

# Databases, Compilers and XTDB

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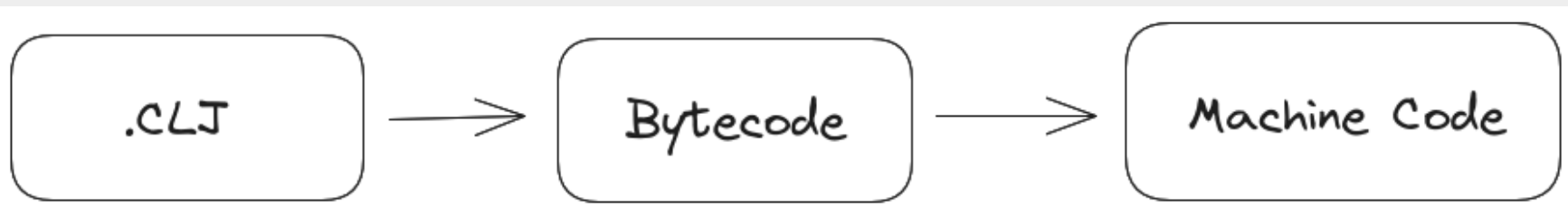
# Agenda

Databases vs Compilers in the  
context of XTDB (version 2)

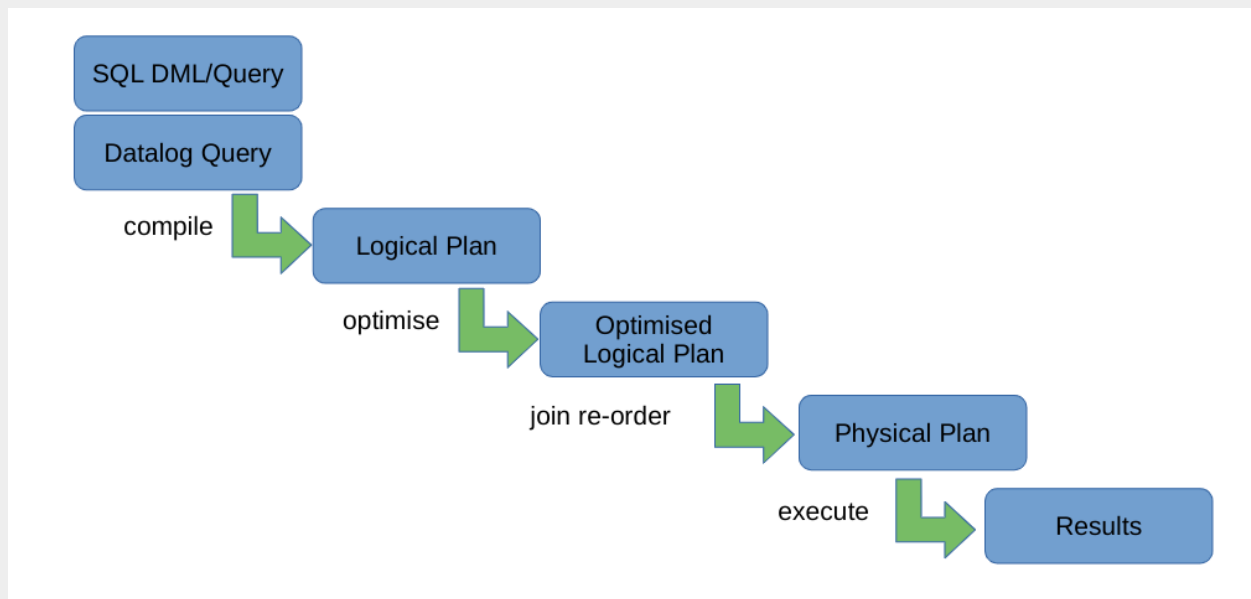
1. Where are they the same?
2. Where do they differ?

| Where are they the same?

