

Experience Design Framework for Securing Large Scale Information and Communication Systems

**Azadeh Nematzadeh
Omar Sosa-Tzec**

School of Informatics and Computing
Indiana University

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AGENDA

- 1. Security and Privacy Concerns**
- 2. Information and Communication Systems (ICSs) Concerns**
- 3. Complex Systems and ICSs**
- 4. Security and Privacy Framework**
- 5. Implications**
- 6. Conclusions**

1. Security and Privacy Concerns

Instagram

amazon

citibank

facebook®

*As designers, what and how
do we think about
security and privacy
of Information and
Communication Systems?*



People have **different**
privacy and security **concerns**



RESPONSIBILITY ON THE USERS' HANDS





Banking Credit Cards Lending Investing

First time user?

REGISTER

SIGN ON TO CITIBANK

User ID

Password

Remember my User ID

SIGN ON

Email or Phone

Keep me logged in

Password

[Forgot your password?](#)

Sign Up

It's free and always will be.

First Name

Last Name

Your Email

Re-enter Email

New Password

Birthday

Month

Day

Year

Why do I need to provide my birthday?

Female Male

BETWEEN PUBLIC AND PRIVATE



Azadeh Nematzadeh

Timeline About Photos

DO YOU KNOW AZADEH?

To see what she shares with friends, send her a friend request.

ABOUT

Worked at Nokia Siemens Networks

PHOTOS



Azadeh Nematzadeh

Timeline About Photos 700

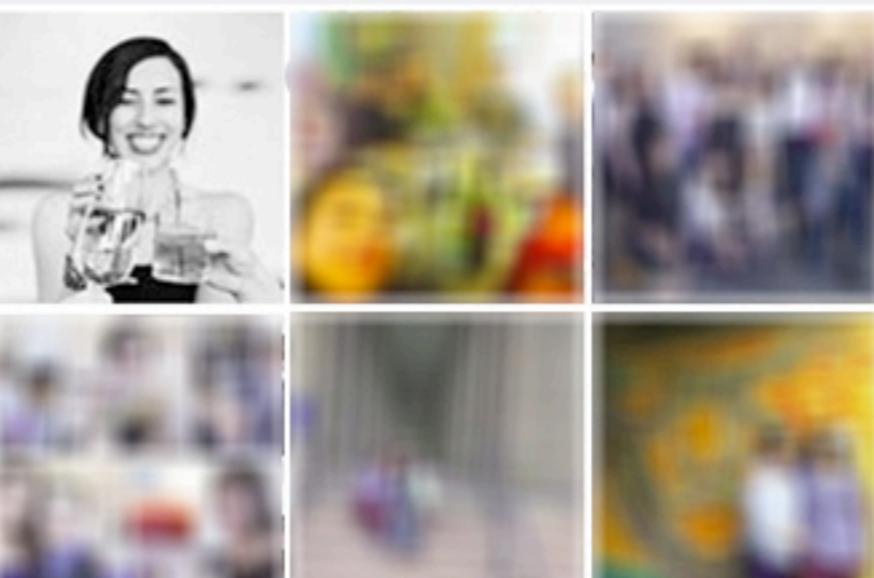
ABOUT

Worked at Nokia Siemens Networks

Studied Informatics at Indiana University

Lives in Bloomington, Indiana

PHOTOS · 700



May 31

First girl of the seas
and 4 other



A complex network of white lines forming a mesh against a dark red background.

Unknown and unpredictable security and privacy threats and failures

A large, dense cluster of white lines forming a complex network structure against a dark red background.

tumblr.

