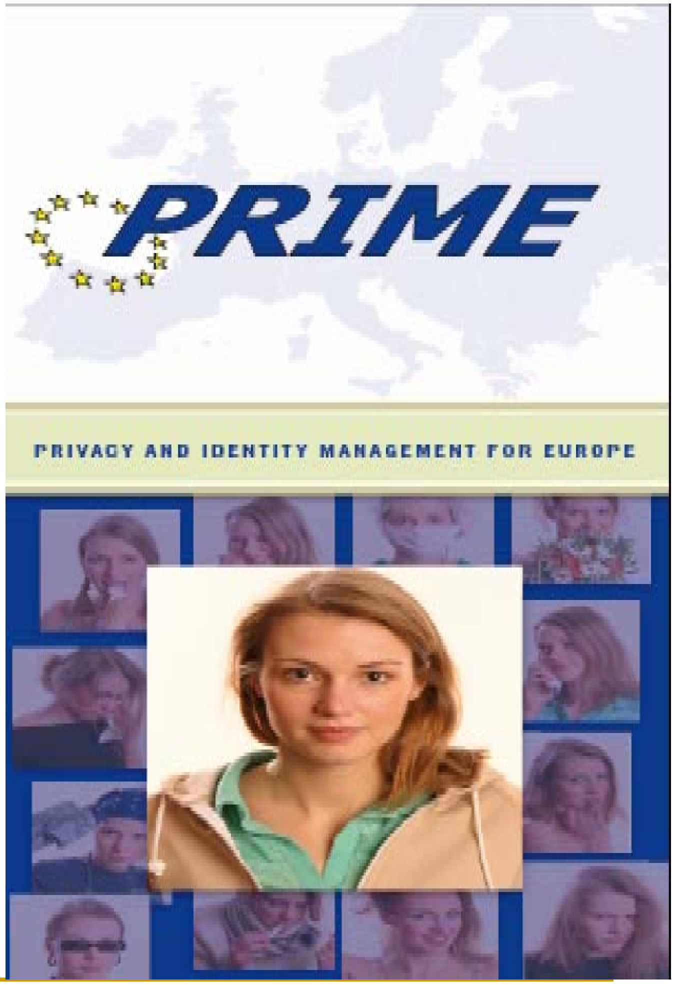
Privacy and Trust Frameworks/Systems

Presented by Zalia Shams

PRIME - Privacy and Identity Management for Europe

- Primarily a research project .
- Aimed to develop a working prototype of a Privacy-enhancing Identity Management System.
- www.prime-project.eu



Trust In PRIME (2005)

Christer Andersson*,
Jan Camenisch‡,
Stephen Crane§,
Simone Fischer-Hübner*,
Ronald Leenes†,
Siani Pearson§,
John Sören Pettersson* and
Dieter Sommer‡

