

### *Session 1: PrimeLife Usability Work*



A research project funded by the European Commission's 7<sup>th</sup> Framework Programme

# Session 1: Usability

- Background
- **Simplified *privacy preferences* management**
- **Anonymous *credential selection* user interfaces**
- ***Trust evaluation* user interfaces**

Discussion and Feedback



# Privacy-enhanced Interactions – Technology

## 1 Simplified privacy preferences management

*Non-intrusive, intuitive definition of user preferences*

## 2 Anonymous credential selection

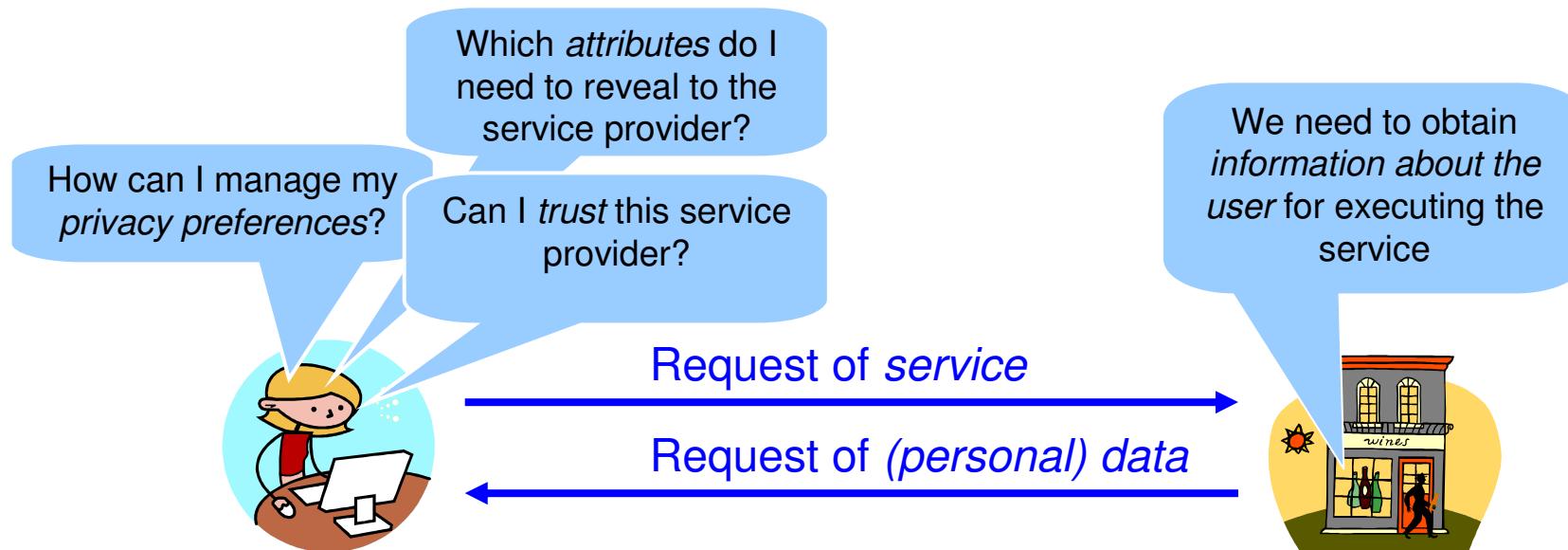
*Decision on attribute information to be revealed*

