

Linked Data Access Goes Mobile

Context-Aware **Authorization** for Graph Stores



SELECT ...
WHERE {...}



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Key Features

Background

WAC, [Abel et al, ISWC2007], [Finin et al.,SACMAT2008],[Flouris et al., FIS2010],
[Sacco and Passant, LDOW2011], [Toninelli et al, ISWC2006]



Semantic Web
languages **only**

> No new Policy languages



Pluggable to
any RDF store

> SPARQL 1.1



Granularity from
triples to whole graphs

> Named Graphs

[Carroll et al, WWW2005]
RDF 1.1



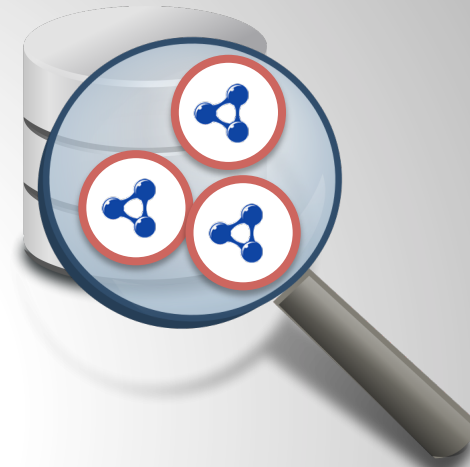
Mobile context in
the loop

> Context Awareness

[Schilit and Theimer, 94]
[Dey, 01]

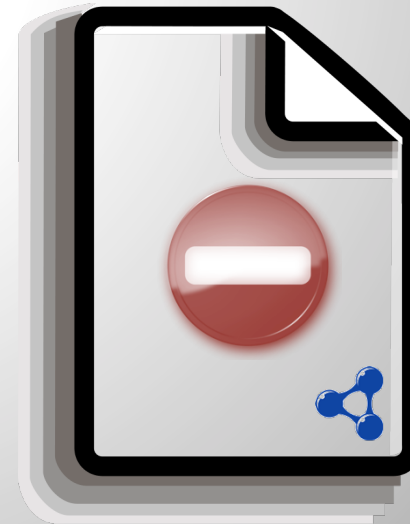
How it Works – Initial Setup

- Named Graph Partitioning



- Access Policy Definition

S4AC & PRISSMA Vocabularies



Sample Access Policy

```
:policy1 a s4ac:AccessPolicy;  
s4ac:appliesTo :ng1;  
s4ac:hasAccessPrivilege [a s4ac:Read];  
s4ac:hasAccessConditionSet :acs1.
```

Protected resource

```
:acs1 a s4ac:AccessConditionSet;  
s4ac:ConjunctiveAccessConditionSet;  
s4ac:hasAccessCondition :ac1.
```

```
:ac1 a s4ac:AccessCondition;
```

```
s4ac:hasQueryASK
```

```
""ASK {?context  
  a prisma:Context;  
  prisma:environment ?env.  
  ?env prisma:currentPOI ?poi.  
  ?poi prisma:radius "500";  
  foaf:based_near ?p.  
  ?p geo:lat "43.615811";  
  geo:long "7.068532"}.}
```

Conditions
to verify

How it Works

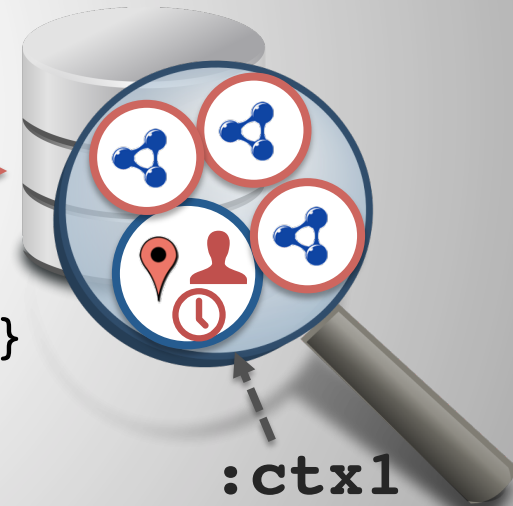
1. Query Contextualization



```
INSERT DATA {  
  GRAPH :ctx1{  
    [  ,  ,  , ... ]  
  }  
}
```

+

```
SELECT ...  
WHERE {...}
```