* Karlstad University
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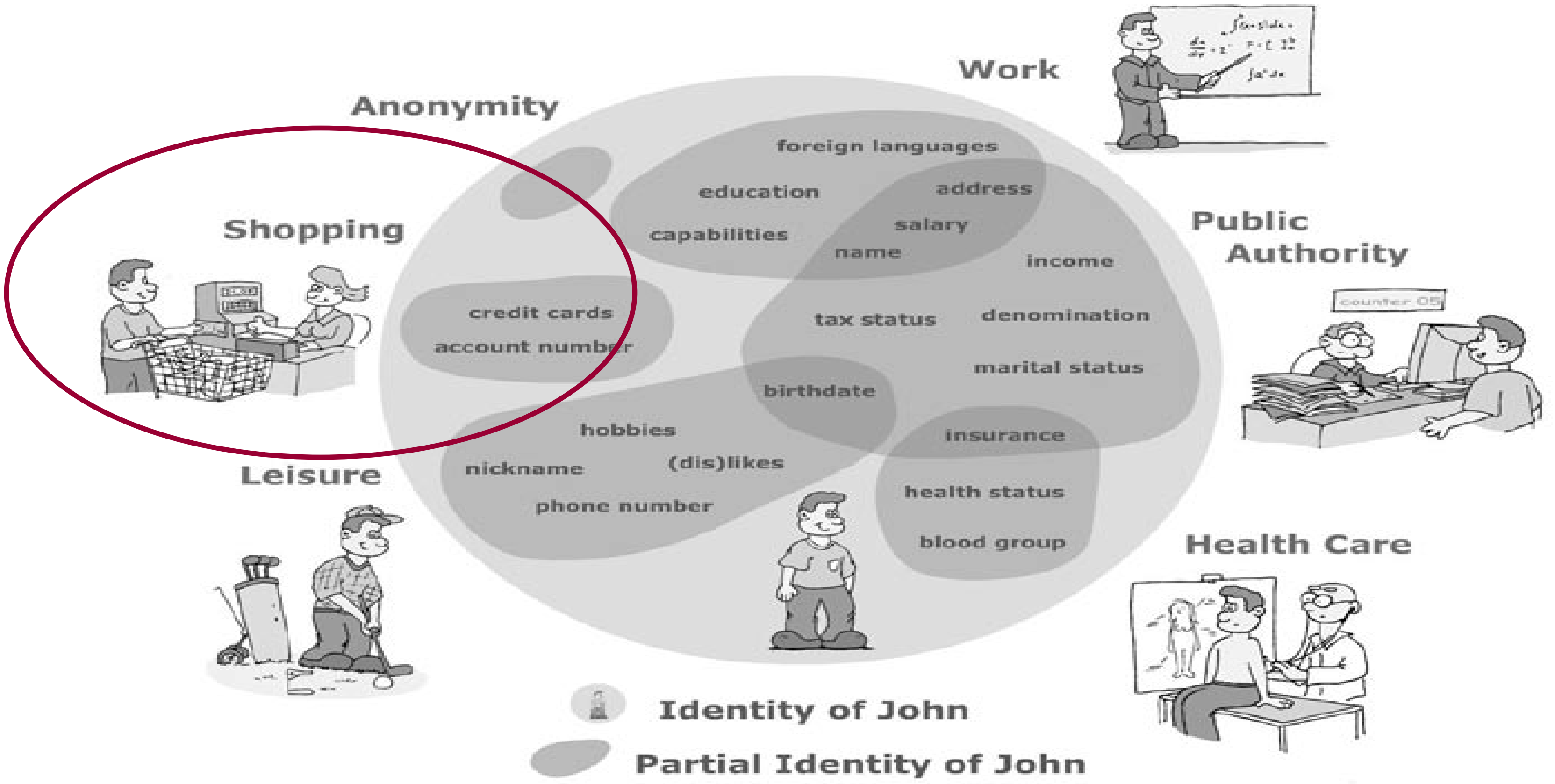
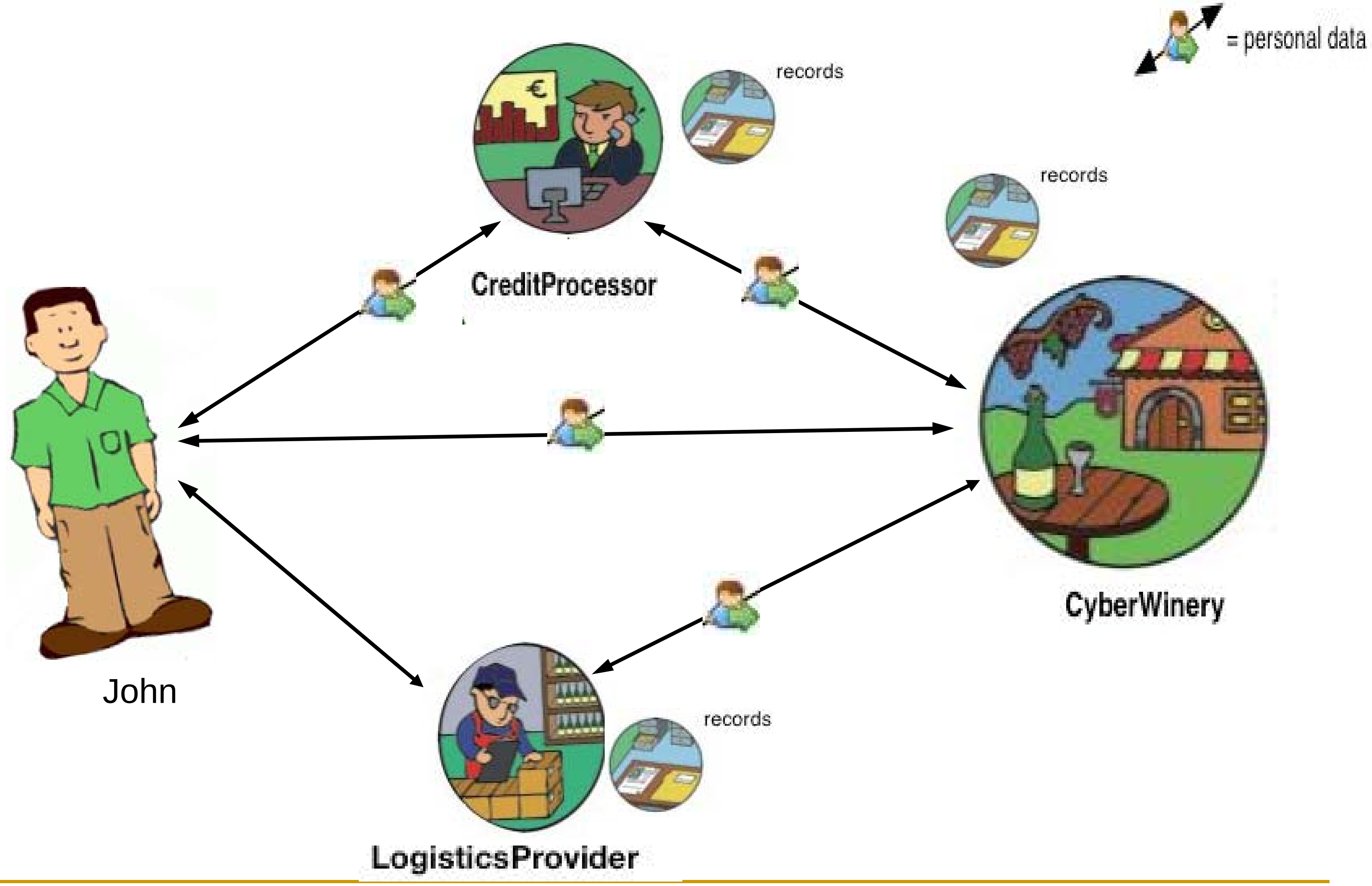
†Tilburg University