## 3 Trust evaluation

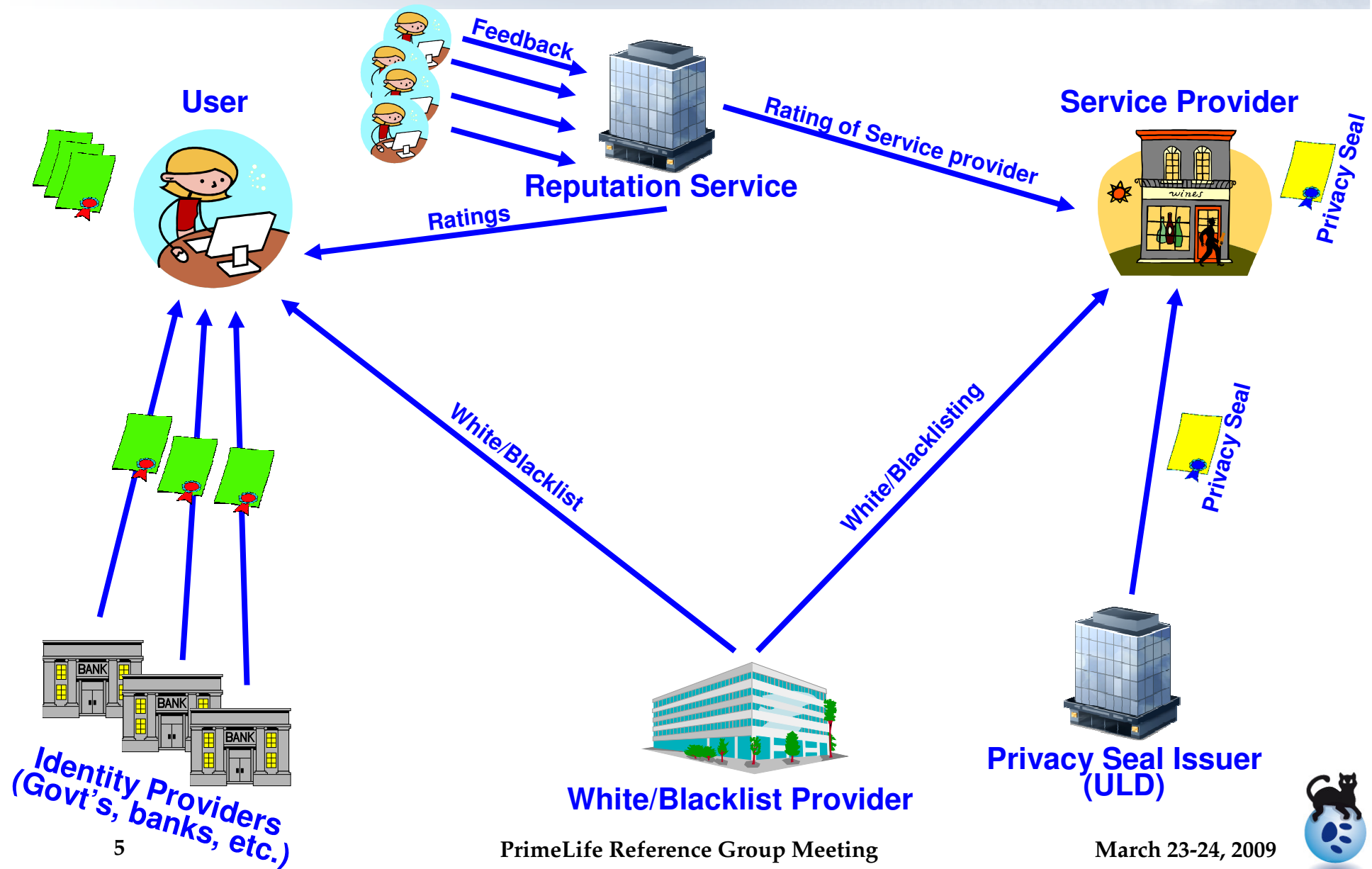
*How users can establish trust in service providers*



# The Setting

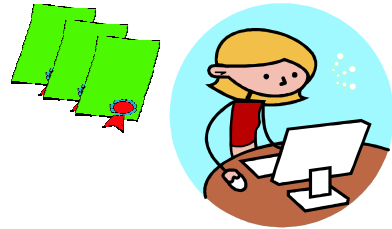


# The Architecture



# An Interaction

White/Blacklist Provider



Privacy Seal

Evaluation of request

White/Blacklist query

Ok

Request of service

**Data request; data handling proposal**

- A valid service subscription and its type
- Proof of age > 14 years

**Request of trust & assurance data and evidence**

We can offer the following:

- A privacy seal issued by ULD
- We are running a PrimeLife-enabled system including a privacy obligation management engine

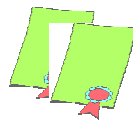
...

Trust assessment against local trust & assurance policy

Trust > Trust & assurance evaluation

Preferences > Display of privacy policy  
Privacy preferences management

Credentials > Display of data request  
Identity selection



Subscription.type = "Basic"  
Date of birth < "1995-03-23"  
Proof = <Binary blob>

Negotiation



# Session 1: Usability

- Background ✓
- **Simplified privacy preferences management**
- **Anonymous credential selection user interfaces**
- **Trust evaluation user interfaces**





# How to simplify Privacy Preference Management?

- Assumption: Users will not do complex privacy preference settings beforehand
- Our approach:
  - Provide a predefined privacy preferences that can be adapted "on the fly" according to the user's behaviour
  - Take the most privacy-friendly preference as a default





# Privacy Preference Types ("PrivPrefs")

- 3 predefined PrivPref-Types:
  - Anonymous
  - Only Minimal Data
  - Additional Data
- PrivPref-Structure:
  - (`"Anonymous"` | `"Only Minimal Data"`, `contact`, `purpose`)
  - or
  - (`"Additional Data"`, `contact`, `purpose`, `data categories`)
- In addition, we need a table of necessary data categories for purposes, i.e. with entries (`purpose`, `data categories`)



# PrivPref-Management

## "on the fly"

- If a user contacts a side (contact) for a specific purpose:
  - Check whether there exist a PrivPref for (contact, purpose)
  - If yes: Use this PrivPref
  - If no: Use PrivPref ("Anonymous", contact, purpose) ( or ("Only Minimal Data", contact, purpose))
- If "more data" is requested than allowed by current PrivPref: Inform the user and provide the possibility to adapt/change PrivPref settings "on the fly".



## Example: Current PrivPref "Only Minimal Data"

Send Personal Data?

