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Unlocking Value from the Networks
Smarter Networks for Smarter Things 15-16 October 2013, Venice, Italy

Real-Time Privacy-Preserving Cobrowsing with Element Masking

Joern Franke, *Bin Cheng*

NEC Laboratories Europe

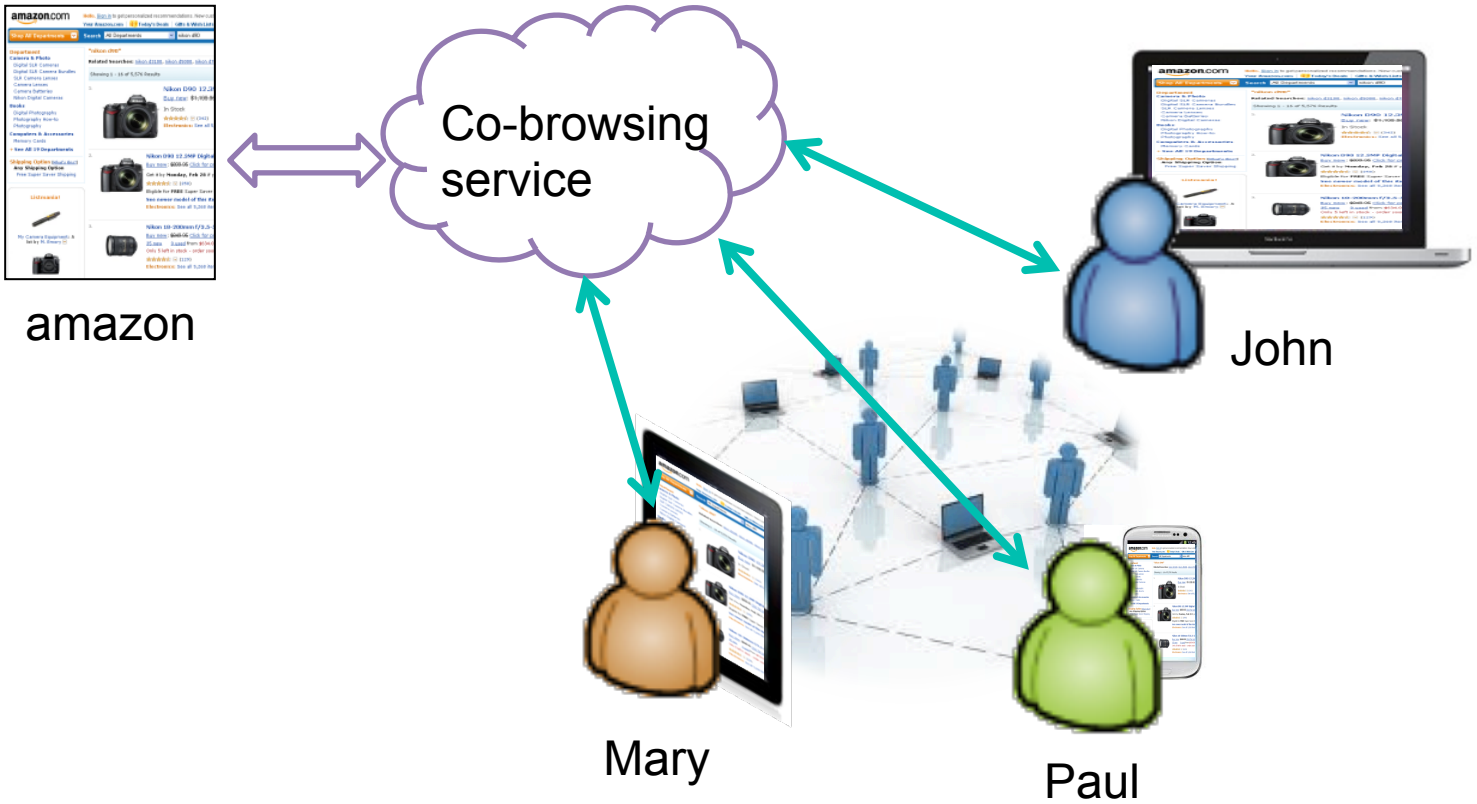
NEC Empowered by Innovation

Agenda

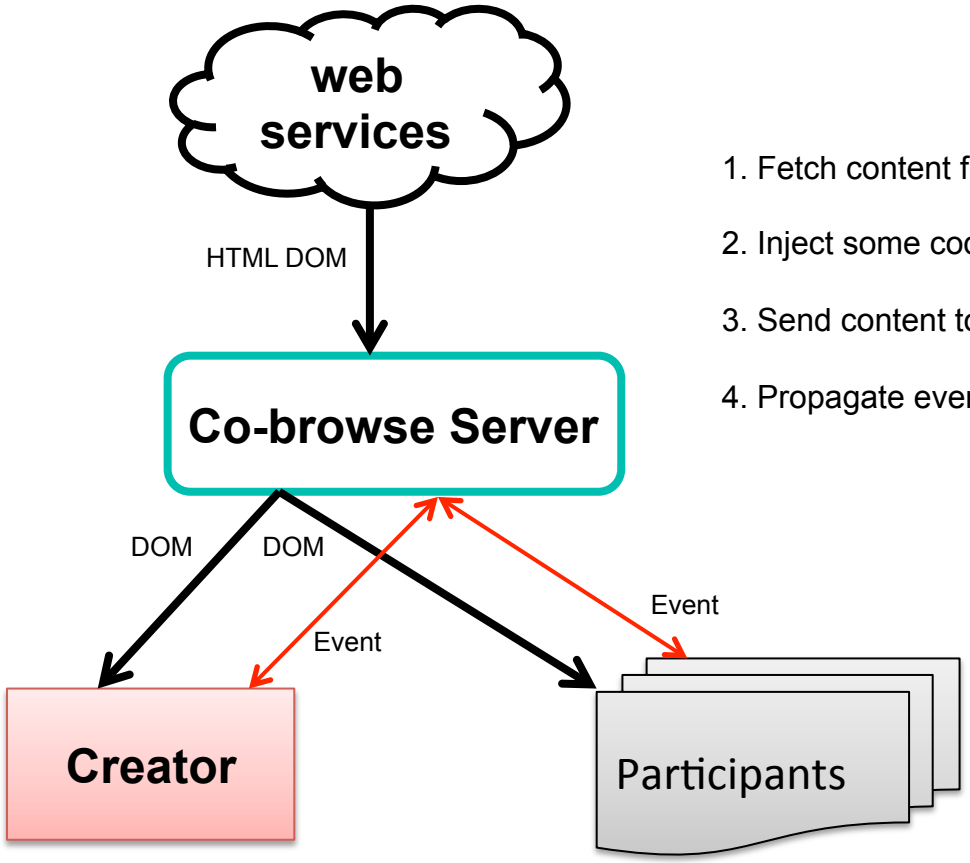
- Co-Browsing Service
  - Background, traditional solution, and problems
- New Solution for HTTPs-based Web Services
  - New approach, major design issues, and features
- Use Cases
  - Demonstrations and technology transfer