# Intermediate representations



# Intermediate representations in XTDB



# | Intermediate representations

```
{:find [user-name]  
 :where [(match :users {:name user-name})]}
```

# Intermediate representations

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```

```
[ :project  
  [{user-name name}]  
  [ :scan  
    { :table users  
      [name] } ] ]
```

# Correlated subqueries

```
1  SELECT
2    o.order_id
3  FROM orders AS o
4  WHERE EXISTS (
5      SELECT *
6      FROM shipping AS s
7      WHERE s.order_id = o.order_id
8      AND s.commitdate < s.receiptdate
9  )
```



# | Correlated subqueries

```
1  [:rename
2   {x1 order_id}
3   [:apply
4    :semi-join
5    {x1 ?x7}
6    [:rename {order_id x1}
7     [:scan {:table orders} [order_id]]]
8    [:rename
9     {order_id x3, commitdate x4, receiptdate x5}
10   [:select
11    (and (< commitdate receiptdate)
12         (= order_id ?x7))
13    [:scan {:table shipping}
14     [order_id commitdate receiptdate]]]]]
```

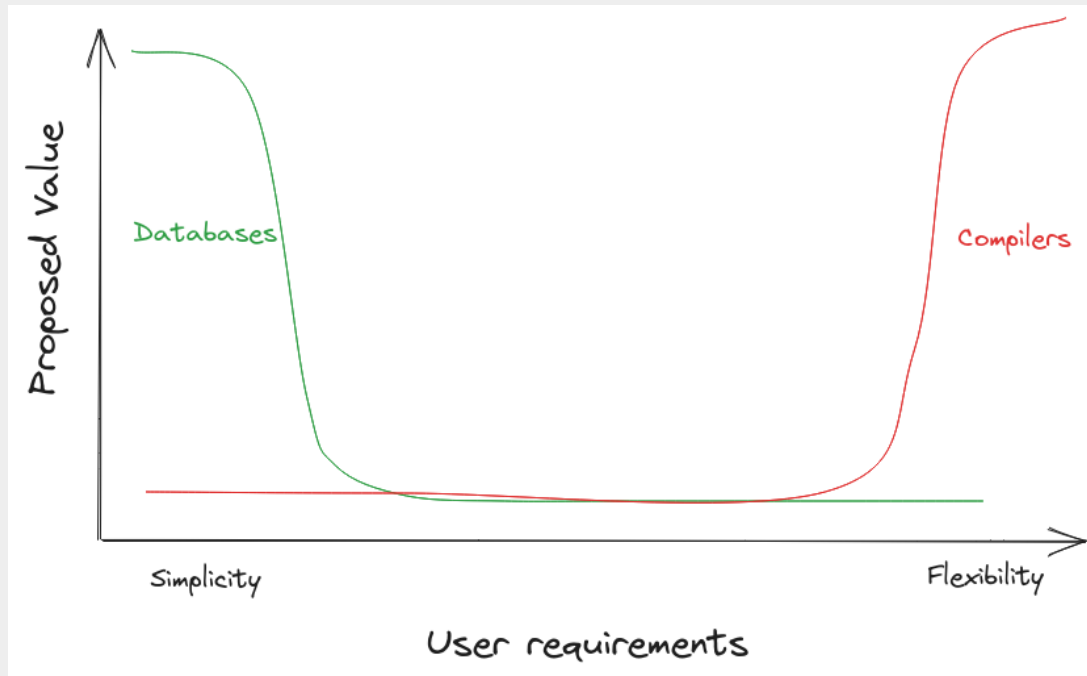
# | Correlated subqueries

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4 :semi-join
5 {x1 ?x7}
6 [:rename {order_id x1}
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11 (and (< commitdate receiptdate)
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```

