

Note:
A couple of meta-ontological choices for ontological architectures

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Abstract. Major metaphysical meta-ontological choices, whether made consciously nor not, influence the overall shape of an ontological architecture. This brief note argues that the development of upper ontologies should include a characterisation of their architecture in terms of these choices and their impact. How this might work is illustrated here with examples of two major choices, these are: Perdurantism versus Endurantism and Presentism versus Eternalism.

1 Introduction

It seems to me that there is almost certainly a kind of ontological relativity – in the sense that there are a variety of possible ontologies that one can adopt (and that people are adopting). There are major structural (that is, architectural) differences between these ontologies and these can be characterised in terms of metaphysical meta-ontological choices. And these choices influence one another – making one choice has architectural implications for the other choices.

Understanding this should help in the design of upper ontologies in that it should provide a framework discussing architectural options in terms of the choices that need to be made and the impact that they will have. I have tried to set out below examples of how this might work, using two related choices.

I firstly try to explain what (I think) the choices are – as, unless agreement can be reached on this, discussion will not be very fruitful. I then try to clarify some of the architectural implications of the choices. Finally I summarise the major architectural issues.

The objective is to start establishing a framework within which people can work on upper ontologies at a general strategic level so that a general direction can be agreed upon. Once this is established, then the finer details can be worked out.

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1.1 This paper

To get the discussion started, some options for the top level structure is given in terms of the following questions:

- Do distinctions give rise to disjoint categories?
- How are disjoint categories related?

Then the paper moves onto discussion of the examples – the following two meta-ontological choices:

- Perdurantism versus endurantism
- Presentism versus eternalism

To give some idea of the range of choices, here is a list of some of the other choices:

- Absolute versus relative space, time and space-time
- Modally extended versus unextended individuals
- Materialism and non-materialism
- Extensionalism versus non-extensionalism – I – Universals
- Extensionalism versus non-extensionalism – II – Particulars
- Topology of time – branching or linear.

2 Rules of the ontological game and ontological relativity

It seems to me that the ontological framework can be divided (maybe only roughly) into two layers. The top layer consists of the rules of the game – these do not actually make any ‘real’ commitment to the way our actual world is. A good example of this is the related categories of entity, individual and universal. This is the level at which most of the metaphysical meta-ontological choices are made.

2.1 Individuals and Universals

To get the discussion going, let’s assume some rules for our ontological game. We start by assuming that there are entities. In other words, anything that exists is an entity. Assume that there is a relation called exemplifying between entities. ‘John Smith exemplifies Person. Call the entities that are exemplified ‘universals’ (or properties or classes). Call the entities that do not (and cannot) exemplify ‘individuals’ (or ‘particulars’). By these definitions then, these two are disjoint – if an entity is a universal it is not an individual, and vice versa¹.

There are still some degrees of freedom in this structure that give us three key architectural choices:

- Firstly, whether universals can exemplify universals. It makes practical sense to allow this.

¹ This is the approach adopted to characterising universals and particular in the Aristotelian tradition – based upon passages in Aristotle *The categories*

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- Secondly, whether there are any structural restrictions on what kinds of entities universals can exemplify.
 - For example, must all the entities exemplified by a universal be either individuals or universals. If so then universals could be categorised as individual universals (that are exemplified by individuals) and universal universals (that are exemplified by universals). A stricter version of this would have levels of universals in which universals can only be exemplified by entities of the level below. This could be called a stratified hierarchy rather than a cumulative hierarchy. It is hard to make a principled case for these kinds of restrictions.
 - Are there any restrictions on what collections of entities can exemplify a universal? Is there a universal (a class) corresponding to every collection of entities? In part this is a question about ontological reduction.
- Thirdly, whether universals and individuals exhaust the kinds of entities there are. This is a moot point. One kind of entity that needs to be accommodated is relations – but one can argue for relational individuals and relational entities.

2.1 Ontological Relativity

As well as the rules of the game, there are assumptions we make about the nature of the world, particularly our actual world. What we know about the world does not seem to tell us enough to make a decision on these matters – the facts under-determine the nature of the world. One of the key decisions relates to the nature of space, time and their relationships – and this is closely related to the nature of causality.

