



# Sustainable Programming @ SAP

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PUBLIC

## SAP's sustainability approach – Dual role as enabler and exemplar



*SAP can directly or indirectly impact progress on all 17 UN SDGs*

## **Sustainable programming – The mission, the challenge**

### **The Mission**

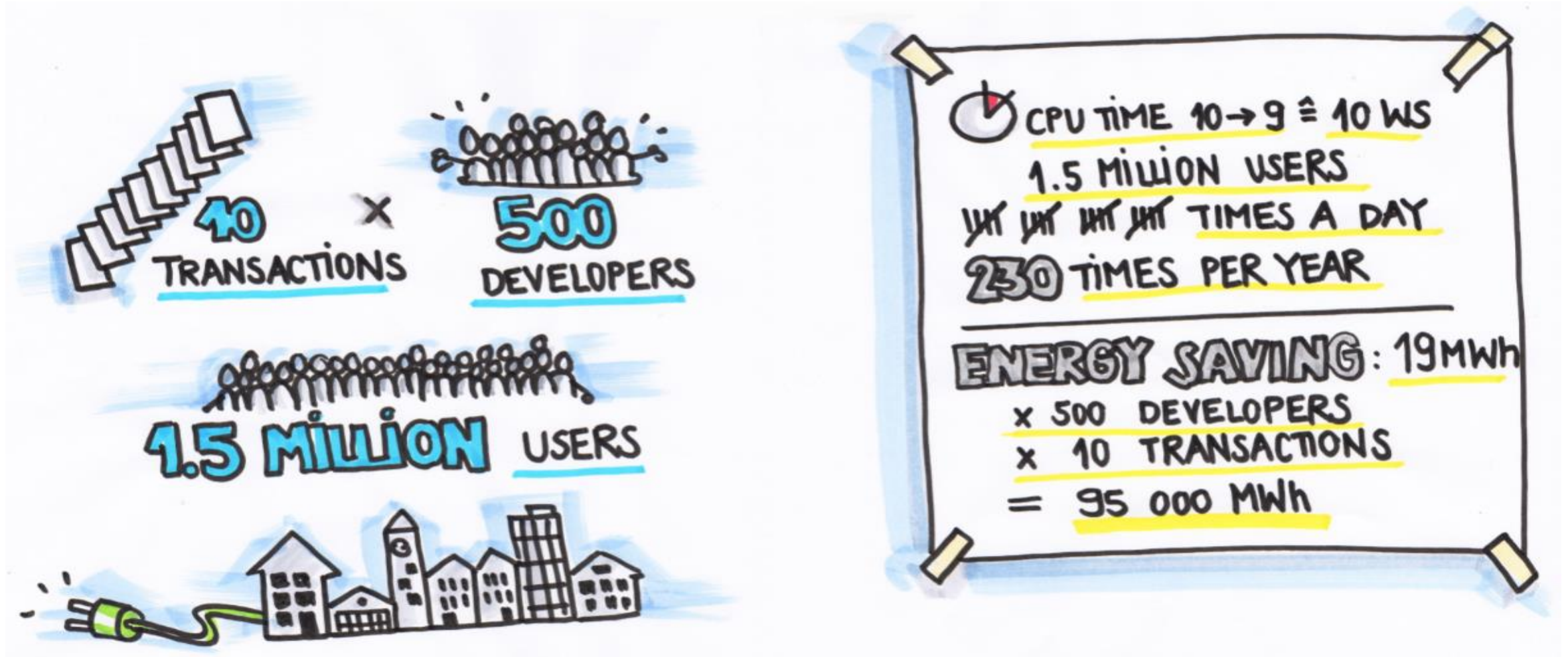
Software designed in an energy-efficient way to ensure that SAP software easily leverages innovative optimization technologies and makes efficient use of computing resources.

### **The Challenge**

Find the right balance between end-to-end response time, throughput, and economical/sustainable resource consumption.



