

From basic distance search to a complex multi criteria search

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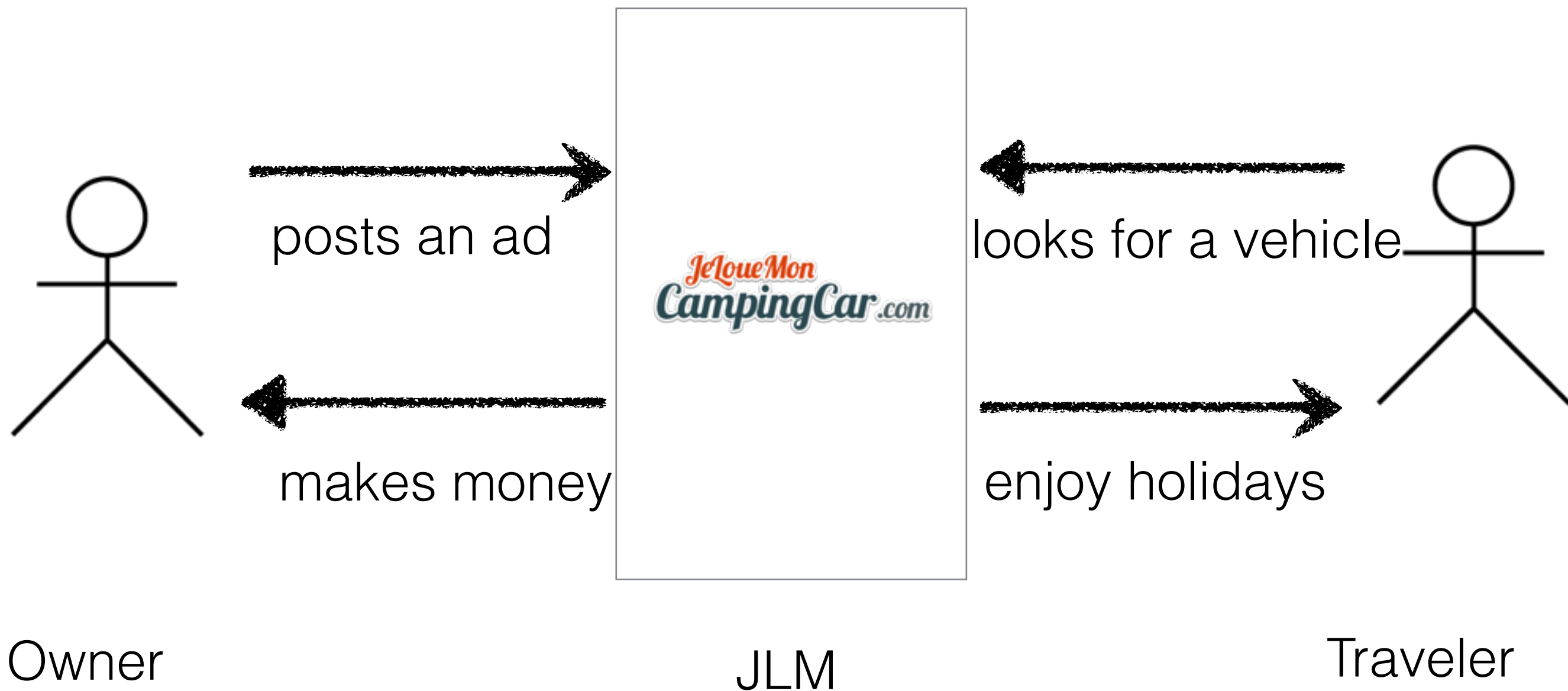
About Me

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What we are going to talk?

Yes

- distance search
- haystack backends
- ES function_score
- campers

No

- installing haystack
- installing Elasticsearch
- configure indexes
- go deep in ES

Previously at JLM

Basic distance search like this:

```
searched_point = Point(longitude, latitude)  
Ad.objects.distance(searched_point).order_by('distance')
```



And What ?