Web-based Co-browsing Service

allow the users from different places to browse the same web site/page simultaneously



Traditional Solution for Co-browsing



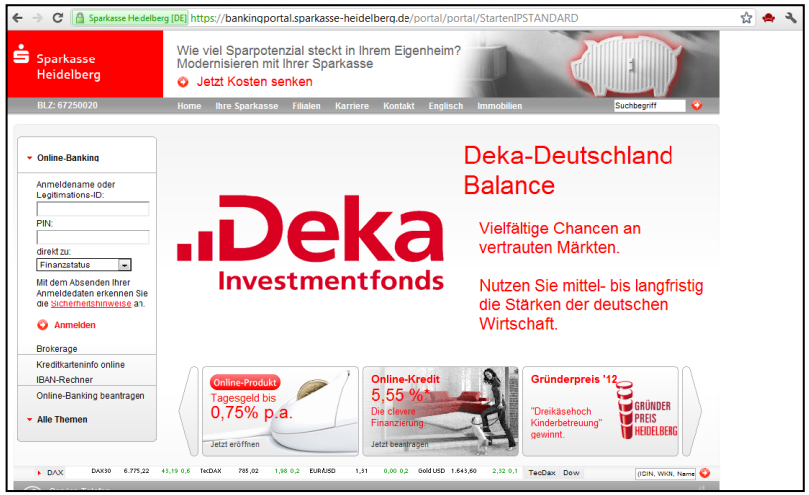
1. Fetch content from the original web server
2. Inject some code into co-browsed web pages
3. Send content to all users in the same session
4. Propagate events from one to all

Existing Problems

- A web proxy in between the original web site and all participants
  - The page content will first go through the web proxy
  - The web proxy can see and change the page content