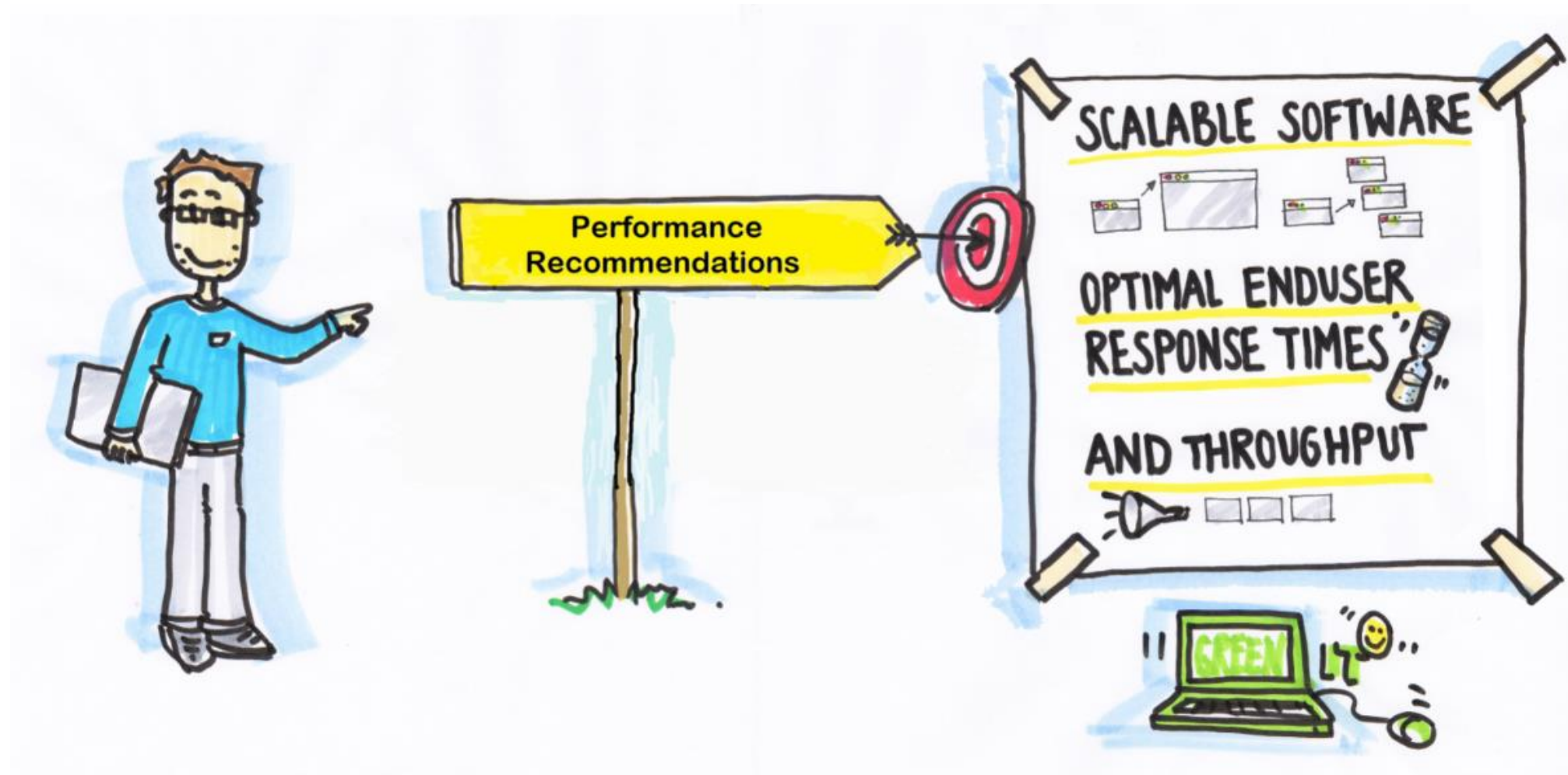
## How to save the energy consumption of a small city





