What is Multi-Level Modelling?

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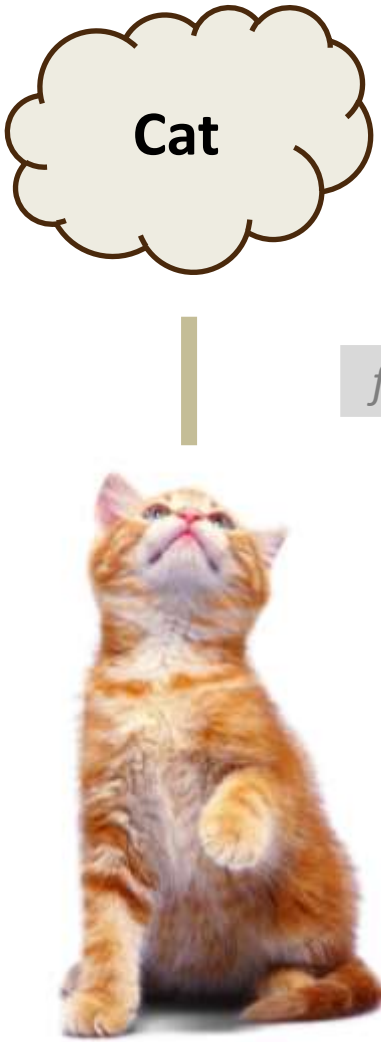
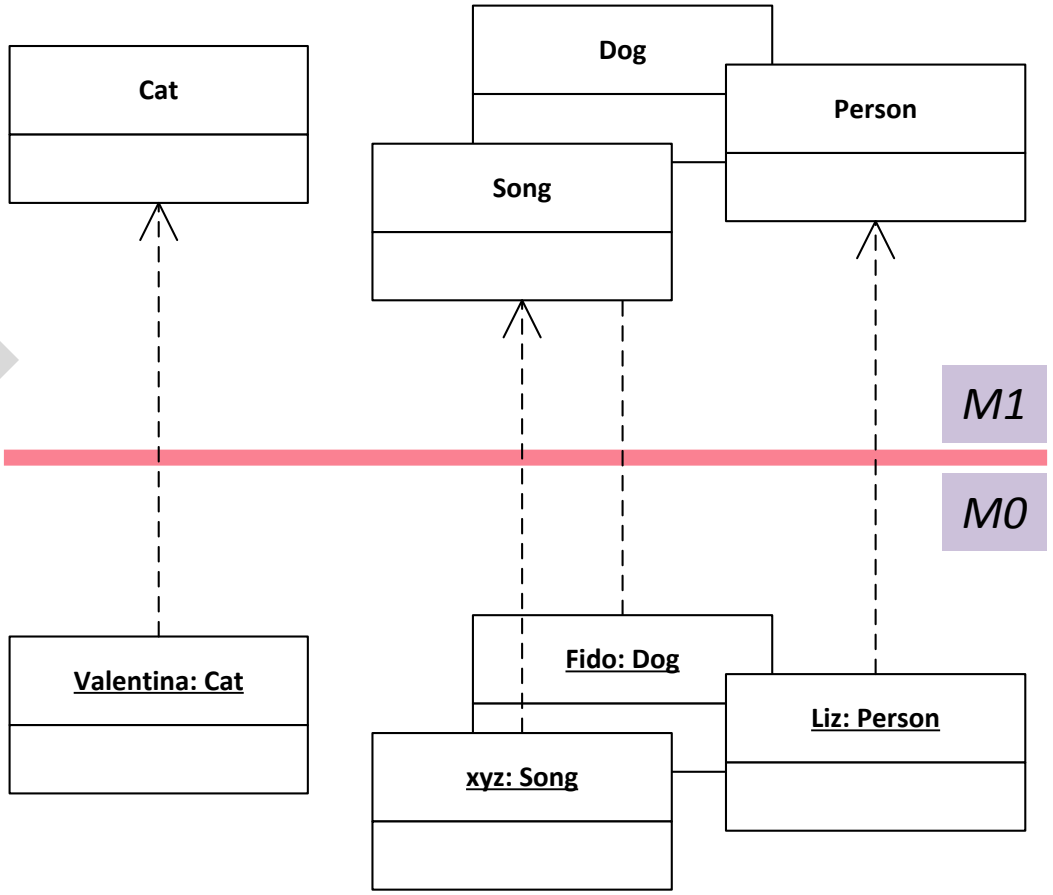
Incipit CSIC

