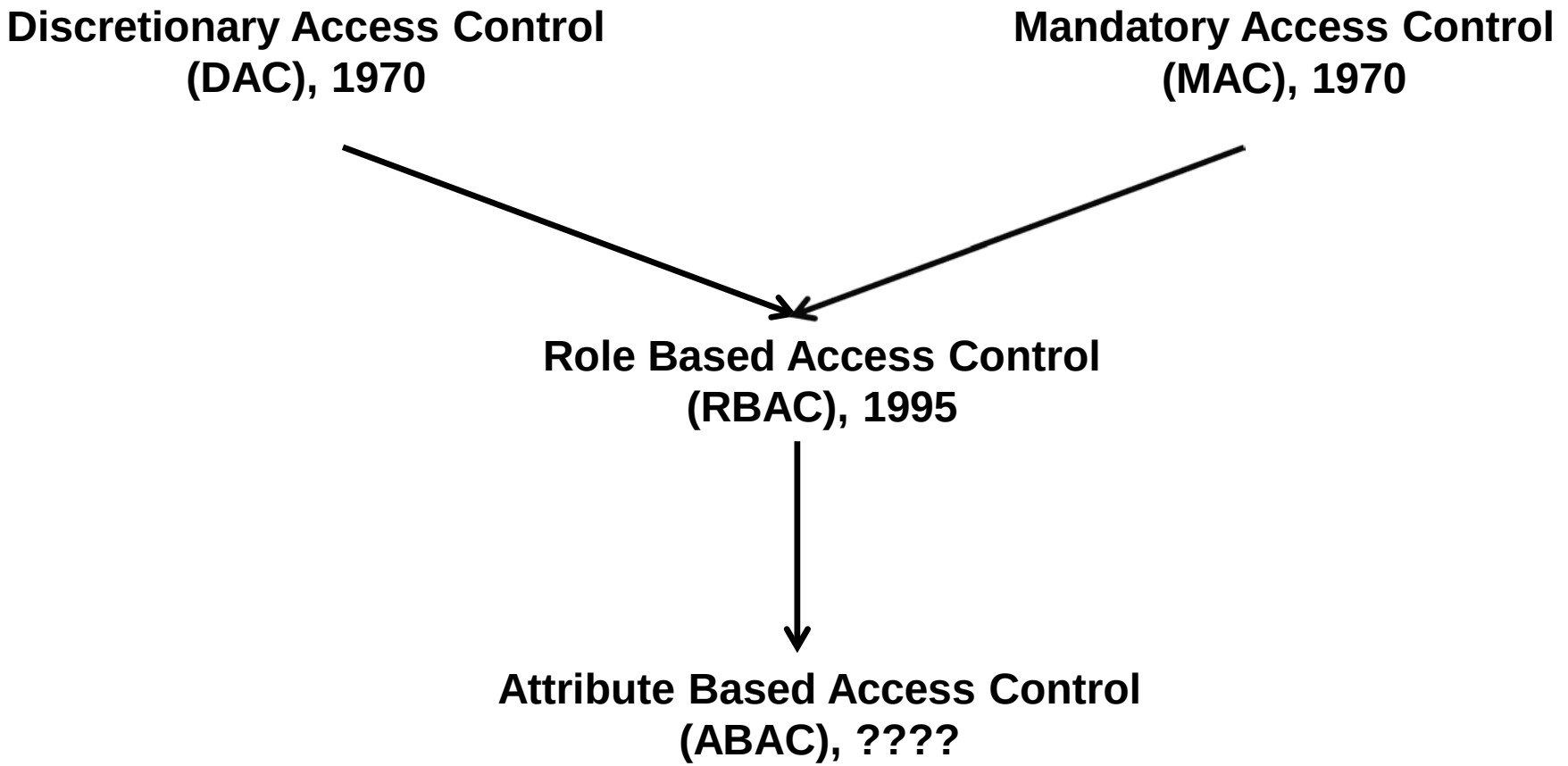
Attribute-Based Access Control (ABAC)