WIKIPEDIA

SOUNDCLOUD

reddit

tum

PEDIA

SOUND

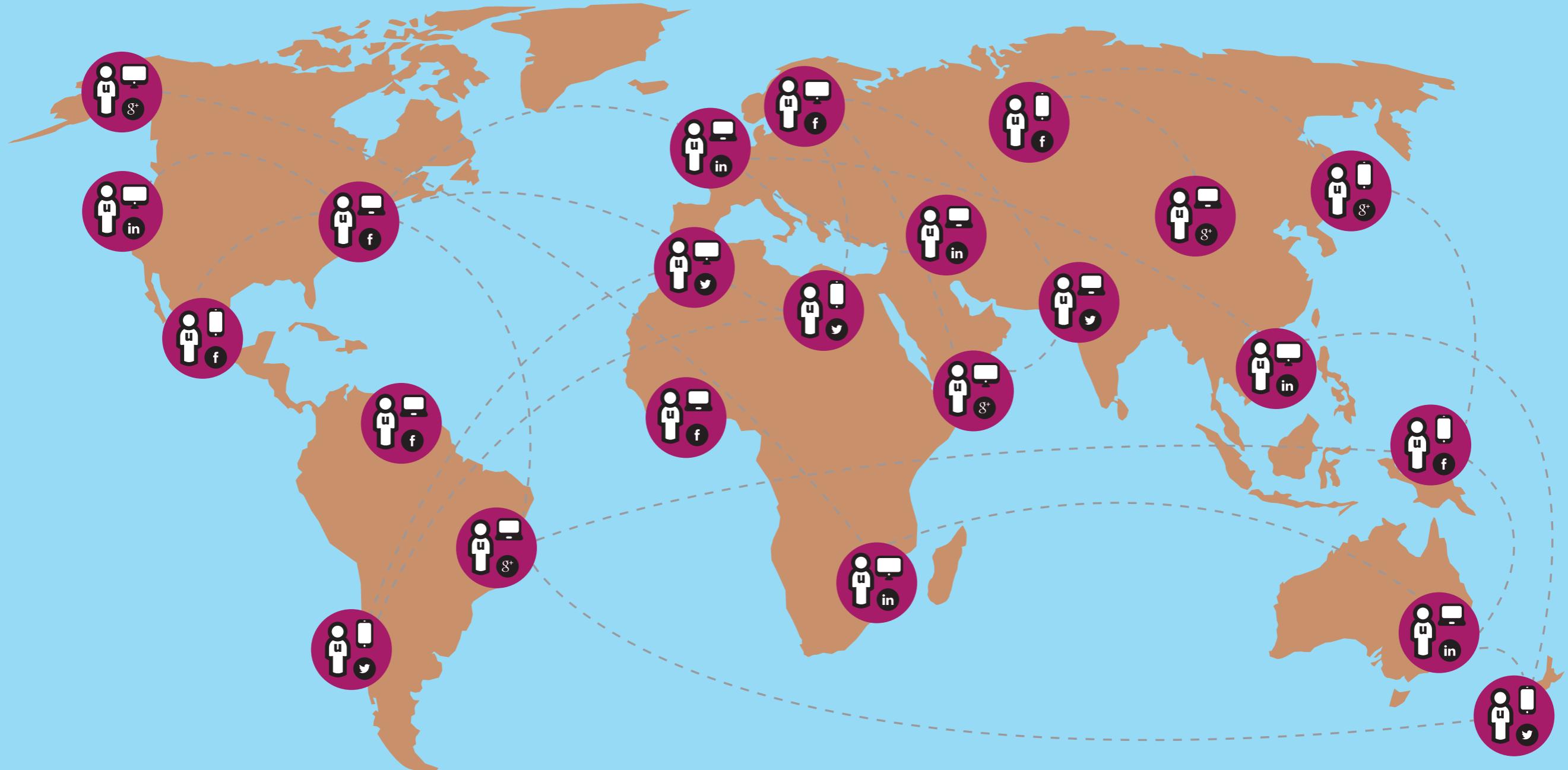
ddit



2. ICSs concerns

Heterogeneity of users

DIVERSE PEOPLE: A “WORLD” USING ICSS





ICSs entail
multiple use scenarios

SAME SYSTEM, DIFFERENT USE



Justin Bieber @justinbieber · 2h

@marlenebravo70 miss u too ;) #beliebers shots.me/p/j13possu #selfie



13K

16K

...



Doctors w/o Borders @MSF_USA · 7h

Want to work in the field with MSF? Join us for a free recruitment webinar on June 26 at 7pm EST. Register: bit.ly/1ioUNca



31

14

...

DIFFERENT SECURITY AND PRIVACY SCENARIOS

Security Settings

Login Notifications

Get notified

Login Approvals

Use your phone
into your account.

Code Generator

Use your Facebook

App Passwords

Use special
password on

Trusted Contacts

Pick friends
out.

Trusted Browsers

Review which

Where You're Logged In

Review and

Privacy Settings and Tools

Who can see my stuff?

Who can see y

Review all you

Limit the audience
friends of friends

Who can contact me?

Who can send me

Whose messages

Who can look me up?

Who can look me up
provided?

Who can look me up
provided?

Use scenarios **change** over time



A complex network of white lines on a red background, forming a dense web of triangles and polygons.

Information and Communication Systems **also change**

A complex network of white lines on a red background, forming a dense web of triangles and polygons.