Two sets of choices are set out below:

1. Perdurantist versus Endurantist, and
2. Presentist versus Eternalist.

3 Perdurantist versus Endurantist

In ordinary everyday language we talk about physical objects, things we can see and touch. These things, bodies (such as trees, stones and people) seem to persist as individuals through time despite changing. In constructing an ontology, there is a choice to be made about the nature of these bodies' existence through time – and the nature of the changes they undergo. The choice is between whether these bodies are changelessly extended in time (perdure through time) or whether they change as they

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endure through time². This can be seen as a question about the nature of change and/or a question about whether bodies are extended in time. [Note: a similar kind of choice needs to be made about individual's modal extension.]

3.1 Continuants-Bodies

Endurantists believe that when these bodies – which they call continuants – exist at a time, they exist wholly and completely at that time – and at every other time at which they exist. When I say I am in this room now, I am talking about 'me'. This 'me' is both completely present and identical with the 'me' who was somewhere else yesterday. This position involves accepting that things can change – and so invites an explanation of what change is, a decision on whether changes is a category in the ontology and, if so, how this category is related to other categories. [Occurrents are a prime candidate for this category.]

Perdurantists believe that, where bodies exist at several times, there is an overall body that is temporally extended through each of those times. So when I say I am in this room, I do not mean all of me is here, but part of a temporally extended me is in the room. And when I say that I am the same person now as I was yesterday, what I am actually saying is that the temporally extended me overlaps both now and yesterday. In this scheme things do not change, so there is no need for a category of changes – or its relations to other categories.

So one big structural difference is that Endurantists' continuants are not extended in time whereas Perdurantists' bodies are. Endurantists often use this to characterise their position by saying that continuants have no temporal parts.

Another big structural difference is that Endurantists accept the reality of change – and so have an ontological category of changes (occurrents), whereas Perdurantists regard change as unreal – and so ontologically irrelevant.

3.2 Occurrents-Events

In ordinary language we also talk about events, things such as football matches and world wars. We seem to be happy to talk about these as if they have temporal parts – for example, we feel comfortable saying that the first half of the football match was boring. Endurantists accept that these are not continuants, they call this type of physical object 'occurrents'. They characterise these as being extended temporally and having temporal parts – they regard the first-half of the football match as (a temporal) part of the (overall) football match. [It is unclear to me whether this is a good way of characterising occurrents as it seem to make what we would normally think of as events (and so occurrents) that only exist at one time – for example, a

² The terms 'endurantist' and 'perdurantist' are taken from Lewis (1986) *On the plurality of worlds*, where 'persist' is intended to be neutral with regard to the 'endure' and 'perdure' interpretations

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instantaneous clap of thunder or the end of a life – as continuants. Or is there some other way of characterising what an occurrent is that captures these?]

Endurantists regard continuants and occurrents as necessarily disjoint – after all something either has temporal parts or does not. Some Endurantists also regard them as an exhaustive categorisation of physical objects. Perdurantists typically regard all physical objects that exist at more than one time as temporally extended. Often Endurantists will characterise the Perdurantists' position as saying it regards all physical objects as occurrents.

The Endurantists' continuants and occurrents typically enter into close relationships – it would be difficult to have a football match (an occurrent) without a football (a continuant). Endurantists use the relation 'participates' to mark these close relationships (and they distinguish it from the mereological part of relation). When I kick a football, the ball and I participate in the kicking. Both the football and I participate in the football match – whereas the kicking is part of the football match.

Introducing the participates relation helps the Endurantist to articulate architectural questions about the nature of the relation between continuants and occurrents. Does an occurrent always have continuants as participants – and conversely, does a continuant always have occurrents it participates in? Answering yes to either of these seems to lead to some difficulties.

Where Perdurantists consider the 'participates' relations between what Endurantists have characterised as continuants and occurrents, they interpret these as an overlapping relation – a part for a time. The extension of the football match overlaps my and the football's extension. In other words, the participates relation deflates into the part relation.