Context



formalise



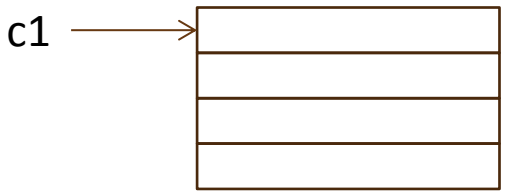
Context

```
public class Cat
{
    //...
}
```

```
Cat c1 = new Cat();
```

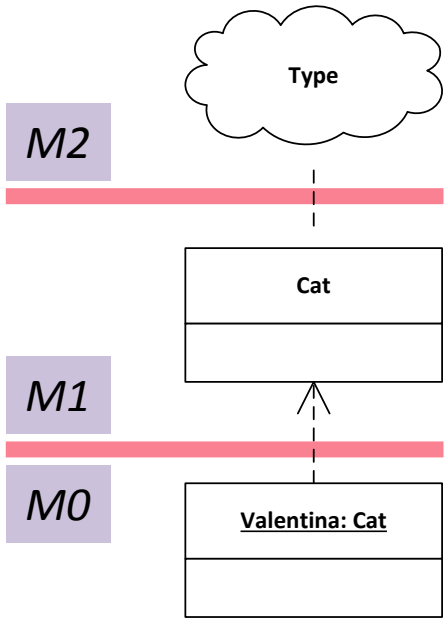
design time — *M1*

run time — *M0*

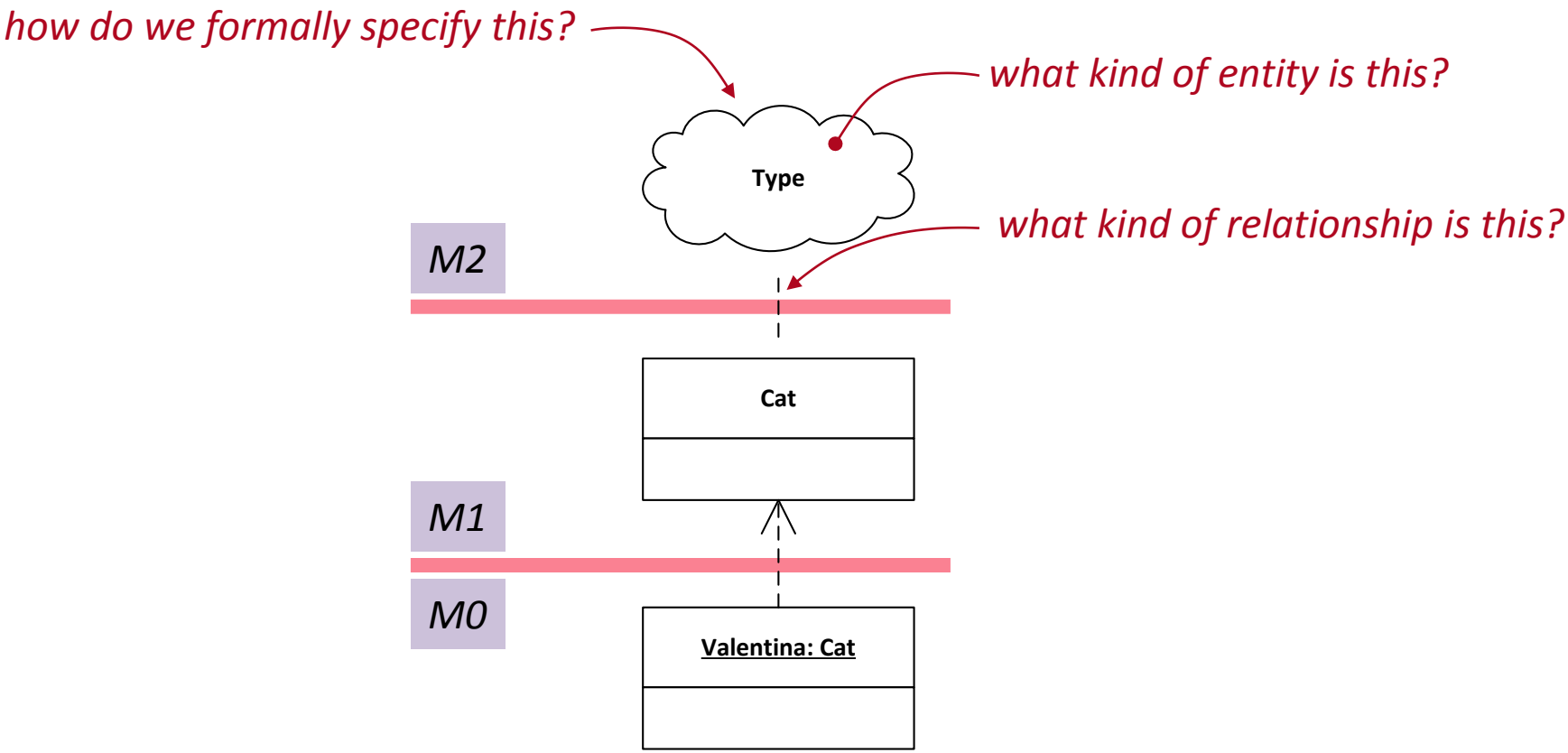


Problem

- Early 1990s: ISO/IEC 15474 (CDIF)
  - Where do types come from?
  - How do we formally specify types?
- A new M2 level appears…
- …and with it, the “meta” notion.

