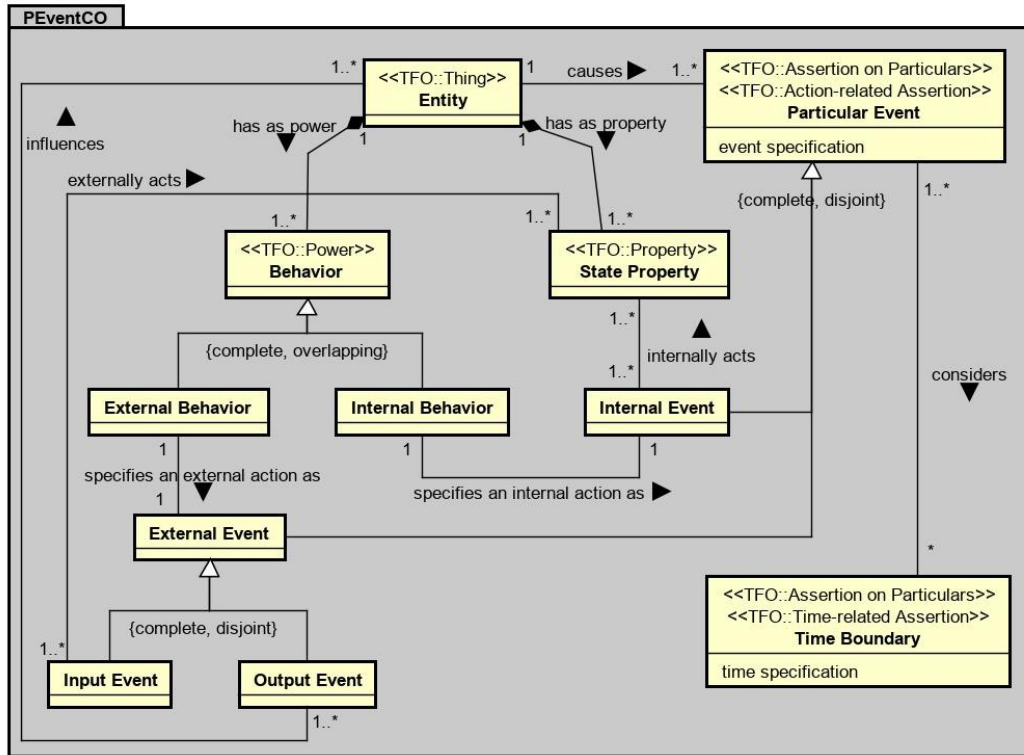


## PEventCO v1.0: Graphical Representation



## PEventCO v1.0: Terms

Term	Definition
<b>Entity</b> (Synonym: <b>Dynamic Entity</b> )	It represents a particular or concrete, tangible or intangible object, for which a dynamic behavior is defined explicitly using its Properties and Powers.  <i>Note:</i> Entity has the semantics of Thing –term coming from the ThingFO ontology. Therefore, an Entity is not a particular object without its Properties and Powers.
<b>Behavior</b>	It refers to what a particular Entity behaves under established conditions.  <i>Note:</i> Behavior has the semantics of Power –term coming from the ThingFO ontology. A Power is one member of the triad that conforms the unique individual named Thing.
<b>State Property</b>	It refers to the intrinsic state structure of a particular Dynamic Entity.  <i>Note:</i> State Property has the semantics of Property –term coming from the ThingFO ontology. A Property is one member of the triad that conforms to the unique individual named Thing.
<b>Particular Event</b>	It is an Assertion on Particulars and, at the same time, an Action-related Assertion that explicitly states and specifies the occurrence of an Entity action. It is related to the interaction and happening of Entities since acting Behaviors cause any Particular Events that might occur.  <i>Note:</i> Particular Event mechanisms need to consider Time Boundaries, in addition to the changes or queries in the states of the Entities' Properties.

<b>Time Boundary</b>	It is a Time-related Assertion that specifies temporal limits and restrictions from which a Particular Event or series of Particular Events can be related and modeled.
<b>Internal Behavior</b> (Synonym: <b>Internal Power</b> )	It is a type of Behavior that refers to what a particular Entity can do to act over its State Properties. <i>Note: It refers to the occurrence of internal actions on an Entity.</i>
<b>External Behavior</b> (Synonym: <b>External Power</b> )	It is a type of Behavior that refers to the occurrence of external actions on an Entity.
<b>Internal Event</b> (Synonym: <b>Entity Internal Event</b> )	It is a Particular Event that explicitly states and specifies the occurrence of an internal Entity action that acts over State Properties of such an Entity.
<b>External Event</b> (Synonym: <b>Entity External Event</b> )	It is a Particular Event that explicitly states and specifies the occurrence of an external Entity action.
<b>Input Event</b> (Synonym: <b>External Input Event</b> )	It is an External Event that explicitly states and specifies the occurrence of an external Entity action that acts over State Properties of an Entity according to its External Behavior.
<b>Output Event</b> (Synonym: <b>External Output Event</b> )	It is an External Event that explicitly states and specifies the occurrence of an external Entity action that has some implication in other Entities.

#### PEventCO v1.0: Properties

Term	Attribute	Definition
Particular Event	event specification	It specifies a Particular Event.
Time Boundary	time specification	It specifies temporal relations and restrictions for Events since events happen in time.