For some Perdurantists, the participates relation is what characterises an event – it has participants – and what differentiates it from bodies. However, this is often a matter of perspective. Archetypal bodies (for example, our bodies) can be seen as events if we consider the atoms of which we are composed as participants. So for Perdurantists, event (and body) is more a way of characterising a physical object, than a category of one. So they do not deny that there is an intuitive feeling that bodies and events are different somehow. But they claim that it is not clear that the difference is a good basis for a fundamental ontological distinction.

3.3 Endurantist's issues

Some of the major issues facing the endurantist position are described below.

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Endurantists' temporalising properties. For an Endurantist, trees, stones and people change over time. Trees and people grow, stones move, and so on. They explain this as the continuants' properties changing over time – that a person can be small (have the property of being small) at one time and tall at another (have the property of being tall). One consequence of this position is that (some) properties have to be temporalised. One cannot be tall simpliciter, one is tall at a time. Maybe not all properties have to be temporalised. There may be things that have to have one or more properties – perhaps trees, stones and people do. If George Bush has to be a person, then he can have the property of being a person, simpliciter. If one further assumes that each property is either such that if it is held, it is held necessarily or it is not, then properties simply fall into one of two mutually exclusive categories; temporalised or timeless. If one does not make this assumption, but proposes that some properties have temporalised and necessary versions, then while these versions fall into two disjoint categories, there is still a need to relate the two versions of the same property and explain what they have in common, and what differentiates them.

Endurantists explaining identity. Endurantists have to do some work to explain identity over time for continuants. Why is me-today the same as me-yesterday (though strictly speaking, for Endurantists me-today and me-yesterday are misleading names as they seem to be temporal parts of me)? What is it that endures from yesterday to today? A choice that some Endurantists make is to propose that there is something unchanging that underlies the changing properties – a 'me-substance'.

Endurantists multiplier effect. Endurantists' distinction between continuants and occurrent has a multiplier effect on their ontology. Corresponding to each continuant at any time and place at which it exists is a single (unique) occurrent, its life. [For the Perdurantists this is evidence of an opportunity for ontological reduction.] Occurrents do not seem to have corresponding continuant in the same way – there is no football match continuant that has the football match occurrent as its life.

3.4 Perdurantists' approach to these issues

For Perdurantists (and Endurantists, with respect to occurrents) things do not change and so they have properties simpliciter. This is achieved by saying that it is not I that is tall, but the adult temporal stage of me (it is not the football match that is boring but the first half, a temporal stage) – though, of course as a limiting case, I can be tall, if I am always tall. Similarly, identity is identity simpliciter. However, some of our ordinary language needs paraphrasing to make the ontological commitments more transparent. For example, Perdurantists have to say me-today and me-yesterday are both temporal parts of me – and not that they are identical.

The Perdurantists' spatio-temporal outlook allows a neat generalisation of the notion of dissective properties (ones that apply to their parts up to a certain granularity) from merely spatial to spatial, temporal and spatio-temporal. The spatial parts of a lump of gold are also gold. The temporal parts of a boring first half of a football match are also boring. Similarly, the temporal parts of my 'tall' stage are also

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tall. Moving is an example of a property that is both spatially and temporally dissective – and so spatio-temporally dissective.

3.5 Identity and co-extensivity in space and space-time

Endurantists's continuants have a rigidity in the way they can be 'identical'. If continuants are completely present at a time, then they are either identical or different at that time – and so all other times. So a statue and the clay of which it is made are necessarily different, if they are different at any time. Endurantists typically relate the clay (matter) with the statue (form) through a composition relation. It is not just form and matter that can be co-extensive, so, in general, Endurantists need a 'theory' for determining when co-extensive (at a time) things are identical, and when they are not. Simple spatio-temporal Extensionalism seems a bit arbitrary for Endurantists. At the times when the statue is composed of the piece of clay – where the piece of clay and the statue are different entities – they spatially co-incide. But whether they have the same or different spatio-temporal 'extensions' is irrelevant.

Perdurantists are allowed a bit more flexibility on how bodies may overlap. Two bodies can only be partly present at a time and so, at that time, have temporal parts that are identical, while still remaining different. So, in the case of the statue and the clay the composition relation deflates into the mereological overlapping temporal parts relation.

