Electronic Patient Consent Management

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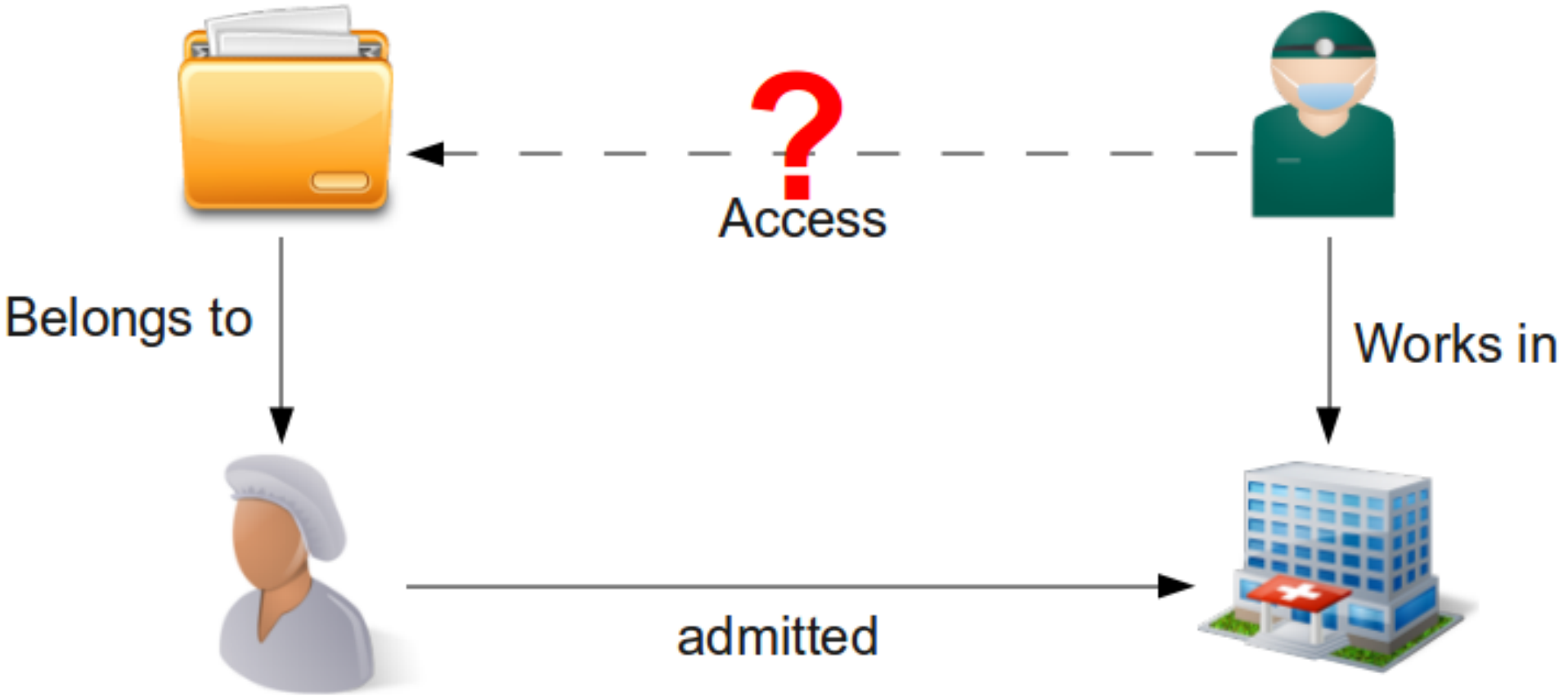
The Big Picture



Patient Consent Example

HealthCareClinics
the caring professionals

I understand that as part of my healthcare, the physicians of HealthCareClinics originates and maintains health records describing my health history, symptoms, examination and test results, diagnosis, treatment and **any plans for future care or treatment**. I understand that this information is utilized to plan my care and treatment, to bill for services provided to me, to communicate with other healthcare providers and other routine healthcare operations such as assessing quality and reviewing competence of healthcare professionals.

HealthCareClinics Notice of Privacy Practices provides specific information and complete description of how my personal information may be used and disclosed. I understand that a copy of the Notice of Privacy Practices is available at the front desk and understand that I have the right to review the notice prior to signing this consent. **I understand that** HealthCareClinics **reserves the right to change** the Notice of Privacy Practices. Prior to implementation of the revised Notice of Privacy Practices , the revised Notice will be mailed to me if I provide my address below. I understand I have the right to restrict the use and/or disclosure of my personal health information for treatment, payment, or healthcare operations and that HealthCareClinics is **not required to agree to the restrictions requested**. I may revoke this consent at any time in writing except to the extent that HealthCareClinics has already taken action in reliance on my prior consent. This consent is valid until revoked by me in writing.