Prof. Ravi Sandhu
Executive Director and Endowed Chair

February 19, 2016

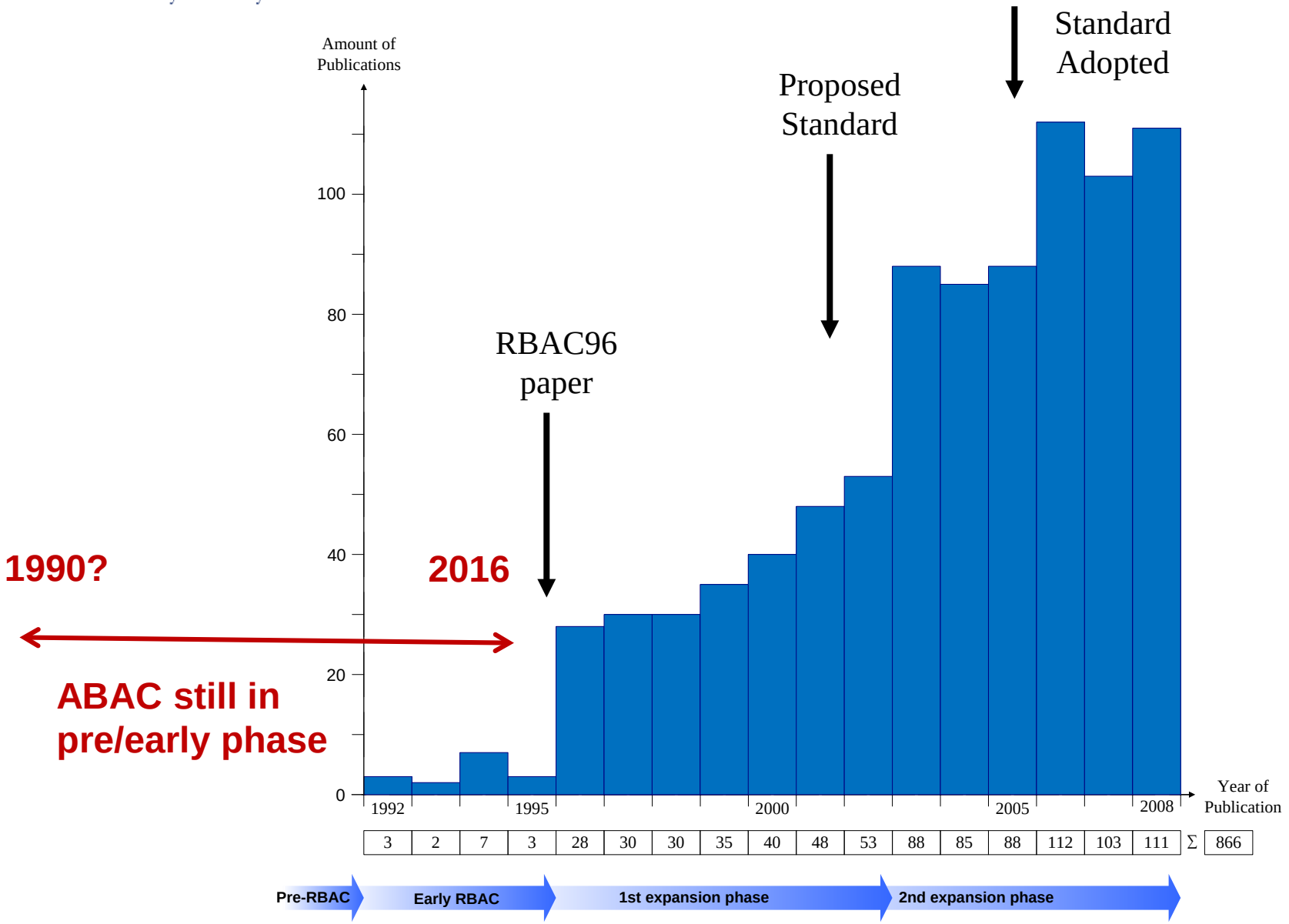
ravi.sandhu@utsa.edu
www.profsandhu.com

Access Control

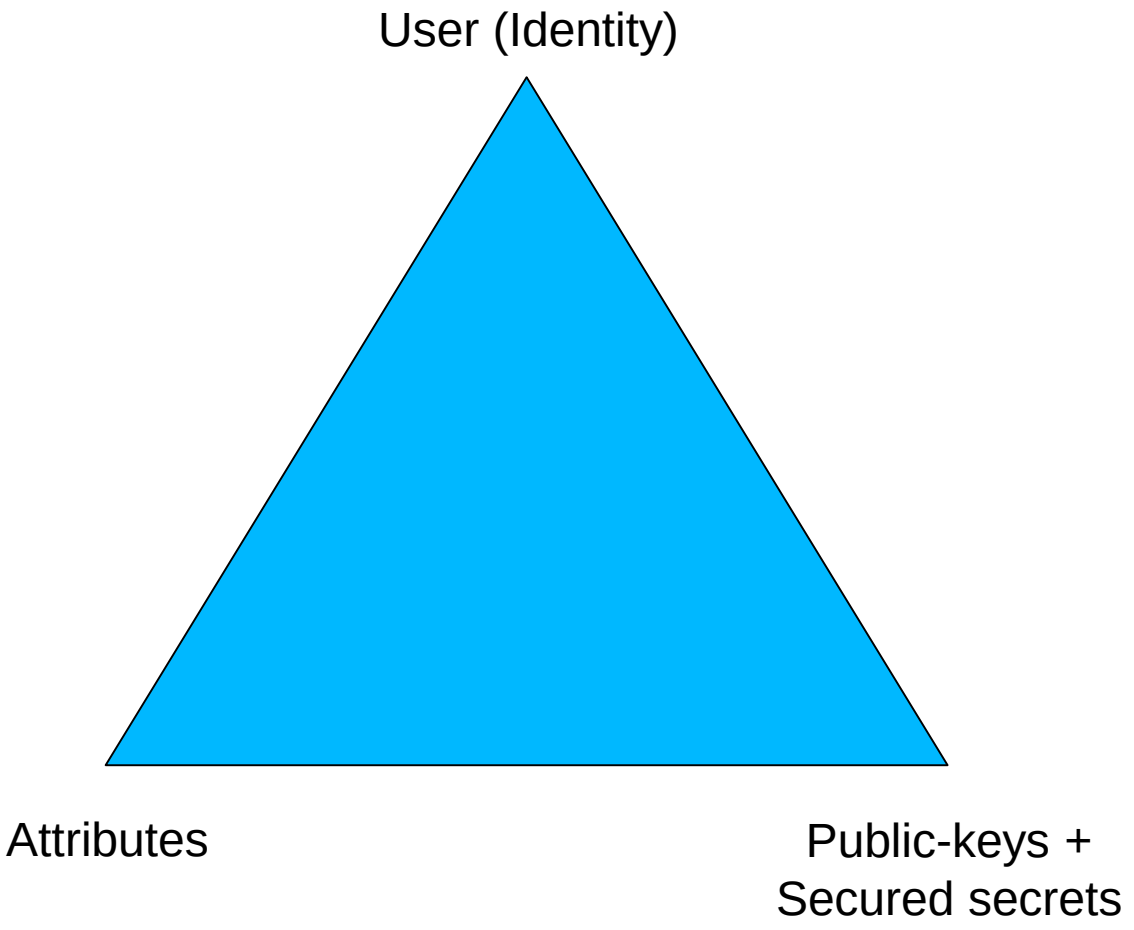


Discuss Figs 2 and 3 of NIST SP 800-162

ABAC Status

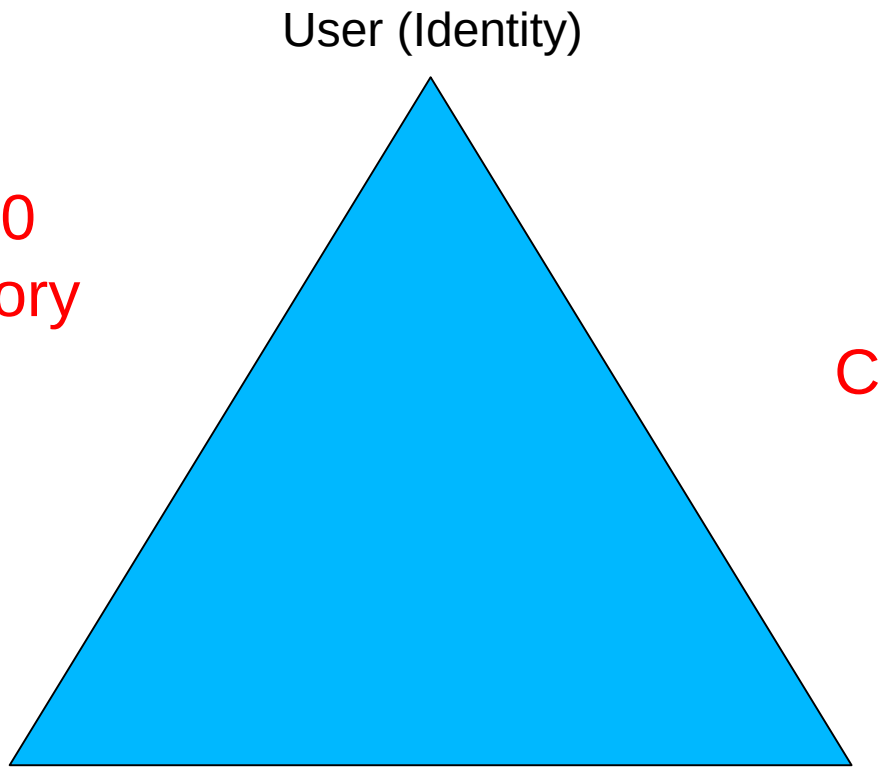

Amount of Publications
Standard Adopted
Proposed Standard
RBAC96 paper
1990?
2016
ABAC still in pre/early phase
100
80
60
40
20
0
1992
1995
2000
2005
2008
Year of Publication
3 2 7 3 28 30 30 35 40 48 53 88 85 88 112 103 111 Σ 866
Pre-RBAC
Early RBAC
1st expansion phase
2nd expansion phase

