

# The bourne identity of a web resource

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# From URIs to Worlds

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- The URI mechanism is effective for referencing resources that are on the world wide web
- Original intention was to refer to things in general
- Software agents should be able to unambiguously identify a resource, in order to perform the appropriate operations on it
- Need for a formal categorization
- We propose an ontology that helps characterizing the identity of a resource



# Identity on the web

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- <http://loa-cnr.it/AldoGangemi>
- what does it identify?
  - a string, in particular a URI
  - a (web) location in a virtual space
  - a file, a piece of information
  - Aldo, the person



# Identity crisis

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I'm a semantic web service able to collect information about people and put it together in the form of a discourse :)



# Identity crisis

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I use web services that  
inform me about a resource



# Identity crisis

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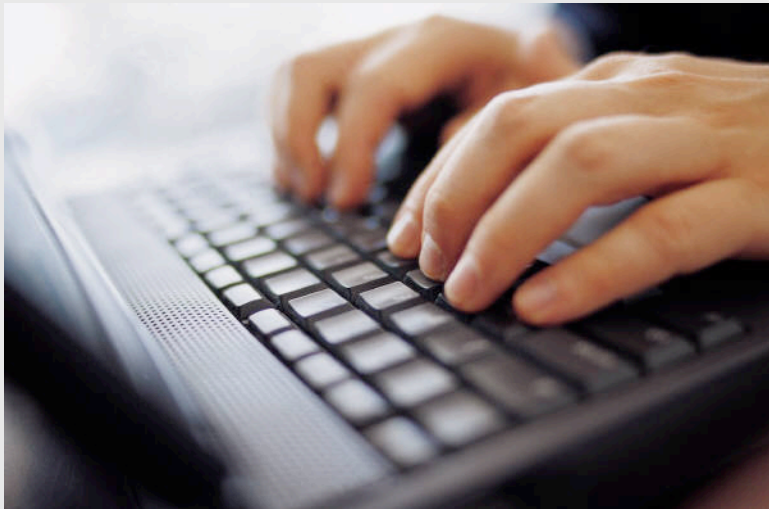


Give me the URI of two persons and I will provide you with interesting information about them

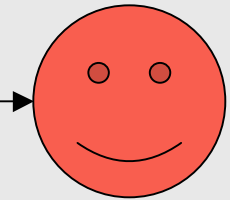


# Identity crisis

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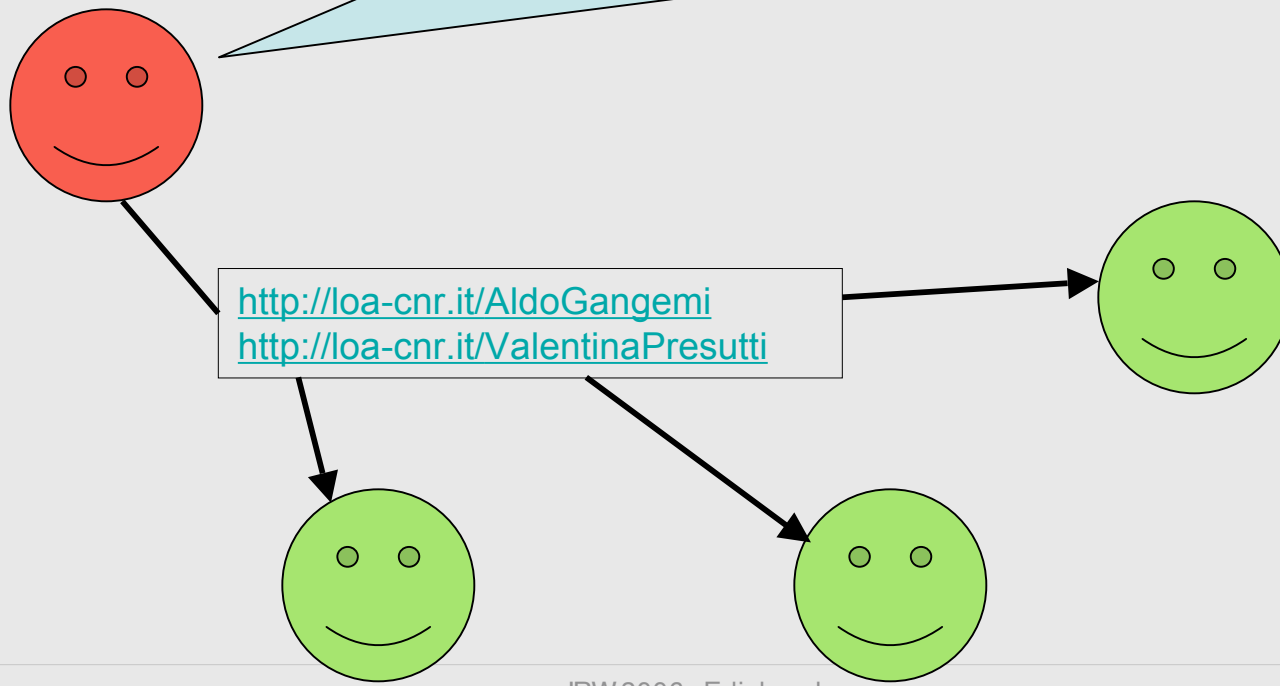