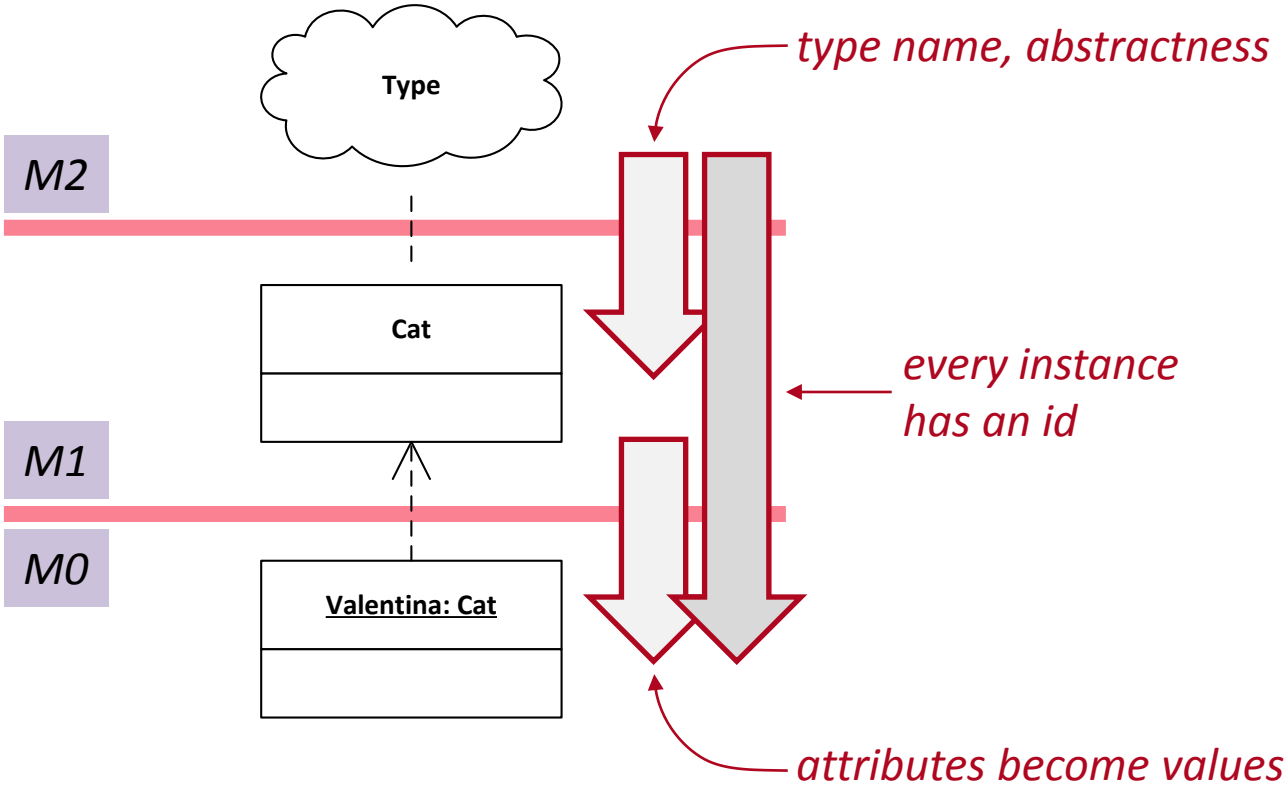


Problem



Problem

How to achieve explicit and precise trans-layer control.



