

# ESO HANDOUT

The Event and Implied Situation Ontology (ESO) is an OWL2 ontology which formalizes the pre and post situations of events and the roles of the entities affected by an event. The ontology relies on Semantic Role Labeled text and focusses primarily on the interpretation of event implications rather than the semantics of the event predicates. As such, the ontology is designed to infer information from text that otherwise would remain implicit.

For instance, from an annotated sentence with a Decreasing event, we can derive the following:

"Apple lowered the price of the Iphone from 600 to 500 dollar."

pre situation	Iphone	hasAttribute	price
	price	hasRelativeValue	+
	price	hasValue	600
post situation	Iphone	hasAttribute	price
	price	hasRelativeValue	-
	price	hasValue	500

meaning that the price of the iPhone was higher before the event than after the event and the value of the attribute (price) changed from 600 to 500 dollar.

The ontology consists of 63 event classes with 103 mappings to FrameNet and 46 mappings to SUMO on class level. In total, 58 properties were defined to model the pre and post situations of events. For the roles of the entities affected by an event, 131 mappings to FrameNet Frame Entities were created.

## Useful links:

ESO.owl and an extensive documentation:

<https://github.com/newsreader/eso>

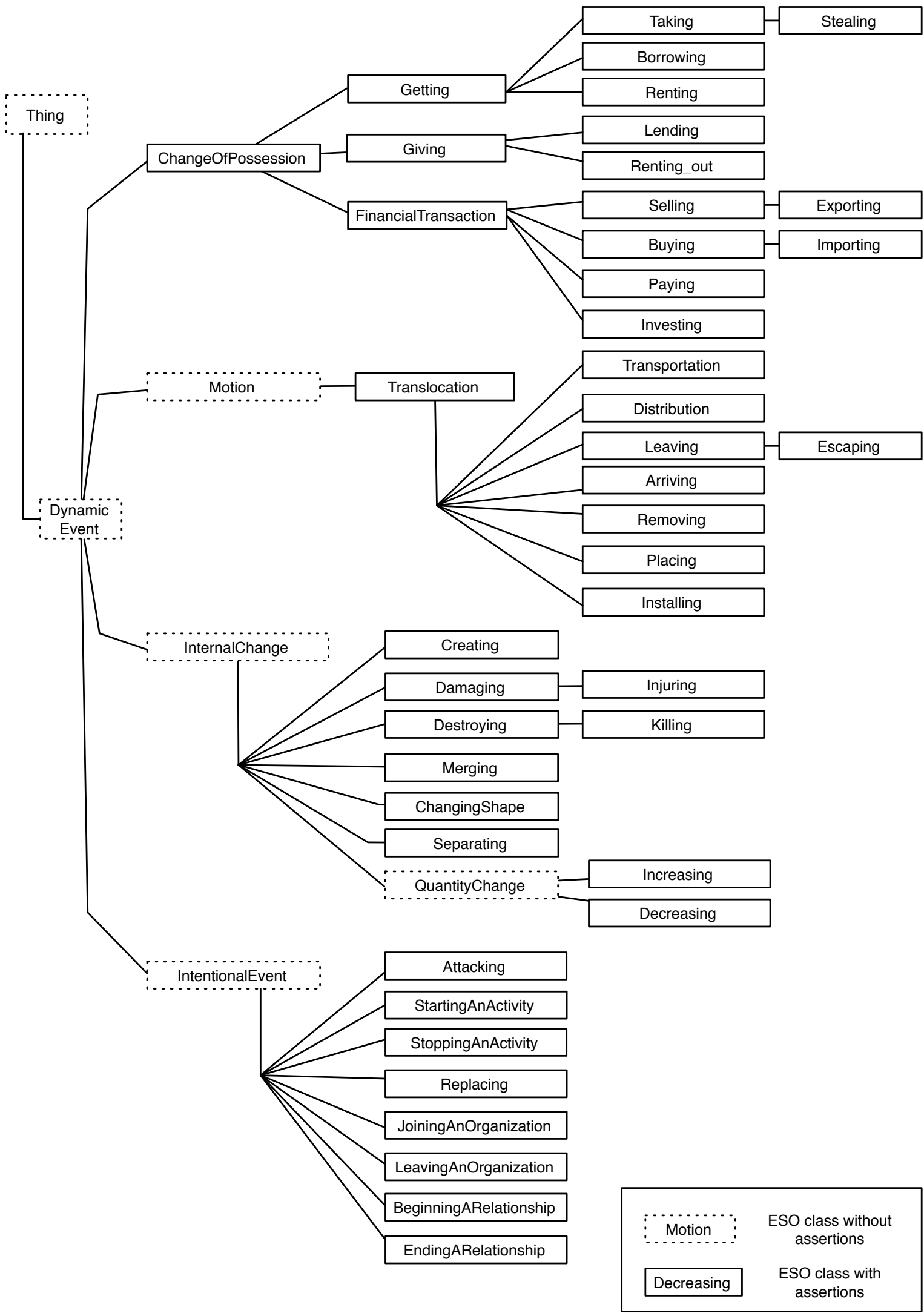
A non-formal transcription of the ESO classes, properties, assertions and example sentences that illustrate the expressivity of the assertions can be found in the appendix of the ESO documentation.