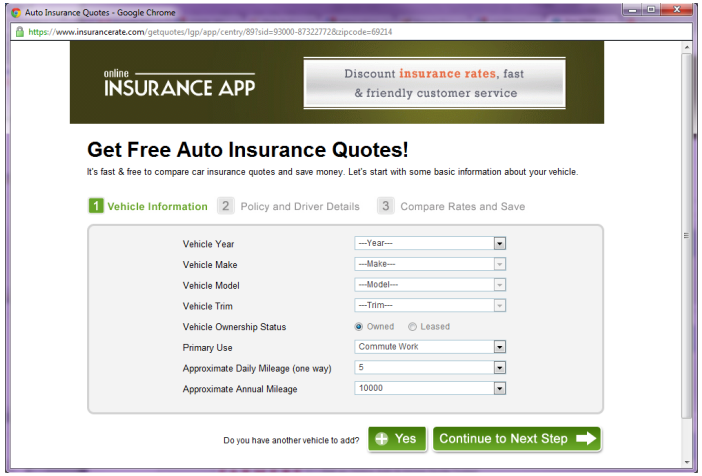
- Problems
  - Impossible to protect user privacy
  - HTTPs-based services not supported
  - Need to fully trust the co-browsing server

HTTPs-based Services



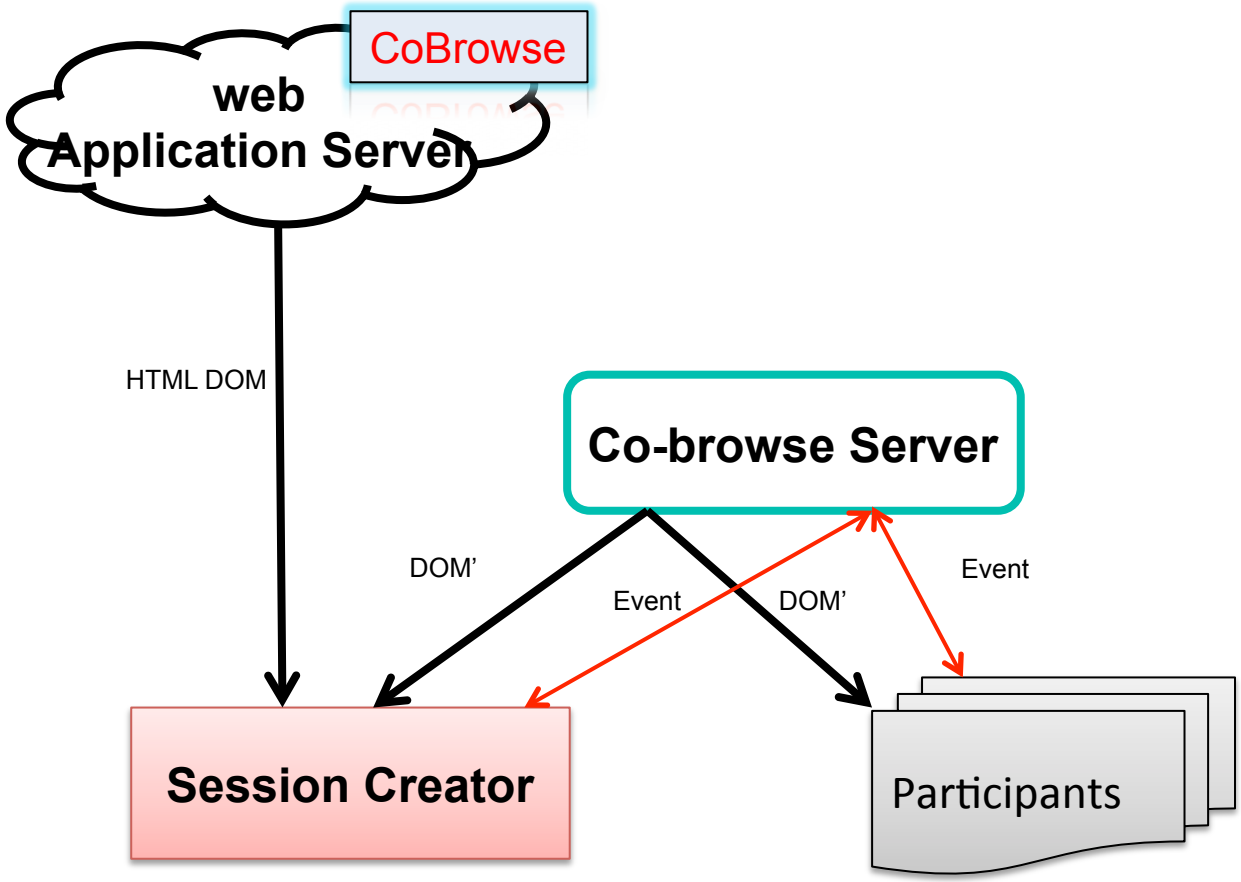