:ctx1

How it Works

2. Access Policy Evaluation

```
ASK {?context
      a prisma:Context;
      prisma:environment ?env.
      ?env prisma:currentPOI ?poi. = "false"
      ?poi prisma:radius "500";
          foaf:based_near ?p.
      ?p geo:lat "43.615811";
          geo:long "7.068532".}
```

BINDINGS ?context {(:ctx1)}



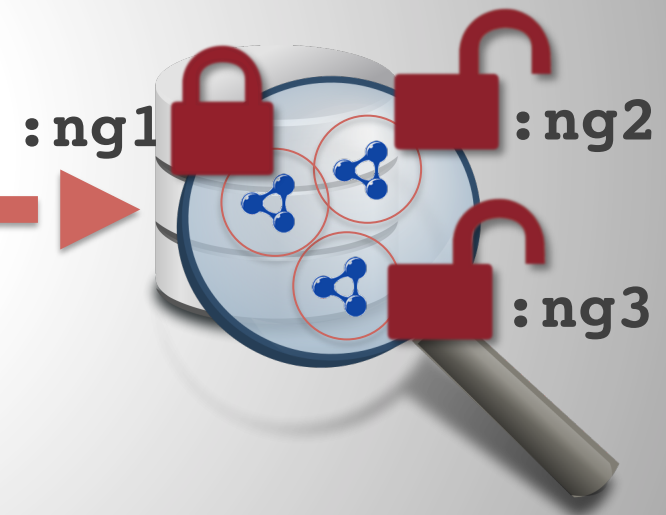
How it Works

3. Query Execution on Accessible Named Graphs



~~SELECT ...
WHERE {...}~~

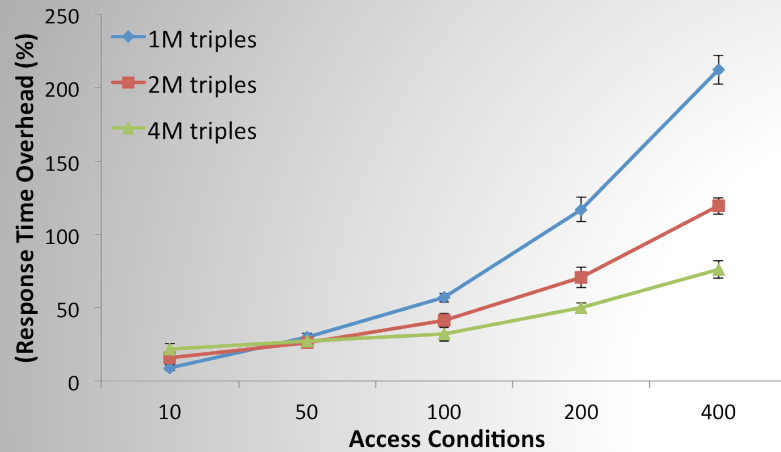
SELECT ...
FROM :ng2, :ng3
FROM NAMED :ng2, :ng3
WHERE {...}



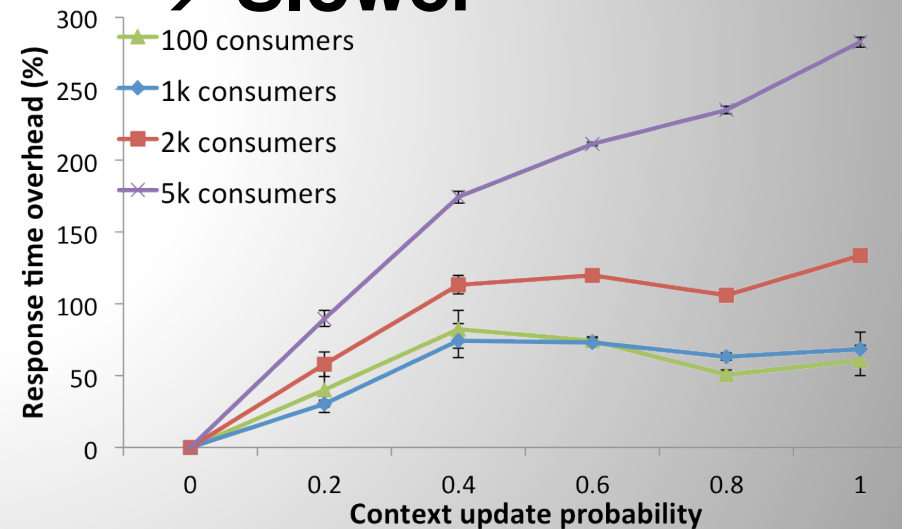
Response Time Evaluation

RDF store and SPARQL 1.1. engine: Coresense-KGRAM with Berlin SPARQL Benchmark Dataset 3.1