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1 [:rename
2 {x1 order_id}
3 [:semi-join
4 [{x1 x3}]
5 [:rename {order_id x1}
6 [:scan {:table orders} [order_id]]]
7 [:rename
8 {order_id x3, commitdate x4, receiptdate x5}
9 [:select
10 (< commitdate receiptdate)
11 [:scan {:table shipping}
12 [order_id commitdate receiptdate]]]]]
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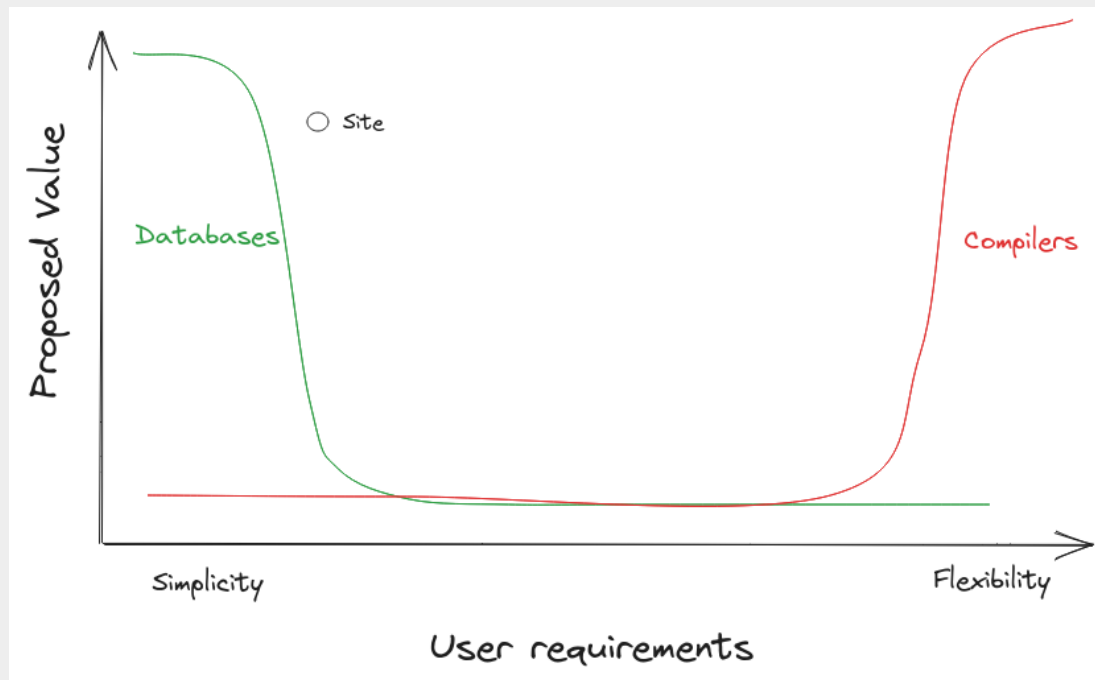
| Where are they different?