Online banking

Online shopping

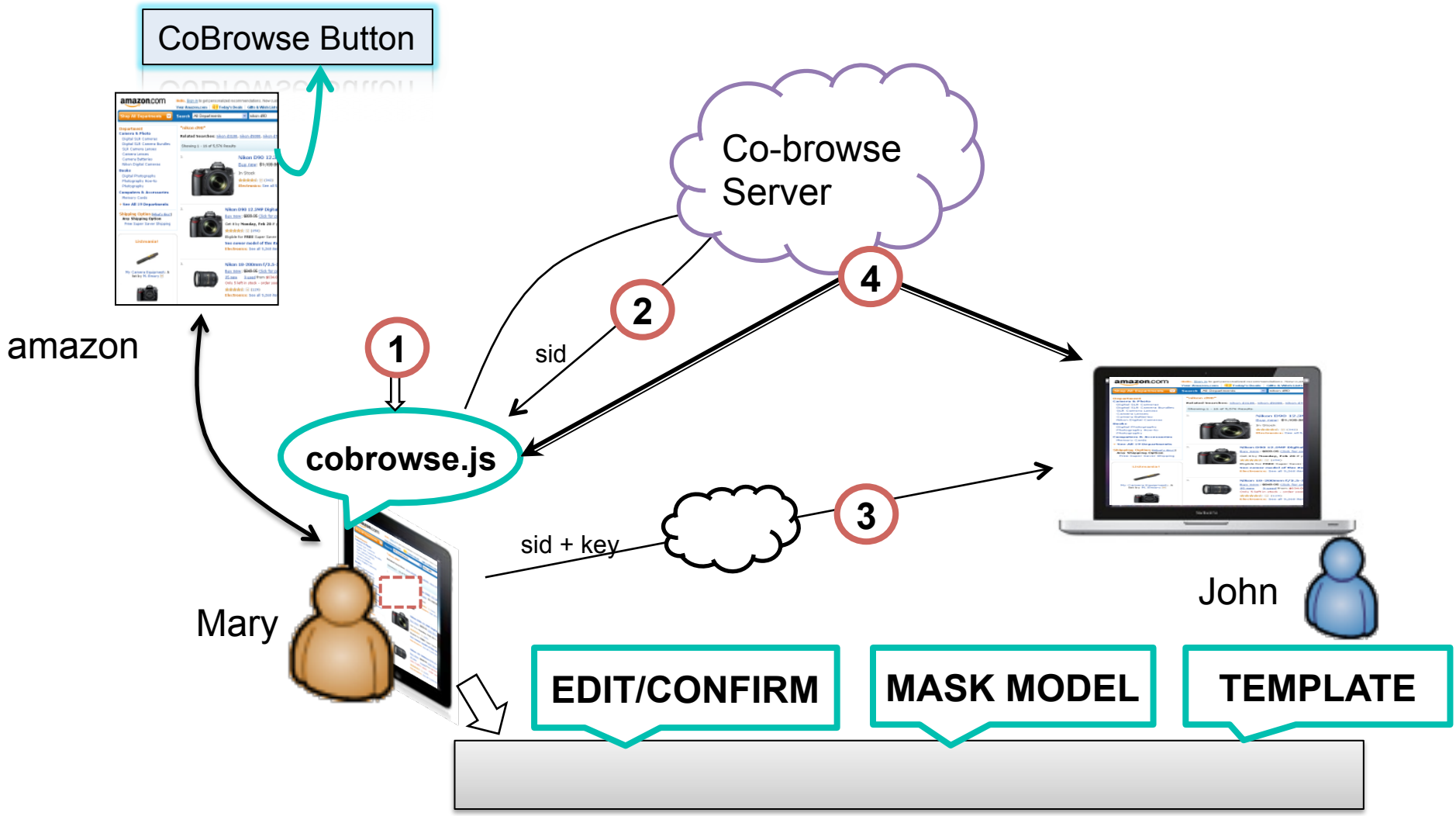


Insurance Application

Our New Approach



How It Works


CoBrowse Button
amazon
Co-browse Server
1
2
4
sid
cobrowse.js
3
sid + key
Mary
John
EDIT/CONFIRM
MASK MODEL
TEMPLATE