ABAC is not New



© Ravi Sandhu

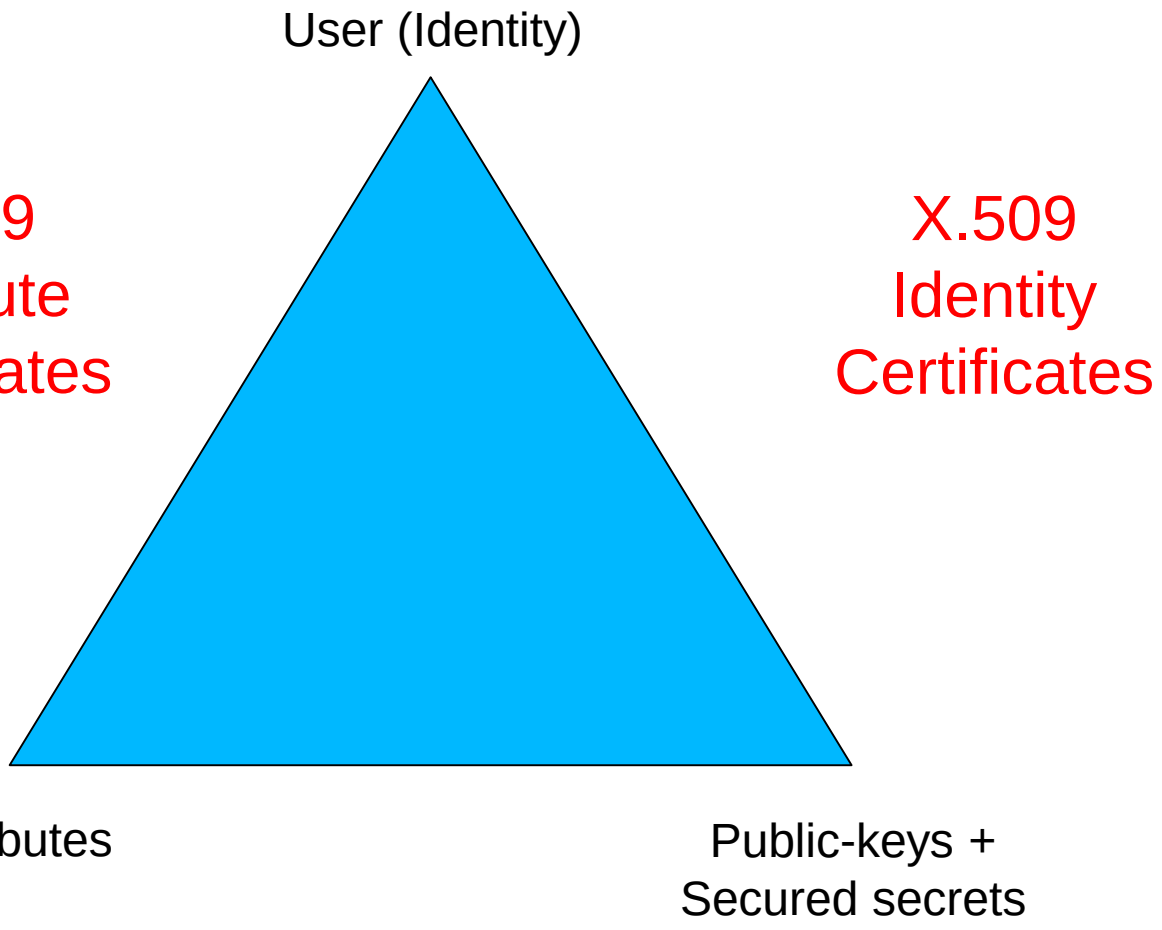
ABAC is not New



Pre Internet, early 1990s

© Ravi Sandhu

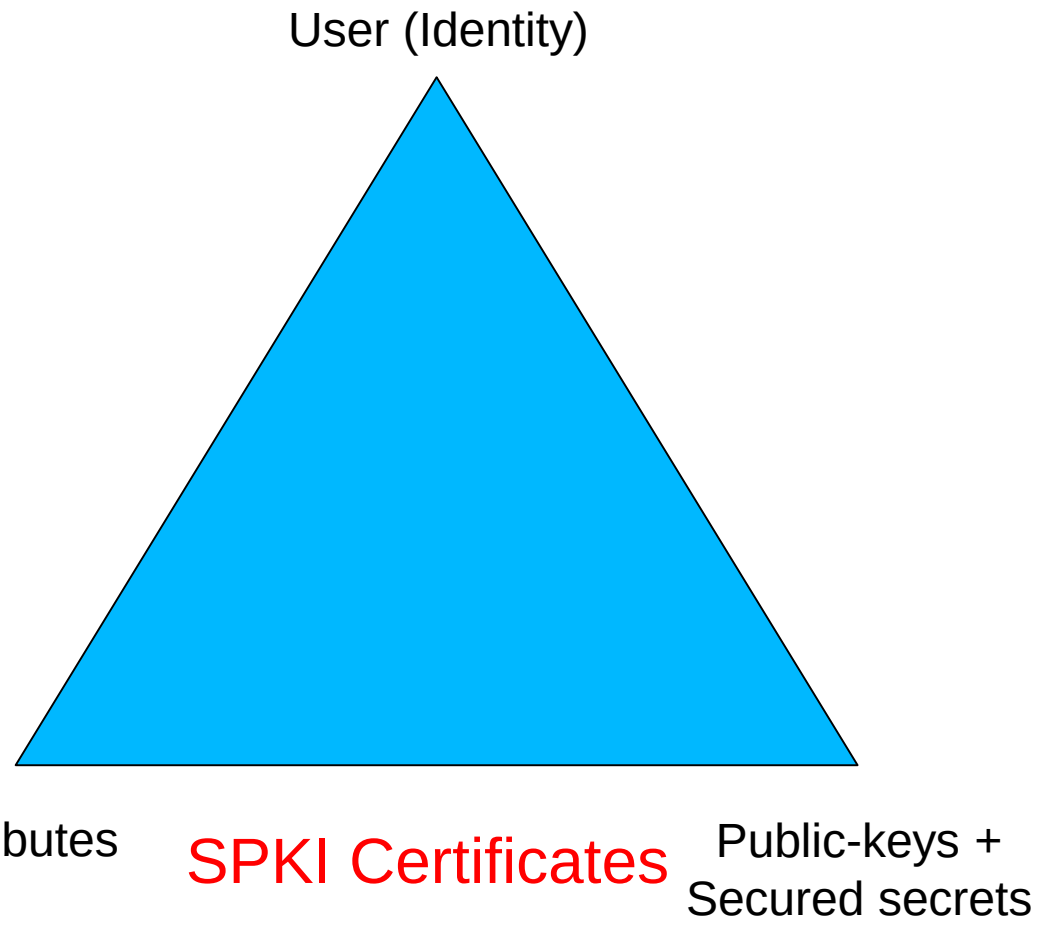
ABAC is not New



Post Internet, late 1990s

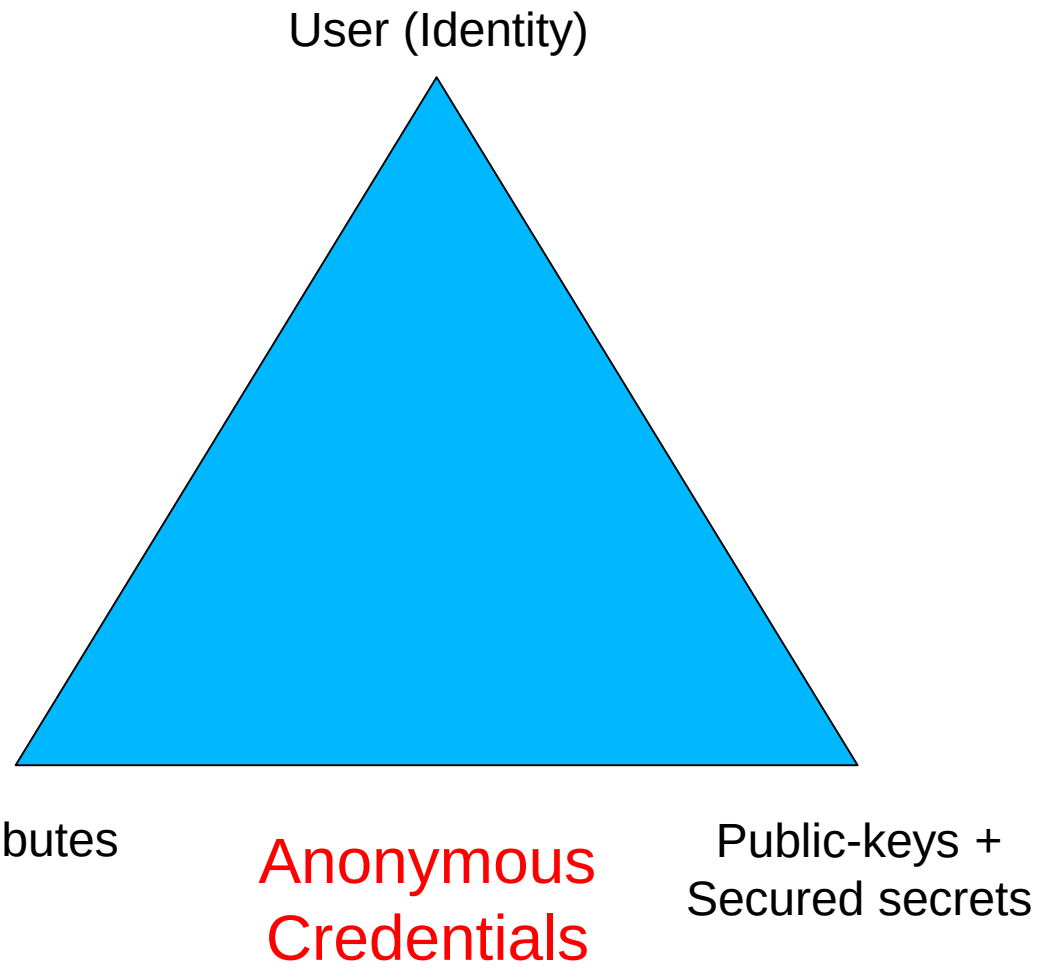