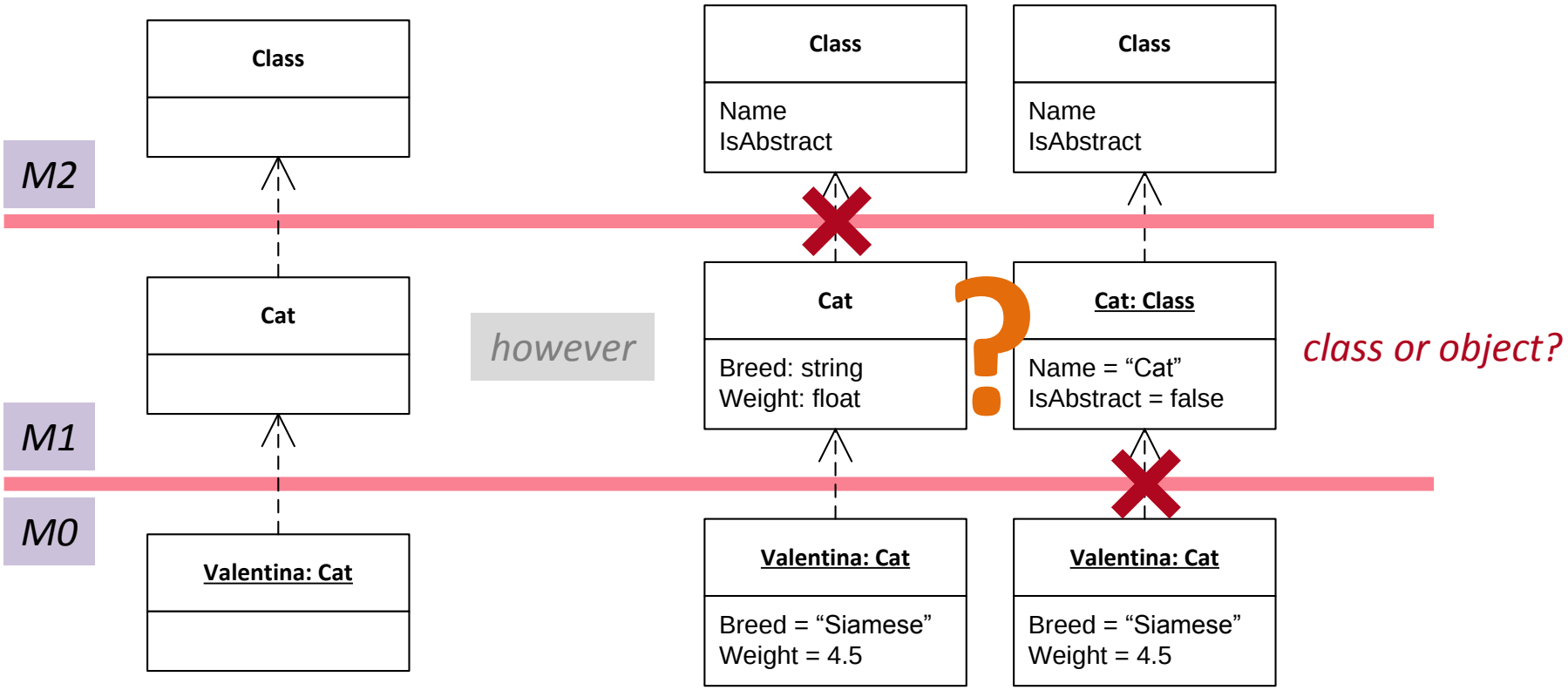
Approaches

- Strict metamodelling
- Orthogonal approaches
- Deep instantiation approaches
- Powertype-based approaches