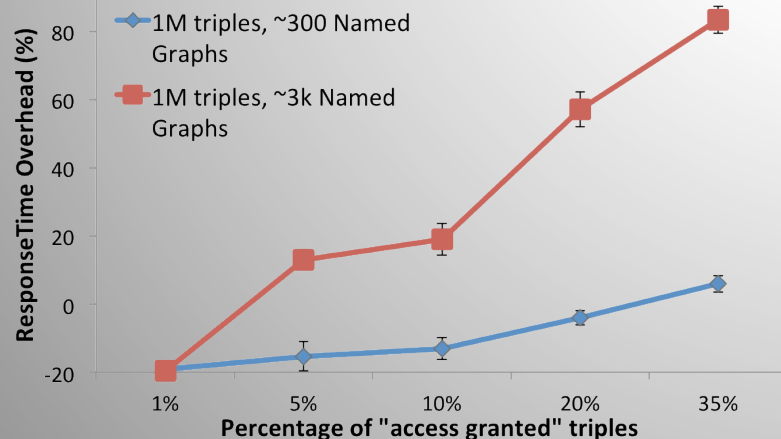
- **Dataset size** still predominant



- More **context updates**, more **consumers** → **Slower**

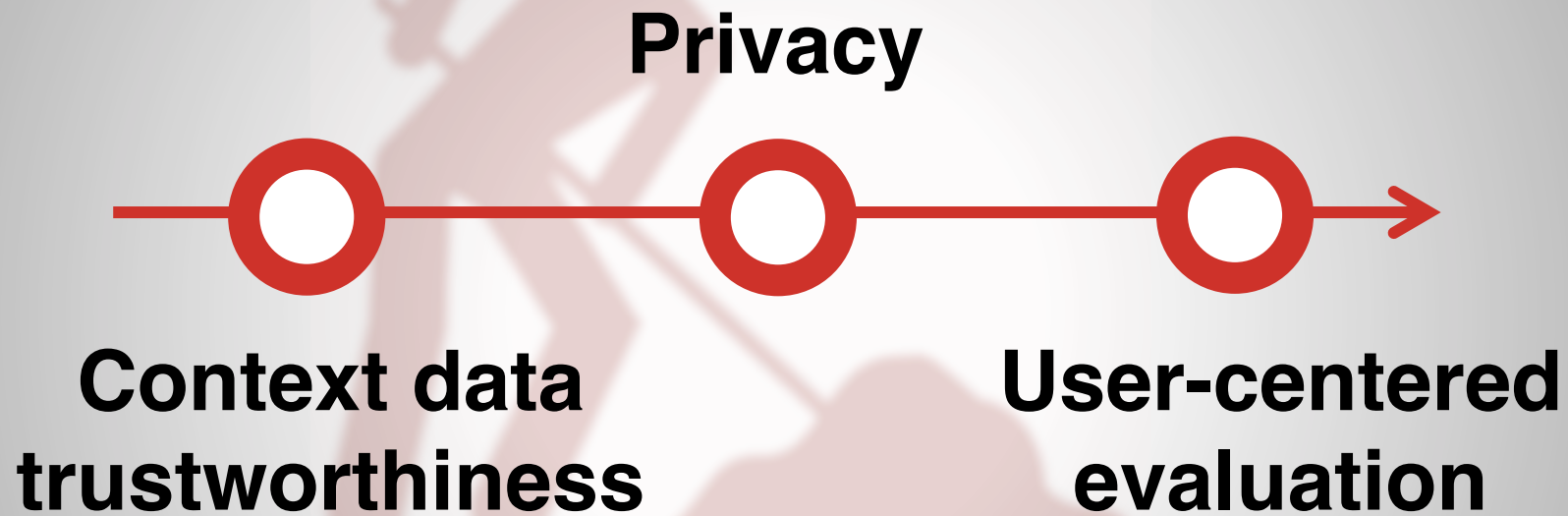


- **Small fraction granted** → **Faster**



Future Work

Poster Session
Thursday 19
Recommender Systems / Semantic Web



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