© Ravi Sandhu

ABAC is not New



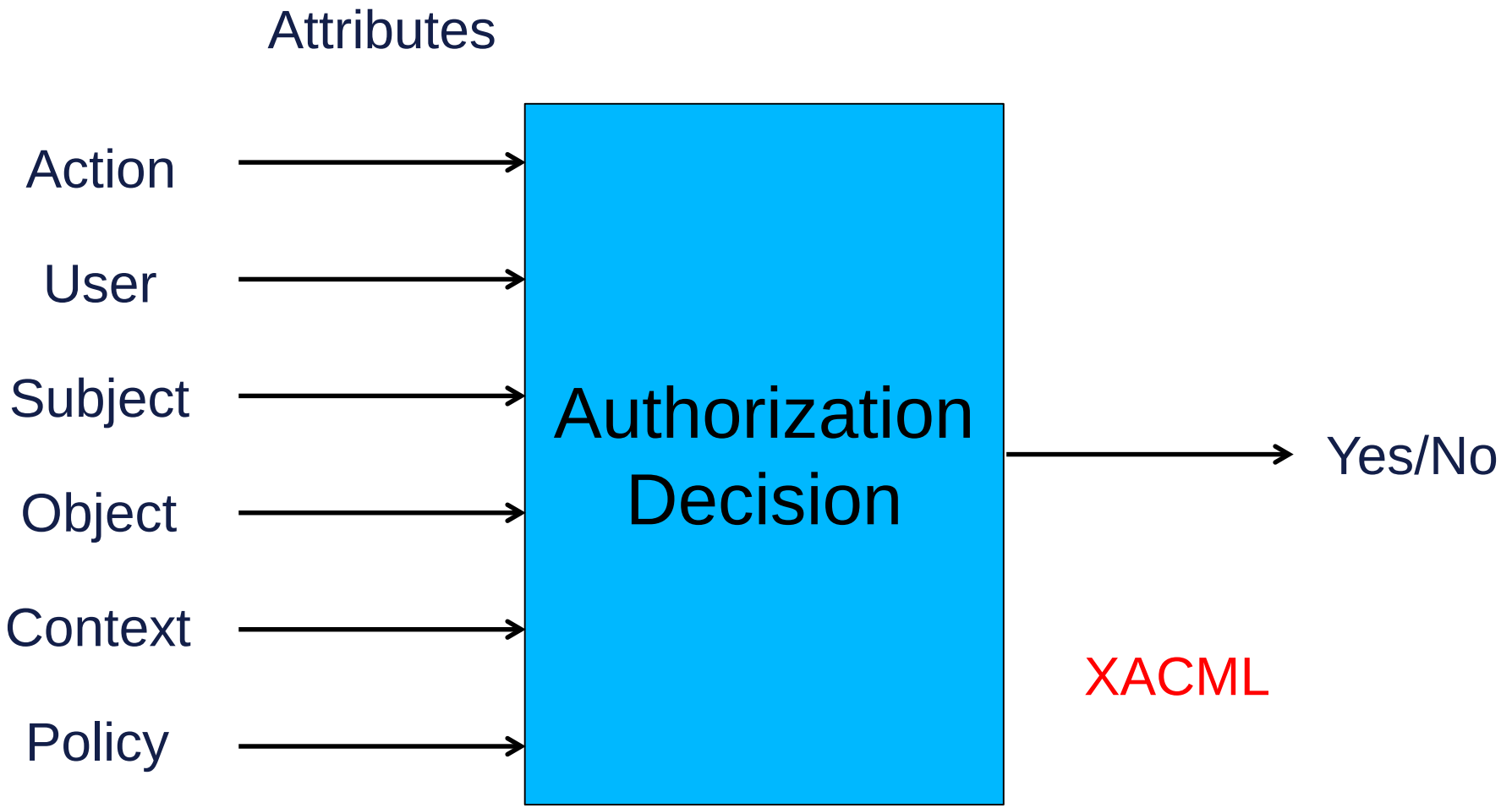
Post Internet, late 1990s

ABAC is not New



Mature Internet, 2000s

ABAC is not New

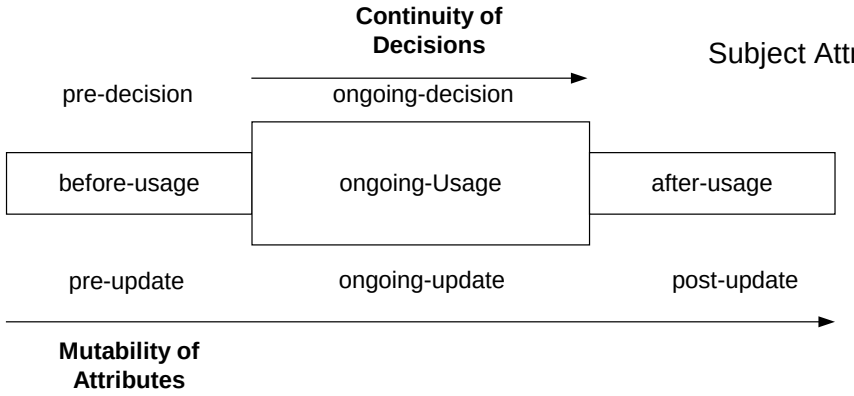


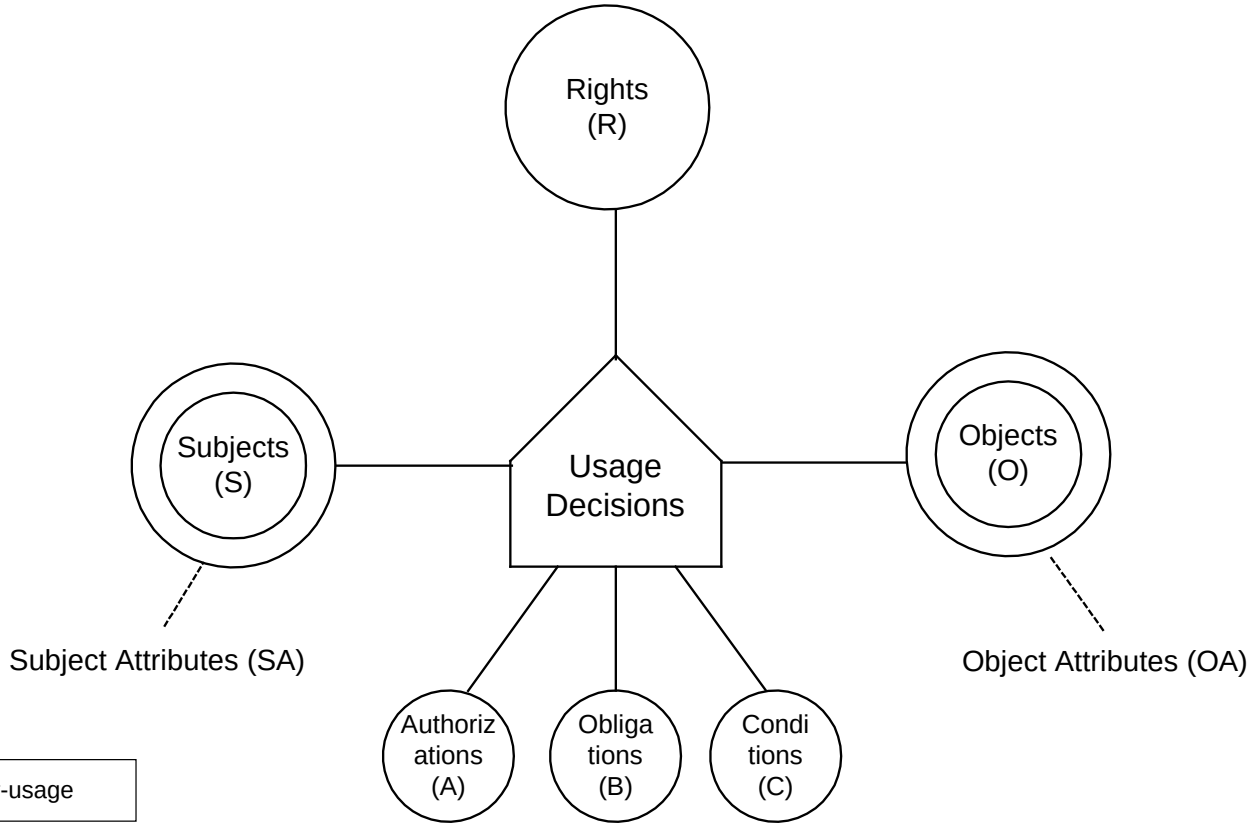