2004

2005

2006

2007

2008

2009

2010

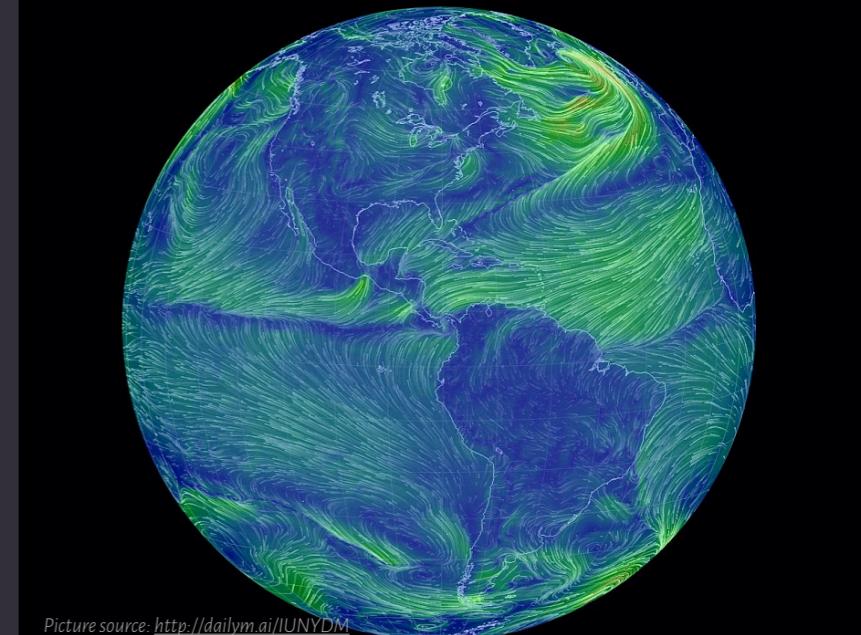
2011

2012

Picture source: <http://bit.ly/1lblv7T>

3. Complex Systems and ICSs

COMPLEX SYSTEMS

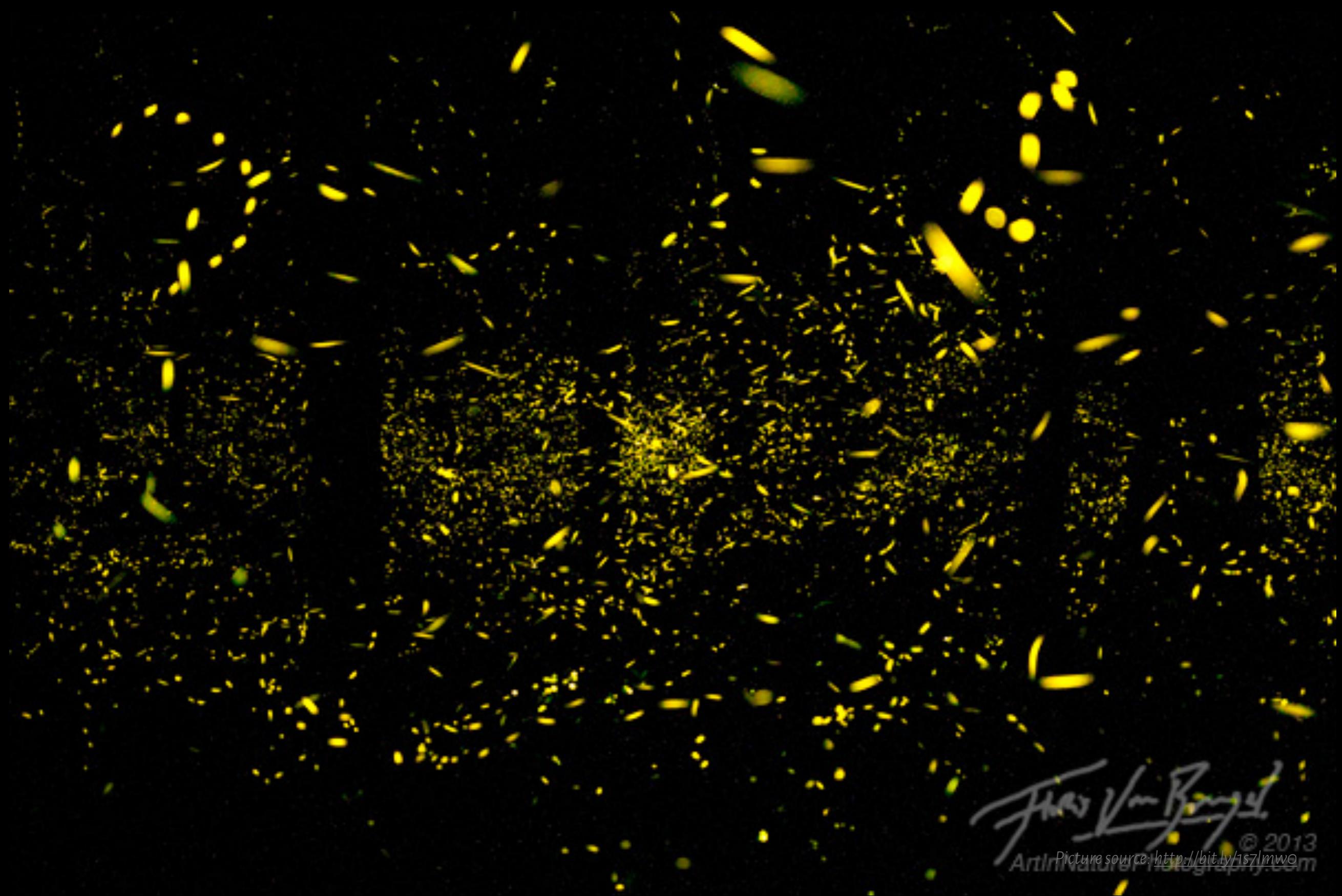




Aspects of security and privacy in
ICSs show the characteristics of
complex systems