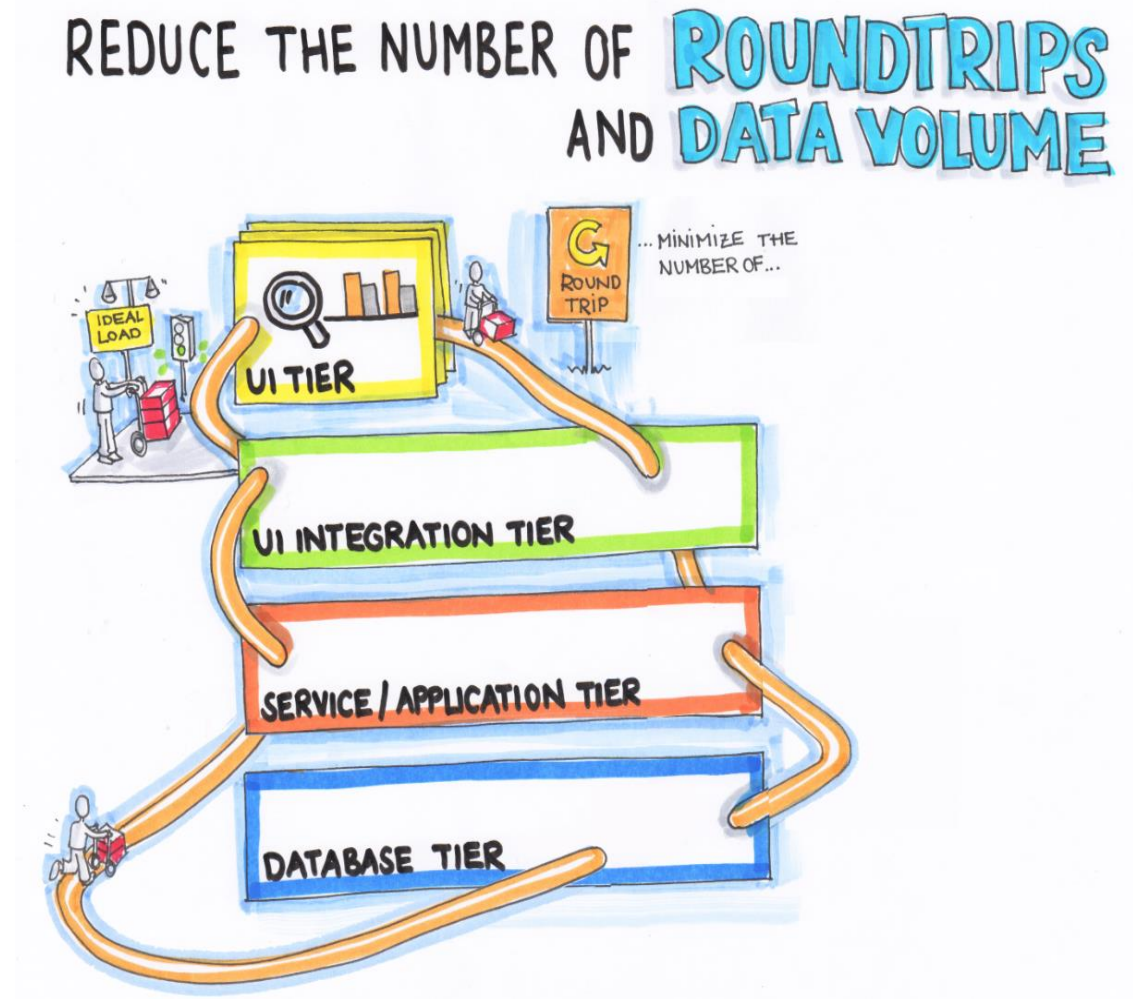
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## Performance recommendations