<http://loa-cnr.it/AldoGangemi>  
<http://loa-cnr.it/ValentinaPresutti>



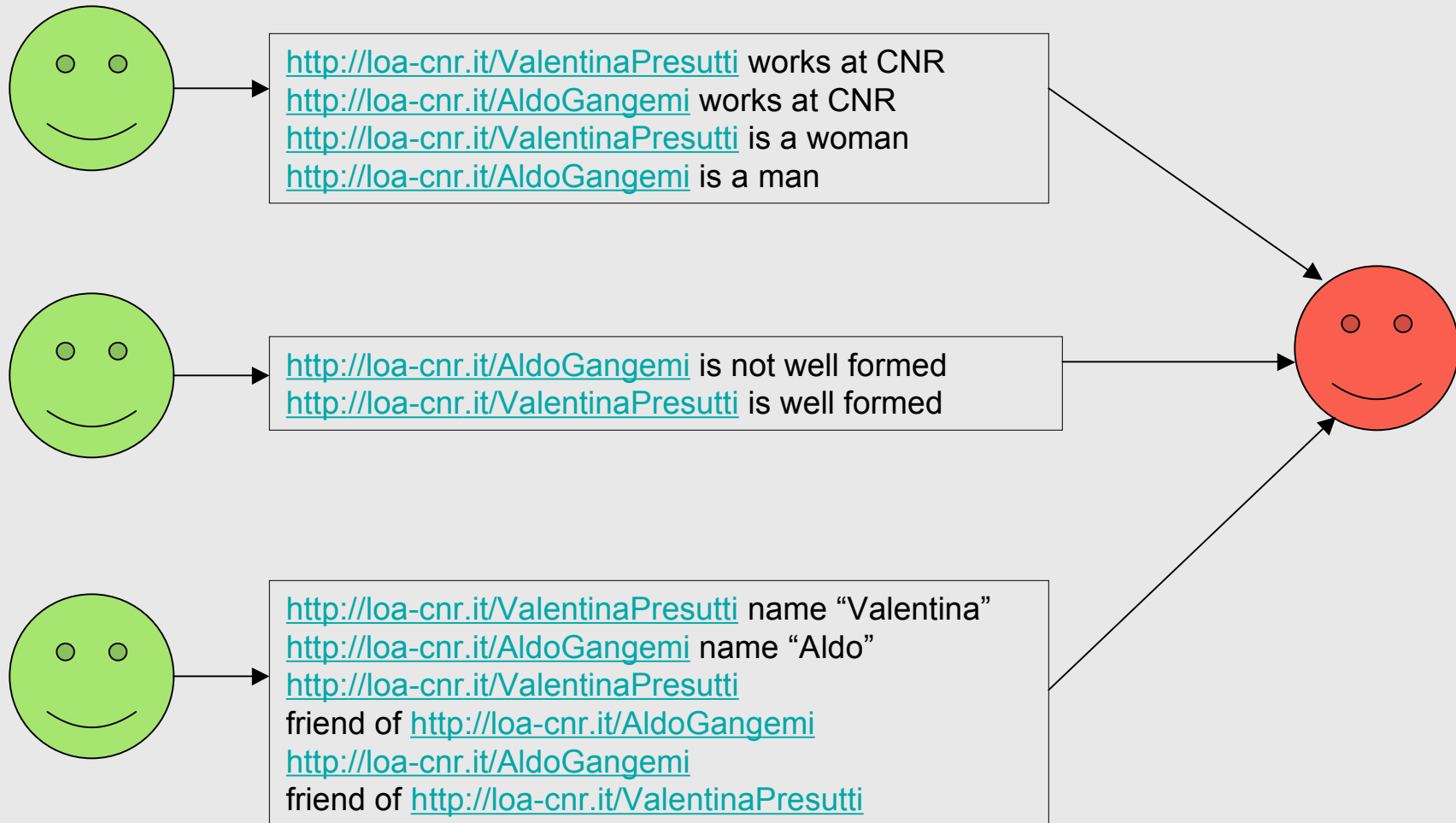
# Identity crisis

Hi :) please, can you give me information about  
<http://loa-cnr.it/AldoGangemi>  
and <http://loa-cnr.it/ValentinaPresutti>?





