

A Casual Glossary for iRING

This is a glossary for iRING, covering a lot of terms from related technology, theory and standards material. The contents are meant to be casual and informative – consult official sources for proper definitions. In the iRING community, some of these general terms are often used analogously across disciplines, rather than literally.

abstraction – a generalization that extracts commonalities from some subject matter and presents a unified view, either to make the subject easier to understand, represent, relate, apply or compute. An abstraction is arrived at through analysis. See also: encapsulation.

application programming interface, or API – see interface (software engineering); more specifically used for the external abstraction layer in commercial and closed-source packages;

availability zone – a set of geographically-close cloud hosting facilities located to provide low latency and high internal network throughput between nodes; see edge computing.

certificate authority – relating in particular to SSL and X.509, an organization that certifies a submitter of a certificate signing request as a valid owner of the identity in the request and then issues a certificate on their behalf (typically for our purposes an SSL certificate).

CGI – Common Gateway Interface is a key-value pair encoding convention originally created to allow service parameters to be transmitted in HTTP URLs. CGI comes in two forms GET (where the parameters remain in the URL) and POST (where the parameters are embedded in the request body).

class (ISO15926) - Category or division of things based on one or more criteria for inclusion and exclusion (ISO/FDIS 15926-1:2003(E) 3.1.1)

closed world assumption – a formal logic assumption that can be informally described as “assuming that we know everything about something”; closed world assumptions can be very helpful when expressing validation constraints that make sense to humans; see also: open world assumption.

cloud service – a massive, distributed virtual hosting service with supporting storage and network abstractions and usually many other related services.

configuration management – a process used to ensure that changes between and to components of a system remain cohesive and functional in terms of the requirements over the whole system lifecycle.

content realm – from the Avalon service provisions specification, meaning an owned set of RDF triplestores, along with their related presentation and access constraints, managed on a substrate service.

CSS – cascading style sheets, a mechanism for the independent application of style to content markup, see also HTML.

DAV – development community shorthand for WebDAV, see below.

dataset (RDF) – a set of named RDF graphs, usually including one unnamed or default graph; SPARQL queries are executed in the context of a dataset, to allow bridging queries across more than one model (RDF).

description logics – a group of formal logic systems which are well-adapted to expressing ontology; technically a form of predicate logic, it overlaps first order logic in certain concepts, but neither can fully express the other.

DTD – Data Type Definition, an SGML (precursor to XML) description language, commonly used for expressing simple XML structure constraints.

DNS – Domain Name System, a suite of interoperability standards for managing the correspondence and bidirectional resolution between human-readable names and network service data, especially addresses; typically used for resolving host names, but also many other purposes.

DNS delegation – core feature of DNS that allows the resolution responsibility for some zone to be delegated to another authority; typically used to give countries and organizations control over their own namespaces and networks.

edge computing – a technique whereby data and processing are moved out towards the “edges” of a cloud services infrastructure in order to reduce network latency for external access; typically this means placing redundant services in geographical availability zones closer to customers than the availability zone of the primary service.

encapsulation (software engineering) – an application of abstraction specifically to contain complexity. Encapsulation typically places algorithmic and integration complexity behind interfaces. See also: interface and abstraction.

entailment (logic, RDF) – taking a set of statements and creating a new set that contains all statements in the original set, plus all statements implied by them through some declared ontology.

entity (ISO15926) – Entity Data Type is a class which is also an ISO 15926 Part 2 model element. i.e. ‘Thing’ and all subclasses in Part 2 are Entity Data Types

façade (ISO15926) – a defined set of SPARQL and Web Services functionality exposing an RDF triplestore containing ISO15926 part 8 data. Façades are a single abstraction used for declaring content and transmitting change across a distributed ISO15926 dataset.

first-order logic – a predicate logic that forms the foundation of large parts of mathematical and computational theory; it has some important limitations, but is otherwise useful because of its simplicity.

graph (mathematics, logic) – in mathematics, a set of nodes and edges; adapted in various forms to analyzing predicate logic.

graph (RDF) – in RDF, a graph is a view of a set of predicate statements; a graph usually corresponds to a model (RDF) and set of named graphs is known as a dataset.

HTML – HyperText Markup Language, the language that most web-pages are presented in; typically used in concert with CSS.

HTTP Basic – an insecure clear-text authentication mechanism that has been supported in HTTP nearly since its inception; Basic has a number of drawbacks, the worst of which can be solved by using it over HTTP/S, however it still has some significant security problems even in that usage; even so, sometimes it is the only option due to interoperability constraints.

