

# OWL Web Ontology Language as a Scripting Language for Smart Space Applications

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Simplify the development of new software applications that use the features of multiple smart devices.

```
with phone:- Phone, pvr:- PVR(id="pvr01"):  
  when phone.IncomingCall: pvr.Pause  
end
```

```
with  user  $\equiv$  /User  $\sqcap$   $\exists$ /Id>{"peter.smith@abo.fi"}
      phone  $\equiv$  /Phone  $\sqcap$   $\exists$ /Owner-. user
      busyUser  $\equiv$  user  $\sqcap$  /Busy
      ringingPhone  $\equiv$  phone  $\sqcap$  /IncomingCall

when  ( $\exists T$ . busyUser)  $\sqcap$  ( $\exists T$ . ringingPhone)

then  insert /ActivateVoicemail( ringingPhone )
```

```
with   EquivalentClasses(user ObjectIntersectionOf(/User
      ObjectSomeValuesFrom(/Id ObjectOneOf(
        "peter.smith@abo.fi"))))
      EquivalentClasses(phone ObjectIntersectionOf(/Phone
      ObjectSomeValuesFrom(ObjectInverseOf(/Owner) user)))
      EquivalentClasses(busyUser
      ObjectIntersectionOf(user /Busy))
      EquivalentClasses(ringingPhone
      ObjectIntersectionOf( phone /IncomingCall))

when   ObjectIntersectionOf(ObjectSomeValuesFrom(
      owl:topObjectProperty busyUser)
      ObjectSomeValuesFrom(owl:topObjectProperty
      ringingPhone))

then   insert /ActivateVoicemail( ringingPhone )
```

```
with  user = /User and /Id == "peter.smith@abo.fi"  
      phone = /Phone /Owner user  
      busyUser = user and /Busy  
      ringingPhone = phone and /IncomingCall  
  
when  busyUser, ringingPhone  
  
then  insert /ActivateVoicemail( ringingPhone )
```

```
when /SIB_Location and /EmployeeRestaurant,  
    dev/Time > "11:00:00" ^^xsd:time,  
    dev/Time < "13:30:00" ^^xsd:time  
  
then insert /AtLunch( user )
```

Class Expression	Interpretation $\cdot^C$
( CE )	$(CE)^C$
$CE_1$ and $CE_2$	$(CE_1)^C \cap (CE_2)^C$
$CE_1$ or $CE_2$	$(CE_1)^C \cup (CE_2)^C$
$CE_1 \sqsubseteq CE_2$	$\begin{cases} \delta & \text{if } \exists x, y : x \in (CE_1)^C \text{ and } y \in (CE_2)^C \\ \emptyset & \text{otherwise} \end{cases}$ where $\delta \subseteq \Delta_1$ and $\delta \neq \emptyset$
$CE_1 \text{ OPE } CE_2$	$\{x \mid \exists y : (x, y) \in (OPE)^{OP} \text{ and } x \in (CE_1)^C, y \in (CE_2)^C\}$
$n \text{ CE}_1 \text{ OPE } CE_2$	$\{x \mid \#\{y \mid (x, y) \in (OPE)^{OP} \text{ and } x \in (CE_1)^C, y \in (CE_2)^C\} = n\}$
$\min n \text{ CE}_1 \text{ OPE } CE_2$	$\{x \mid \#\{y \mid (x, y) \in (OPE)^{OP} \text{ and } x \in (CE_1)^C, y \in (CE_2)^C\} \geq n\}$
$\max n \text{ CE}_1 \text{ OPE } CE_2$	$\{x \mid \#\{y \mid (x, y) \in (OPE)^{OP} \text{ and } x \in (CE_1)^C, y \in (CE_2)^C\} \leq n\}$
only $CE_1 \text{ OPE } CE_2$	$\{x \mid \forall y : (x, y) \in (OPE)^{OP}, x \in (CE_1)^C \text{ implies } y \in (CE_2)^C\}$
? OPE CE	$\{x \mid \exists y : (x, y) \in (OPE)^{OP} \text{ and } y \in (CE)^C\}$
CE OPE ?	$\{y \mid \exists x : (x, y) \in (OPE)^{OP} \text{ and } x \in (CE)^C\}$
DPE DR	$\{x \mid \exists y : (x, y) \in (DPE)^{DP} \text{ and } y \in (DR)^{DT}\}$

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