Current privacy preference:

"Only Minimal Data"

Your data:

Name:

Anna Larsson

Credit Card:

No.: 1234 5678 1234 5678 Valid to: 01/11

Mobile Phone:

Not strictly needed

1

... is requested by:

Travel Trips Ltd  
info@traveltrips.com

Purposes:

Book and pay trip

1 Mobile phone number is not needed for this purpose

☐ Don't warn me for this on future visits to www.traveltrips.com

☐ Don't warn me for this on future visits to any site (for this purpose)

Send

Cancel



# HCI for Anonymous Credential Selection

- Problem: No obvious real-world analogies exist -  
Difference to real-world credentials:
  - Only parts of the credential attributes or characteristics of attributes can be proven/revealed
  - Different credential shows are unlinkable
- What mental models can be developed or can be accounted on?



# Test task: buy something

The screenshot shows the Amazon.com homepage in a Mozilla browser window. The browser's address bar displays 'http://www.amazon.com/'. The page features the Amazon logo, a 'Hello.' greeting, and a sign-in prompt. Below the header, there are links for 'Your Amazon.com', 'Today's Deals', and 'Gifts & Wish Lists'. A search bar contains the text 'Kindle Books'. The left sidebar lists various departments under 'Kindle Books', including Fiction (84,486), Nonfiction (113,405), Advice & How-to (11,455), Arts & Entertainment (5,130), Biographies & Memoirs (6,272), Business & Investing (17,288), Children's Chapter Books (4,652), Computers & Internet (9,722), Fantasy (3,112), General (1,000), History (12,665), and Humor (3,070). The main content area, titled 'Kindle Books', shows 'Showing 1 - 12 of 200,545 Results'. The first two results are: 1. 'Slaughterhouse Five' by Kurt Vonnegut, priced at \$7.19, with a 'Pay with PrimeLife' option and a 5-star rating (704 reviews). 2. 'The Great Gatsby' by F. Scott Fitzgerald, priced at \$3.95, also with a 'Pay with PrimeLife' option and auto-delivered wirelessly to Kindle.



# Paying [In General]

1

## Assemble Data

The screenshot shows a web browser window titled "PRIME - Send Personal Data". The interface has a blue header bar with a navigation menu: "Overview", "Condensed Privacy Notice", "Full Privacy Notice", and "Claim Request". Below the header, there are two tabs: "Select Credentials" and "Payment". The "Payment" tab is active. The main content area is titled "Create Card!". It features a summary box on the left with a black cat icon and the text "Age >18:" and "Credit Card:". To the right of the summary box, there are two dropdown menus: "Select Proof" and "Select Credit Card". At the bottom of the window, there are three buttons: "Show in one Step", "Back", and "Next".

2


## Send Data

The screenshot shows the same web browser window as in Step 1, but now the "Send Card?" tab is active. The main content area shows a summary box on the left with the black cat icon and the text "Age >18:" and "Credit Card: paysafecard". To the right of the summary box, there is a large question mark icon. Further right, there is a box containing a card icon and the text "amazon.com". At the bottom of the window, there are three buttons: "Show in one Step", "Back", and "Send".



# 1st Iteration of Mockups - Paying [Scenarios]


## Selecting Parts of Credentials



**Name:**

**Credit Card:**

## Proofs of Characteristics with Credentials



**Age >18:**


**Credit Card:**





# Assembly [Mental Models]


Create Card!



**Name:**

**Credit Card:**

Select Credentials!




**Name:**

**Credit Card:**



# Assembly [Selection Mechanism]

Create Card!




Age >18:

Select Proof

Driver License

Passport

Select Credentials!





Age >18:

Select Proof

Credit Card:

Select Credit Card



# Send data [Text/Icons]


Send Card?





**Age >18**  
Yes [Proof: NY Driver License]

**Credit Card:**  
Octopus

Send Credentials?



**Age >18**  
 >18

**Credit Card:**  
 paysafecard



# Questions [Data sent?]

What does Amazon.com know about you? Tick the boxes and fill in the blanks below if you need to!



Questions [Data sent?]

<input type="checkbox"/>	<u>Förnamn</u>
<input type="checkbox"/>	<u>Efternamn</u>
<input type="checkbox"/>	<u>Födelsedag</u>
<input type="checkbox"/>	<u>Förarbehörighet</u>
<input type="checkbox"/>	<u>Utfärdandedatum</u>
<input type="checkbox"/>	<u>Utgångs datum</u>