We **may change our policies** and this notice **at any time** and have those **revised policies apply** to all the **protected health information** we maintain. If or when we change our notice, we will post the new notice in the office where it can be seen. You can request a paper copy of this notice, or any revised notice, at any time (even if you have allowed us to communicate with you electronically). For more information about this notice or our privacy practices and policies, please contact the person listed at the end of this document.

Outline

Electronic Patient Consent

Current Approaches

Our Proposed Solution: *Consentir*

- Supported Policies
- Example Facts

Demo

Future Work

Electronic Patient Consent

Patients need to control:

- Who can access their information
  - *generic inclusions to specific exclusions*
- When their information can be accessed
  - *confidentiality a function of need*
- What can be accessed
  - *all of the information OR part of the information*

Electronic Patient Consent

Electronic Patient Consent Management System:

- Defining effective consent policies
- Accurately capturing patient consent electronically
- Representing policies
- Processing facts & policies

Challenges

- Balancing patient privacy & health care
- Trust & acceptance of electronic consent
  - Healthcare providers
  - Patients
- Minimal impact on clinical work flow
- Combining policies from different levels

Current Approaches

Security oriented

- Focus on security aspects & ignore semantics

Technology oriented

- Consent rules defined within the confines of technology
  - e-Consent objects [1]

Whats missing?

- Semantics
- Proof of correctness & decision

Learning from the Semantic Web

Semantic Web

- Describe data with meaning
  - (RDF + OWL + XML) → ability to describe anything
- Use Notation 3
  - RDF shorthand + ability to define rules

```
<rdf:RDF
   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
   xmlns:dc="http://purl.org/dc/elements/1.1/">
  <rdf:Description
          rdf:about="http://en.wikipedia.org/wiki/Tony_Benn">
    <dc:title>Tony Benn</dc:title>
    <dc:publisher>Wikipedia</dc:publisher>
  </rdf:Description>
</rdf:RDF>
```

```
@prefix dc: <http://purl.org/dc/elements/1.1/>.
<http://en.wikipedia.org/wiki/Tony_Benn>
  dc:title "Tony Benn";
  dc:publisher "Wikipedia".
```

Reasoning Engine

Semantic Reasoner

- Infer logical consequences from a set of asserted facts

Euler [2]