SELF-ORGANIZATION



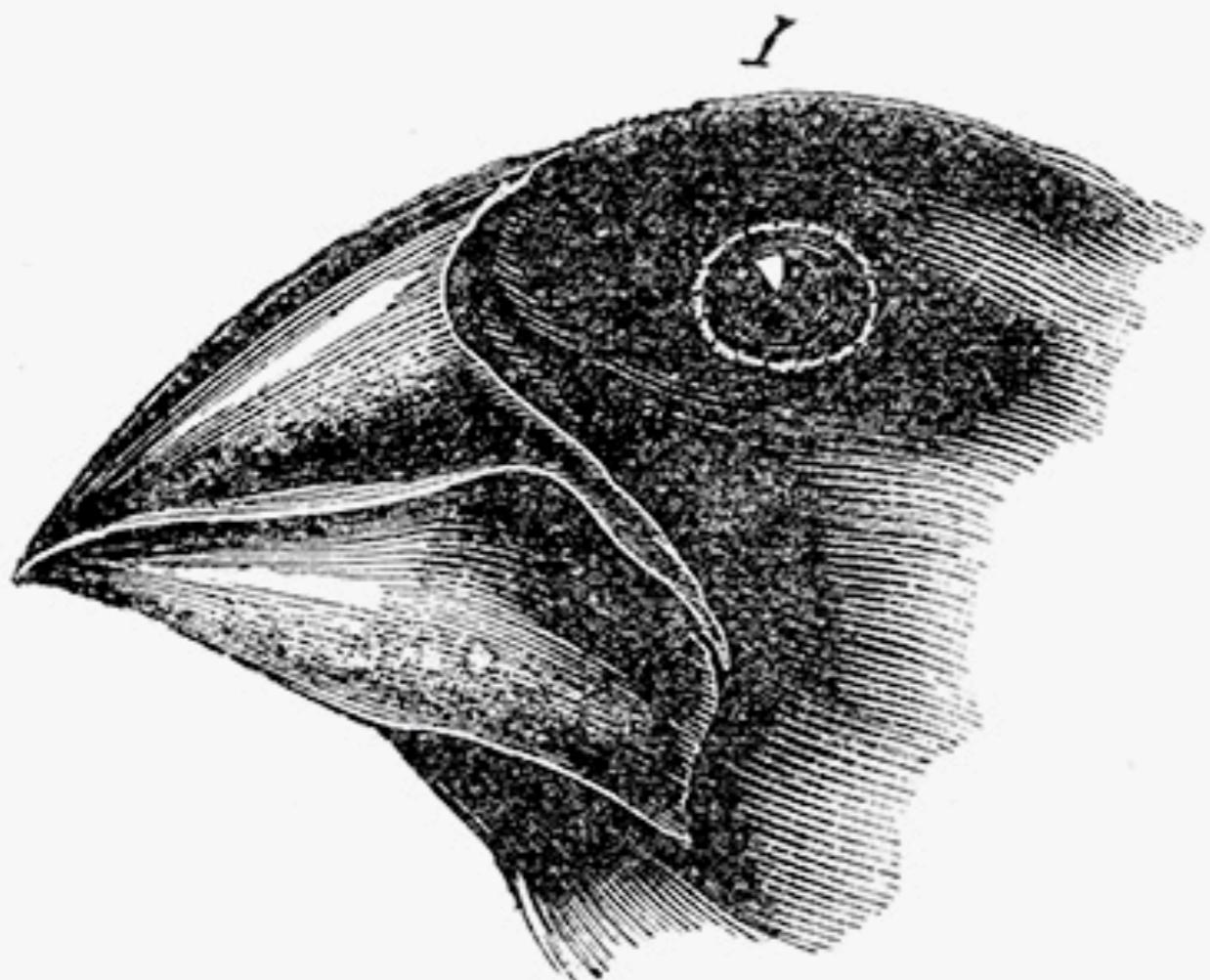
Frank Van Beek
© 2013
ArtInNaturePhotography.com
Picture source: <http://bit.ly/1s7lmw0>