Övrigt: \_\_\_\_\_

Övrigt: \_\_\_\_\_



# Test results – 1st Iteration

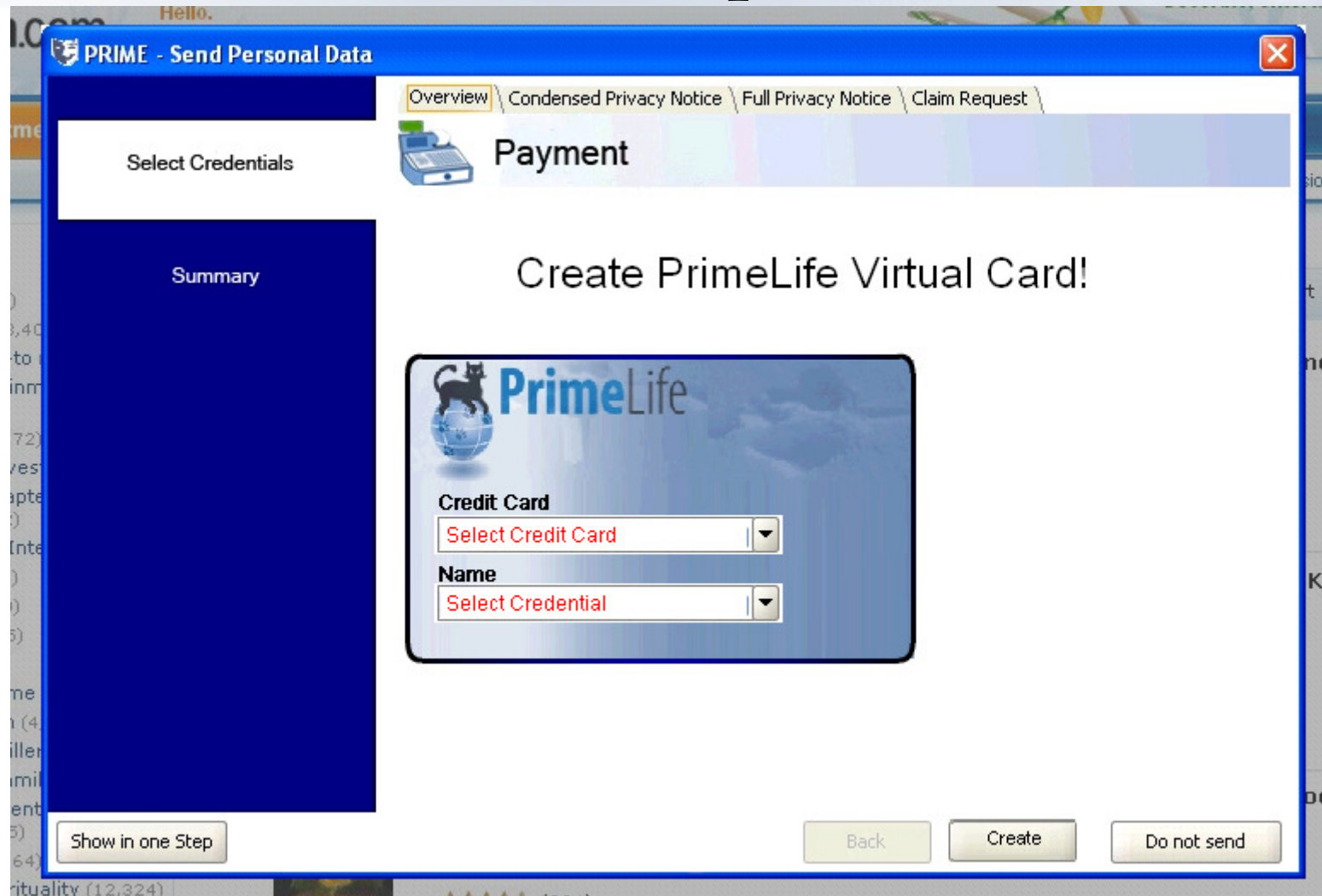
40 participants

3 got it!

(7,5%)



# 3rd Iteration of Mockups



A mockup of a web application window titled "PRIME - Send Personal Data". The window has a blue header bar with a close button (X) in the top right corner. Below the header, there is a navigation bar with four tabs: "Overview" (highlighted), "Condensed Privacy Notice", "Full Privacy Notice", and "Claim Request". The main content area is divided into two sections. On the left, there is a dark blue sidebar with two buttons: "Select Credentials" and "Summary". The right section has a light blue background and contains the heading "Create PrimeLife Virtual Card!". Below this heading is a rounded rectangle containing the PrimeLife logo (a black cat on a globe) and two dropdown menus. The first dropdown is labeled "Credit Card" and has the text "Select Credit Card" in red. The second dropdown is labeled "Name" and has the text "Select Credential" in red. At the bottom of the window, there are three buttons: "Show in one Step", "Back", "Create", and "Do not send".

PRIME - Send Personal Data

Overview | Condensed Privacy Notice | Full Privacy Notice | Claim Request

Select Credentials

Payment

Create PrimeLife Virtual Card!