Privacy-preserving

- Data controlling
  - The session creator has the control
    - decide which part of content to be showed to the other participants
- Element marking
  - Visualize Interface or rule-based specification
- Data obfuscation
  - Hide the private information associated all marked elements
    - images, divs, forms

Data Controlling

- Two steps to control what to hide
  - Controlled by the application server
    - Initial setup for privacy protection
    - Use an external file to specify which element should be hidden
  - Controlled by the session creator
    - The first user customizes what to hide on the co-browsed page
    - Select elements to hide before announcing the session
    - Visualized user interface to select elements

Data Obfuscation

- Problem
  - How to hide some elements without affecting the page layout?

- Methods
  - Replace the element with some faked information (properties/content)
  - Be adaptive to the element type

Mask Rules

Rule	Description	Example	Output
Mask any text	This rule converts each text character into "X", but ignoring HTML Tags	private data<table class="mytemplate"><tr><td> First Head</td><td>Second Head</td></tr></table>	XXXXXXXXXXXX<table class="mytemplate"><tr><td>XXXXXXXXXX</td><td>XXXXXXXXXXX</td></tr> </table>
Mask input Values	This rule masks text in input fields	<input value="myprivateinput"></input>	<input value="XXXXXXXXXXXXXX"></input>
Mask select values	This rule masks text in lists (e.g. dropdown lists)	<select id="myprivateoptions"><option value="myoption1">Option 1</option> <option value="myoption2">Option 2</option> </select>	<select id="myprivateoptions"><option value="XXXXXXXXX">XXXXXXXX</option> <option value="XXXXXXXXX">XXXXXXXX</option> </select>
Mask images/videos	This rule masks images		The image img.png will be replaced by a transparent image or an image with a privacy note of the same dimension as the original image.

Event Synchronization

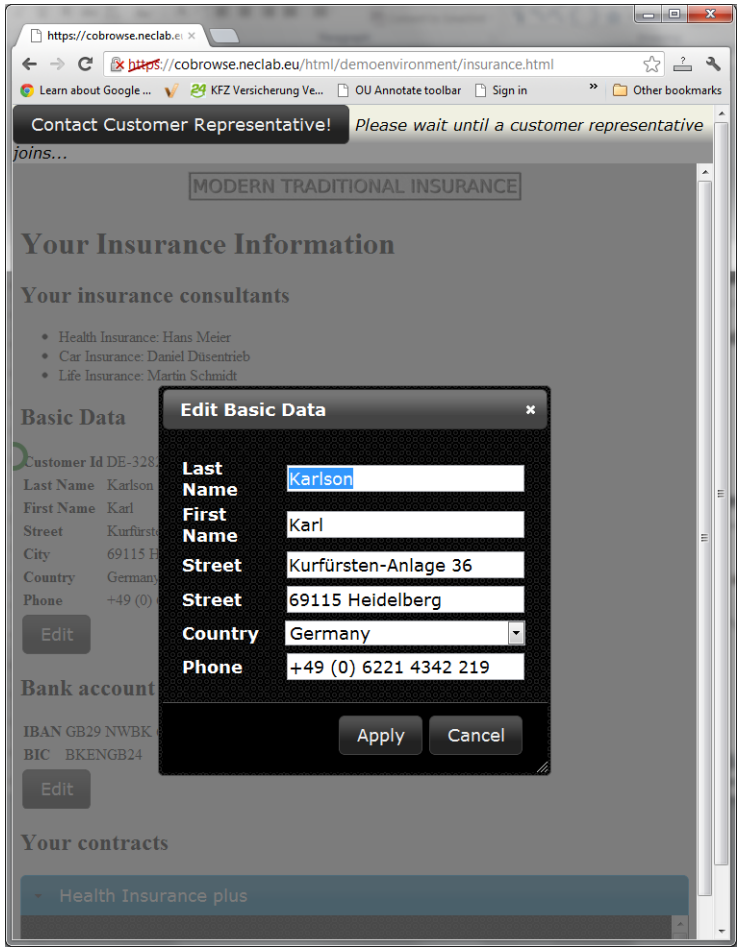
- Problem
  - How to synchronize user interaction based on two slightly different DOM trees?