Searching is hard

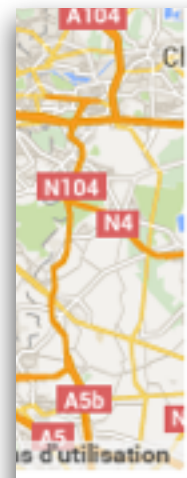
maybe harder than you think



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EuroPython 2015

Closer is not the better



Location camping-car

1 439 camping-cars à louer

1 Renault Trafic

Paris (75) à 2km de Paris

Bonjour, je loue mon trafic long, 2 places avant carte grise; Toit relevable avec couchage 2 personnes Arrière vide, possibilité d'y mettre une table et des chaises pour y mange...

A partir de

69 €

par jour de location

2 places 2 couchages

Fourgon aménagé

Score : 1,86290702932805



2 Volkswagen T3 Westfalia Stylevan

Paris (75) à 3km de Paris

Notre VW accueillera 4 adultes avec tout le nécessaire pour voyager au grand air: 2 lits 2 places (dont dans la partie haute), 1 table et 4 chaises de camping, ...

A partir de

72 €

par jour de location

4 places 4 couchages

Fourgon aménagé

Score : 3,4878119726378



3 Rapido Modèle 1T

Paris (75) à 4km de Paris

A partir de

98 €

par jour de location

2 places 2 couchages

Profilé

Score : 3,904117866152577



What do we want ?

Reward owners that deliver a great experience to guests

- rent vehicle close to a city
- to a top notch owner (rent often, good reviews, answer fast...)
- an available vehicle
- with many pictures

Let's do things **better**



Select a stack



elastic



Rewrite with Haystack

Basic distance search using Haystack and ES:

```
searched_point = Point(longitude, latitude)  
sqs = SearchQuerySet().models(Ad).distance('location', searched_point).order_by('distance')
```



I said **better**

Not the same function refactored





Problem....

We **CAN'T** add more ordering rules with Haystack

Warning

You can not specify both a distance & lexicographic ordering. If you specify more than just `distance` or `-distance`, Haystack assumes distance is a field in the index & tries to sort on it.

This is a limitation in the engine's implementation.

If you actually have a field called `distance` (& aren't using calculated distance information), Haystack will do the right thing in these circumstances.

