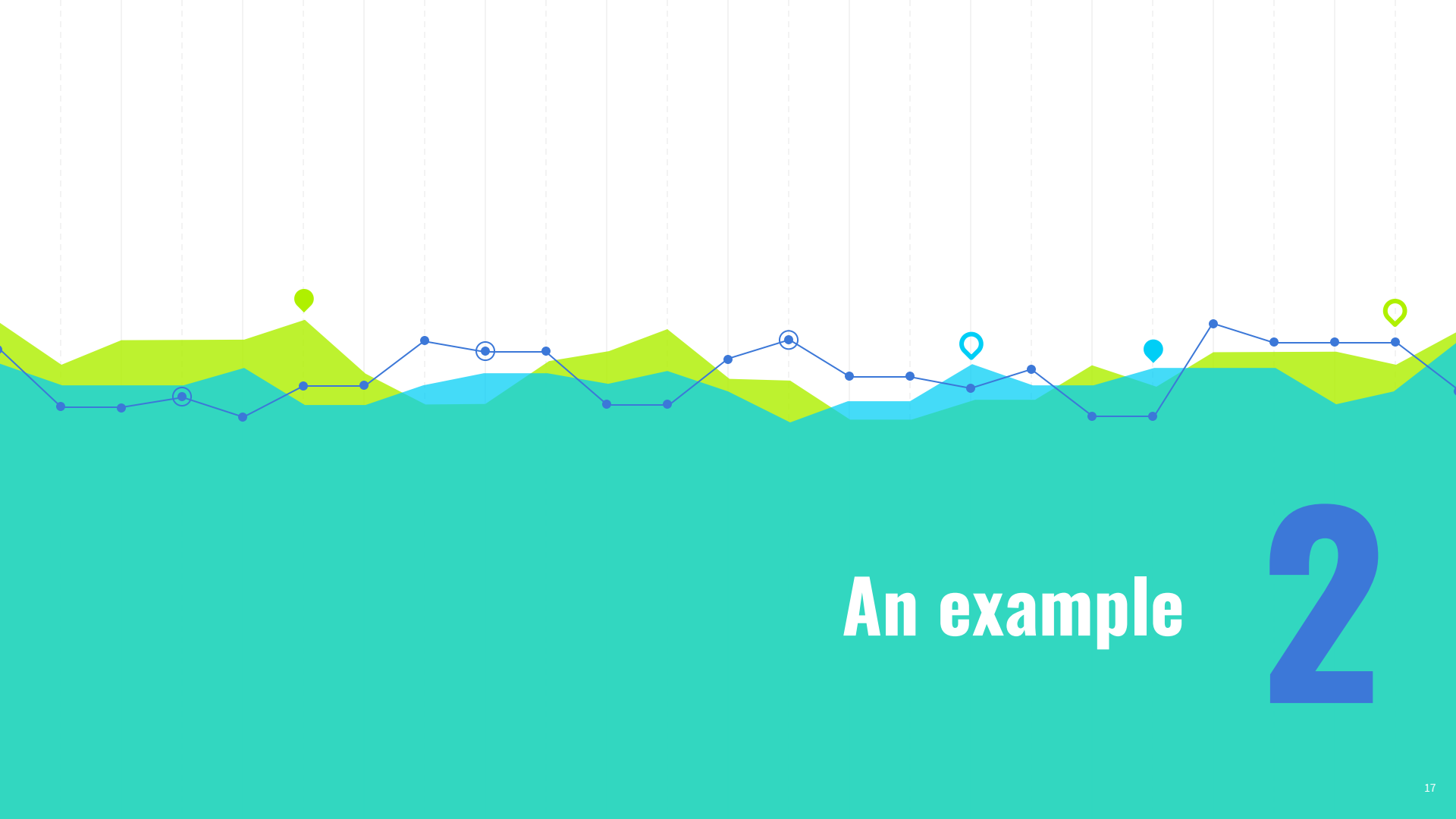
- Opcional
- ⚠ Fraude, bots etc

## Posibles enfoques

- *Confusion matrix* <sup>[2]</sup>
- *Escoger las respuestas redundantes como correctas.*