Mature Internet, 2000s

© Ravi Sandhu

ABAC is not New

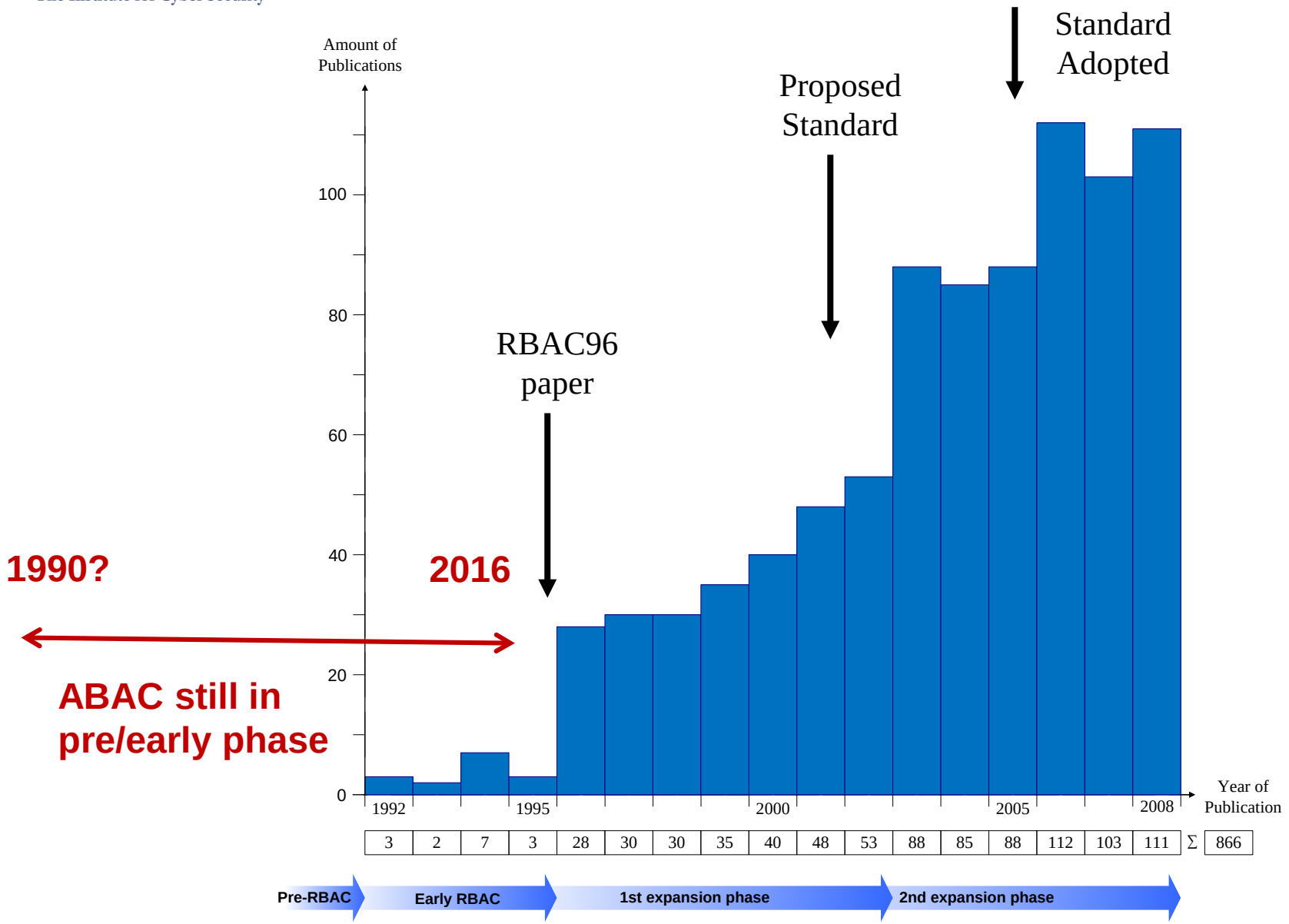
- unified model integrating
  - authorization
  - obligation
  - conditions
- and incorporating
  - continuity of decisions
  - mutability of attributes