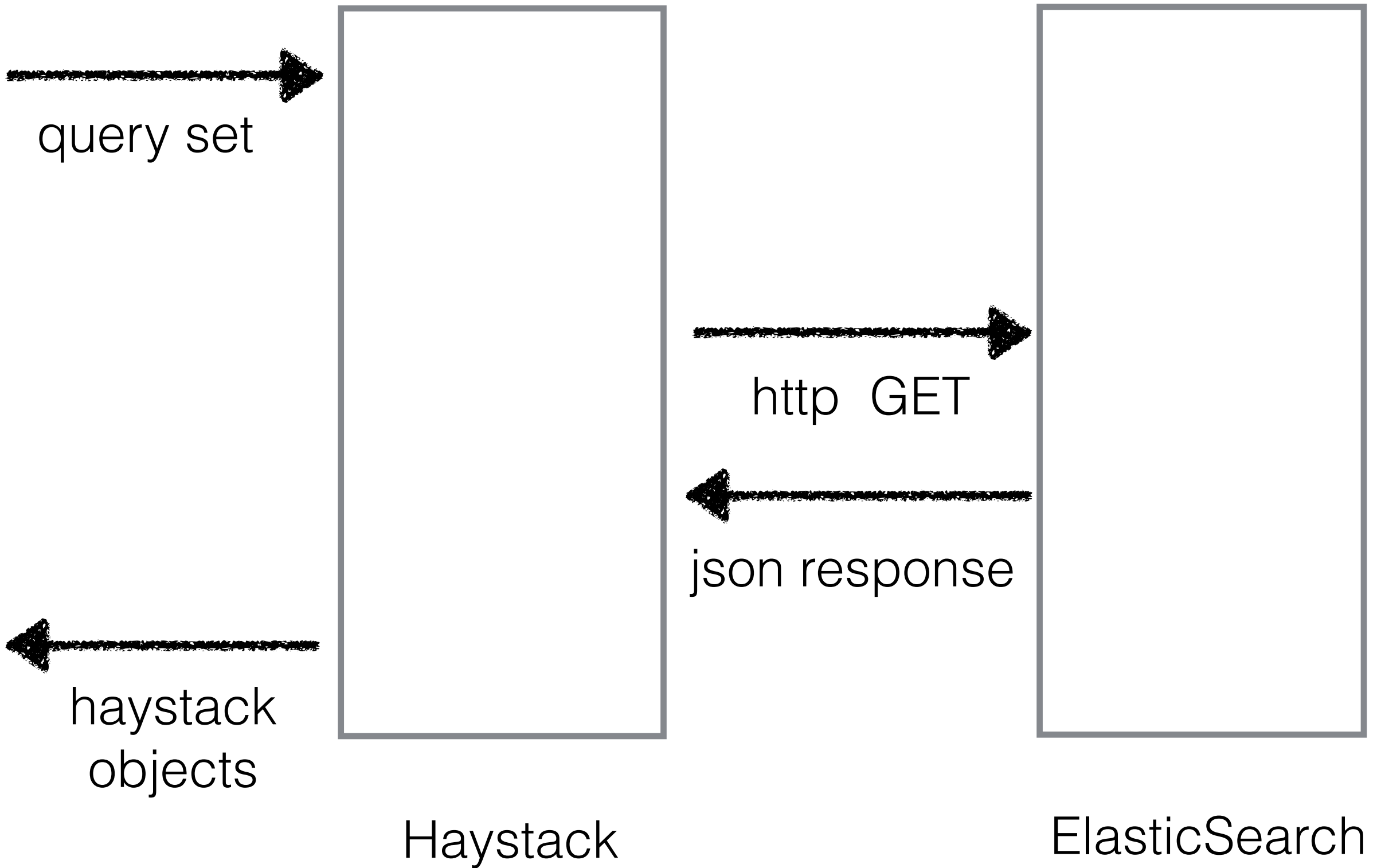




function_score and decay

- function_score allow you to combine multiple functions like decay
- function_score are not implemented in haystack (decay neither)





```
GET /_search
```

```
{
```

```
  "query": {
```

```
    "function_score": {
```

```
      "query": {...},
```

```
      "score_mode": "sum"
```

```
      "functions": [
```

```
        {
```

```
          "gauss": {
```

```
            "location": {
```

```
              "origin": { "lat": 51.5, "lon": 0.12 },
```

```
              "offset": "2km",
```

```
              "scale": "3km"
```

```
            }
```

```
          },
```

```
        },
```

```
      ],
```

```
      "gauss": {
```

```
        "price": {
```

```
          "origin": "50",
```

```
          "offset": "50",
```

```
          "scale": "20"
```

```
        }
```

```
      },
```

```
      "weight": 2
```