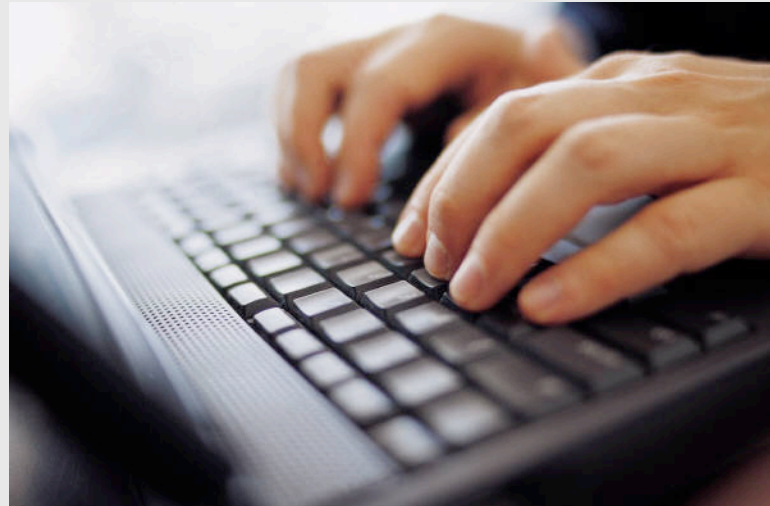
# Identity crisis



# Identity crisis

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Aldo and Valentina are friends.  
They work at CNR. Valentina is a woman, she is well formed  
Aldo is a man, he is not well formed.



# Identity crisis

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Aldo and Valentina are friends.  
They work at CNR. Valentina is a woman, she is well formed  
Aldo is a man, he is not well formed.



# What is a WWW Resource?

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- From WWW architecture, RFC2396 and RFC3986:
  - a *thing* that might be identified by a URI
  - *anything* that has identity
  - a *conceptual mapping* to an entity or set of entities
  - is not necessarily accessible via the Internet
  - human beings, corporations, and bound books in a library can be also resources
  - an *information resource* is a resource which essential characteristics can be conveyed in a message



# A many-sensed word

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- **At least four interpretations:**
  - a conceptual mapping
    - a location in a virtual space - not a computational object
  - a computational object
    - something that can take part in a computational process
  - a proxy
    - a computational object located in a virtual region, its identity is the set of elements composing it
  - an entity
    - whatsoever



# Which interpretation?

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- **Need for a formal description of:**
  - what things can be described
  - how things are described
  - relations between *how* and *what*
- **A formal description can help:**
  - defining an operational semantics
  - finding appropriate syntactic solutions
  - reconciling different terminologies



# Identifier, Resource, Entity: the IRE pattern 1/2

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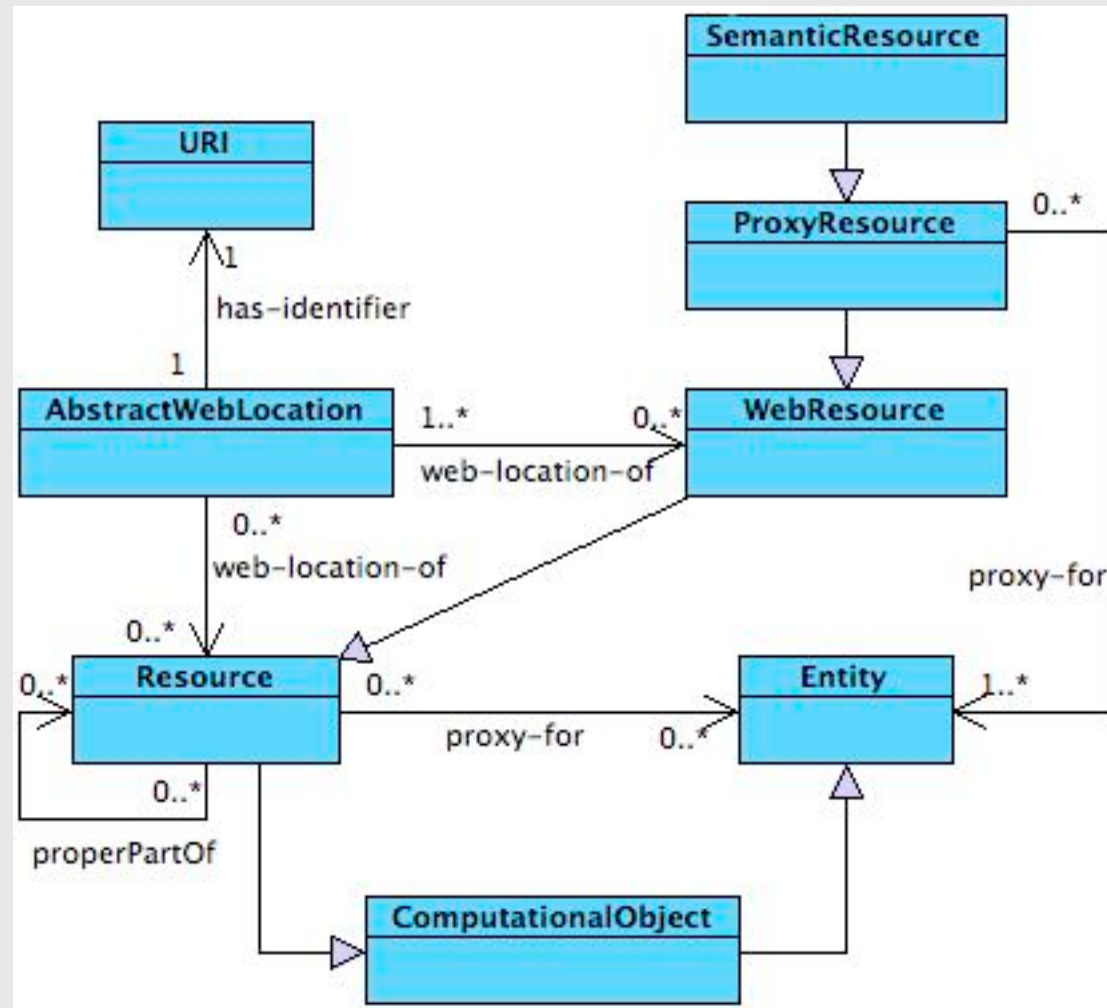
- **IRE**
  - is a conceptual pattern
  - is based on DOLCE and some of its modular extensions (notably the InformationObjects one)
  - provides the basis for defining a categorization of the kinds of resources that can be referenced on the web
  - the term *resource* in IRE has not the same sense as it has in the WWW context
  - WWW “Resource” = IRE “Entity”