FrameNet: <https://framenet.icsi.berkeley.edu/fndrupal/>

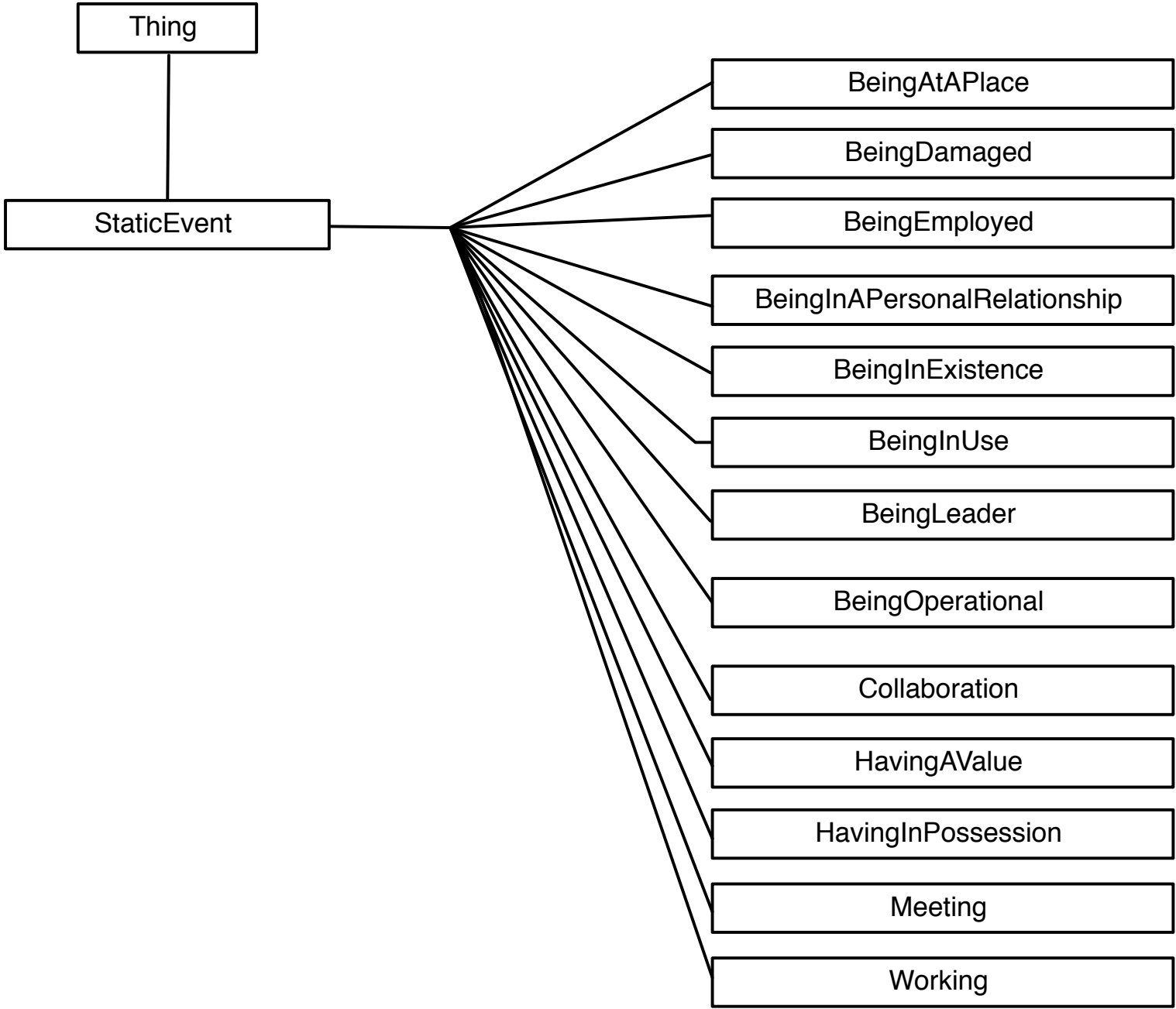
SUMO: <http://www.adampease.org/OP/>

**In this handout we provide:**

- a) an overview of the dynamic and static class hierarchies in ESO
- b) a table with the frequency of the ESO classes in the NewsReader Cars dataset
- c) a table with all mappings from ESO to SUMO and FrameNet