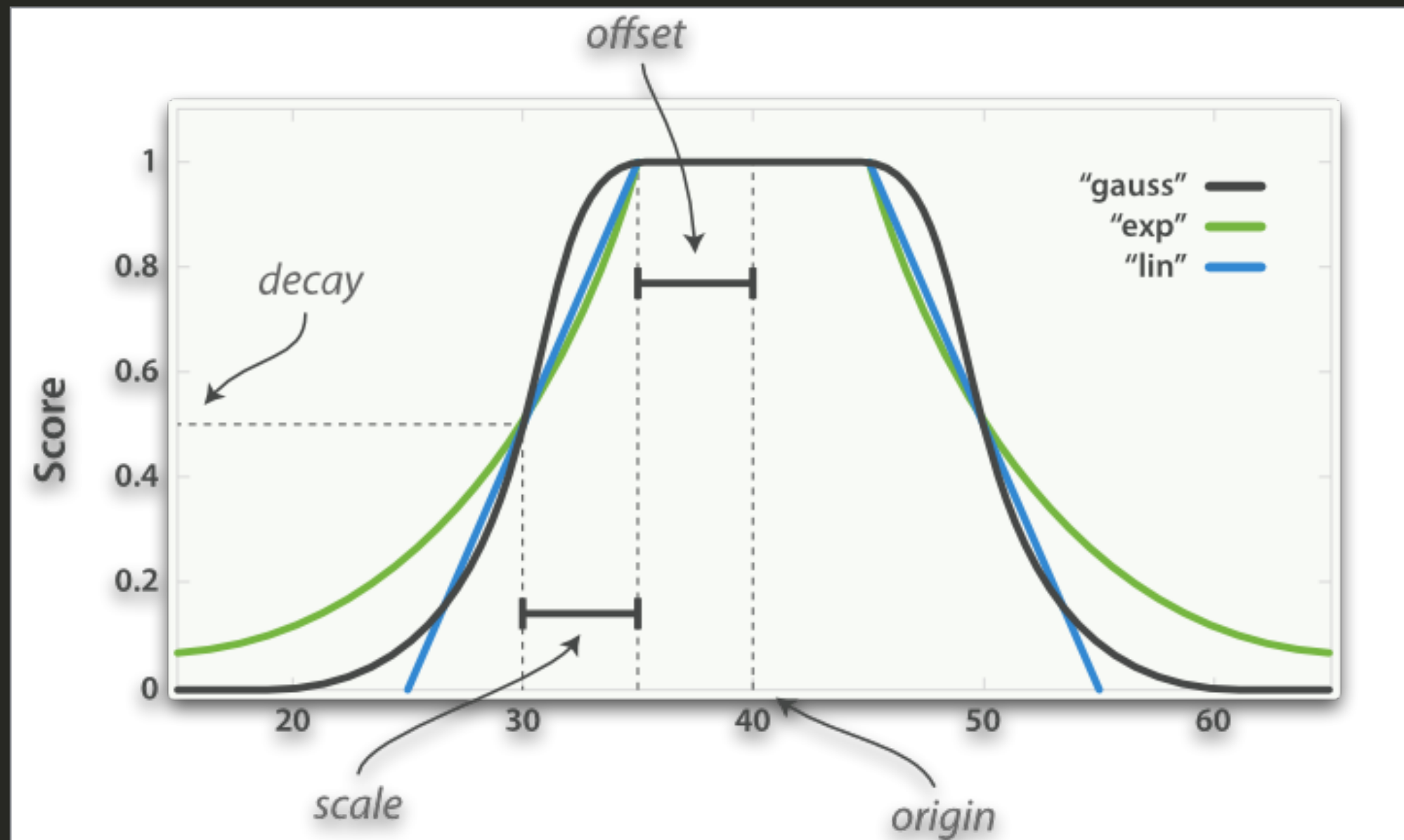
```
    }
```

```
  }
```

```
}
```

```
}
```

```
}
```