Where Identity Information is Stored?

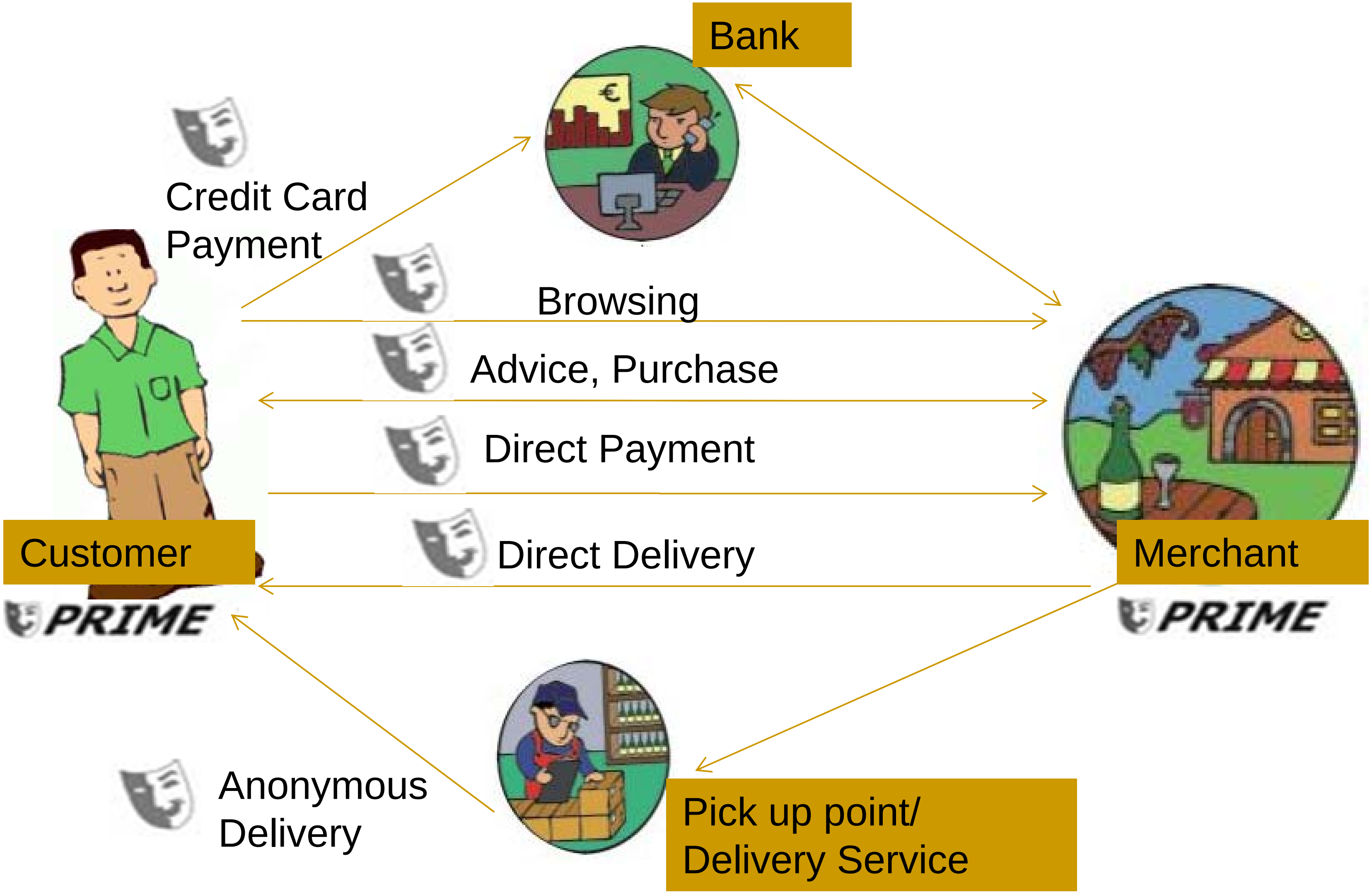


A complete picture of someone's movements, transactions, whereabouts and relationships can be found from the trail left from interaction with websites!!!

A Typical e-Shopping Scenario



PRIME Solution



Contribution

- Introduces the PRIME technical architecture.
- Discusses end user's trust influencing factors
  - Socio-psychological factors
  - HCI aspects
- Describes necessity of
  - HCI research,
  - User studies and
  - Socio-psychological research

  in system design.

Design Principles

- Start from maximum privacy (anonymity).
- State explicit privacy rules.
- Privacy rules must be enforced, not just stated.
- System should be transparent (data track).

PRIME Architecture

User Side:

- ➢Stores users' personal data and credentials in repository
- ➢Protects these by software layer.