Strict Metamodelling

- Simple, naïve extension of 2-level modelling:
  - Layers are given by instance-of relationships
- Sponsored by the OMG
- Heavily criticised
- Massively adopted

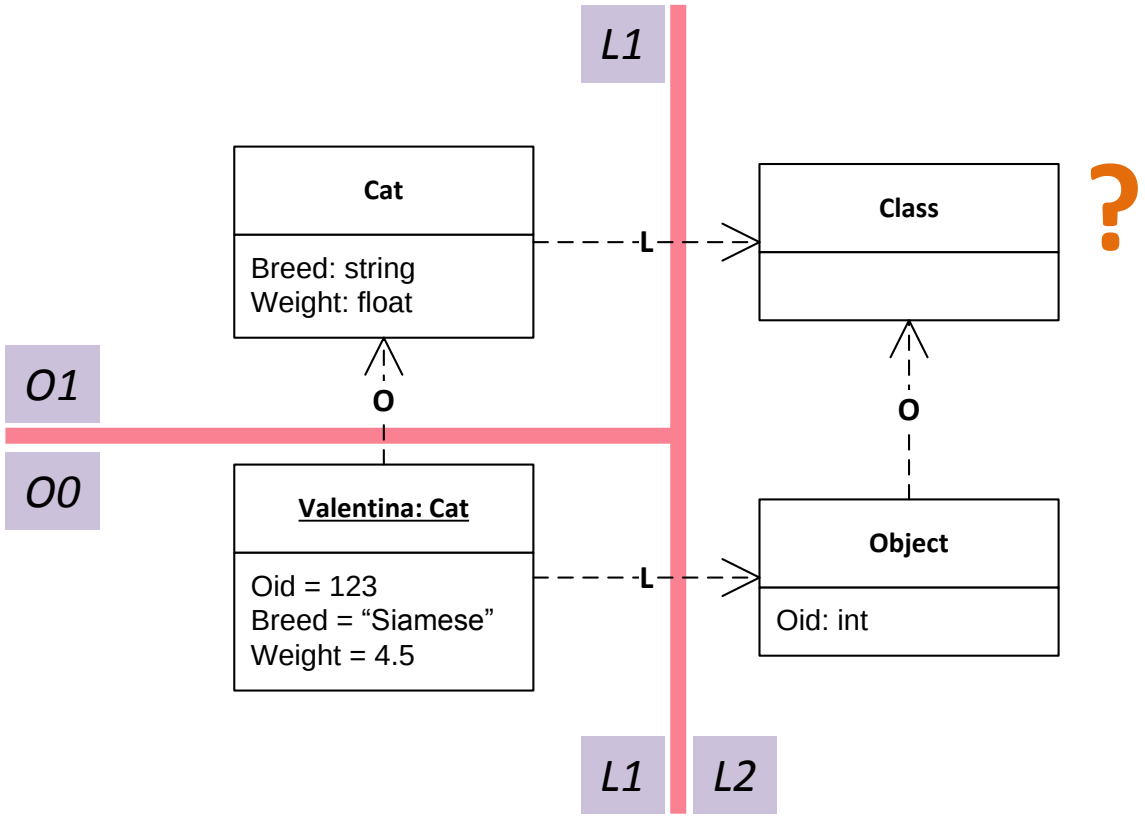
Strict Metamodelling



Orthogonal Approaches

- Use a 2-dimensional classification scheme:
  - Linguistic
  - Ontological
- Acknowledge objects as first-class citizens
- Developed as “Orthogonal Classification Architecture”

