Federated Identity Management in the Norwegian Oil and Gas Industry

NTNU, April 29 2014

Jostein Jensen
Norwegian oil and gas environment

North Sea

Communication infrastructure
Collaborative industry

“We collaborate, but at the same time we are competitors, so it is essential that only information concerning the collaboration is available.
Research Goal

This PhD project will:
• analyse companies involved in close inter-organisational collaboration in Integrated Operations

For the purpose of:
• exploring the perceived benefits, challenges and security risks

Related to:
• adoption of Federated Identity Management (FIM) in the Norwegian Oil and Gas industry
Research Design

Study 1: Secure development of IdM in distributed environments

Review 1: Security in MDD

Review 2: FIM in academia

Study 2: FIM in O&G

P1

SP1

SP2

P2

P3

P4

P5

P6

P7

Included paper

Secondary paper

Study A led to B

Study A motivated B

Case study

Literature review
Identity Management Lifecycle

- Create
- Revoke
- Governance
- Use
- Update

- Processes
- Policies
- Technology
Identity Management – Example of Use

Company A
- Login
- SecurityTokenA
- Use(SecurityTokenA)
- Authorize access based on security token A

Company B
- Login
- SecurityTokenB
- Use(SecurityTokenB)
- Authorize access based on security token B
Today’s challenges

“One of the main challenges today is to keep track of our employees’ access rights to various systems. And what happens when they change job?“

“Some systems and passwords are used infrequently. You forget those passwords and have to call user support”

“During a working day I might visit 15 to 20 systems with different user and password regimes.”

“I have 184 user accounts to systems at different clients”
Better Solutions?

“Our way of thinking of identity management is outdated.”

Ian Glazer, Research Director at Gartner

Federated Identity Management – A Possible Solution

Intra-organisational cooperation on:
- Processes
- Policies
- Technologies

Figure: Identity Management Lifecycle
Federated Identity Management

Company A

- Login
- SecurityTokenA
- Use(SecurityTokenA)
- Authorize access based on security token A

IdP

Company B

- Login
- SecurityTokenA
- Use(SecurityTokenA)
- Authorize access based on security token A

Service
Perceived Benefits

- User experience / usability
- Better protection
- Efficient user administration
- Improved data quality
- Efficient collaboration
- Reduced cost
- Audit
Are Identity Federations Attractive for the Industry?
Perceived challenges

- Identity and access management
- Trust in Collaborators
- Standardisation and interoperability
- Organisational maturity
- Privacy
- Investment cost
Perceived security threats

“The drawback is that someone could authenticate as another user with access rights, not only to one company, but to all the companies where this user has access.”

“Our biggest fear is that someone unauthorized can get access to, and control a production process.”

“The risk of unintended errors increases.”

Photo: http://www.directstaffuk.com
What about FIM Adoption in the Oil and Gas Industry?

• Benefits offset by challenges

• Trust

• Confusion

• Development support

• Ubiquitous FIM too ambitious?

Picture: https://www.unboundid.com
Research Questions

RQ1: What are the main security challenges faced during development of secure identity management solutions for a distributed service platform?

RQ2: What empirical evidence exists on the development and adoption of FIM in industry?

RQ3: What are the benefits and challenges related to FIM from the perspective of the academic community and the industry, respectively?
## Summary of Results

<table>
<thead>
<tr>
<th>No</th>
<th>Key finding</th>
<th>RQ</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IdM security specifications alone do not guarantee secure applications</td>
<td>1</td>
<td>P1, SP1, SP2</td>
</tr>
<tr>
<td>2</td>
<td>Identity assertions must be properly protected</td>
<td>1</td>
<td>P1</td>
</tr>
<tr>
<td>3</td>
<td>Secure identity management is more than secure technology</td>
<td>1</td>
<td>P7</td>
</tr>
<tr>
<td>4</td>
<td>Little empirical evidence exists on the development and adoption of federated identity management</td>
<td>2</td>
<td>P2, P3, P4</td>
</tr>
<tr>
<td>5</td>
<td>Academics expect increased privacy, security and usability for end users</td>
<td>3</td>
<td>P3</td>
</tr>
<tr>
<td>6</td>
<td>Academics expect businesses to benefit from reduced administrative cost and complexity, improved data quality and security, and easier cooperation.</td>
<td>3</td>
<td>P3</td>
</tr>
</tbody>
</table>
## Summary of Results

<table>
<thead>
<tr>
<th>No</th>
<th>Key finding</th>
<th>RQ</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Academics expect technical challenges related to interoperability, attribute synchronization and consistency, revocation and identity provider discovery</td>
<td>3</td>
<td>P4</td>
</tr>
<tr>
<td>8</td>
<td>Academics expect organizational challenges related to investment cost, liability issues, identity assurance, security, knowledge and trust.</td>
<td>3</td>
<td>P4</td>
</tr>
<tr>
<td>9</td>
<td>Practitioners perceive that FIM will improve user administration and usability, make collaboration more efficient, reduce cost, facilitate audit and lead to better protection</td>
<td>3</td>
<td>P5</td>
</tr>
<tr>
<td>10</td>
<td>Practitioners expect trust issues, technological challenges, investment cost and security challenges to be obstacles to adoption of FIM in industry, and there is a risk that they confuse identity management with access management.</td>
<td>3</td>
<td>P5</td>
</tr>
<tr>
<td>11</td>
<td>Practitioners question whether there is sufficient organizational maturity to adopt new identity management solutions</td>
<td>3</td>
<td>P5, P6</td>
</tr>
</tbody>
</table>
Conclusion

• Security important in all phases of software development, and all phases of identity management

• Little empirical evidence on development and adoption of FIM in industry

• The thesis provides a knowledgebase relevant for:
  – IT strategy planners and solution architects
  – Researchers
  – IdM developers and product manufacturers
Acknowledgements

• Torbjørn, Martin, Åsmund

• Committee

• SINTEF colleagues

• Family
Questions?