[2] Panagiotis G. Ipeirotis, Foster Provost, Jing Wang, *Quality Management on Amazon Mechanical Turk*. Fall 2012.  
[Available at:] <http://misrc.csom.umn.edu/workshops/2012/fall/Ipeirotis.pdf>





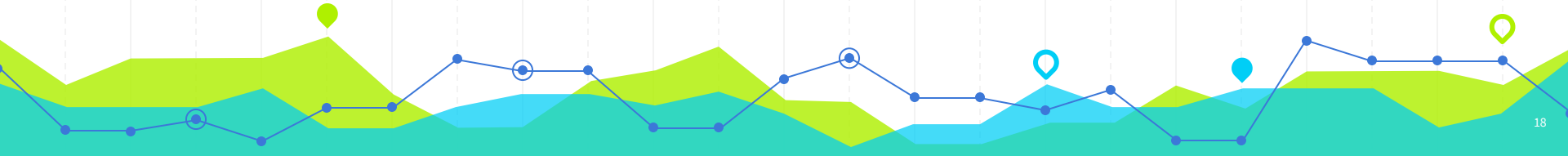
An example

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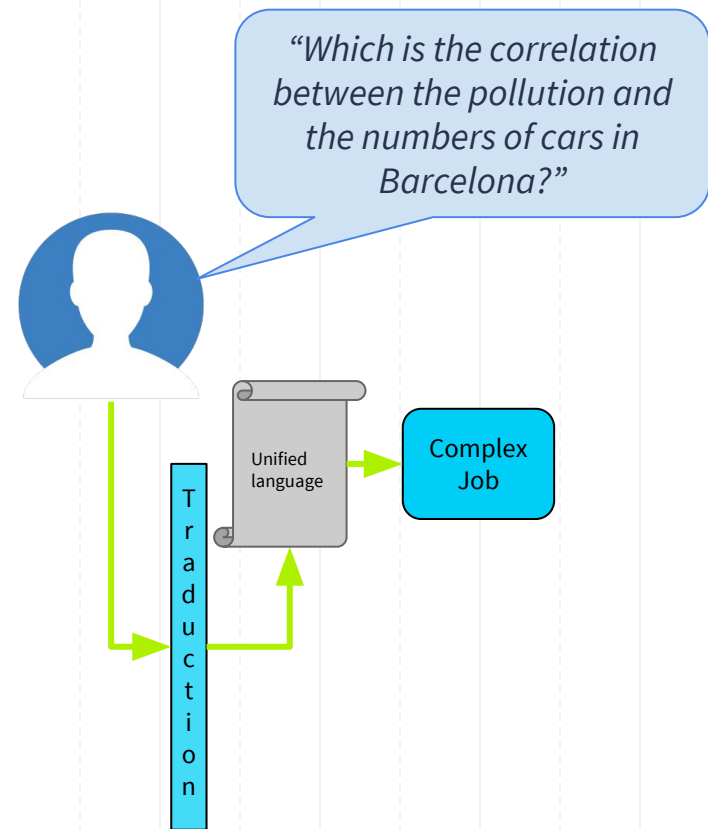
## EXAMPLE



*Which is the correlation between the pollution and the numbers of cars in X country?*



## EXAMPLE

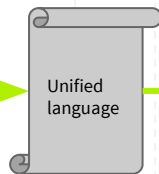


## EXAMPLE

*“Which is the correlation between the pollution and the numbers of cars in Barcelona?”*

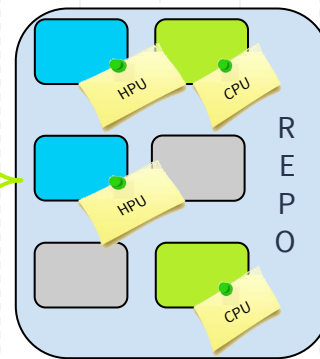
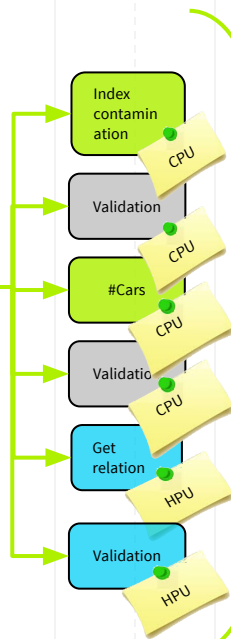