EMERGENCE

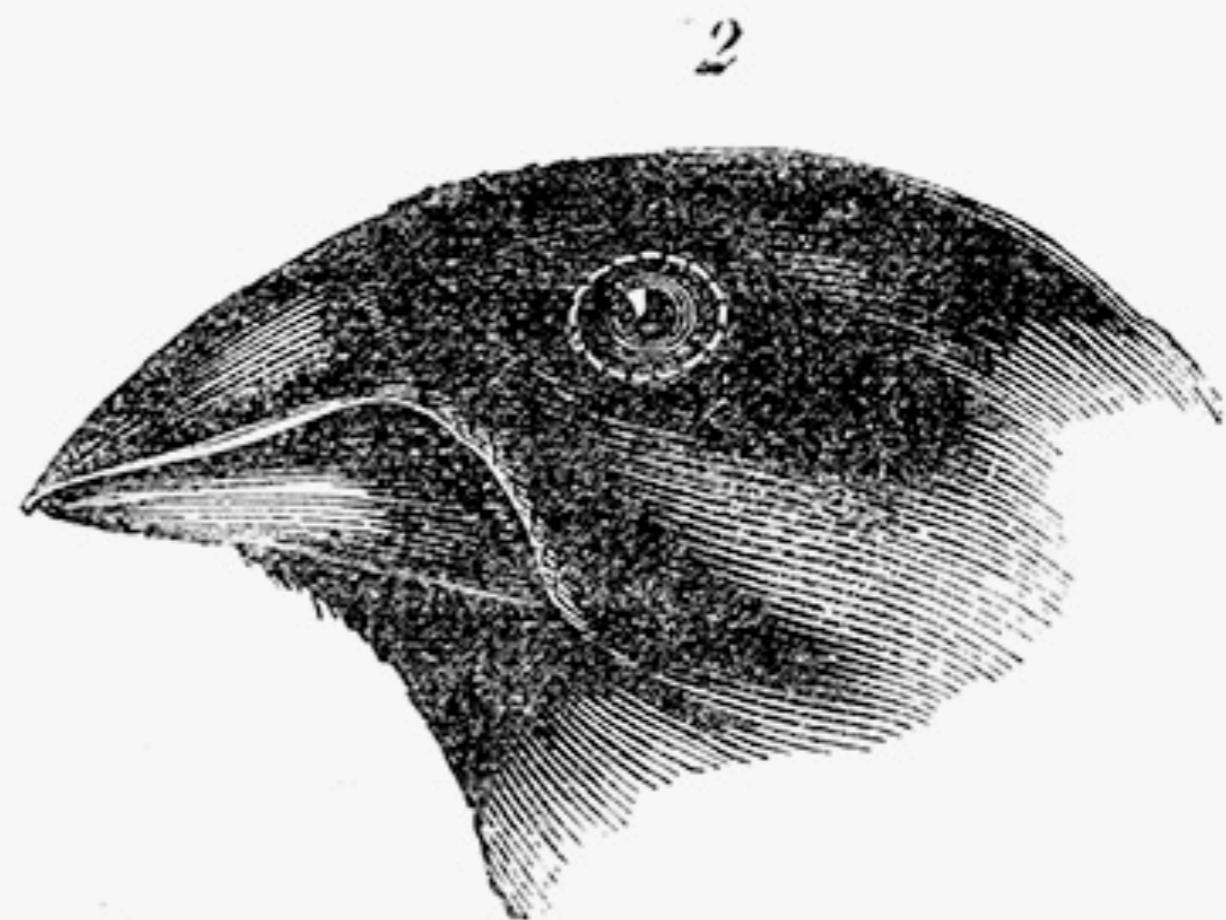


Picture source: <http://bit.ly/1kQ3X64>

EVOLUTION



1. *Geospiza magnirostris*.



2. *Geospiza fortis*.