#### PEventCO v1.0: Non-taxonomic Relationships

Relationship	Definition
has as power	An Entity has one or many Behaviors as Powers.
has as property	An Entity has one or many State Properties as Properties.
causes	A Dynamic Entity causes one or many Particular Events.
specifies an internal action as	An Internal Behavior specifies an Internal Event.
specifies an external action as	An External Behavior specifies an External Event.
internally acts	An Internal Event internally acts on one or more State Properties.

<b>externally acts</b>	An Input Event externally acts on one or more State Properties.
<b>considers</b>	A Particular Event can be attached to Time Boundaries.
<b>influences</b>	An Output Event influences one or many Entities.

### PEventCO v1.0: Axioms

**A1 description:** *An Entity that causes a Particular Event is a Thing that defines an Assertion on Particulars.*

$$\forall e, \forall ev: [Entity(e) \wedge ParticularEvent(ev) \wedge causes(e, ev) \rightarrow defines(e, ev)]$$

**A2 description:** *A Behavior that composes an Entity is a Power that composes a Thing.*

$$\forall e, \forall b: [Entity(e) \wedge Behavior(b) \wedge hasAsPower(e, b) \rightarrow partOf(b, e)]$$

**A3 description:** *A State Property that composes an Entity is a Property that composes a Thing.*

$$\forall e, \forall s: [Entity(e) \wedge StateProperty(s) \wedge hasAsProperty(e, s) \rightarrow partOf(s, e)]$$

**A4 description:** *A Particular Event that considers a Time Boundary defines two related Assertions.*

$$\forall e, \forall tb: [ParticularEvent(e) \wedge TimeBoundary(tb) \wedge considers(e, tb) \rightarrow relatesWith(e, tb)]$$

**A5 description:** *The relationship labeled 'acts upon' between Power and Property helps to represent Internal Events produced by an Internal Behavior over State Properties.*

$$\forall ib, \forall ie, \forall sp: [InternalBehavior(ib) \wedge specifiesAnInternalActionAs(ib, ie) \wedge InternalEvent(ie) \wedge internallyActs(ie, sp) \wedge StateProperty(sp) \rightarrow actsUpon(ib, sp)]$$

**A6 description:** *The relationship labeled 'acts upon' between Power and Property helps to represent External Input Events produced by an External Behavior over State Properties.*

$$\forall eb, \forall ie, \forall sp: [ExternalBehavior(eb) \wedge specifiesAnExternalActionAs(eb, ie) \wedge InputEvent(ie) \wedge externallyActs(ie, sp) \wedge StateProperty(sp) \rightarrow actsUpon(eb, sp)]$$

**A7 description:** *The relationship labeled 'interacts with other' between the Power of a Thing and other Things helps to represent External Output Events produced by the External Behavior of an Entity.*

$$\forall eb, \forall oe, \forall e: [ExternalBehavior(eb) \wedge specifiesAnExternalActionAs(eb, oe) \wedge OutputEvent(oe) \wedge influences(oe, e) \wedge Entity(e) \rightarrow interactsWithOther(eb, e)]$$

**A8 description:** *An Output Event that influences an Entity is dealing with such an Entity.*

$$\forall oe, \forall e: [OutputEvent(oe) \wedge influences(oe, e) \wedge Entity(e) \rightarrow dealsWithParticulars(oe, e)]$$

**A9 description:** *When the Internal Behavior of an Entity specifies an Internal Event, the Entity is causing the Internal Event and the Internal Event is dealing with the Entity.*

$$\forall e, \forall ib, \forall ie: [Entity(e) \wedge partOf(ib, e) \wedge InternalBehavior(ib) \wedge specifiesAnInternalActionAs(ib, ie) \wedge InternalEvent(ie) \rightarrow causes(e, ie) \wedge dealsWithParticulars(ie, e)]$$

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**A10 description:** *When the External Behavior of an Entity specifies an External Input Event, the Entity is causing the External Event and the External Event is dealing with the Entity.*

$$\forall e, \forall eb, \forall ie: [Entity(e) \wedge partOf(eb, e) \wedge ExternalBehavior(eb) \wedge specifiesAnExternalActionAs(eb, ie) \wedge InputEvent(ie) \rightarrow causes(e, ie) \wedge dealsWithParticulars(ie, e)]$$

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**A11 description:** *When the External Behavior of an Entity specifies an External Output Event, the Entity is causing the External Event, but the External Event is not dealing with the Entity.*

$$\forall e, \forall eb, \forall oe: [Entity(e) \wedge partOf(eb, e) \wedge ExternalBehavior(eb) \wedge specifiesAnExternalActionAs(eb, oe) \wedge OutputEvent(oe) \rightarrow causes(e, oe) \wedge \neg dealsWithParticulars(oe, e)]$$

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**A12 description:** *The Time Boundary of a Particular Event that deals with an Entity, it is also dealing with the Entity.*

$$\forall e, \forall tb, \forall en: [ParticularEvent(e) \wedge TimeBoundary(tb) \wedge considers(e, tb) \wedge Entity(en) \wedge dealsWithParticulars(e, en) \rightarrow dealsWithParticulars(tb, en)]$$

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