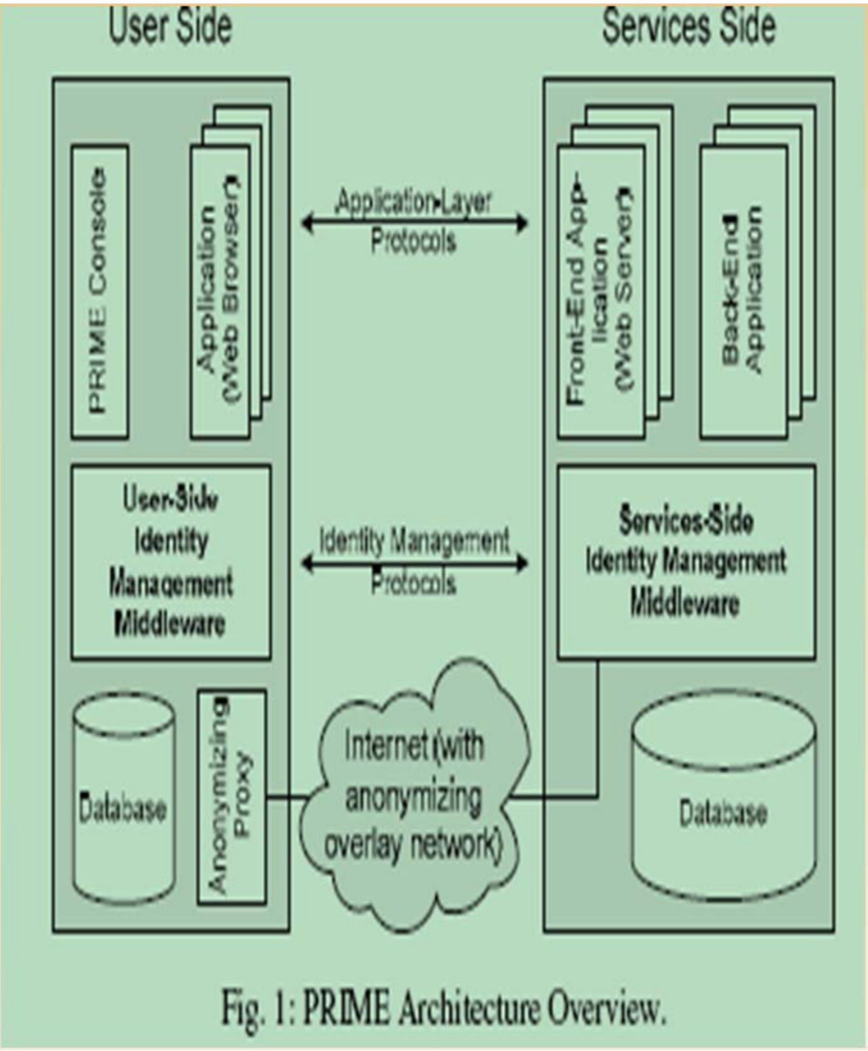

User Side
Services Side
PRIME Console
Application (Web Browser)
Application-Layer Protocols
Front-End Application (Web Server)
Back-End Application
User-Side Identity Management Middleware
Identity Management Protocols
Services-Side Identity Management Middleware
Database
Anonymizing Proxy
Internet (with anonymizing overlay network)
Database

Fig. 1: PRIME Architecture Overview.

Services Side :

- ➢Interacts with users.
- ➢Provide evidence of its trustworthiness.
- ➢Protects user's data once released.