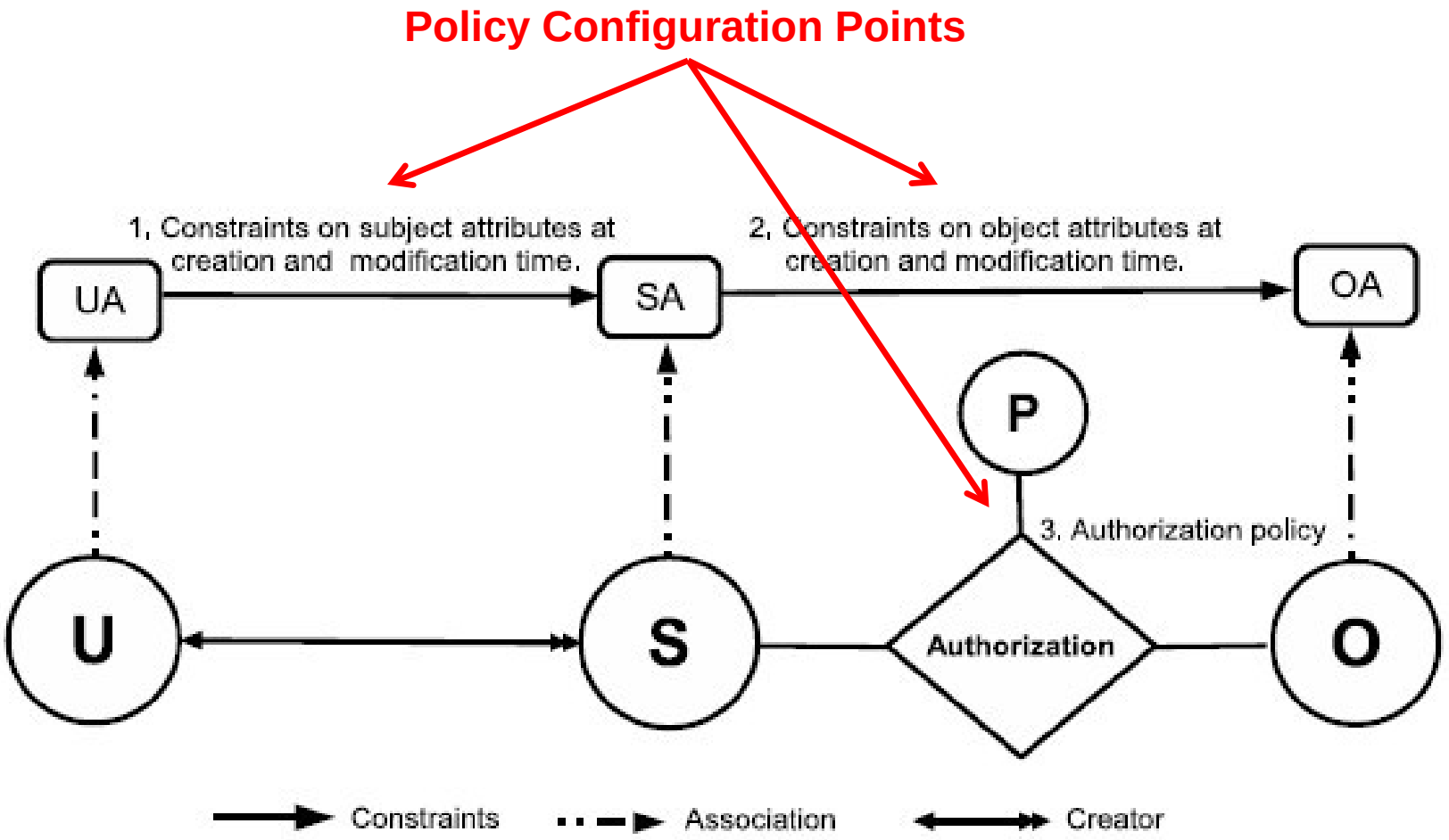


Usage Control Models, early 2000s
ABAC on steroids

ABAC Status


Amount of Publications
Standard Adopted
Proposed Standard
RBAC96 paper
1990?
2016
ABAC still in pre/early phase
100
80
60
40
20
0
1992
1995
2000
2005
2008
Year of Publication
3 2 7 3 28 30 30 35 40 48 53 88 85 88 112 103 111 Σ 866
Pre-RBAC
Early RBAC
1st expansion phase
2nd expansion phase