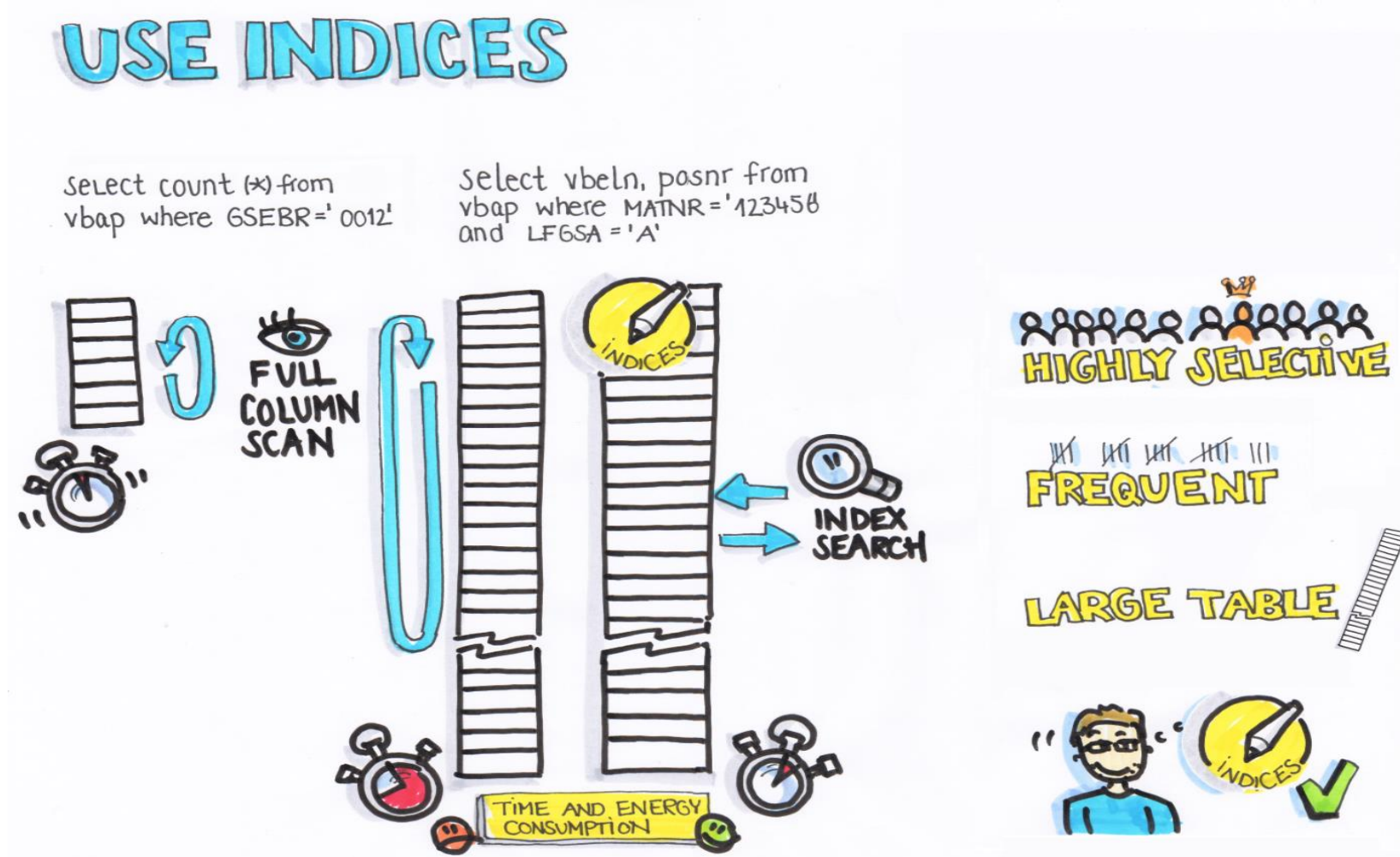


## Programming recommendations: roundtrips and caches

- Distribute functionality smartly over the tiers to reduce communication
- Share the static resources globally in a content delivery network
- Reduce the number of network round trips by caching static metadata
- Minimize the amount of transferred data by compression