PRIME Architecture

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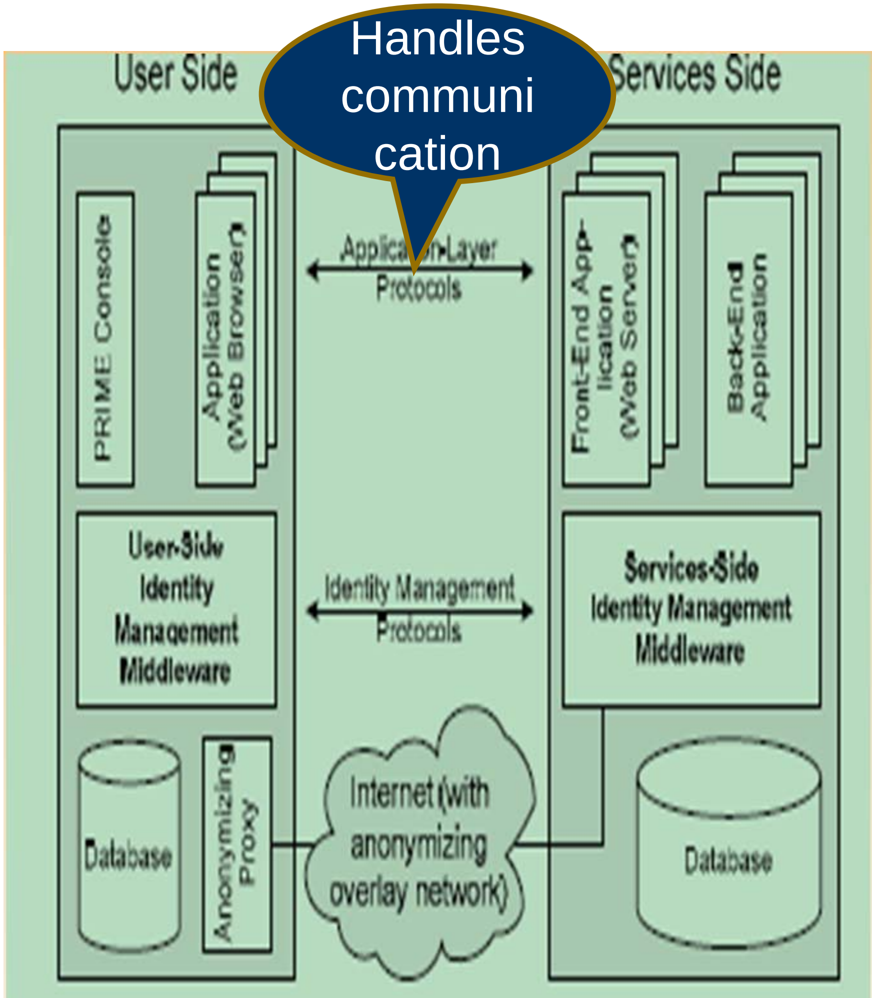
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Handles communication

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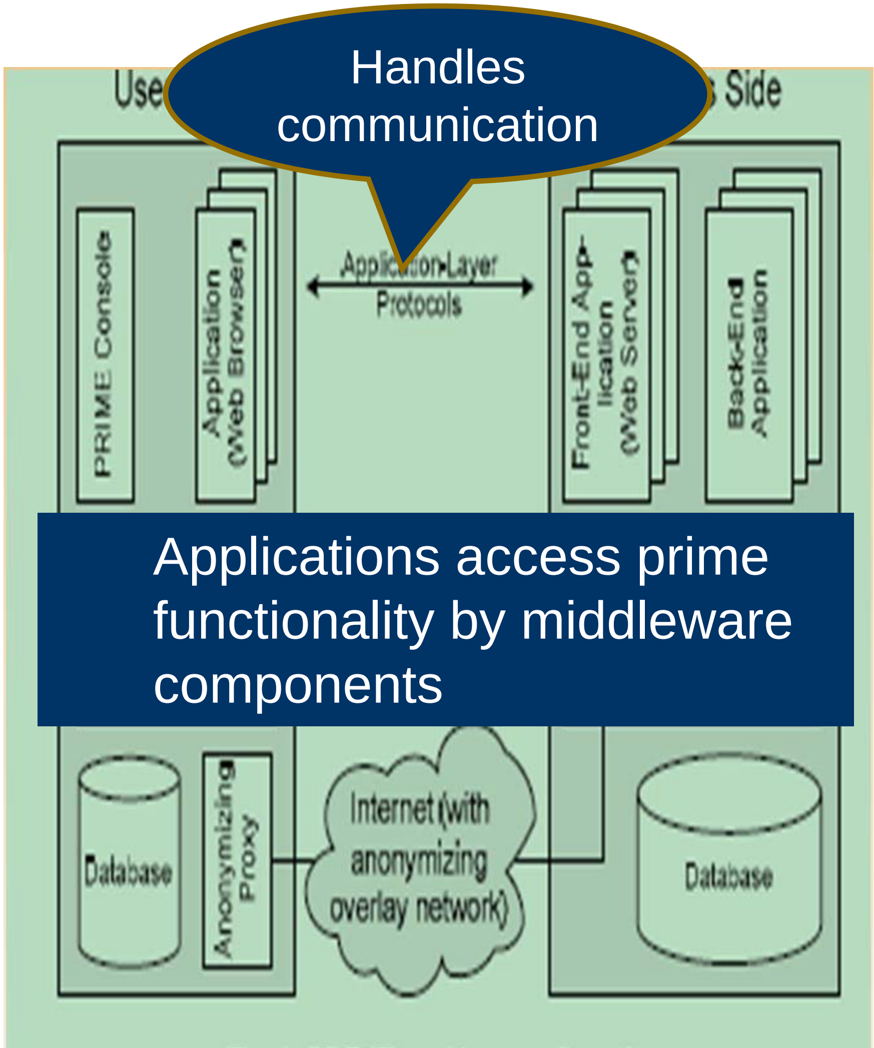
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Handles communication