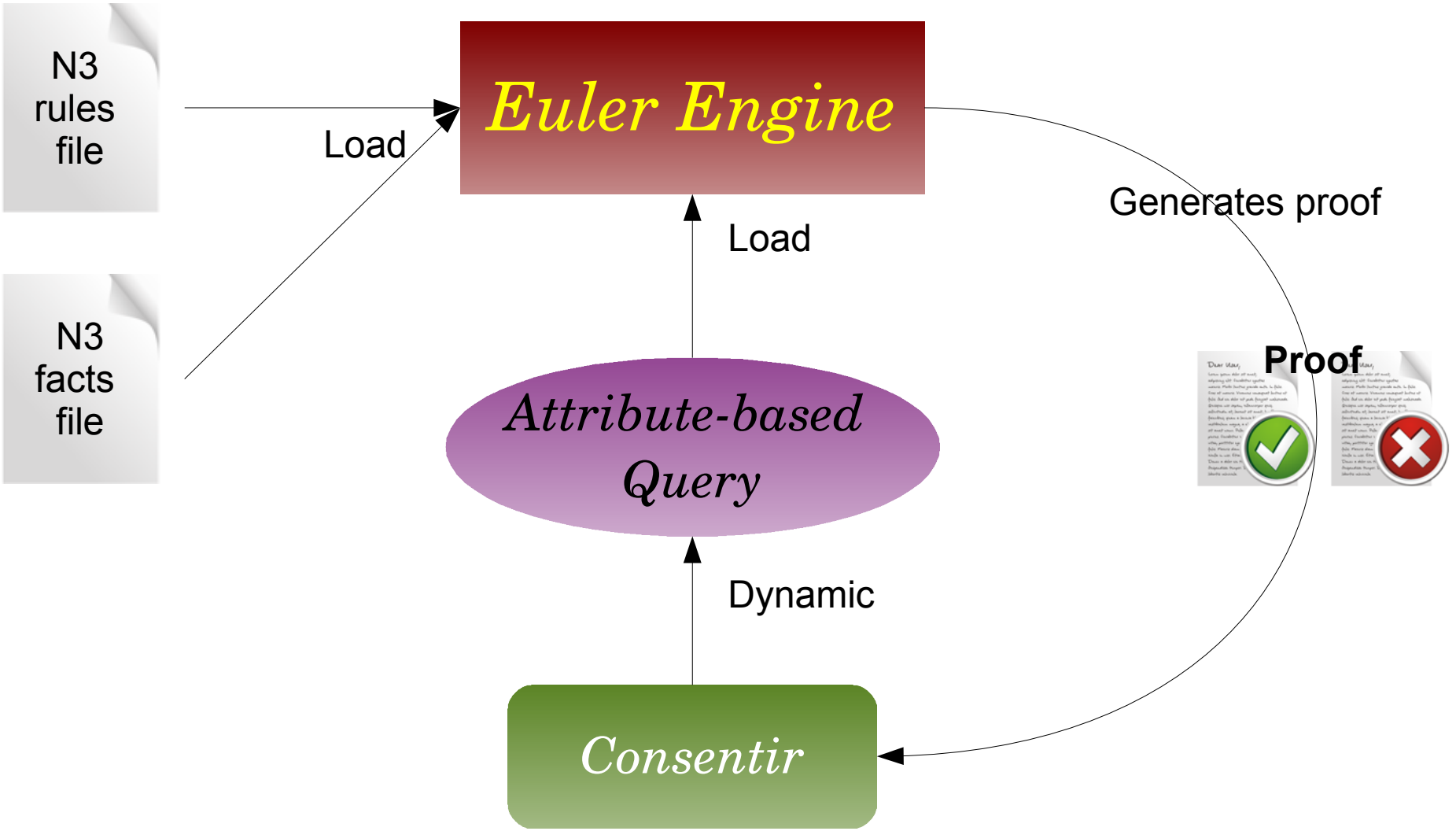
- *"Euler is an inference engine supporting logic based proofs"*
  - *Backward-chaining*
    - *Start form the list of goals*
    - *Work backwards from consequent to antecedent*

Consentir

A rule-based system which:

- Uses N3 notation for patient facts & policies
  - Benefits:
    - Simple notation
    - Supports facts & rules
- Uses Euler for access control reasoning
  - Benefits:
    - Already established reasoning process
    - Provides proofs → can be used for verification

System Overview



Supported Policies

Hospital policies

- Members only
- By shift
- Must be treating doctor/nurse (except in emergencies)

Patient consent policies

- Opt in
- Opt in except for sensitive documents
- Opt in except for certain people
- Opt out
- Opt out with emergency override

Example Rules

a **has possible access** to *p*'s records

- *a* member of *o* & *o* has a by shift policy & *o* is on shift & *p* is treated in *o*

