HomeViews

Geambasu et al., 2007

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Motivation

- We have a lot of personal digital data
- Existing solutions for organizing and sharing aren't ideal

Typical Scenario





Existing Solutions: Sharing

- One must manually upload content to centralized repository
- Centralized repositories typically require registration for new users
- Inevitably you end up with multiple copies
- Dynamic data isn't supported

Existing Solutions: Organizing

- Desktop search tools
- Create abstract data views or smart folders
- Requires metadata for non-textual objects

Existing Solutions: Organizing

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Idea!

- Decentralize data using P2P
- Share data using location-independent abstract views
- Provide lightweight access control
- Put it all in a middleware framework





Query Processing



- Associated with a view
- Self-authenticating unit of permission
- Capabilities unforgeable with high probability
- Used in global naming and routing



- Capability provides location information
- IP hint hopefully points to node where capability is defined
- When IP Hint fails, use a DHT (Chord) to locate the content

- Capability could be represented as a simple "token"
- Distributing capabilities is annoying, but relatively easy
- Revocation is easy

- Is this an appropriate model for sharing personal digital data?
- Do capabilities provide sufficient security?

Queries

- Extension of SQL
- Fundamental difference: relations replaced with capabilities
- Define a capability by creating a view
- Base capability provides access to all files

Queries:Views

CREATE VIEW MyFiles2007 AS SELECT * FROM BaseCapability WHERE createDate > '2007-01-01' AND createDate < '2008-<u>01-01</u>'

New capability: Jeremy2007

Queries: Restrictions

RESTRICT Jeremy2007 RIGHTS SELECT

→ **New capability:** Jeremy2007_RO

Queries: Selections

SELECT * FROM Jeremy2007_RO
WHERE fileType = 'image'

Queries: Complex Views

CREATE VIEW MyFriendMovies2007 AS

SELECT * FROM Jeremy2007_RO WHERE fileType = 'movie' UNION

SELECT * FROM Rob2007_RO
WHERE fileType = 'movie'

New capability: FriendMovies2007

Evaluation: Applications

- Simple read-only filesystem
- Photo gallery

Evaluation: Applications

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Photos			Photos	
2007				
	Track Star Party 12 Images		Back in Toronto 9 Images	
	Seattle to Toronto Road Trip 23 Images		Olympic Peninsula 52 Images	
	Summer in BC 22 Images		Lazy Seattle Weekend 11 Images	

Evaluation: Numbers



Result Size

Evaluation: Numbers



Applicability to OSNs

- Middleware platform for OSN applications to share data between users: ie.
 PeerSpective, Facebook
- Capability management could be hidden

Applicability to OSNs

Danger: lack of explicit sharing action and dynamic data

Conclusions

- P2P not always appropriate model for sharing personal digital data
- Complex views offer opportunities for poor performance
- We still don't have an ideal solution