Applications access prime functionality by middleware components

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Components and Mechanisms

Combining Accountability and Privacy (Access Control):

- User side checks evidence of service provider’s trustworthiness (e.g. privacy seal)
- Services side checks proof of individual attributes denoted as Anonymous Credentials

Enforcing Privacy Policy (Before and After):

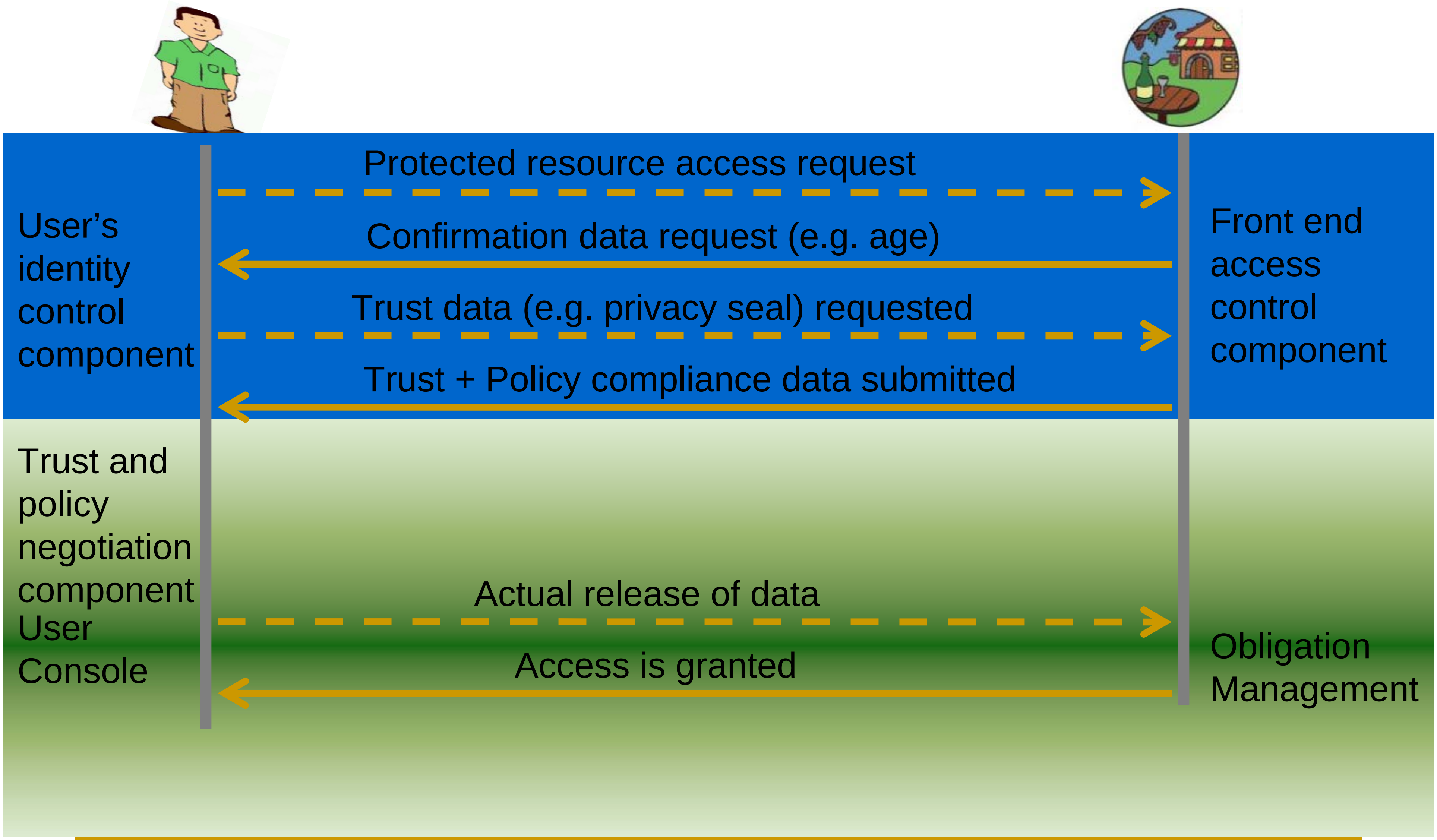
- Both sides checks compliance on policy and obligation of data handling by Automated Trust and Policy Negotiation.
- A component on service side enforces agreed obligations (e.g. limited time data retention).This is Obligation Management.