Translation



Complex Job

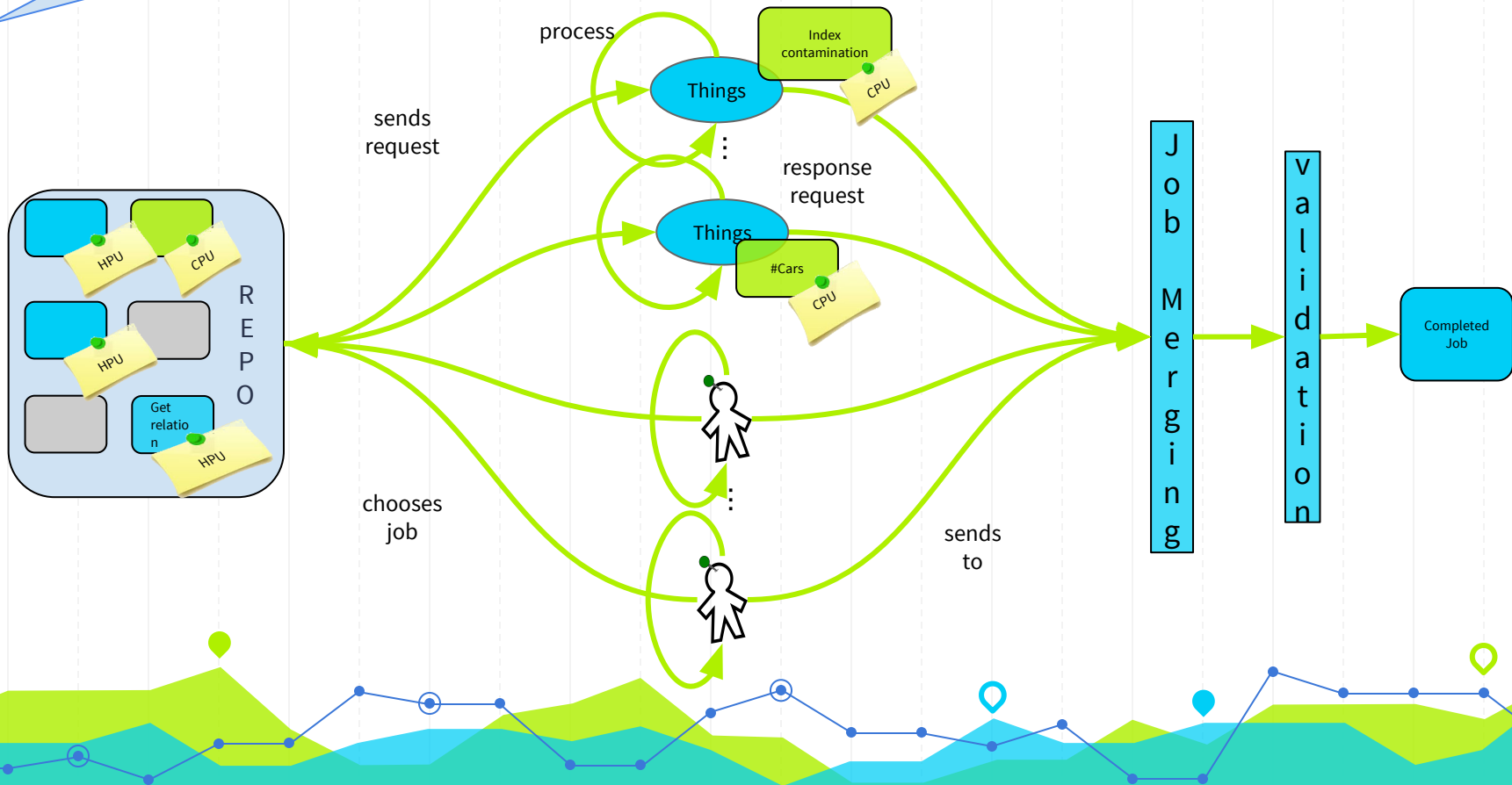
processing



stores in