PrimeLife

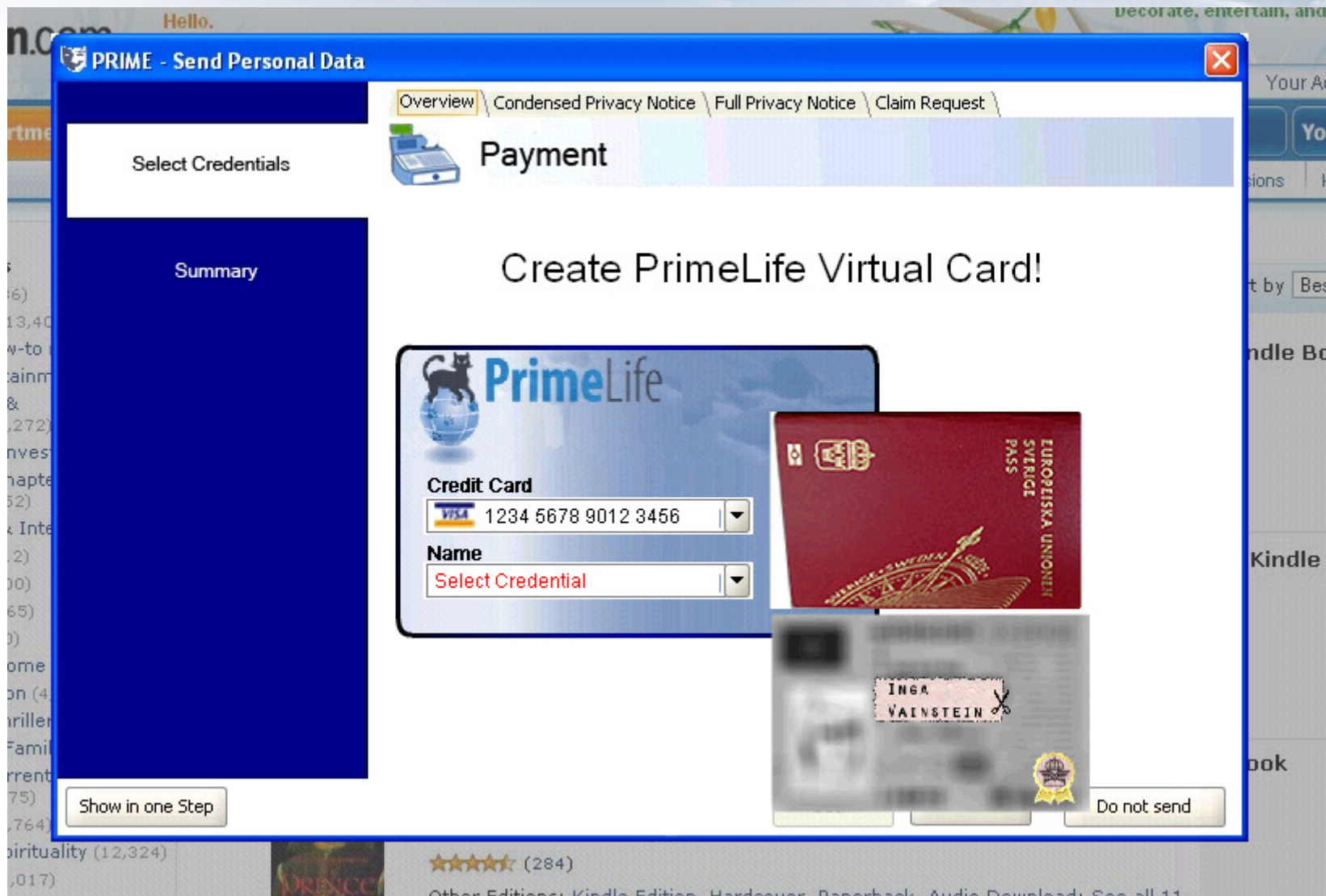
Credit Card  
Select Credit Card

Name  
Select Credential

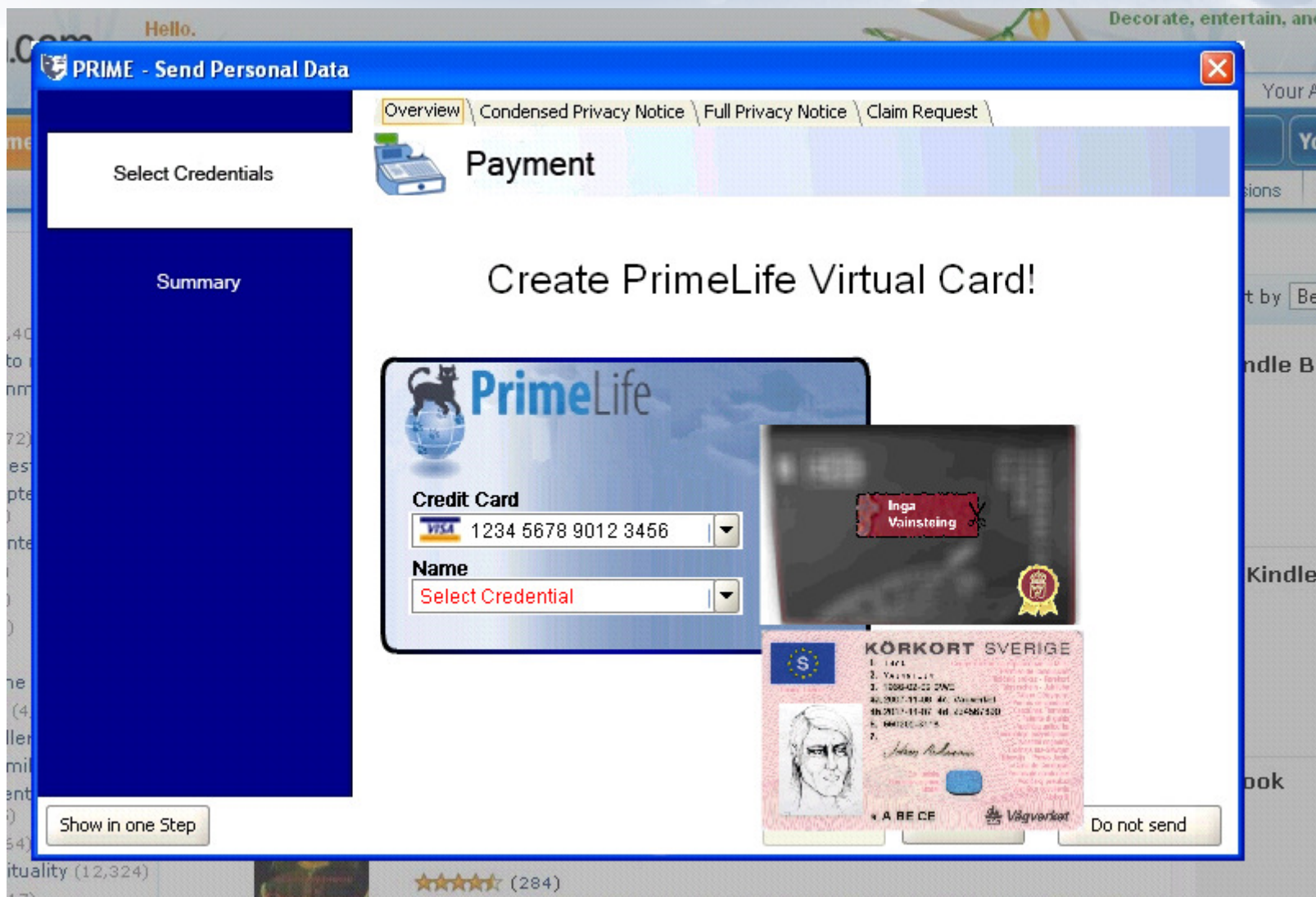
Show in one Step

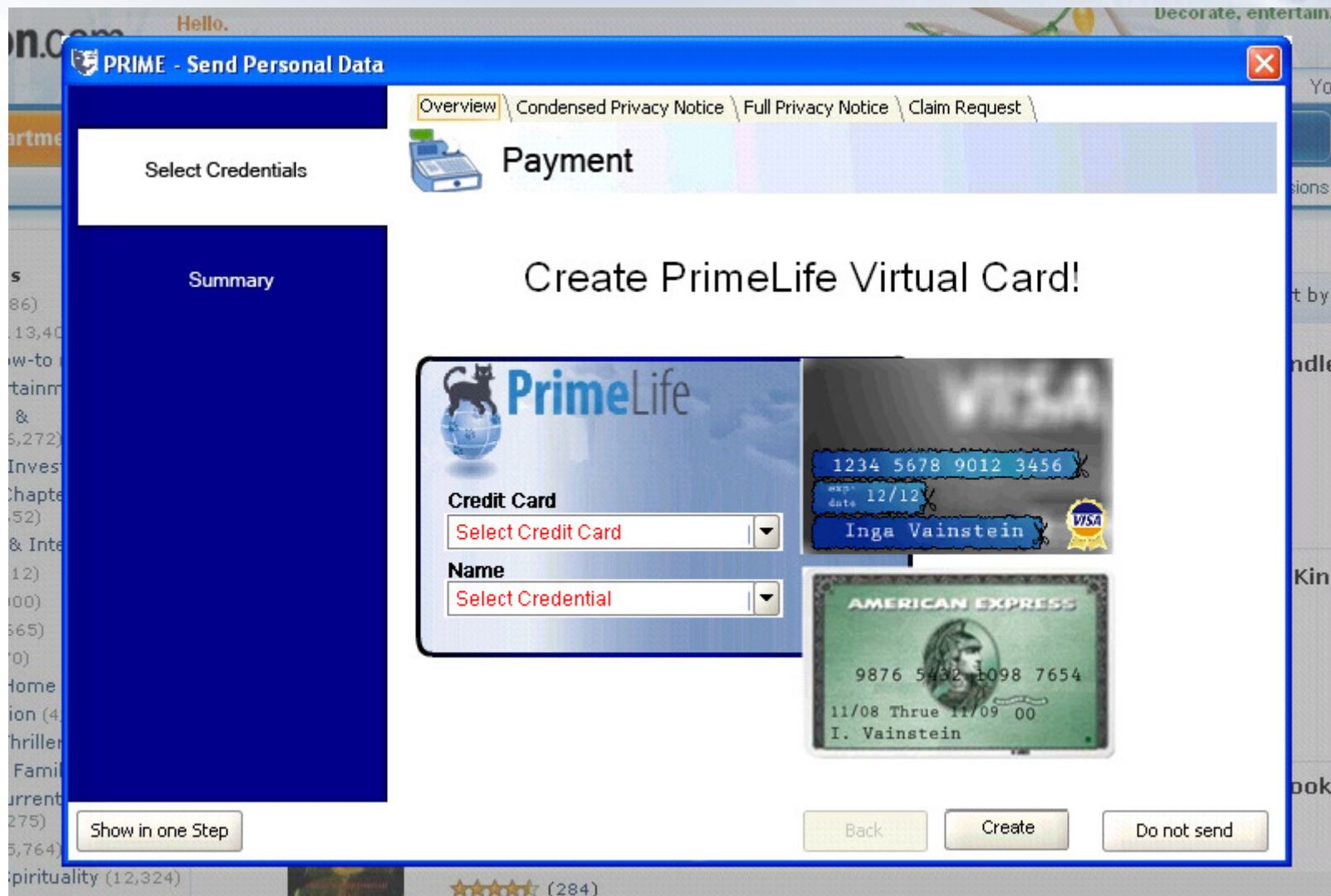
Back Create Do not send

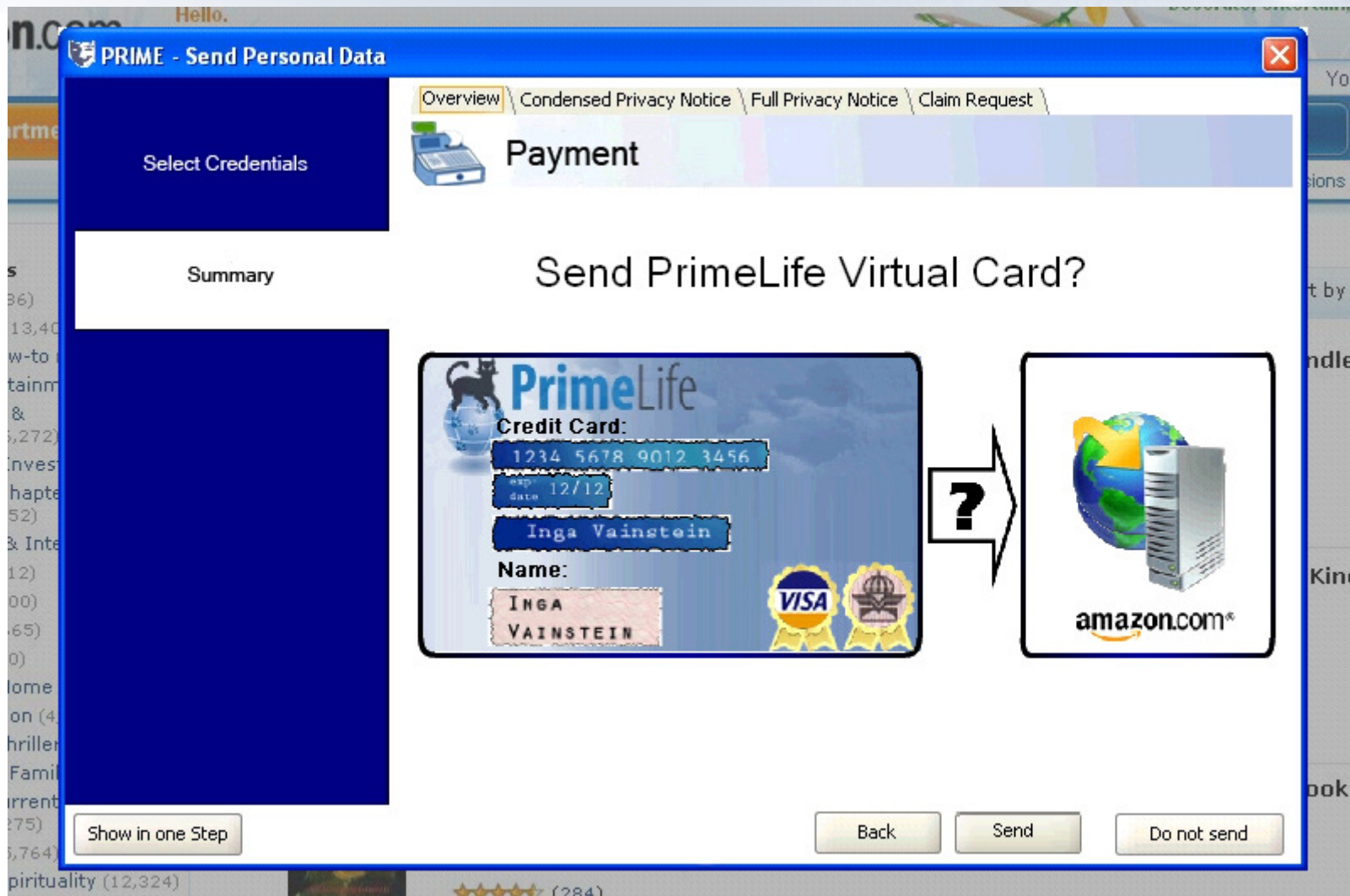












## Result – 3rd Iteration

5 participants

2 got it!



# Next Steps?

- Error of measurement?
- Show MouseOver state or only cut-outs?
- Scrap the card metaphor?
  
- Suggestions from the Primelife General Meeting:
  - Black out lines
  - Drag and drop or Animations
  - Send partial cards / send selected pieces
  - Select verifiers instead of cards
  - Combining with tutorial
  - Add text:
    - “Please note that this data is not sent”
    - “Please note that only this data is sent”





# HCI for Trust evaluation of Services Sides – *Challenges:*

- Find suitable trust & assurance parameters
  - *Has Privacy seals*
  - *Mentioned on security & privacy alert lists*
  - *Blacklisted*
  - *Supports PrimeLife functions*
  - *(To be included next: reputation ratings)*
- Illustrate parameters with different semantics & scopes
- Find intuitive icons
- Address usability problems
  - *Users have difficulties to differentiate between user and services sides*
  - *Extensive warnings can be misleading*