Motion	ESO class without assertions
Decreasing	ESO class with assertions



<b>ESO CLASS</b>	<b>FREQUENCY IN CAR DATA</b>
Creating	3159866
Motion	2559184
Getting	2290087
Giving	2222249
Increasing	1913293
Translocation	1900909
Transportation	1437277
IntentionalEvent	1353717
Placing	1244858
Merging	1015398
Arriving	975604
BeingEmployed	901300
Working	751349
BeingLeader	714560
Replacing	644671
Decreasing	605651
Taking	597966
BeingAtAPlace	577688
Injuring	534312
Selling	428060
Collaboration	345414
Removing	300170
Leaving	285265
Buying	273922
Separating	269880
Meeting	248834
Paying	235091
LeavingAnOrganization	214412
HavingAValue	187695
JoiningAnOrganization	185741
BeingInUse	181818
Attacking	169586
Damaging	154389
Destroying	151891
HavingInPossession	116261
ChangingShape	103691
Killing	97468
ChangeOfPossession	89950
Distribution	75754
Lending	39957
Stealing	39692
Installing	37740
Escaping	31541
BeginningARelationship	24687

Renting	16924
Exporting	16344
FinancialTransaction	15968
Importing	15697
EndingARelationship	11642
RentingOut	10514
BeingInAPersonalRelationship	5407
Borrowing	4926
BeingInExistence	501
StoppingAnActivity	102
StartingAnActivity	4

ESO Class	FrameNet frame	SUMO class
Arriving	Arriving Vehicle_landing	Arriving
Attacking	Attack	ViolentContest
BeginningARelationship	bm:Forming_relationships	-
BeingAtAPlace	Residence Presence Temporary_stay Being_located	-
BeingDamaged	bm:Being_operational	-
BeingEmployed	Being_employed Employing	-
BeingInAPersonalRelationship	Personal_relationship	-
BeingInExistence	Existence	-
BeingInUse	bm:Being_operational Using_resource Using	-
BeingLeader	Leadership	-
BeingOperational	Being_operational	-
Borrowing	Borrowing	Borrowing
Buying	Commerce_buy	Buying
ChangeOfPossession	rm:Transfer	ChangeOfPossession
ChangingShape	Manipulate_into_shape Reshaping	ShapeChange
Collaboration	Collaboration	Cooperation
Creating	Building Intentionally_create Creating Manufacturing	Constructing Making Creation Manufacture
Damaging	Damaging Render_nonfunctional	Damaging
Decreasing	bm:Change_of_quantity_of_possession bm:Cause_change_of_position_on_a_scale bm:Change_position_on_a_scale bm:Proliferating_in_number bm:Expansion bm:Cause_expansion	Decreasing
Destroying	Cause_to_fragment Destroying	Destruction
Distribution	Dispersal	-
DynamicEvent	-	-
EndingARelationship	bm:Forming_relationships	-
Escaping	Escaping Fleeing	Escaping
Exporting	Exporting	Exporting
FinancialTransaction	Commercial_transaction	FinancialTransaction
Getting	Receiving Getting	Getting
Giving	Sending	Giving

	Giving	
	Supply	
HavingAValue	Amounting_to	-
HavingInPossession	Possession	-
	Retaining	
Importing	Importing	rm:Exporting
Increasing	bm:Change_position_on_a_scale	Increasing
	Cause_proliferation_in_number	
	bm:Change_of_quantity_of_possession	
	bm:Expansion	
	bm:Proliferating_in_number	
	bm:Cause_expansion	
	bm:Cause_change_of_position_on_a_scale	
Injuring	Experience_bodily_harm	Injuring
	Cause_harm	
Installing	Installing	Installing
IntentionalEvent	Intentionally_act	IntentionalProcess
InternalChange		InternalChange
Investing	-	Investing
JoiningAnOrganization	Hiring	bm:JoiningAnOrganization
	Get_a_job	
Killing	Execution	Killing
	Killing	
Leaving	Vehicle_departure_initial_state	Leaving
	Departing	
	Setting_out	
	Quitting_a_place	
LeavingAnOrganization	Firing	TerminatingEmployment
	Quitting	
Lending	Lending	Lending
Meeting	Assemble	Meeting
	Come_together	
	Social_event	
Merging	Amalgamation	Combining
	Cause_to_amalgamate	
Motion	Motion	Motion
Paying	Commerce_pay	Payment
Placing	Placing	Putting
QuantityChange		QuantityChange
Removing	Removing	Removing
Renting	Renting	Renting
RentingOut	Renting_out	-
Replacing	Replacing	Substituting
	Take_place_of	
	Change_of_leadership	
Selling	Commerce_sell	Selling
Separating	Becoming_separated	Separating
	Separating	
StartingAnActivity	Activity_start	-
StaticEvent	State	-



Stealing	Theft	Stealing
StoppingAnActivity	Activity_stop	-
Taking	Taking	UnilateralGetting
Translocation	Self_motion	Translocation
	Cotheme	
	Traversing	
	Use_vehicle	
	Intentional_traversing	
	Ride_vehicle	
	Travel	
	Operate_vehicle	
	Cause_motion	
Transportation	Bringing	Transportation
	Delivery	
Working	Working_a_post	-
	Work	

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Table 1: Mappings from ESO classes to FrameNet frames and SUMO including a shortened specification of the mapping.