

Summary of Syntax Validity of SPARQL Queries

| Concept | Code | Valid Syntax | Parser Output |
|----------------|--|--------------|---|
| rdfs:Resource | <pre>PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> ASK { SELECT (count(*) as ?count) WHERE { ?s a rdfs:Resource . } GROUP BY ?s HAVING (COUNT(?s) = 1) }</pre> | True | None |
| rdfs:Literal | <pre>PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (COUNT(?literal) AS ? literal_count) WHERE { ?literal a rdfs:Literal . }</pre> | True | None |
| rdfs:Class | <pre>PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (COUNT(*) as ?count) WHERE { ?class rdf:type rdfs:Class . } GROUP BY ?class HAVING (COUNT(*) = 1)</pre> | True | None |
| rdfs:Datatype | <pre>PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (COUNT(?datatype) as ? datatypeCount) WHERE { ?datatype a rdfs:Datatype . } HAVING (COUNT(?datatype) = 1)</pre> | True | None |
| rdfs:Container | <pre>PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (COUNT(?container) AS ? containerCount) WHERE { ?container rdf:type rdfs:Container . }</pre> | False | <p>QueryBadFormed: A bad request has been sent to the endpoint: probably the SPARQL query is badly formed.</p> <p>b'Error 400: Parse error: \nPREFIX rdfs:\n<http://www.w3.org/2000/01/rdf-schema#>\nSELECT (COUNT(?container) AS ?containerCount) \nWHERE {\n ?container rdf:type rdfs:Container .\n}\n\nLine 4, column 14: Unresolved prefixed name: rdf:type\n'</p> |
| rdfs:label | <pre>PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT DISTINCT ?s WHERE { ?s rdfs:label ?label. FILTER NOT EXISTS { ?s rdfs:label ?otherLabel. FILTER (?otherLabel != ?label) } }</pre> | True | None |

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| rdfs:comment | <pre> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT ?resource WHERE { ?resource rdfs:comment ?comment . FILTER NOT EXISTS { ?resource rdfs:comment ?otherComment . FILTER (?otherComment != ?comment) } } </pre> | True | None |
| rdfs:domain | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> PREFIX owl: <http://www.w3.org/2002/07/owl#> SELECT ?property (COUNT(?domain) AS ?domainCount) WHERE { ?property rdf:type owl:ObjectProperty . ?property rdfs:domain ?domain . } GROUP BY ?property HAVING (COUNT(?domain) = 1) </pre> | True | None |
| rdfs:range | <pre> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (count(*) as ?count) WHERE { ?property rdfs:range ?range . } GROUP BY ?property HAVING (count(*) = 1) </pre> | True | None |
| rdfs:subClassOf | <pre> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> PREFIX owl: <http://www.w3.org/2002/07/owl#> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> SELECT ?class (COUNT(?parent) AS ?count) WHERE { ?class rdfs:subClassOf ?parent . } GROUP BY ?class HAVING (COUNT(?parent) = 1) </pre> | True | None |
| skos:Concept | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> ASK { ?c a skos:Concept . FILTER NOT EXISTS { ?c a skos:Concept . FILTER (?c != ?c2 ?c2 != ?c) } } </pre> | True | None |
| skos:Collection | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT (COUNT(*) AS ?count) WHERE { ?s a skos:Collection . } HAVING (COUNT(*) = 1) </pre> | True | None |
| skos:ConceptScheme | <pre> PREFIX rdf: </pre> | True | None |