Transparency:

- User can track their data that are released to services side.

Trusted User Interface: Prime console is used as front-end.

A Typical Interaction



User's identity control component

Trust and policy negotiation component

User Console

Front end access control component

Obligation Management

Protected resource access request

Confirmation data request (e.g. age)

Trust data (e.g. privacy seal) requested

Trust + Policy compliance data submitted

Actual release of data

Access is granted

Socio-Psychological Factors

Trust Layers	Influence
Socio-cultural	▪ Relates to trust in Society. ▪ Strongly associate with known people , likely to have low trust in online stores.
Institutional	▪ Relates to trust in institution. ▪ Legal and technological safeguards enhances peoples' trust.
Service area	▪ Concerns trust in a particular sector of economic activity (e.g. Medical profession > banking sector >internet service provider).
Application layer	▪ Concerns trust in a particular service provider. ▪ Irregular events creates distrust.
Media layer	▪ Relates to communication channel. ▪ Visible icons like lock sign in pages can increase trust.

Usability Tests and Problems found

- A series of usability tests were performed for an e-shopping scenario using interactive mock-ups.
- Results:

1 .Many users did not trust the claim that system will protect their data and privacy

2. “Internet is insecure anyway”.

3. “I did not agree my mental picture that I can buy a book anonymously”.

4. Users had difficulties to

- mentally differentiate server and user side identity managements.
- understand that PRIME console is with in users’ control and protects their identities.

Possible Solutions for Enhancing Trust

- “Institutional Trust” has to put into PRIME from external sources. (e.g. consumers’ organizations recommend PRIME).
- Trustworthiness of the service provider must be conveyed to user.
- Data blocking, rectifying or deleting facilities need to be added.
- Help functions for legal issues need to added.
- User side and services side Identity Management Middleware functionalities should be clearly distinguishable by UI.

Conclusions

- Powerful trust and privacy-enhancing technical mechanisms are developed in PRIME.
- Social factor and usability research have to accompany the development to enhance trust in users'.

Discussions

- Do you think anonymous credentials support unlinkability/privacy appropriately? Is so why? If not, why?
- The paper mentioned-" … buying anonymously via Internet did not fit to a user's mental picture… it is clear that providing anonymous shopping will wake awake an interest in the privacy technology". How this conflict can be resolved?
- Do you think PRIME is transparent enough? If not, what can be done to increase transparency?
- Up to what extent PRIME middleware should enforce service provider and third party's back-end? (e.g. only give a message that you should delete x customers' data

  or,

  Check back-end database and delete the data itself.)