So



Let's write a **custom** ES backend



More than a backend

- We need write:
 - ElasticsearchSearchEngine
 - ElasticsearchSearchBackend
 - ElasticsearchSearchQuery
 - SearchQuerySet



```
class FunctionScoreSearchQuery(ElasticsearchSearchQuery):
```

```
    def __init__(self, **kwargs):  
        super(FunctionScoreSearchQuery, self).__init__(**kwargs)  
        self.decay_functions = []
```

```
    def build_params(self, *args, **kwargs):  
        search_kwargs = super(  
            FunctionScoreSearchQuery, self).build_params(*args, **kwargs)  
        if self.decay_functions:  
            search_kwargs['decay_functions'] = self.decay_functions  
        return search_kwargs
```

```
    def add_decay_function(self, function_dict):  
        self.decay_functions.append(function_dict)
```

```
    def _clone(self, **kwargs):  
        clone = super(FunctionScoreSearchQuery, self)._clone(**kwargs)  
        clone.decay_functions = self.decay_functions[:]  
        return clone
```

```
class FunctionScoreSearchBackend(ElasticsearchSearchBackend):
```

```
    """
```

```
Search backend that add the function score to the elastic search query
```

```
    """
```

```
def build_search_kwargs(self, query_string, decay_functions=None, **kwargs):
```

```
    kwargs = super(FunctionScoreSearchBackend, self).build_search_kwargs(  
        query_string, **kwargs)
```

```
    if not decay_functions:
```

```
        return kwargs
```

```
    original_query = kwargs['query']
```

```
    function_score_query = {
```

```
        'function_score': {
```

```
            'functions': decay_functions,
```

```
            'query': original_query,
```

```
            'score_mode': 'sum'
```

```
        }
```

```
    }
```

```
    kwargs['query'] = function_score_query
```

```
    return kwargs
```

```
class FunctionScoreSearchQuerySet(SearchQuerySet):
```

```
    """
```

```
    usage example:
```

```
    SearchQuerySet().filter(text='foo').decay({'gauss': {'end_time' :  
{'origin': '2014-05-07', 'scale' : '10d' }}}}
```

```
    """
```

```
def decay(self, function_dict):
```

```
    clone = self._clone()
```

```
    clone.query.add_decay_function(function_dict)
```

```
    return clone
```

```
class CustomEsSearchEngine(ElasticsearchSearchEngine):
```

```
    backend = FunctionScoreSearchBackend
```

```
    query = FunctionScoreSearchQuery
```

Available on GitHub



<https://github.com/JeLoueMonCampingCar/haystack-function-score-backend>

Let's use it **now !**




```
from search.custom_elasticsearch import FunctionScoreSearchQuerySet
```

```
sqs = FunctionScoreSearchQuerySet().models(Ad)
```

```
# custome filters
```

```
sqs = sqs.filter(park_assistance=True)
```

```
sqs = sqs.filter(gps=True)
```

```
# compute the distance
```

```
search_location = Point(longitude, latitude)
```

```
sqs = sqs.distance('vehicle_location', search_location)
```

```
# create the distance decay
```

```
decay_distance = {  
    'exp': {  
        'vehicle_location': {  
            'origin': {"lat": str(latitude), "lon": str(longitude)},  
            'scale': "50km",  
            'offset': "15km",  
        }  
    },  
    "weight": 2,  
}
```

```
sqs = sqs.decay(decay_distance)
```

```
# decay gauss depending on the picture count
```

```
decay_picture_count = {
```

```
    'gauss': {
```

```
        'pictures_count': {
```

```
            'origin': 50,
```

```
            'offset': 40,
```

```
            'scale': 9
```

```
        }
```

```
    },
```

```
    "weight": 0.5,
```

```
}
```

```
sqs = sqs.decay(decay_picture_count)
```

```
# decay linear depending on the host activity rate
```

```
decay_owner_quality_rate = {
```

```
    'linear': {
```

```
        'owner_quality_rate': {
```

```
            'origin': 1.0,
```

```
            'scale': 0.5,
```

```
        }
```

```
    }
```

```
}
```

```
sqs = sqs.decay(decay_owner_quality_rate)
```

Results

Motorhome hire

1,439 motorhomes to rent

1 Ford Transit 125T350

Nanterre (92) à 12km de Paris

★★★★★ 1 reviews received after rental

BONUS "GROUPE ELECTOGENE AU GAZ" (pour une autonomie total) OFFRE EXCEPTIONNELLE! ABS avec roues jumelées, idéal pour une famille, tout confort et aussi bien pour les longs ou...

👤 6 seats 🛏 6 Berth

From
119 €
per
rental day

Coachbuilt

Score: 0.21775 Owner quality rate: 0.218 Pictures count: 8



2 Pilote Atlantis A2

Rosny Sous Bois (93) à 10km de Paris

★★★★★ 1 reviews received after rental

Camping Car PILOTE ATLANTIS A2 très compact (6 mètres) Petit camping car compacte idéal pour les ferrys... Sur fiat ducato 2.8, 127cv, année 2003. 6 places carte grise et 6 ...