COEVOLUTION

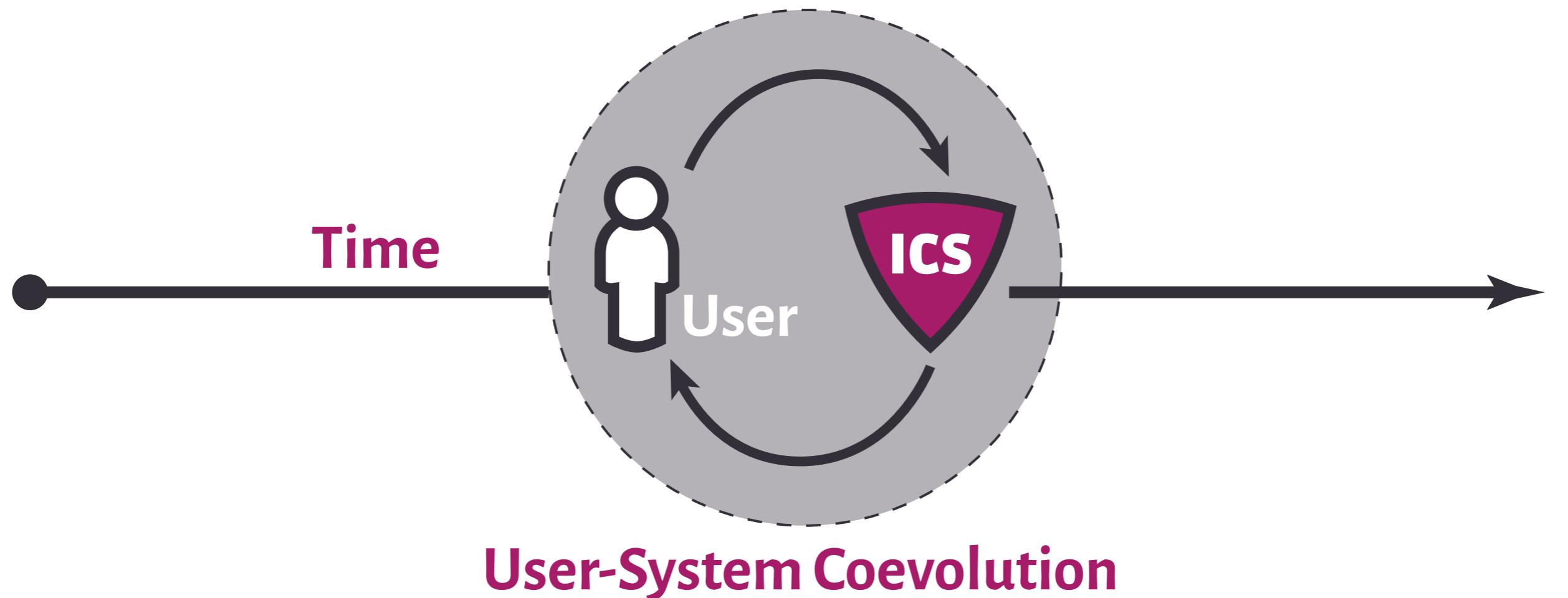


Picture source: <http://bit.ly/1nxVy7O>

A complex network graph with many white lines connecting nodes, forming a dense web against a dark red background.

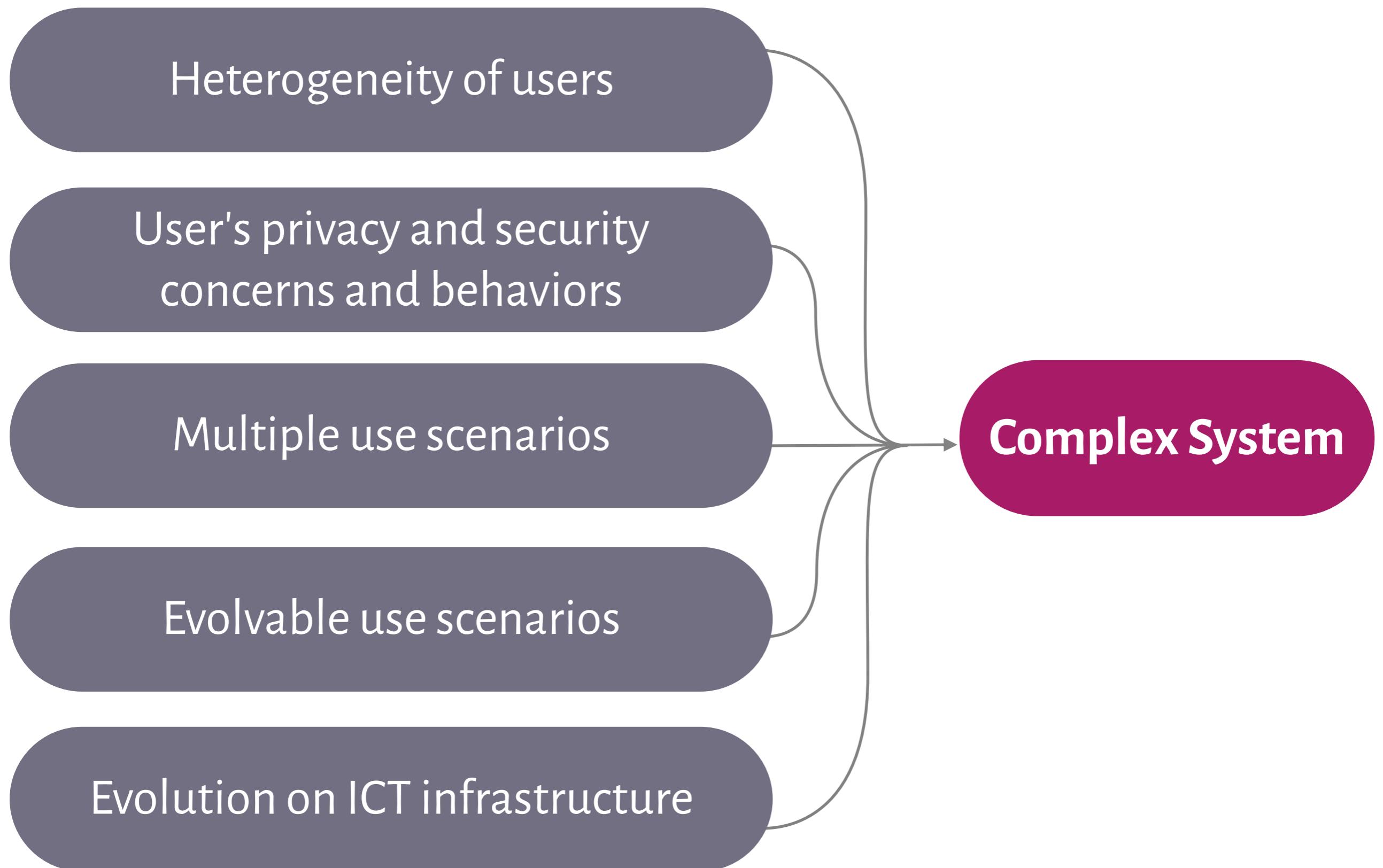
As complex systems, ICSs entail
user-system coevolution