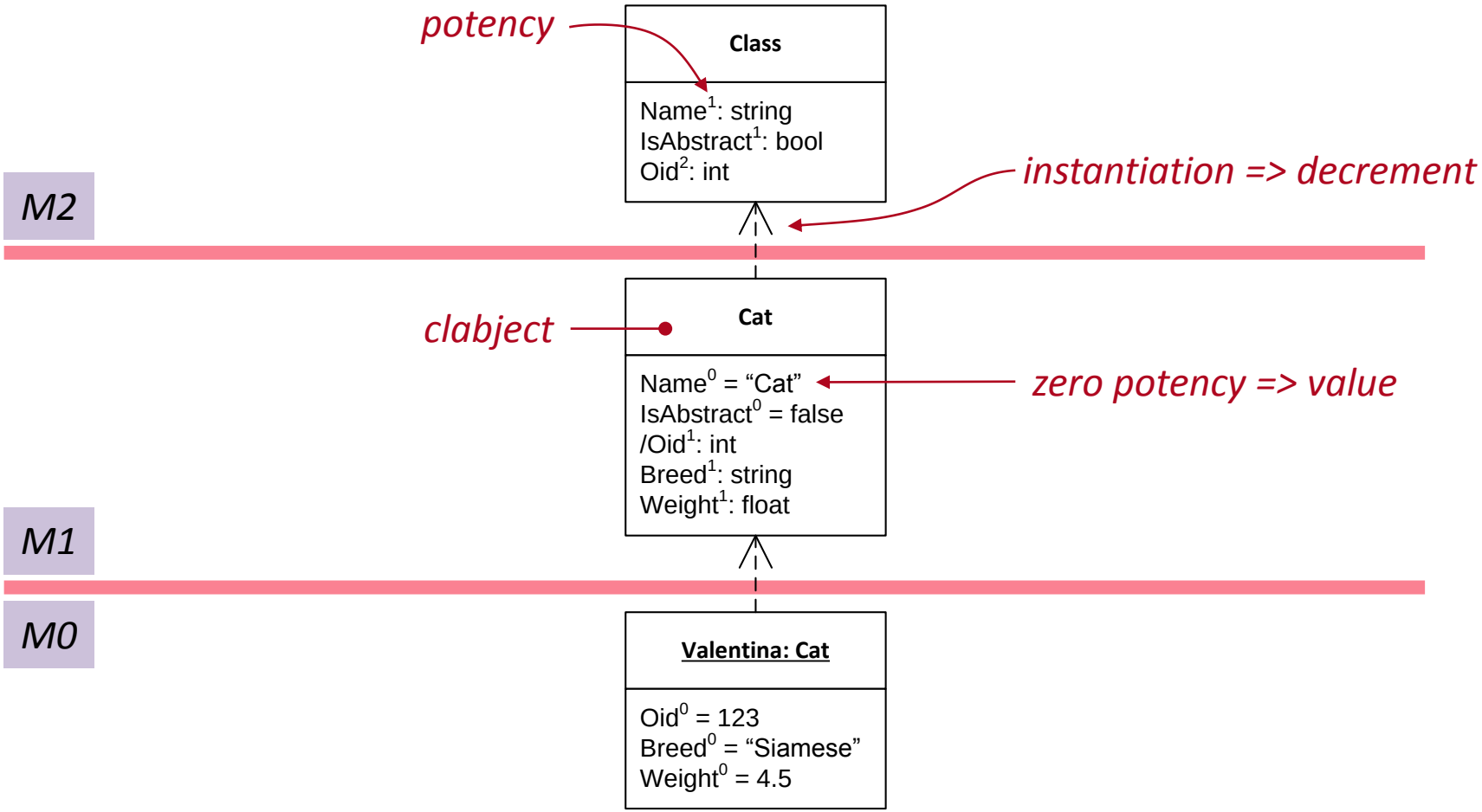
Orthogonal Approaches



Deep Instantiation Approaches

- Takes strict approach as base
- Introduces clabjects
- Adds *potency*:
  - Features can be passed on without being instantiated