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| | <pre> <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> ASK { { SELECT (COUNT(?scheme) AS ?count) WHERE { ?scheme rdf:type skos:ConceptScheme } } FILTER(?count = 1) } </pre> | | |
| skos:OrderedCollection | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT (COUNT(?oc) as ?ocCount) WHERE { ?oc a skos:OrderedCollection . } HAVING (COUNT(?oc) = 1) </pre> | True | None |
| skos:CollectableProperty | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT (COUNT(?cp) AS ? numCollectableProperty) WHERE { GRAPH <mygraph> { ?cp a skos:CollectableProperty . } } HAVING (?numCollectableProperty = 1) </pre> | True | None |
| skos:topConceptOf | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT ?concept (COUNT(?topConcept) AS ?count) WHERE { ?concept skos:topConceptOf ?topConcept . } GROUP BY ?concept HAVING (COUNT(?topConcept) = 1) </pre> | True | None |
| skos:semanticRelation | <pre> PREFIX skos: <http://www.w3.org/2004/02/skos/core#> SELECT ?x WHERE { ?x skos:semanticRelation ?y . FILTER NOT EXISTS { ?x skos:semanticRelation ?z . FILTER (?z != ?y) } } </pre> | True | None |
| skos:memberList | <pre> SPARQL PREFIX skos: <http://www.w3.org/2004/02/skos/core#> ASK { ?c skos:memberList ?list . NOT EXISTS { ?c skos:memberList ?otherList . FILTER (?list != ?otherList) } } </pre> | False | <p>QueryBadFormed: A bad request has been sent to the endpoint: probably the SPARQL query is badly formed.</p> <p>b'Error 400: Parse error: \nSPARQL\nPREFIX skos: <http://www.w3.org/2004/02/skos/core#>\n\nASK {\n ?c skos:memberList ?list .\n NOT EXISTS {\n ?c skos:memberList ?otherList .\n FILTER (?</p> |

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| | <pre>WHERE { ?document a foaf:Document . } HAVING (?count = 1)</pre> | | |
| foaf:Group | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> ASK { SELECT (COUNT(?group) AS ?count) WHERE { ?group rdf:type foaf:Group . } GROUP BY ?group HAVING (COUNT(?group) = 1) }</pre> | False | <p>QueryBadFormed: A bad request has been sent to the endpoint: probably the SPARQL query is badly formed.</p> <p>b'Error 400: Parse error: \nPREFIX foaf: <http://xmlns.com/foaf/0.1/>\n\nASK {\n SELECT (COUNT(?group) AS ?count)\n WHERE {\n ?group rdf:type foaf:Group .\n }\n GROUP BY ?group\n HAVING (COUNT(?group) = 1)\n}\n\nLine 6, column 12: Unresolved prefixed name: rdf:type\n'</p> |
| foaf:OnlineAccount | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> ASK { ?person foaf:onlineAccount ?account1 . { SELECT (COUNT(?account2) AS ?count) WHERE { ?person foaf:onlineAccount ?account2 . } } FILTER (?count = 1) }</pre> | True | None |
| foaf:name | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> SELECT ?s WHERE { ?s foaf:name ?name . FILTER NOT EXISTS { ?s foaf:name ?otherName . FILTER (?name != ?otherName) } }</pre> | True | None |
| foaf:knows | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> SELECT ?person WHERE { ?person foaf:knows ?friend . FILTER NOT EXISTS { ?person foaf:knows ?otherFriend . FILTER (?friend != ?otherFriend) } }</pre> | True | None |
| foaf:based_near | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> SELECT (COUNT(*) AS ?count) WHERE { ?person foaf:based_near ?location . } GROUP BY ?person HAVING (COUNT(*) = 1)</pre> | True | None |
| foaf:accountName | <pre>PREFIX foaf: <http://xmlns.com/foaf/0.1/> ASK { ?person foaf:accountName ?name1 . ?person foaf:accountName ?name2 . FILTER (?name1 != ?name2) }</pre> | True | None |
| foaf:holdsAccount | <pre>PREFIX rdf:</pre> | True | None |

