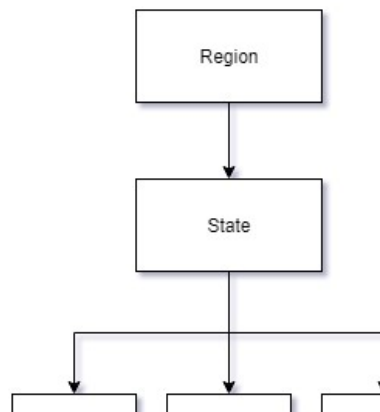


The multi-level-model

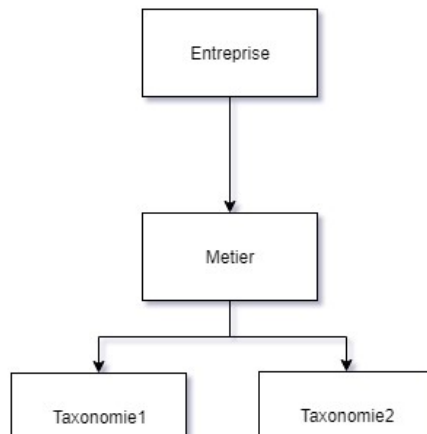
Multilevel models (also known as hierarchical linear models, nested data models, mixed models, random coefficient, random-effects models, random parameter models, or split-plot designs) are statistical models of parameters that vary at more than one level. (Citation Wikipedia)

A multi-level-model is created when a complex structuration is used and require different cutting levels.

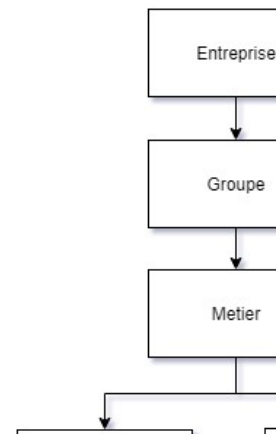
Each region could have many state and each state could have many observation and so on.



Generical Taxonomie



enterprise job



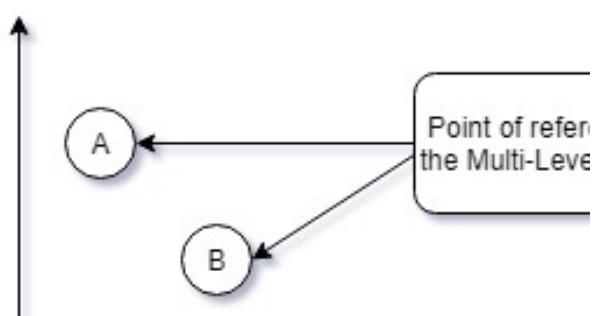
enterprise service of job

For each object created we have a level and for each object many stuff of the taxinomy could be used

Obj	obs1	obs2
A	a1	a2
B	b1	b2

In order to make possible this stuff we could make for each type of object a table in order to compare an object between another object of the same type. (like job, service,...)

Once a table is made for an object, we can observe a dissimilarity measure, reporting differences between the differents columns.



In the end, we can make a graphics thanks to the dissimilarity measure to make a graphics of point of reference for each object.

As a result, with these graphics we can make an HAC (Hierarchical Ascending Classification

Hierarchical Ascending Classification (HAC)

In data mining and statistics, hierarchical clustering (also called hierarchical cluster analysis or HCA) is a method of cluster analysis which seeks to build a hierarchy of clusters.

An HAC is created when :

- a taxonomie is needed
- **dissimilarity are measure**
- for clustering many object in order to make cluster analysis and segmentation.

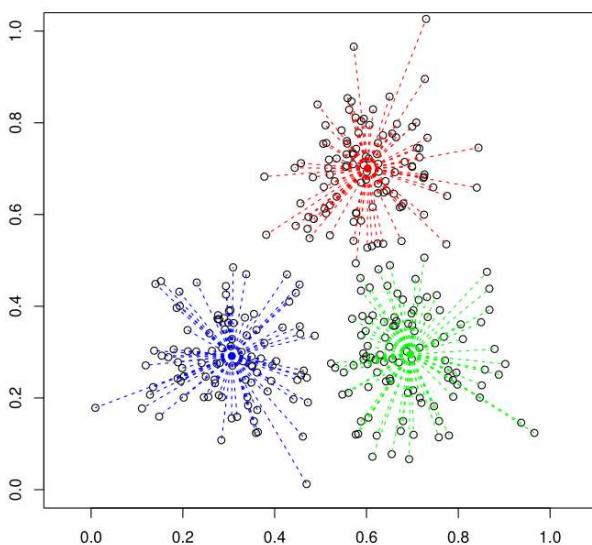
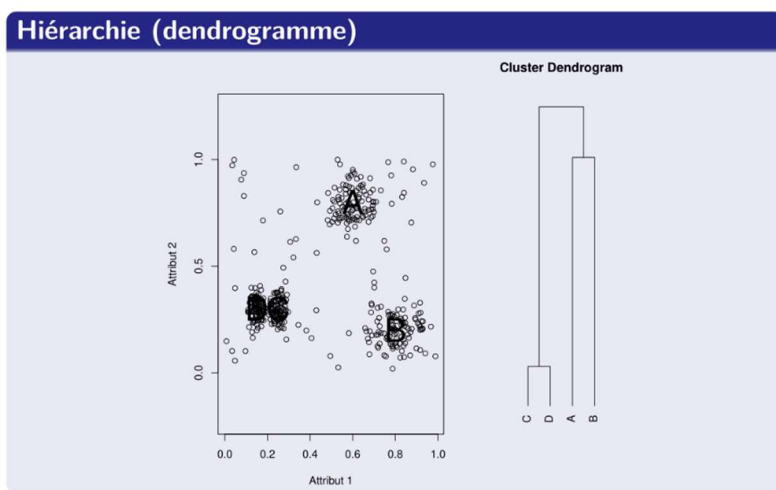
Once created, this cluster will make it possible to present wiser choices to the client.

Point Descriptor :

- As see precedently each point will present an object created with the taxonomy

Strategies for hierarchical clustering generally fall into two types :

- **Agglomerative:** This is a "**bottom-up**" approach: each observation starts in its own cluster, and pairs of clusters are merged as one moves up the hierarchy.
- **Divisive:** This is a "**top-down**" approach: all observations start in one cluster, and splits are performed recursively as one moves down the hierarchy.



(Source wikipedia & Mr blansche M1 AI Course)