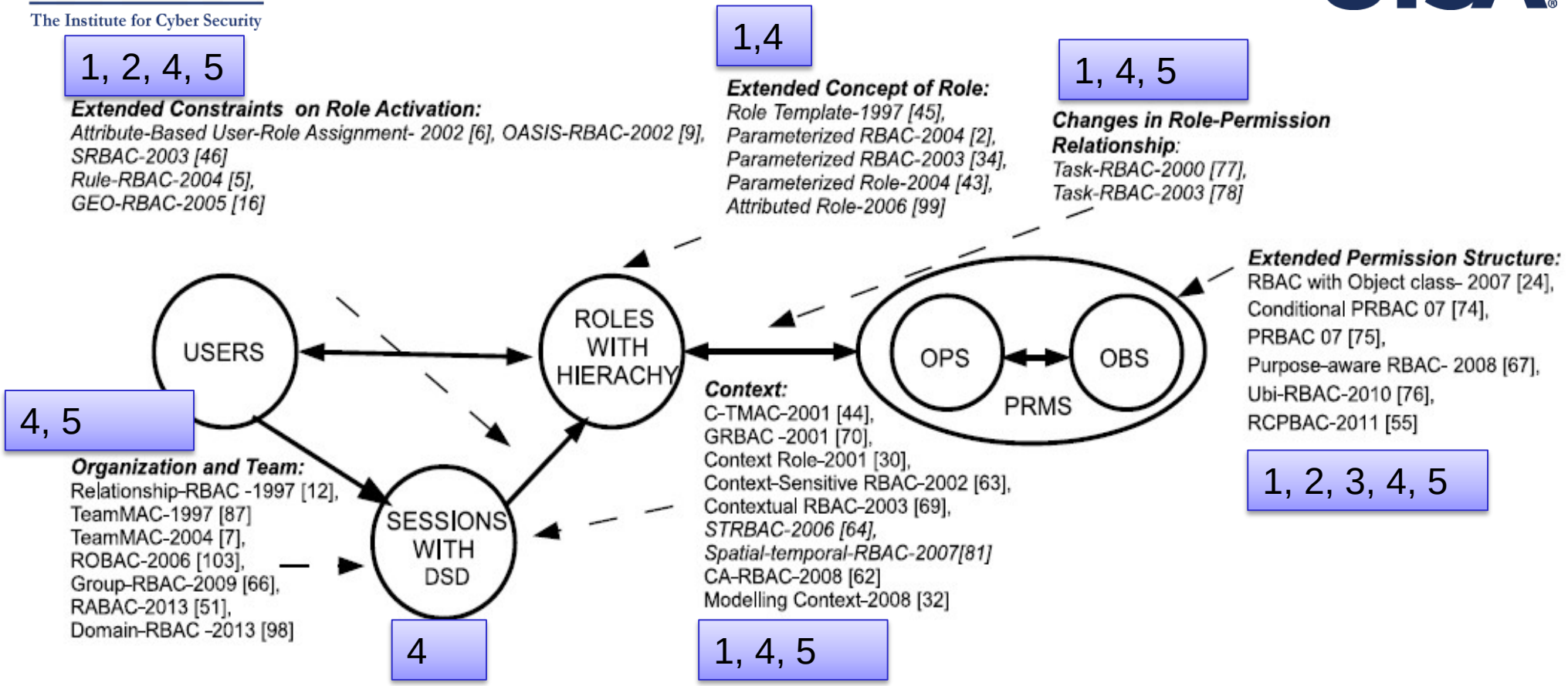
ABACα Model Structure



Can be configured to do simple forms of DAC, MAC, RBAC

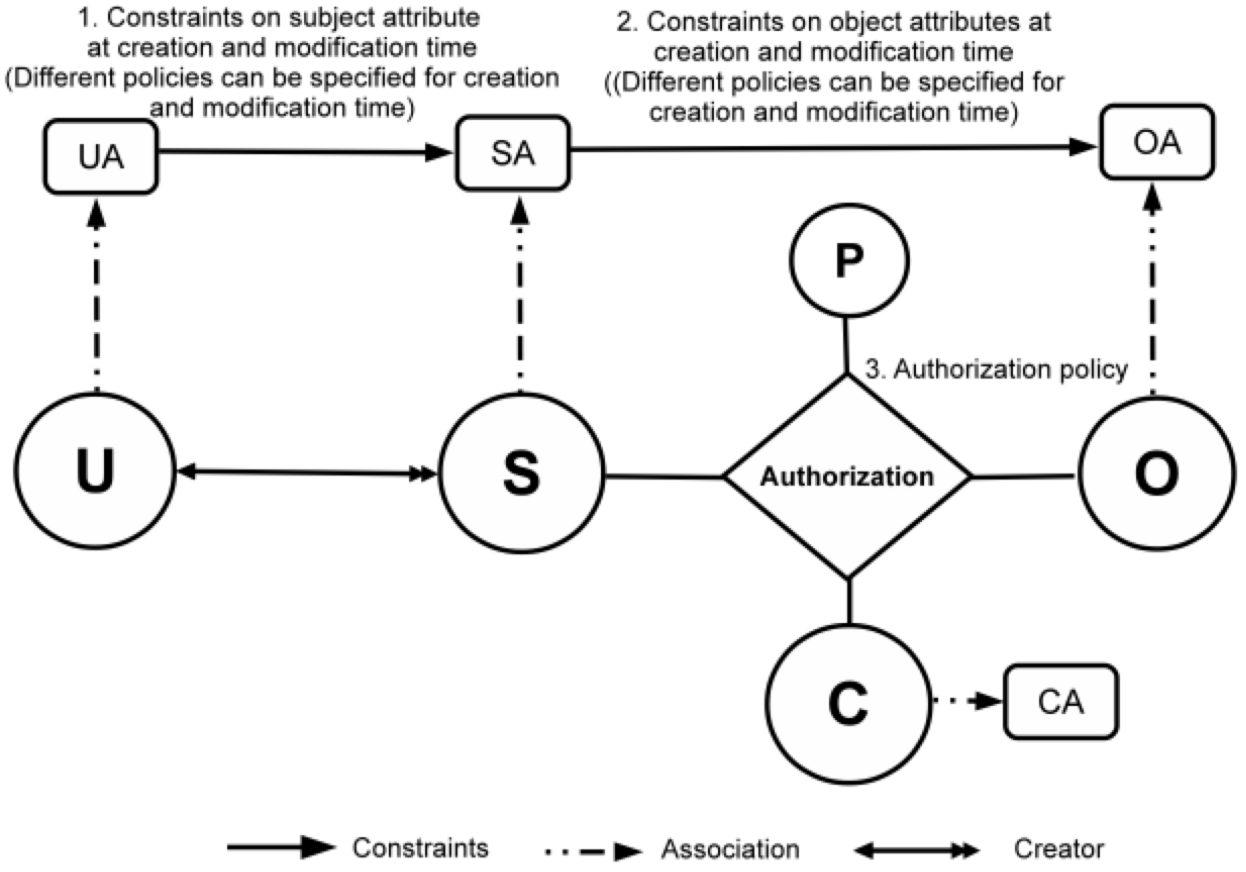
Discuss highlights of Jin 2012 paper

RBAC Extensions



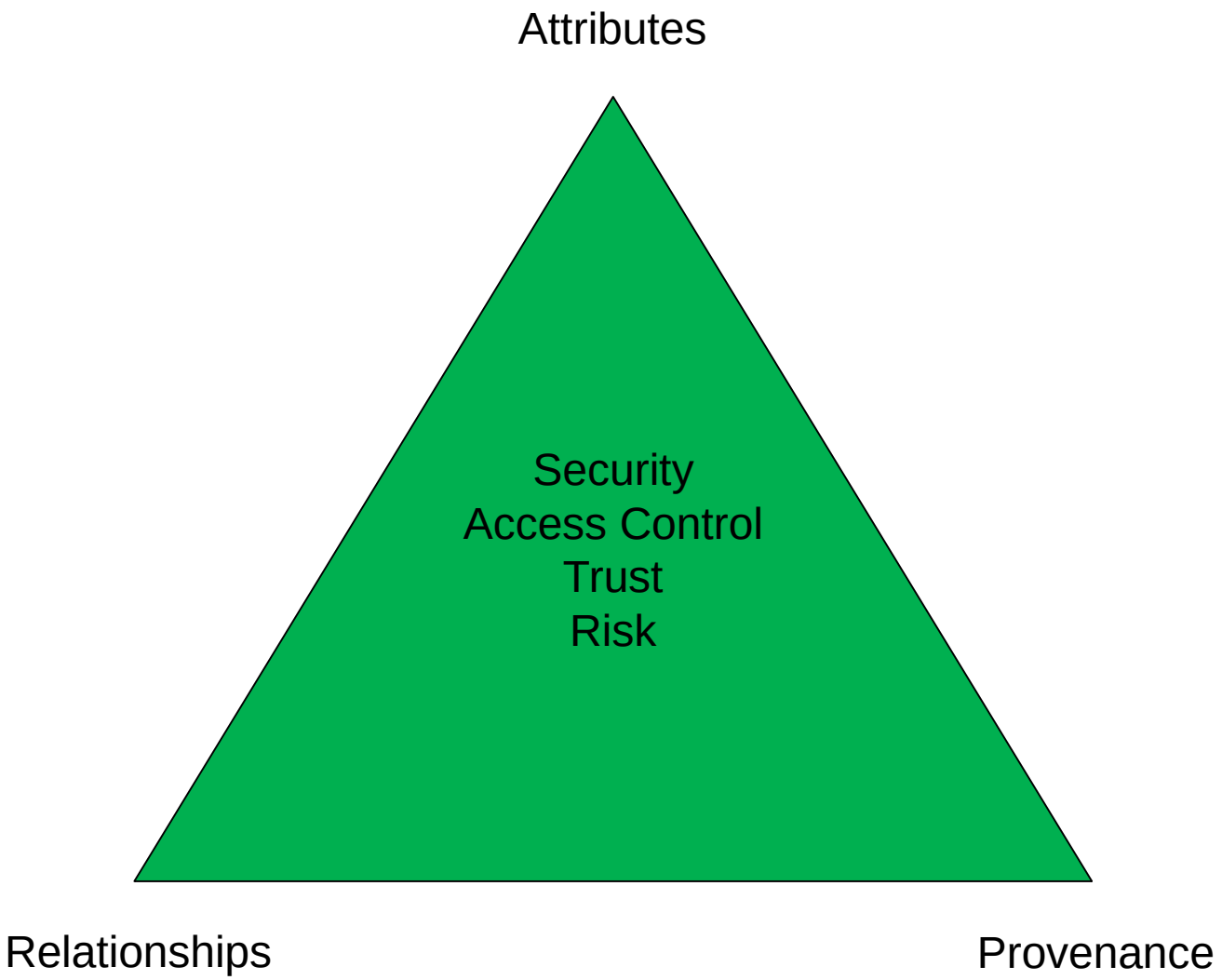
1. Context Attributes
2. Subject attribute constraints policy are different at creation and modification time.
3. Subject attributes constrained by attributes of subjects created by the same user.
4. Policy Language
5. Meta-Attributes

ABAC$_\beta$ Model



Can be configured to do many RBAC extensions

Ultimate Unified Model



© Ravi Sandhu

Application Domains

- Cloud computing
- Internet of Things
- …….

Discuss Fig 1 of Kandala 2011 paper

Discuss Fig 1 and Table 1 of Hu 2015 paper

Discuss Kuhn 2010 paper