HTTP, HTTP/S – network protocols for accessing and sometimes managing web content, specified through the IETF; collectively HTTP(S); see also RFC2616 and WebDAV.

individual (ISO15926) – a thing that exists in space and time (ISO/FDIS 15926-1:2003(E) 3.1.11).

instance (ISO15926) – a representation of data in a computer processable form of some real-world thing (ISO/FDIS 15926-1:2003(E) 3.1.13).

instance (ontology) – a member of a class; corresponds to instance in ISO15926; and somewhat to object in object oriented languages.

interface (software engineering) – the encapsulation of a some abstracted functionality to a set of function call signatures, along with their structures and other types; more specifically, an interface is also a virtually inherited, pure abstract class in many programming languages.

loose coupling (software engineering) – a governing principle of system design, especially in large or distributed systems, where components of the solution are abstracted and encapsulated in order to allow their replacement without affecting the whole system.

Linked Data – a W3C term that stresses the importance of expressing data in terms of HTTP URIs; in particular this can apply to tools that enable the exploration of data expressed in that way (linking HTML to RDF for example).

meta data – additional data that accompanies the main body or regular content of some representation of information; also data about data.

MIME – meta data format and assigned names originally developed for use with SMTP, but later utilized more widely (in HTTP for example). The assigned names are now managed by IANA. In particular, the MIME Content-Type header is widely supported for declaring the MIME content type and character set encoding (charset) of byte streams. See also IETF RFCs 2045 and 2049. Important in relation to SPARQL protocol.

model (RDF) – in RDF terms, a model is a set of predicate statements accessible within a single given scope. These make a possibly disconnected graph; usually interchangeable with graph (RDF).

model (ontology) – an ontology that describes the abstract structure of information, for example ISO15926 part 2 is a temporal model of information.

ontology (logic) – the study of the nature of existence; also used as another word for a semantic model arrived at through that study.

open world assumption – a formal logic assumption that can be informally described as “allowing for the possibility we don't know everything about something”; the open world assumption is fundamental to most semantic web technology; see also: closed world assumption.

OWL – Ontology Web Language, also OWL DL (description logics), OWL2 DS (direct semantics).

payload (iRING) – specifically in iRING, payload means any data in a project deliverable that is not published reference data. Analogous to payload (software engineering).

payload (software engineering) – in network protocols and file formats, a payload refers to the notional content being transmitted or stored, as opposed to the framing around that content used to support the transmission or storage.

PKI (cryptography) – public key infrastructure, a suite of cryptographic conventions, supporting mathematics and standards that enable secure and verifiable communication between parties without the use of shared keys.

predicate (logic) – a predicate in terms of logic refers to the qualified construction around the verb in a statement, excluding the object of the statement; note this is slightly different to predicate in linguistics.

predicate logic – the broad set of formal logic systems based on quantifiers, underpins much of the field of ontology; see also first-order logic, description logics.

property (RDF) – a property in RDF is a predicate (logic) definition. It may be further qualified in various related languages such as RDFS, OWL and OWL2.

property (ISO15926) - denotes a characteristic of a model, analogous to property (RDF), especially in the higher order applications of OWL2 and OWL.

RDF – Resource Description Framework, a set of specifications well adapted to expressing binary relationships on web resources, specified by the W3C. An **RDF endpoint** is a network service providing access (usually SPARQL) to selected graphs in an **RDF triplestore**, which is storage for RDF data, typically organized into multiple sets of data called graphs.

RDFS – Resource Description Framework Schema, an early language for expressing open-world constraints on RDF properties and types.

RDL – Reference Data Library, a searchable repository for reference data; see also reference data (ISO15926). PCA have a specific RDL for publishing ISO15926 reference data.

RDS – Reference Data Services, run by PCA, an ISO15926-specific reference data publication and maintenance technology infrastructure with supporting processes; see also: reference data (ISO15926).

reference data (general) – information supporting the automated interpretation of data, usually linked implicitly or via meta data.

reference data (ISO15926) – process plant life-cycle data that represents information about classes or individuals which are common to many process plants or of interest to many users.

regex patterns – regex, standing for “regular expressions” is a widely supported technology used for pattern matching in text streams; in particular regex groups support the extraction and replacement of specific parts of the matching text. Regex is an IEEE POSIX standard.

reification (logic) – making an instance of a relation the subject of other relations; typical for expressing meta data about the relationship in question; can be applied to binary and n-ary relations equally.

relation (logic) – see predicate (logic).

relationship (data modelling, logic) – a statement linking one (unary relationship), two (binary relationship) or any number (n-ary relationship) of things together via some relation or predicate (logic).

relationship (ISO15926) - denotes a semantic connection among model elements.

representational state transfer (REST) – is a design principle for network services where changes to parts of a system are enacted by taking a copy of a part, altering it accordingly, and then committing the whole modified part back to the system. Contra distinct from an interface, where changes are made through function calls. More specifically, REST binds parts to resources identified by URIs (though this constraint is not necessary to describe a RESTful system).