- Methods
  - Do not propagate the events associated with private elements directly (some data obfuscation is still needed, for example, typing events)

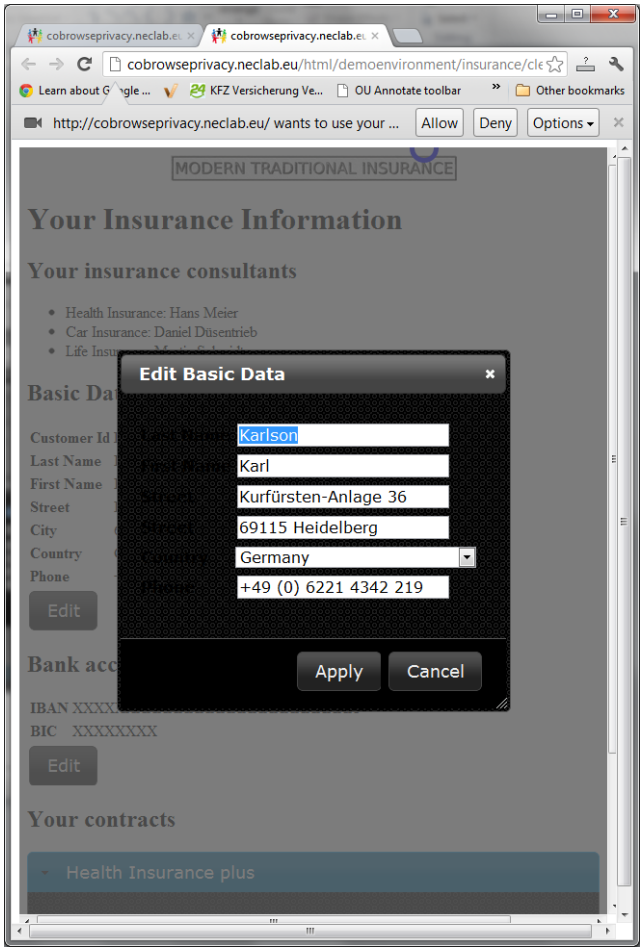
Secure Data Propagation

- Problem
  - Can we have less trust on the co-browse server?
- Methods
  - Establish secure data connections with the co-browse server
  - Use a third-party to spread the generated symmetric key
  - All joined users shared the same key for decrypting the propagated events and content

Use Case (1): Insurance Support Service



Customer (End-user)



CRM Agent

Use Case (2): NEC SaaS MarketPlace

English (USA) User access

Categories

- View All
- Location
- E-Learning
- Office Automation
- Marketing
- Video Conference
- Telecom Services
- Management
- Billing
- Help Desk
- Bundle Packs
- E-Commerce
- Security
- Accounting

News

- NEC Laboratories delivers a new customer support experience
- NEC Cloud Storage Added
- New NEC Cloud Marketplace just released

View all news

Support

- Support
- Manuals
- Contact
- Cobrowsing Support

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Solutions catalog

Mobile Voice Plan by Carrier ★★★★
Best mobile data plan offers for your Enterprise.

Home Voice Plan by Carrier ★★★
It's easy to add professional communication to any business. Our easy-to-use, plug-and-play phone system is expandable up to 4 lines with up to 12 linked phones.

NEC Cloud Storage by NEC ★★★★
NEC Cloud Storage allows seamless and secure data synchronization among all end user devices such as smartphones, tablets, PCs and the Cloud.

NeoDesk by NEC ★★★★★
My Data + My Apps + My Desktop in the same place. NeoDesk is a Desktop as a Service (DaaS) solution, that offers a complete desktop experience based on webOS.. This Virtual Desktop is provided ...

Broadband Plan by Carrier ★★★★
It's easy to add professional communication to any business. Our easy-to-use, plug-and-play phone system is expandable up to 4 lines with up to 12 linked phones.

Firefox vApp by Mozilla ★★★
The awesome web browser made available everywhere

NEC IaaS VM by NEC ★★★★
Flexible service where to buy Virtual Machines on a Pa

NEC Cloud Smartphone by NEC
"NEC Cloud Smartphone" is a cloud-based Smart smartphone" on a cloud from your own smartphone, y a cloud as if you were using...

Also integrated with WebRTC

Demonstrated at MWC'13

been sold to Deutsche Telekom in CZ repubic as one of the main features

Summary: NEC Cobrowsing

- **Privacy-preserving**
  - The participants can not see the sensitive private information of the session creator
  - The first user has a full control on the content to co-browse
  - The co-browsing service provider can not see the propagated events and content
- **Secure**
  - No need to install any browser extensions/plugins (the damage to the local resource is not possible)
  - All communications are HTTPs-based (The intermediate attack is not possible)

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