<http://www.loa-cnr.it/ontologies/InformationObjects.owl>

<http://dolce.semanticweb.org>



# Identifier, Resource, Entity: the IRE pattern 2/2





## The *proxy-for* relation

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$$\text{proxyFor}(x,y,t) \stackrel{\text{def}}{=} \text{Resource}(x) \wedge \text{Entity}(y) \wedge \text{TimeInterval}(t) \wedge \\ \exists z(\text{InformationObject}(z) \wedge \text{realizes}(x,z,t) \wedge \text{about}(z,y,t))$$

- *ire:proxyFor* is a relation between a *ire:Resource* and a *dolce:Entity* at a certain *dolce:TimeInterval*, provided that the resource *edns:realizes* a *edns:InformationObject* that is *edns:about* the entity
- e.g.: <http://www.w3.org> is the identifier for the web location of a resource that currently realizes a text about the the W3C organization



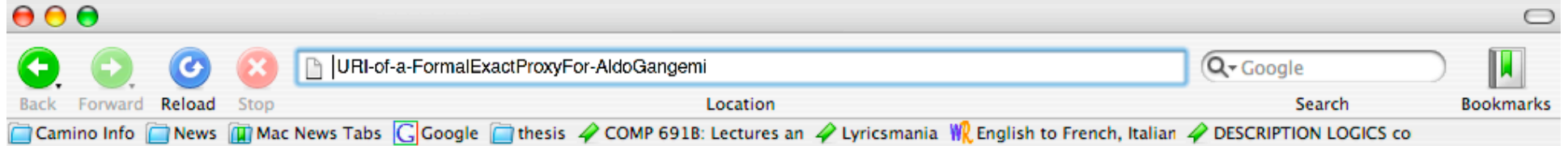
# Types of *proxy-for* relations

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- **resolvable-proxy-for**
  - a relation between a ProxyResource and a WebResource
  - a ProxyResource allows to access the WebResource it is proxy for
  - e.g., a 'href' link in an HTML document
- **approximate-proxy-for**
  - a relation between a Resource and more than one entity
  - the resource refers to all those entities
- **exact-proxy-for**
  - a relation between a resource and one and only one entity
- **formal-exact-proxy-for**
  - a relationship between a SemanticResource and one and only one entity



# A semantic browser



## GO WHERE YOU WANT

The following resources are about this entity:

[aldo.gangemi@istc.cnr.com](mailto:aldo.gangemi@istc.cnr.com)  
[aldo-home-page.html](#)  
[aldo-picture-on-flickr.jpg](#)  
[aldo-cv.pdf](#)

The following resources are about this and other entities:

[loa-home-page.html](#)  
[his-band-picture-on-flickr.png](#)



# Conclusions

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- We have shown some ambiguities that could prevent successful solutions to the web identity crisis
- We have clarified and formalized them in a unique modelling framework
- We have defined IRE
  - a conceptual pattern based on an ontology of *information objects*
  - defines the kinds of resources that can be referenced on the web
  - gives a theoretical foundation to different 'operational' behaviours
  - can be used for mapping between alternative languages e.g. RDF and TM