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| | <pre><http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX foaf: <http://xmlns.com/foaf/0.1/> ASK { ?person foaf:holdsAccount ?account1 . ?person foaf:holdsAccount ?account2 . FILTER (?account1 != ?account2) }</pre> | | |
| prov:Agent | <pre>PREFIX prov: <http://www.w3.org/ns/prov#> SELECT (COUNT(?agent) AS ?count) WHERE { ?agent a prov:Agent . }</pre> | True | None |
| prov:Activity | <pre>PREFIX prov: <http://www.w3.org/ns/prov#> SELECT (COUNT(?activity) AS ? activityCount) WHERE { ?activity a prov:Activity . } GROUP BY ?activity HAVING (COUNT(?activity) = 1)</pre> | True | None |
| prov:Entity | <pre>PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX prov: <http://www.w3.org/ns/prov#> SELECT (COUNT(?entity) AS ?count) WHERE { ?entity rdf:type prov:Entity . } HAVING (?count = 1)</pre> | True | None |
| prov:Collection | <pre>PREFIX prov: <http://www.w3.org/ns/prov#> ASK { { SELECT (COUNT(*) AS ?count) WHERE { ?s a prov:Collection . } } FILTER (?count = 1) }</pre> | True | None |
| prov:Location | <pre>PREFIX prov: <http://www.w3.org/ns/prov#> SELECT ?s WHERE { ?s prov:Location ?o1 . FILTER NOT EXISTS { ?s prov:Location ?o2 . FILTER (?o1 != ?o2) } }</pre> | True | None |
| prov:wasGeneratedBy | <pre>PREFIX prov: <http://www.w3.org/ns/prov#> SELECT ?subject WHERE { ?subject prov:wasGeneratedBy ?value . FILTER NOT EXISTS { ?subject prov:wasGeneratedBy ? otherValue . FILTER (?value != ?otherValue) } }</pre> | True | None |

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| prov:generatedAtTime | PREFIX prov: <http://www.w3.org/ns/prov#> PREFIX ex: <http://example.com/> SELECT DISTINCT ?s WHERE { ?s prov:generatedAtTime ?t . FILTER NOT EXISTS { ?s prov:generatedAtTime ?t2 . FILTER (?t != ?t2) } } | True | None |
| prov:atLocation | PREFIX prov: <http://www.w3.org/ns/prov#> SELECT ?instance WHERE { ?instance prov:atLocation ?location1 . FILTER NOT EXISTS { ?instance prov:atLocation ?location2 FILTER (?location1 != ?location2) } } | True | None |
| prov:hadMember | PREFIX prov: <http://www.w3.org/ns/prov#> SELECT ?group (COUNT(?member) AS ? count) WHERE { ?group prov:hadMember ?member . } GROUP BY ?group HAVING (COUNT(?member) = 1) | True | None |
| prov:used | PREFIX prov: <http://www.w3.org/ns/prov#> SELECT ?entity WHERE { ?activity prov:used ?entity . } GROUP BY ?activity HAVING (COUNT(?entity) = 1) | False | QueryBadFormed: A bad request has been sent to the endpoint: probably the SPARQL query is badly formed. b'Error 400: Parse error: \ nPREFIX prov: <http://www.w3.org/ns/prov #>\n\nSELECT ?entity\ nWHERE {n ?activity prov:used ?entity .\n}\n nGROUP BY ?activity\ nHAVING (COUNT(? entity) = 1)\n\nNon-group key variable in SELECT: ? entity\n' |
| rdf:List | PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> SELECT (COUNT(*) as ?count) WHERE { ?list a rdf:List . } HAVING (COUNT(*) = 1) | True | None |
| rdf:Bag | PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> SELECT (COUNT(?bag) AS ?count) WHERE { ?bag rdf:type rdf:Bag . } | True | None |
| rdf:Statement | PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> SELECT (COUNT(*) as ?count) | True | None |