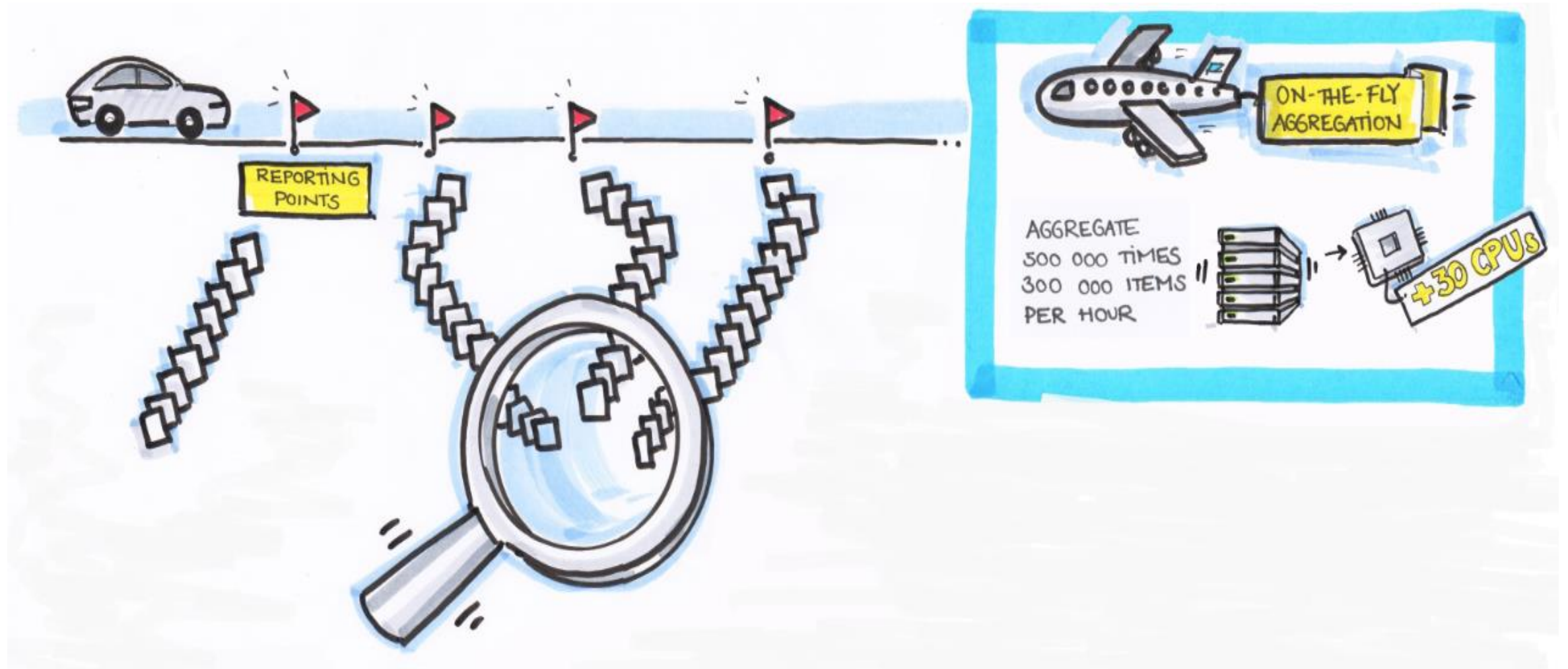


## Programming recommendations: indices





## Programming recommendations: dynamic caching structures





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### Optimization strategy

As the available resources are limited, optimization strategies have side effects which must be taken into account and in many cases there will be trade-offs.

Our optimization strategy is based on these three cornerstones:

- In-memory computing rather than disk I/O
- Caches rather than CPU cycles
- Content delivery network and code pushdown rather than high data transfer and a large number of round trips



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