Enhanced Access Control for Collaborative Documents

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Introduction

- Computer Supported Cooperative Work (CSCW)
- Security Applications
- Discussion
CSCW

• Collaborative Development of Documents
  – Text or Diagrams
  – Real-time What You See Is What I See

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CSCW Problem

• Multiple people interacting with the same document can make conflicting changes
• Violate social protocols
• Need system support to help coordinate people
  – Roughly analogous to concurrency control in a database

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New Approach for Diagrams

- System notifies users when someone acts on a shape someone else is still using
  - Notification can have varied results
- “Still Using” determined by:
  - Incomplete syntax
  - Time, number, area, distance

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Asynchronous Support

- Maintain list of shapes acted upon and compare divergent versions
  - Also supports wireless application
- Particularly for syntactic rules, “in use” spans work sessions
Security Applications

• Confidentiality
  – Diagrams
  – Images

• Integrity

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Confidentiality - Diagram

• Use meaningful connections between shapes to supplement or replace traditional access control lists for the data represented by the shapes
• Various levels are supported
Confidentiality - Diagram
Full Diagram View

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Confidentiality - Diagram

Direct Connection to document A1
Confidentiality - Diagram

Only people

P1

P2

P3

P4

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Confidentiality - Diagram

Only people and connections
Confidentiality - Diagram

Add A4 and see other items connected to same shape (P1) (with people and connections)
Confidentiality - Diagram

Add A4 and see other items directly connected to same shape (P1)
Confidentiality - Diagram

Add A4 and see other items connected to same shape (P1) and 1 connection
Confidentiality - Diagram

Add A4 and see other items connected to same shape (P1) and 2 connections

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Confidentiality - Image

• Visible and hidden features on map
• Annotations
  – Hidden annotations on image
  – Become visible after annotating same object
  – Could notify even if hidden
Integrity

- Coordination control can maintain history of actions taken
  - audit trail
- Explicit or implicit interest areas
  - Notification of shared interest
  - Notification of intrusion (trip wire)
Future Directions

• Graphical evaluation of minimally different queries?
• Other realistic examples?

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