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Treatment of roles. The Perdurantist approach is helpful in the treatment of roles. Typically Endurantists will want to treat a role, such as the President of the United States, as a property belonging to different people at different times. They will also want to treat the Government of the United States as an individual. Then they need an explanation of why we talk of the President as being a key part of the Government – given that the ‘part’ is a property and the ‘whole’ an individual. Perdurantists can give a neater explanation in terms of the (individual) President overlapping people, such as George Bush, and being a part of the (individual) government.

Treatment of times. Also, some people note a problem with Endurantists notion of times at which things exist – it seems idealised. We certainly do not perceive things in an instant. And it seems unlikely that the times different people take to perceive the world can be easily harmonised – establishing a common set of times for properties to be temporalised over. Indeed, with our knowledge of relativity theory, the notion of an objective time seems to be inconsistent.

Amount of structure. Finally it is worth noting that Endurantists’ provide more structure (more categories) than Perdurantists. The real question is whether the additional structure delivers more benefits – or just more complexity.

3.6 Summary of Main Architectural Differences

<i>Endurantist</i>	<i>Perdurantist</i>
<ul style="list-style-type: none"> ❑ two disjoint categories of things – continuants and occurrents, related by ‘participation’. ❑ accept reality of change ❑ need to temporalise some properties. ❑ two categories of property – temporalised and untemporalised (disjoint but some related). ❑ needs an explanation for identity over time ❑ forces identity/difference at a time 	<ul style="list-style-type: none"> ❑ single category – enables participation to be interpreted as ‘a part for a time’. ❑ regard change as unreal ❑ properties simpliciter ❑ single category of properties – but allocate properties to temporal parts. ❑ identity simpliciter ❑ paraphrasing ordinary language for temporal parts ❑ enables overlapping for roles

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4 Presentist versus eternalist

This is a(nother) choice that needs to be made about the nature of time. From one perspective, it can be seen as asking whether things themselves change (rather than just whether things change properties over time).

A Presentist believes our impression of time passing is ‘real’, the Eternalist does not. Thus the Presentist believes that tenses in ordinary language have an ontological significance. What is going on now really exists, what happens in the past has existed and what might happen in the future has yet to exist.

For Presentists, properties of things that exists at any time, have to be modified by tenses. So if I now can say ‘I was ill last Tuesday’ – this property (and me) exists in different way now that it did last Tuesday, when I could say ‘I am ill’.

Note that Endurantist Presentists can talk of having (untemporalised) properties simpliciter in the present tense – I am ill. The present tense modifier effectively temporalises the property.

This can be seen in the treatment of ‘now’. What is it? If it is a property of times, then we cannot establish whether it is true by temporalisation. Now- t_1 (now temporalised to time t_1) is true when t_1 is the present, and false at other times. We have to tense index the times. Now- t_1 -now (now- t_1 -tensed to now) is always true, now- t_1 -past and now- t_1 -future always false.

For the Perdurantist things that exist yesterday, now or tomorrow, exist in exactly the same way and have their properties in exactly the same way.

Among philosophers Presentism and Endurantism go hand in hand, as does Eternalism and Perdurantism.

One of the apparent attractions of Presentism is that it seems to be more favourable to free will – the notion that people have the ability to make choices and are responsible for those choices. However, a good explanation of free will can be made within Eternalism.

The Eternalist can regard Presentism as a good epistemological framework – as it captures what we can possibly know in relation to time. We perceive the present as moving from the past into the future. We frame our talk about our decisions within that context. We write programs telling computers what to do in the same vein. A Presentist epistemology over an Eternalist ontology is a good way to describe the decision making processes of both ourselves and computers. We do not program our computers to regard ‘now’ as a relation between a time and the computer – we just say ‘now do this’ – or ‘do this next’.

4.1 Summary of Main Architectural Differences

<i>Presentist</i>	<i>Eternalist</i>
<input type="checkbox"/> can modify properties with tenses.	<input type="checkbox"/> eliminates the need for tensed properties.
<input type="checkbox"/> is apparently easier to deal with issues such as free will.	
<input type="checkbox"/> helps to have Presentist notions	

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at the epistemological level to describe decision making

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