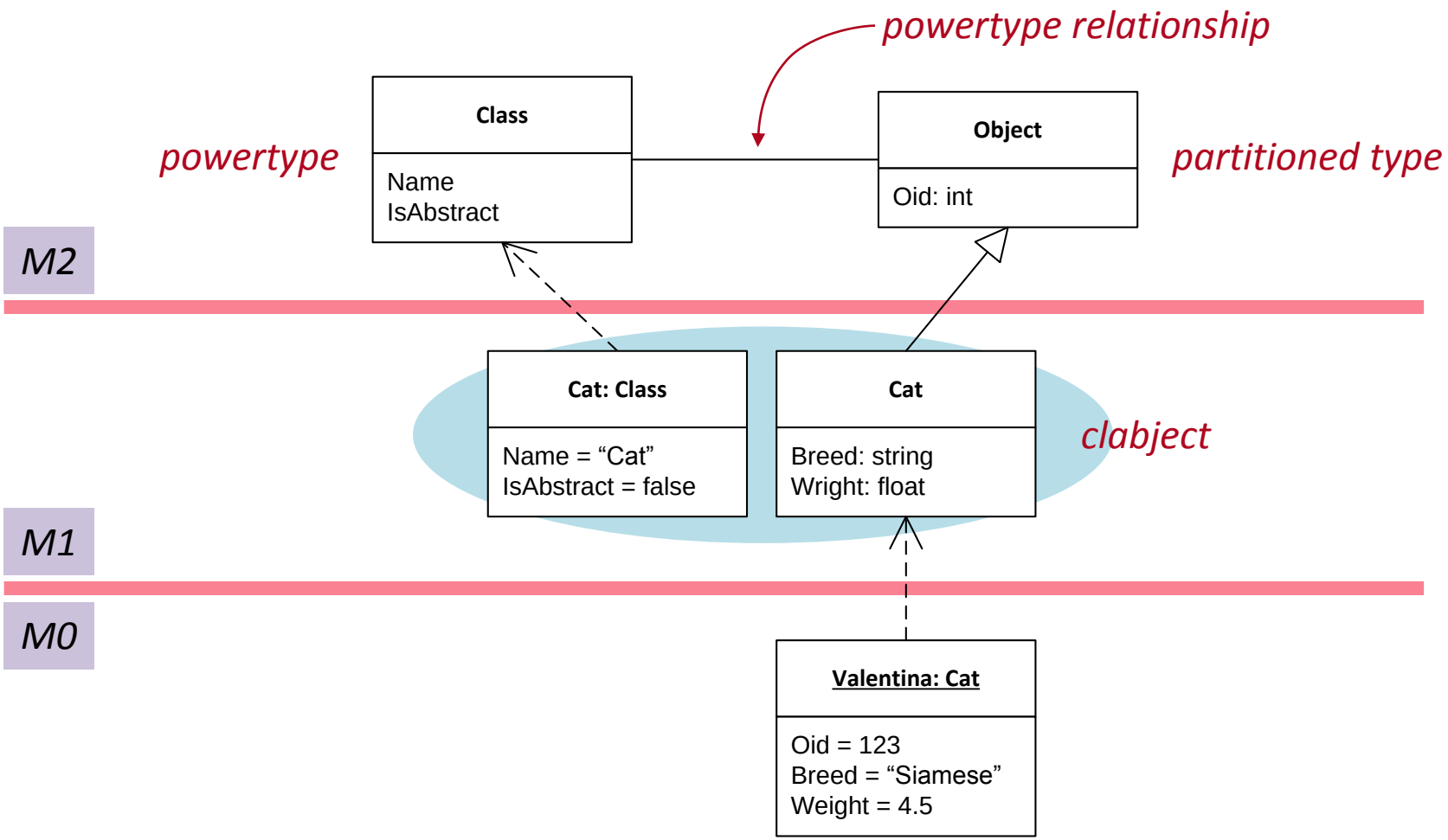
Deep Instantiation Approaches



Powertype-Based Approaches

- Use powertypes and clabjects
- Totally break strict paradigm

Powertype-Based Approaches



Challenges

- Handling partitions (e.g. Siamese, Persian) as individuals as well as universals
- Grounding theories on meaningful mental constructs

Conclusion

- Need to achieve explicit and precise trans-layer control.
- Incorporation of new constructs seems necessary.
- Still, far from consensus.

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