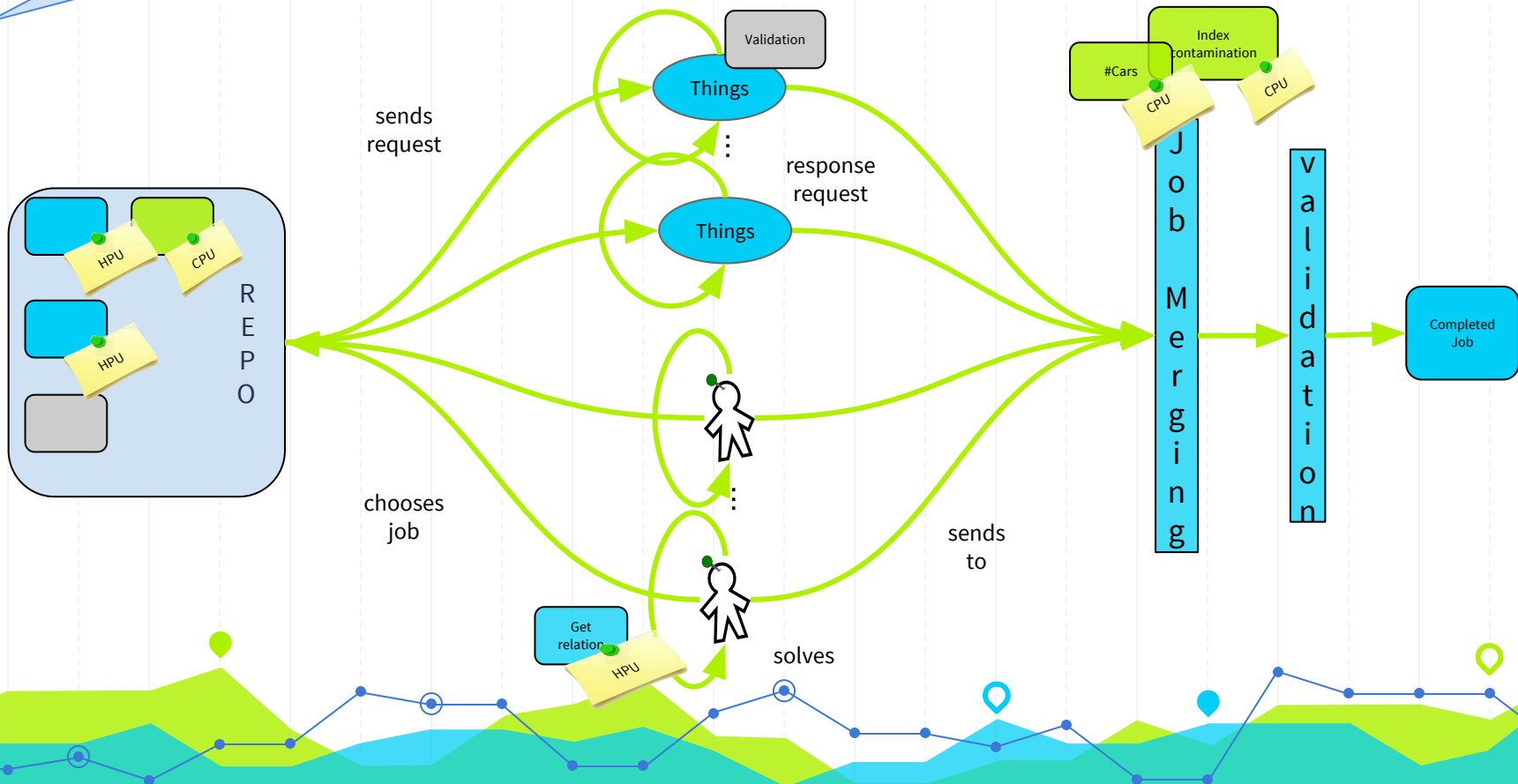
"Which is the correlation between the pollution and the numbers of cars in Barcelona?"