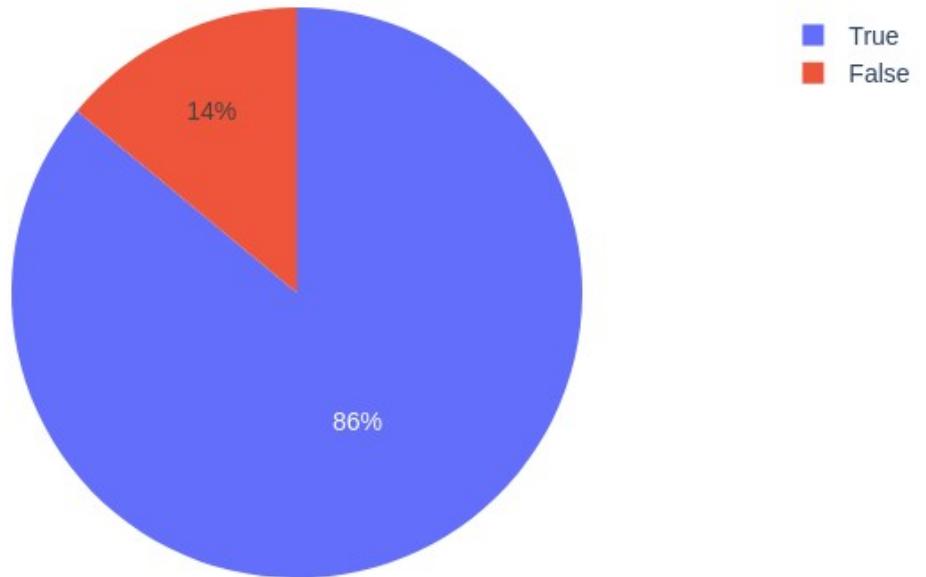
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| | <pre> WHERE { ?subject ?predicate ?object . FILTER(isURI(?subject) && isURI(? predicate) && isURI(?object)) FILTER(!isBlank(?subject) && !isBlank(? predicate) && !isBlank(?object)) FILTER(?predicate = rdf:subject ? predicate = rdf:predicate ?predicate = rdf:object) } GROUP BY ?predicate HAVING (COUNT(*) = 1 && ?predicate = rdf:Statement) </pre> | | |
| rdf:Property | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> SELECT (COUNT(*) as ?count) WHERE { ?s rdf:type rdf:Property. } HAVING(?count = 1) </pre> | True | None |
| rdf:HTML | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> PREFIX owl: <http://www.w3.org/2002/07/owl#> ASK { ?s rdf:type owl:Class . ?s owl:equivalentClass ?c . ?c owl:onProperty rdf:HTML . ?c owl:cardinality '1'^^xsd:nonNegativeInteger . } </pre> | False | <p>QueryBadFormed: A bad request has been sent to the endpoint: probably the SPARQL query is badly formed.</p> <p>b"Error 400: Parse error: \nPREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>\nPREFIX owl: <http://www.w3.org/2002/07/owl#>\n\nASK { \n ?s rdf:type owl:Class .\n ?s owl:equivalentClass ?c .\n ?c owl:onProperty rdf:HTML .\n ?c owl:cardinality '1'^^xsd:nonNegativeInteger .\n}\n\nLine 8, column 27: Unresolved prefixed name: xsd:nonNegativeInteger\n"</p> |
| rdf:first | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> ASK { ?s rdf:first ?first . FILTER NOT EXISTS { ?s rdf:first ?other . FILTER (?first != ?other) } } </pre> | True | None |
| rdf:type | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> SELECT (COUNT(?type) AS ?count) WHERE { ?s rdf:type ?type . } HAVING (COUNT(?type) = 1) </pre> | True | None |
| rdf:subject | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax- ns#> PREFIX example: <http://example.com/> SELECT ?s (COUNT(?s) AS ?count) </pre> | True | None |

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| | <pre> WHERE { ?s rdf:subject example:exampleConcept . } GROUP BY ?s HAVING (COUNT(?s) = 1) </pre> | | |
| rdf:value | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX owl: <http://www.w3.org/2002/07/owl#> SELECT ?subject WHERE { ?subject rdf:value ?value . FILTER NOT EXISTS { ?subject rdf:value ?otherValue . FILTER (?value != ?otherValue) } } </pre> | True | None |
| rdf:rest | <pre> PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> SELECT (COUNT(?rest) AS ?count) WHERE { ?s rdf:rest ?rest . } </pre> | True | None |

The table below shows the occurrences of each category for the tested ontologies.

| Ontology Prefix | True Count | False Count | No Response Count |
|-----------------|------------|-------------|-------------------|
| rdfs | 9 | 1 | 0 |
| skos | 9 | 1 | 0 |
| foaf | 7 | 3 | 0 |
| prov | 9 | 1 | 0 |
| rdf | 9 | 1 | 0 |

Figure 1: Occurences of each category of response ('True', 'False', 'None')



| Type of Code | Valid Syntax | Invalid Syntax |
|-----------------|--------------|----------------|
| sparql_queries | 43 | 7 |
| instance_graphs | 0 | 0 |
| shacl_shapes | 0 | 0 |