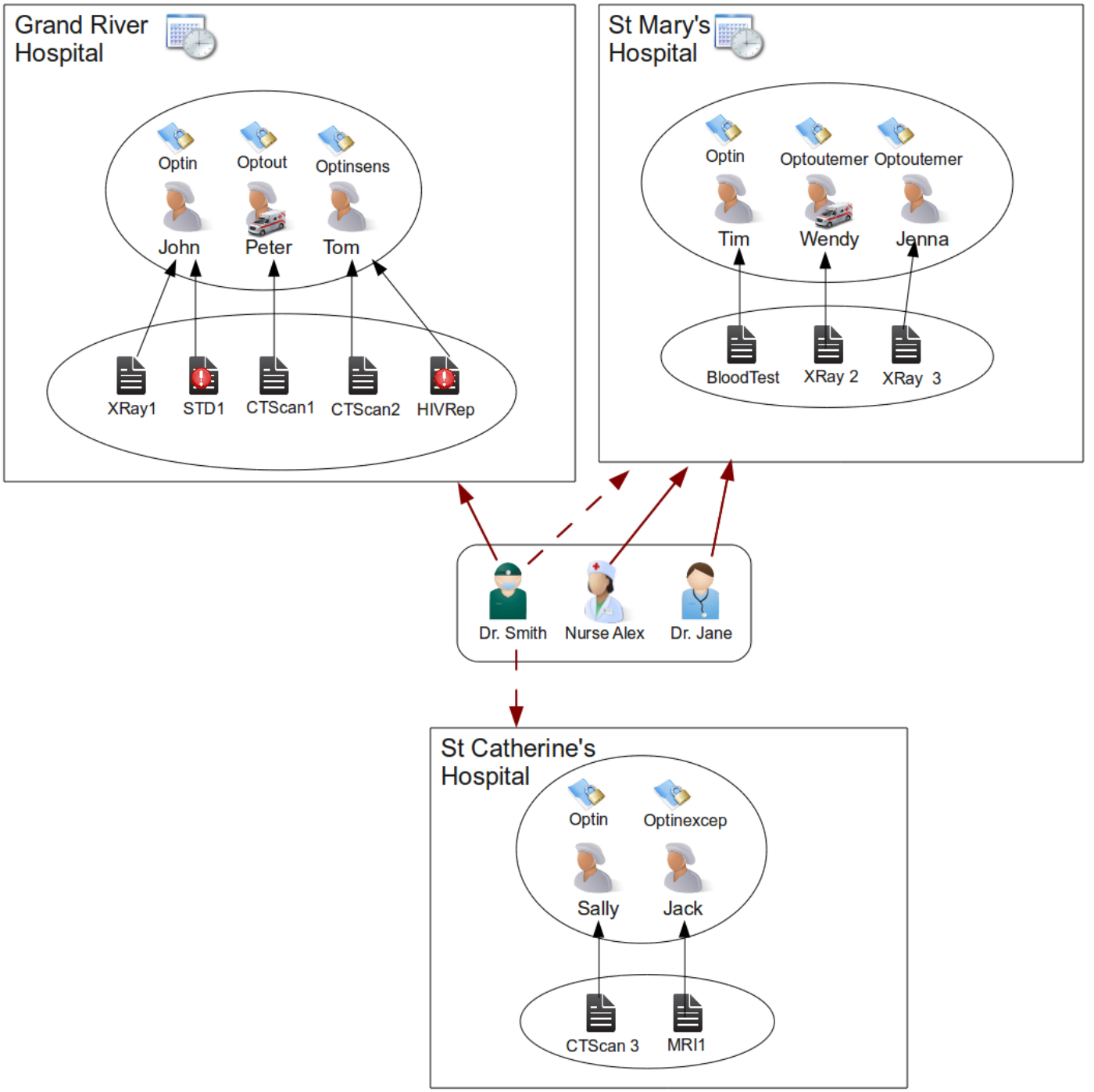
a **is authenticated to access** p's records

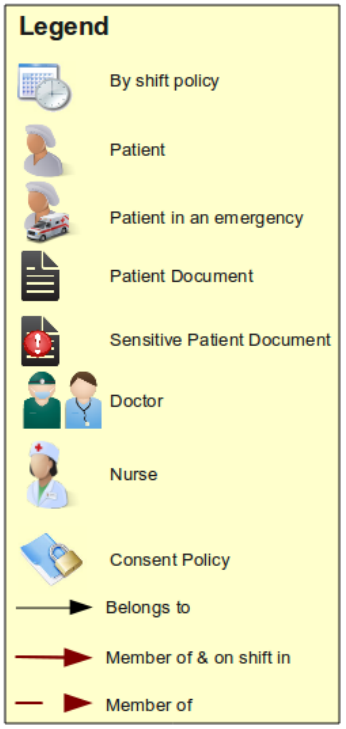
- *a* has possible access to *p*'s records & *a* treats *p*

a **can access** d

- *a* is authenticated to access *p*'s records & *d* belongs to *p* & *p* has an *opt in* policy

Example Facts





"the proof is in the pudding"

Future Work

- Formalize ontology
  - Extend rules for
    - Institutional policies
    - Patient consent
- More sophisticated N3 rules
- Integrate with existing systems
- Multiple Policies
  - Discover policy conflicts
  - Policy overrides

Thank you!!

References

[1]T. Berners-lee, D. Connolly, L. Kagal, Y. Scharf, and J. Hendler, “N3logic: A logical framework for the world wide web,” *Theory Pract. Log. Program*, vol. 8, no. 3, pp. 249–269, 2008.

[2]http://www.agfa.com/w3c/euler/

Euler Backward Chaining

my pet croaks and eats flies

what colour is my pet?

If X croaks and eats flies – Then X is a frog

If X chirps and sings – Then X is a canary

If X is a frog – Then X is green

If X is a canary – Then X is yellow