## EXAMPLE



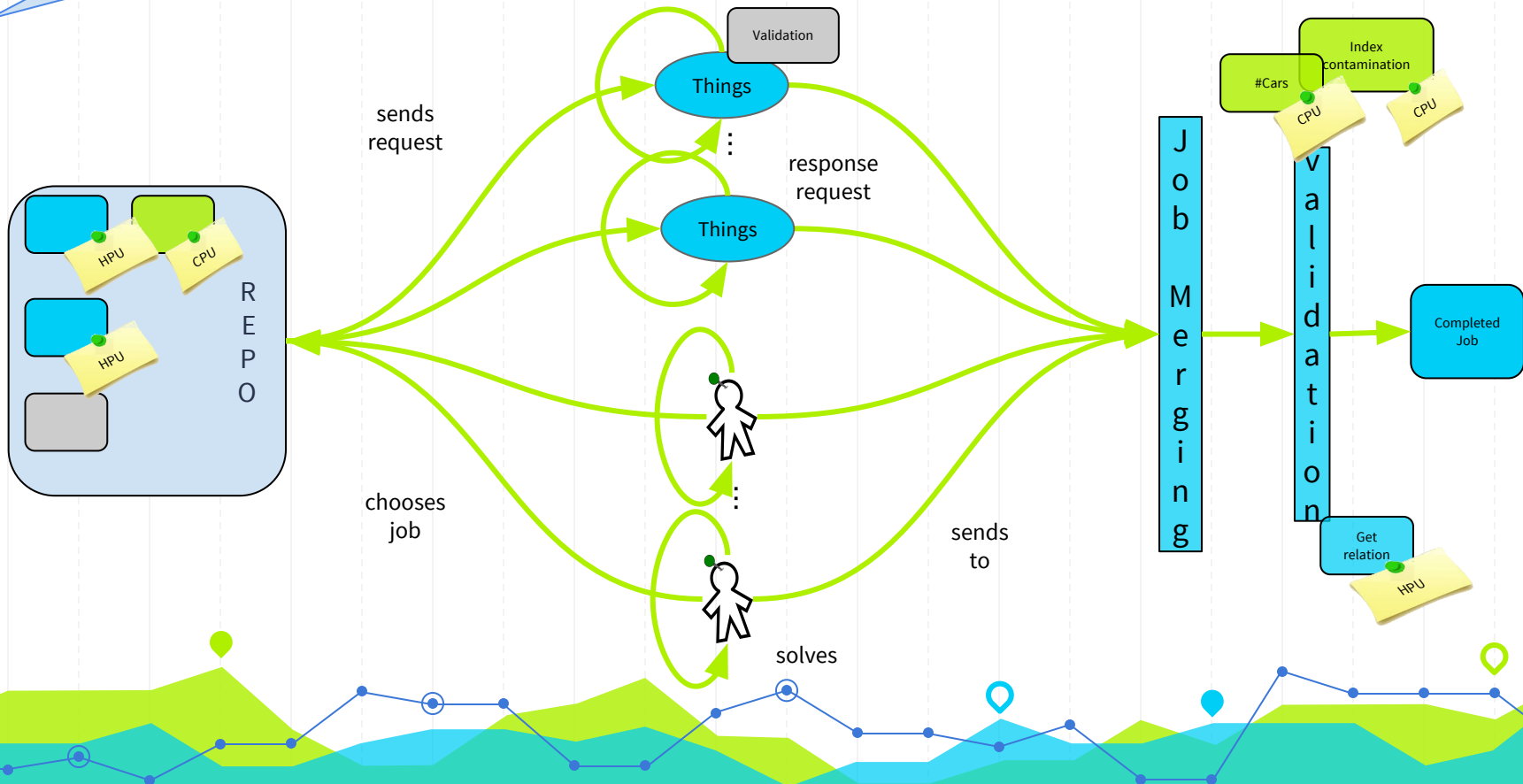
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## EXAMPLE



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