# Valley of No Man's Land

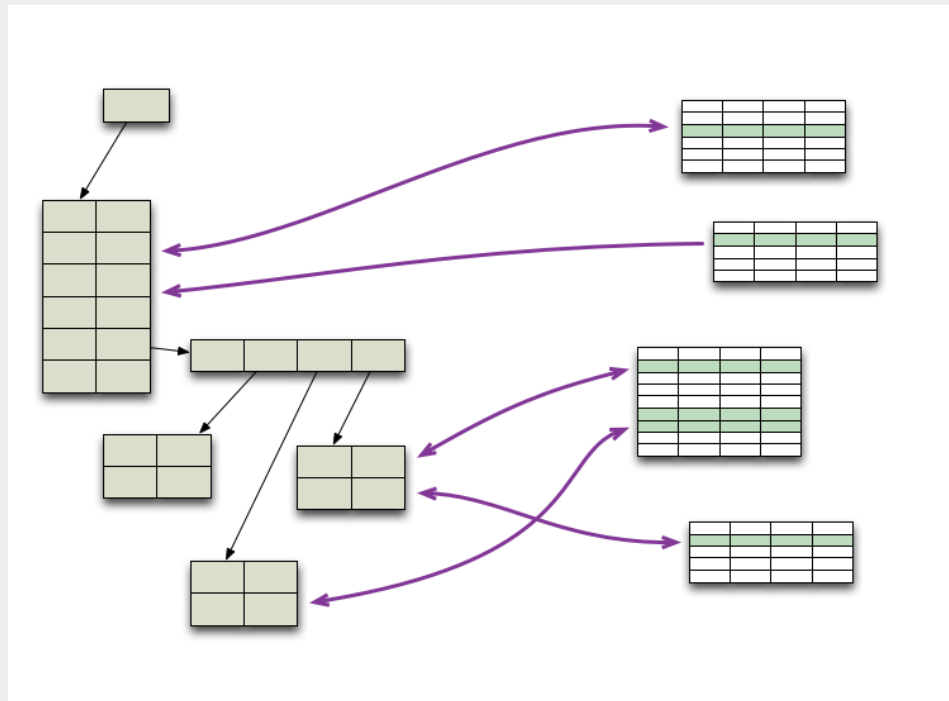


Source: <https://www.cidrdb.org/cidr2019/papers/p91-pirk-cidr19.pdf>

# Valley of No Man's Land

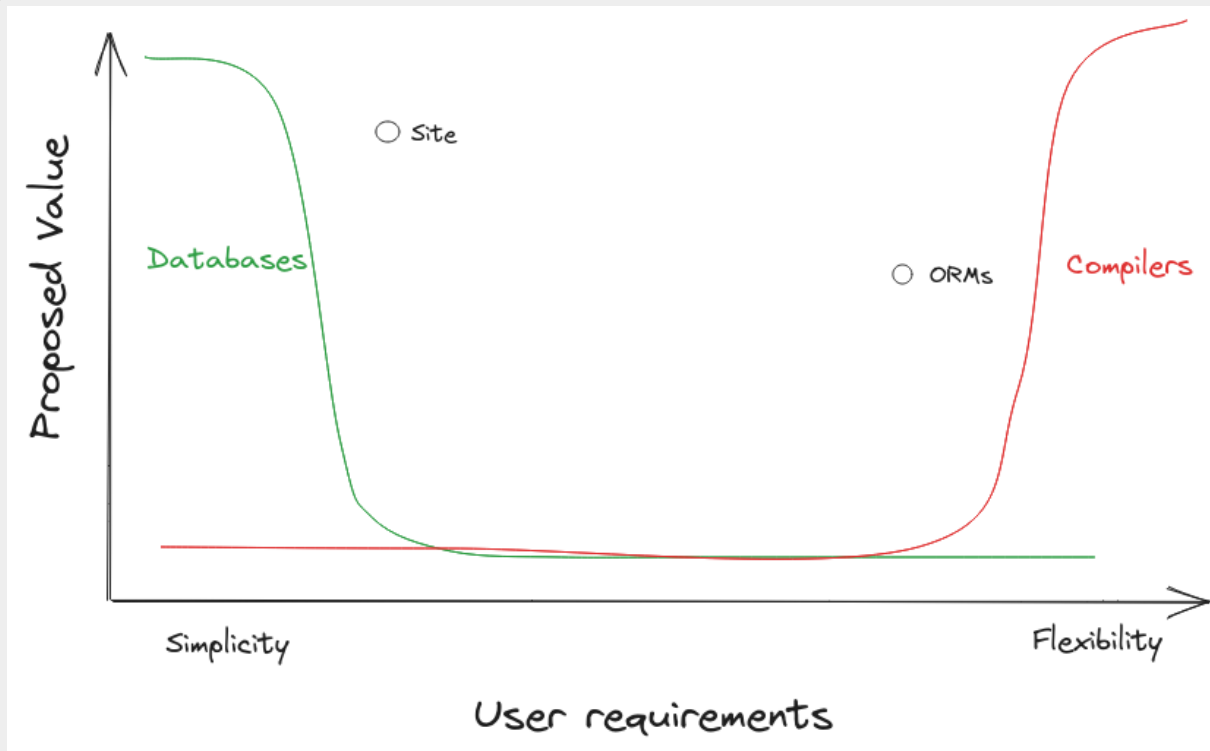


# ORMs



Source: <https://martinfowler.com/bliki/images/ormHate/sketch.png>

# Valley of No Man's Land

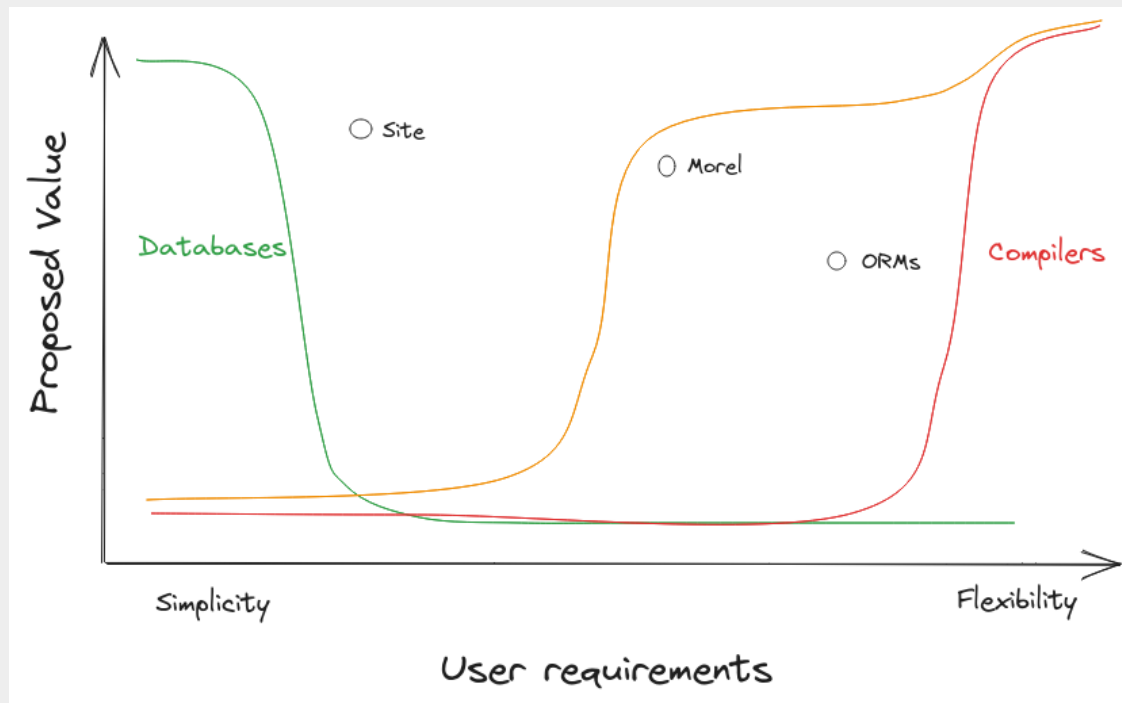


# Morel

```
1  let
2    fun in_ e [] = false
3      | in_ e (h :: t) = e = h orelse (in_ e t)
4  in
5    from e in emps
6      where in_ e.deptno (from d in depts
7        where d.name = "Engineering"
8          yield d.deptno)
9        yield e.name
10  end;
```