RESTful – a design that uses REST as a principle for application of changes to subject matter. RESTful designs, in spite of the name containing the word “state”, are in fact inherently stateless (see below).

semantics – the study of the meaning of signifiers (words, symbols etc.)

semantic web – an extension of the link-oriented principles of the world wide web to encompass raw data, not just presentation; see also “linked data” and RDF.

SGML – Standard Generalized Markup Language, a precursor to XML: XML started as a constrained subset of SGML and still uses SGML DTD for expressing structural rules.

SMTP – Simple Message Transfer Protocol, the protocol underlying most email routing, governed primarily by IETF RFC821 and RFC822.

SOAP – once stood for Simple Object Access Protocol, is now just SOAP – its a mechanism for joining XML and XML Schema together with some formal structures and conventions over existing protocols such as HTTP and SMTP to provide a message-passing protocol suitable for transmitting structured data between services. Underpins Web Services.

SPARQL – a query language (and update language – SPARUL variant) for RDF, specified by the W3C and with associated HTTP/S bindings.

SSL – Secure Sockets Layer is a network protocol used for providing confidentiality and some kinds of proof of identity. In particular, SSL is used to secure HTTP, where it is often referred to as HTTP/S or just “https” as a protocol name. See also: TLS.

SSL certificates – X.509 metadata wrapping the public key of an assymetric key pair – the metadata provides information on identity, the authority certifying that identity and the intended usage of the certificate as a whole; essential for SSL/TLS servers, and sometimes also clients; see also: certificate authority.

stateful (software engineering) – a behavior in network services where communicating parties build and maintain their own private “state” (temporary data) across multiple communication exchanges. This state informs their decision making in relation to subsequent communication.

stateless (software engineering) – a design principle in network services whereby a single communication exchange (request/response pair) contains all of the information required for related decision making; application of a network protocol that exhibits this behavior.

substrate service – from the Avalon service provisions specification, meaning a service that provides RDF triplestore hosting, default presentation and content management for multiple content realms.

template (ISO15926) – a template is an n-ary relation in general terms; a **template definition** describes the kind of n-ary relation, and may include a decomposition into part 2 binary relations (properties) and rules for inference of other relations; a **template instance** is an n-ary statement instantiated from a template definition.

template information pattern (experimental ISO15926) – template information pattern is a formal approach to specifying the usage patterns of RDL items such as classes, template signature patterns (TSP) and the roles in TSP. Template information patterns (TIP) are derived from the use of classes and TSPs used to facilitate a property and or relationship requirement. TIPs can be instantiated and supports decomposition to their underlying classes and TSPs.

template signature patterns (experimental ISO15926) – a template signature is a formal approach to specifying the roles in a template definition; template signatures can be instantiated into template instances. Template signatures in turn derive from template signature patterns (TSP), providing linkage to part 2 and some additional automatic decomposition into binary relations. Instantiating a template signature therefore allows some of the part 2 decomposition to be inferred.

TCP – Transmission Control Protocol is the internet's primary connection-oriented transport. Most web traffic travels on application protocols built on this layer.

TLS – Transport Layer Security, is a later version of SSL that fixes some problems and allows secure connections to be created from connections that typically use insecure protocols, in particular HTTP.

UTF-8 – UCS Transformation Format 8-bit is a means of encoding ISO/IEC 10646 characters in variable lengths of 8-bit bytes. UTF-8 is the default character encoding for many modern applications, especially XML.

UTF-16 – UCS Transformation Format 16-bit is a means of encoding ISO/IEC 10646 characters in variable lengths of 16-bit words, in either byte order. UTF-16 makes optional use of a byte-order marker (BOM) so that the byte order of the stream can be detected.

UCS-2 – Universal Character Set 2-byte encoding is a means of encoding the pure 16-bit characters within ISO/IEC 10646 as fixed length 16-bit words, typically in network byte order.

UUID – Universally Unique Identifier is form of randomly generated identifier that is intended to be unique (that is, it is very unlikely to create collisions). See also RFC4122.

W3C – World Wide Web Consortium, responsible for web, semantic web and related technologies.

WebDAV – also known as DAV, Distributed Authoring and Versioning, an extension to HTTP/S for managing web-based content, specified through the IETF. First specified as RFC2518 with subsequent revisions and errata.

WS, Web Services – a system involving SOAP use specifically over HTTP(S) along with formalized structure and addressing for related XML Schemas to support “self-documenting” network services. In short, the service endpoint knows how to communicate its own arbitrary communication structures and constraints.

X.509 – a suite of cryptographic standards supporting public key cryptography, in particular its application in SSL/TLS.

XML – eXtensible Markup Language, a data exchange format developed by the W3C and based on SGML; supports arbitrary tree-structured data.

XML Schema – a sophisticated means of applying structural constraints to XML data. XML Schema is better suited to structural definition in XML for object oriented and federated programming languages than DTD.