# Our Design Principles

- Use multilayered structure
- Use a selection of meaningful overall evaluation results
- Make clear who is evaluated
- Use several UI concepts for informing the users
- Group evaluation results into sub categories "*Privacy*" and "*Business Reliability*"

**Send Personal Data ?**

**Send Personal Data?**

Your data:

.....is requested by:  
Nils Engströms HB **Nisses böcker**  [Trust Evaluation result](#) for this site: **Poor** 

[www.nissesbocker.nu](http://www.nissesbocker.nu)


**Purposes:** Betalning och leverans av beställd bok [Link to full privacy policy](#)

I agree Cancel

**Trust Evaluation - PrimeLife 0,2**



**Trust Evaluation Result**

**Evaluated Site:**  
**Nisses böcker** [www.nissesbocker.nu](http://www.nissesbocker.nu)  
has been evaluated according to [your trust policy settings](#).


**Summary Result:**  
**Poor** 

**Detailed Result:**

**Privacy Reliability:**

- ☐ Not mentioned in [security & privacy alert lists](#)
- ☐ Has none of the [desired privacy seals](#) 
- ☒ **Supports PrimeLife functions** 

**Business Reliability:**


- ☒ **Blacklisted** 

Expand (Show Complete view)

**Trust Evaluation - PrimeLife 0,2**



**Trust Evaluation Result**

**Evaluated Site:**  
**Nisses böcker** [www.nissesbocker.nu](http://www.nissesbocker.nu)  
has been evaluated according to [your trust policy settings](#).

**Summary Result:**  
**Poor** 


**Detailed Result:**

**Privacy:**

- ☐ Not mentioned in [security & privacy alert lists](#)
- ☐ Has none of the [desired privacy seals](#) 
- ☒ **Supports PrimeLife functions** 

[Credentials](#)  
[Automatically Readable Privacy Policy](#)  
[Privacy-Enhanced Access Control](#)  
[User Obligation Management](#)  
[Functions for Exercising Rights](#)

**Business Reliability:**

- ☒ **Blacklisted** 

[Konsumentverket](#) (Sweden)

Close this window



# Test results of two mockup iterations (I)

## Positive results +:

- Good understanding of the “Send Personal Data?” user interfaces and presented top-level trust evaluation results
- The “Good” and “Poor” emoticons on top level were also clearly understood by all users.
- All participants also clearly understood that the services side and not the user side was evaluated
- The colours red and green in the prototype (both on icons and over text) were all understood correctly by the participants.
- The icon for alarming the users was also correctly understood.
- Majority of participants like the function they tested to be called “Trust Evaluation”.
- All participants said in the interviews that they would like to use a PrimeLife prototype including a Trust Evaluation function that is similar to the one that was tested.



# Test results (II)

## Issues -:

- More detailed trust evaluation results on the second layer, both red and green colours, were harder to understand
- Some icons used in the 1st mockup version were hard to understand:



or made them suspicious:



.... and were replaced:

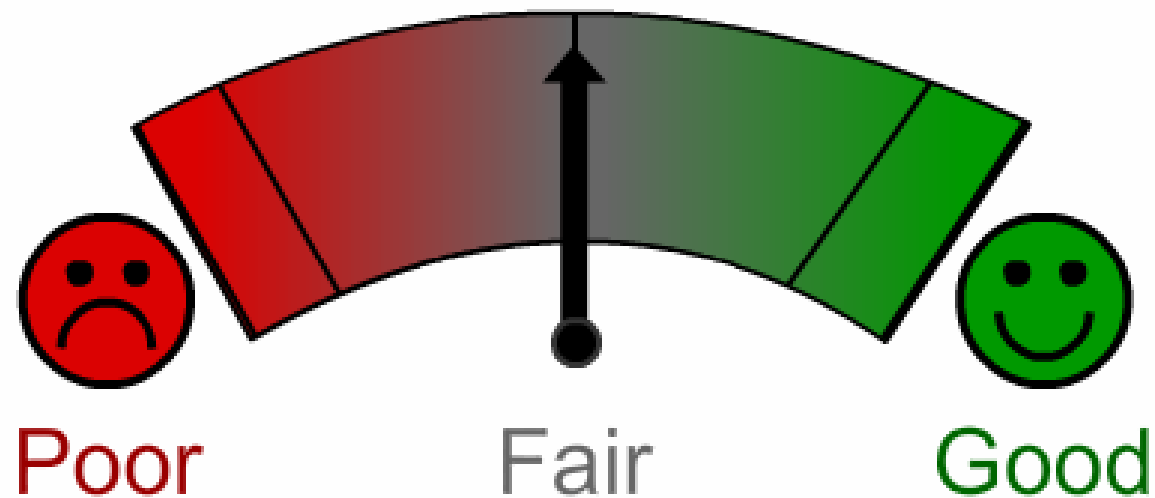


- “Neutral” evaluation result (“Not bad”, “ok”, “No alarm”) hard to understand for some participants.  
*New suggestion: “Fair”*
- Confusion on how trust evaluation can work if PrimeLife is not enabled.



# To be tested next.....

Trust meter for illustrating overall results:





# Discussion and Feedback