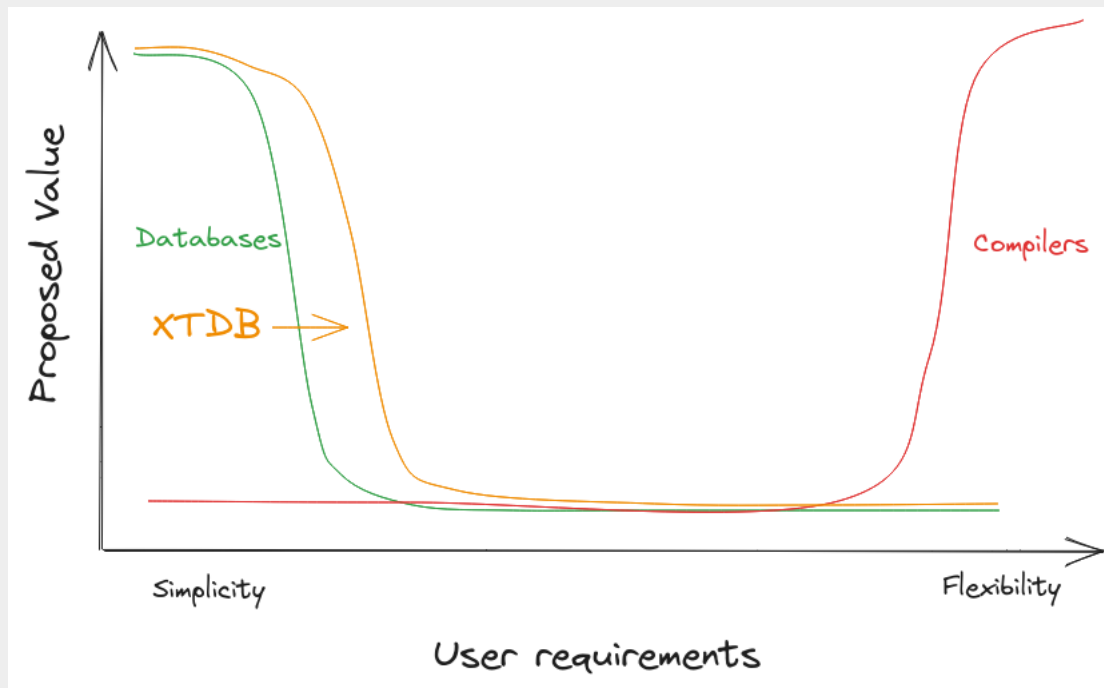
# Valley of No Man's Land



## Where does XTDB fit in?

```
'{:find [start end dis]
  :where [[start :g/to _]
          [_ :g/to end]
          (shortest-path start end dis)]
  :rules [[(shortest-path start start 0)]
          [(shortest-path start end 1)
           [start :g/to end]]
          [(shortest-path start end (min dis))
           [start :g/to next]
           (shortest-path next end other-dis)
           [(+ other-dis 1) dis]]]}
```

# Valley of No Man's Land



# |Q&A

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## Let's Connect:



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