👤 6 seats 🛏 6 Berth

From
91 €
per
rental day

Coachbuilt

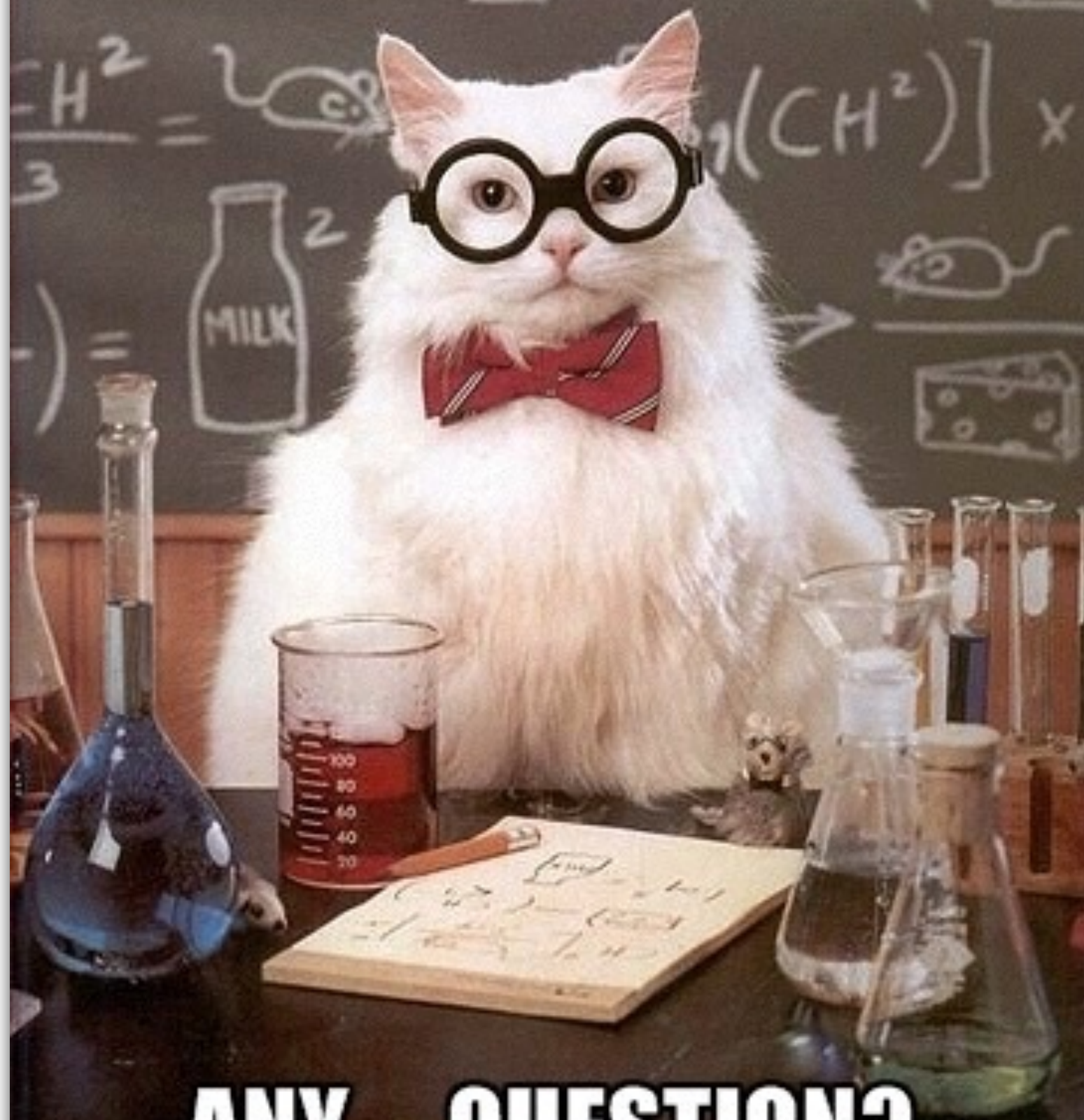
Score: 0.16011 Owner quality rate: 0.160 Pictures count: 3



3 Fiat Bavaria T71



**HMM... THE PRESENTATION IS
FINISHED**



ANY.... QUESTION?