A complex network graph with many white lines connecting nodes, forming a dense web against a dark red background.



4. Security and Privacy Framework

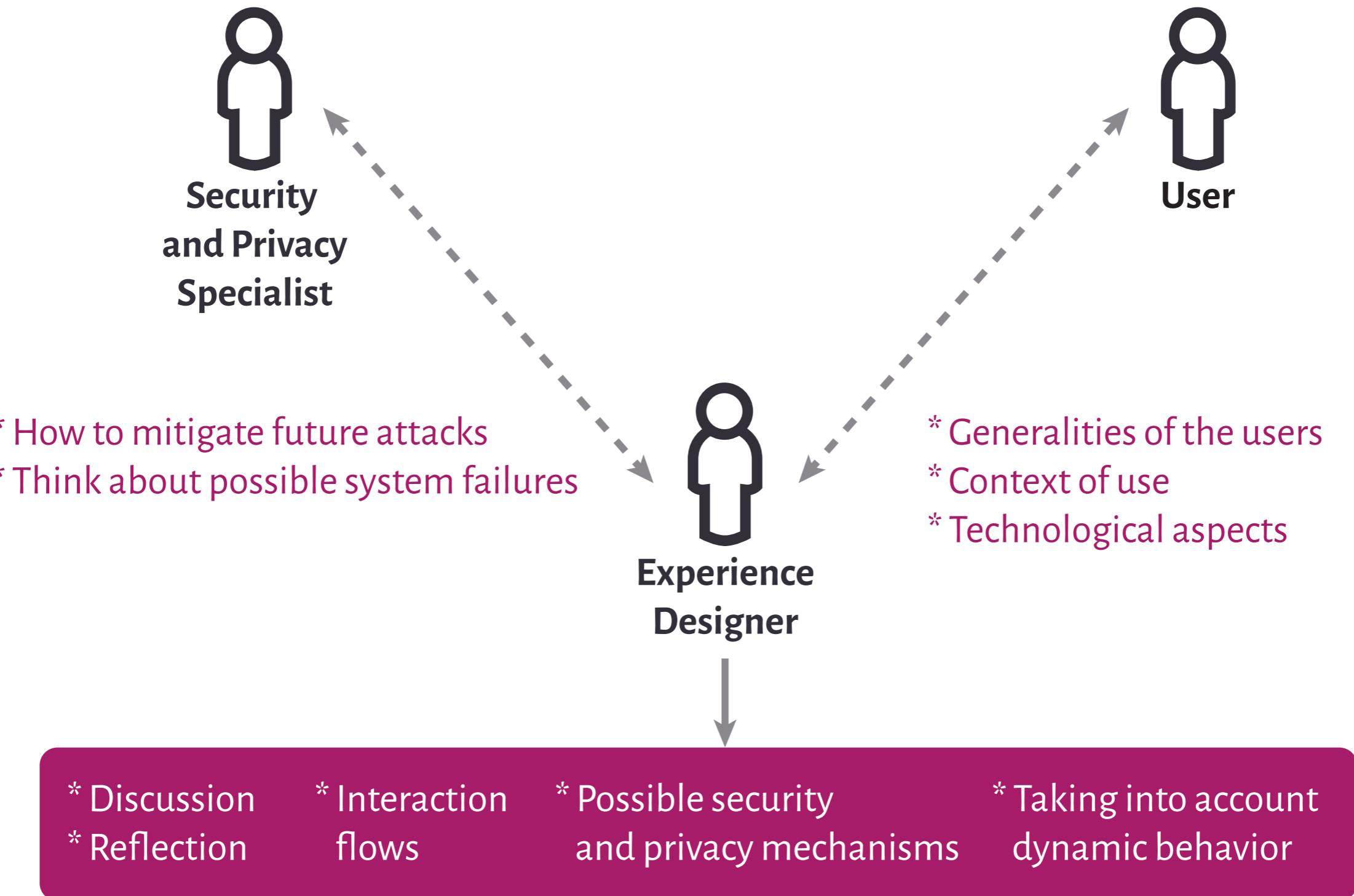
SECURITY AND PRIVACY CHALLENGES FOR EXPERIENCE DESIGN



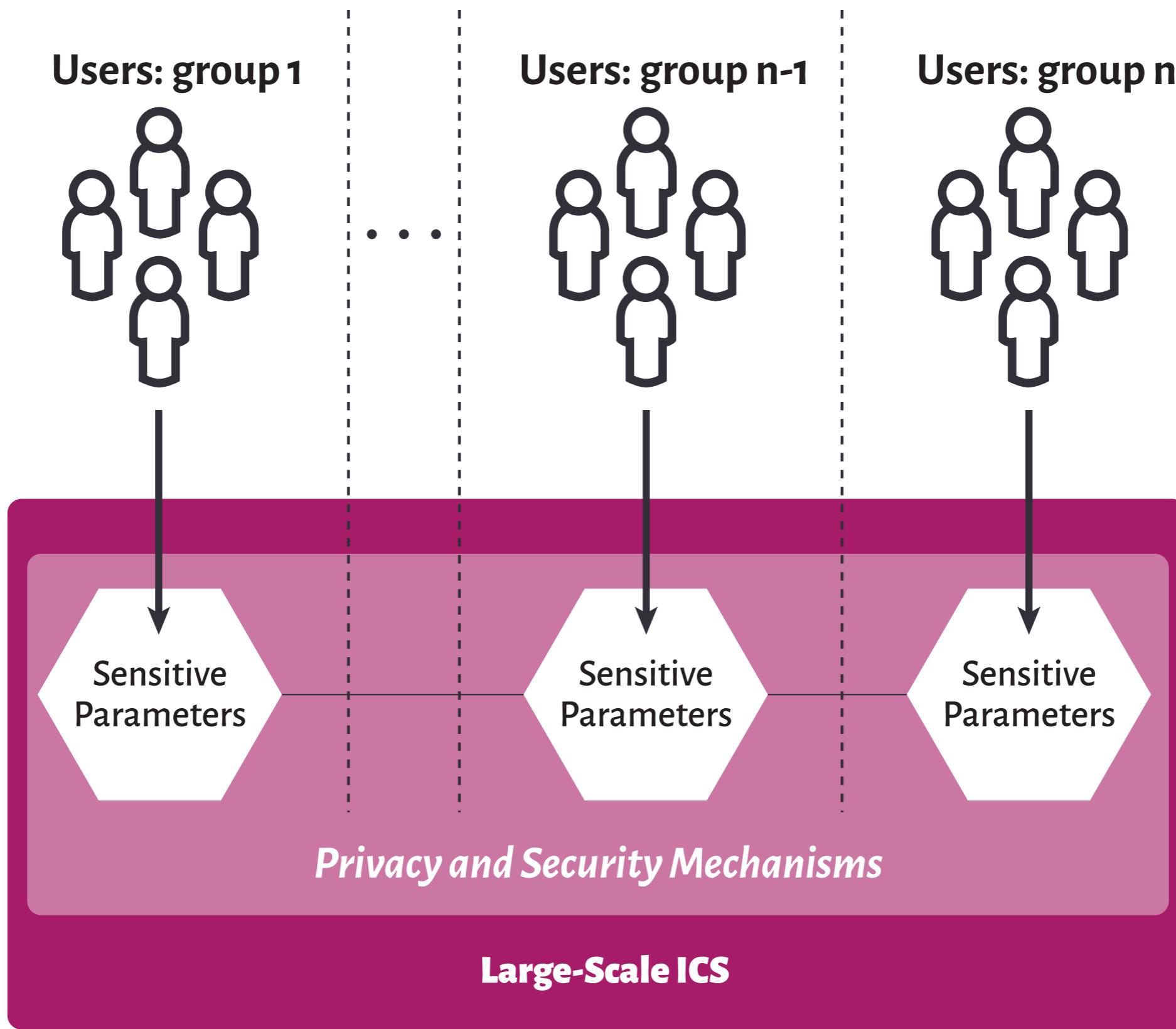
FRAMEWORK



SECURITY AND PRIVACY MATTERS



PERSONALIZATION



PERSONALIZATION

A screenshot of a Facebook profile page. At the top, there are four tabs: Status, Photo / Video, Place, and Life Event. The Place and Life Event tabs are circled in red. To the right of the tabs, it says "Recent 2014". On the left, there's a sidebar with a profile picture and the name "Omar Sosa" followed by "June 7". Below that, it says "at the millen" and "led Album (14)". The main content area shows a list of categories under "Place" and "Life Event".

Place

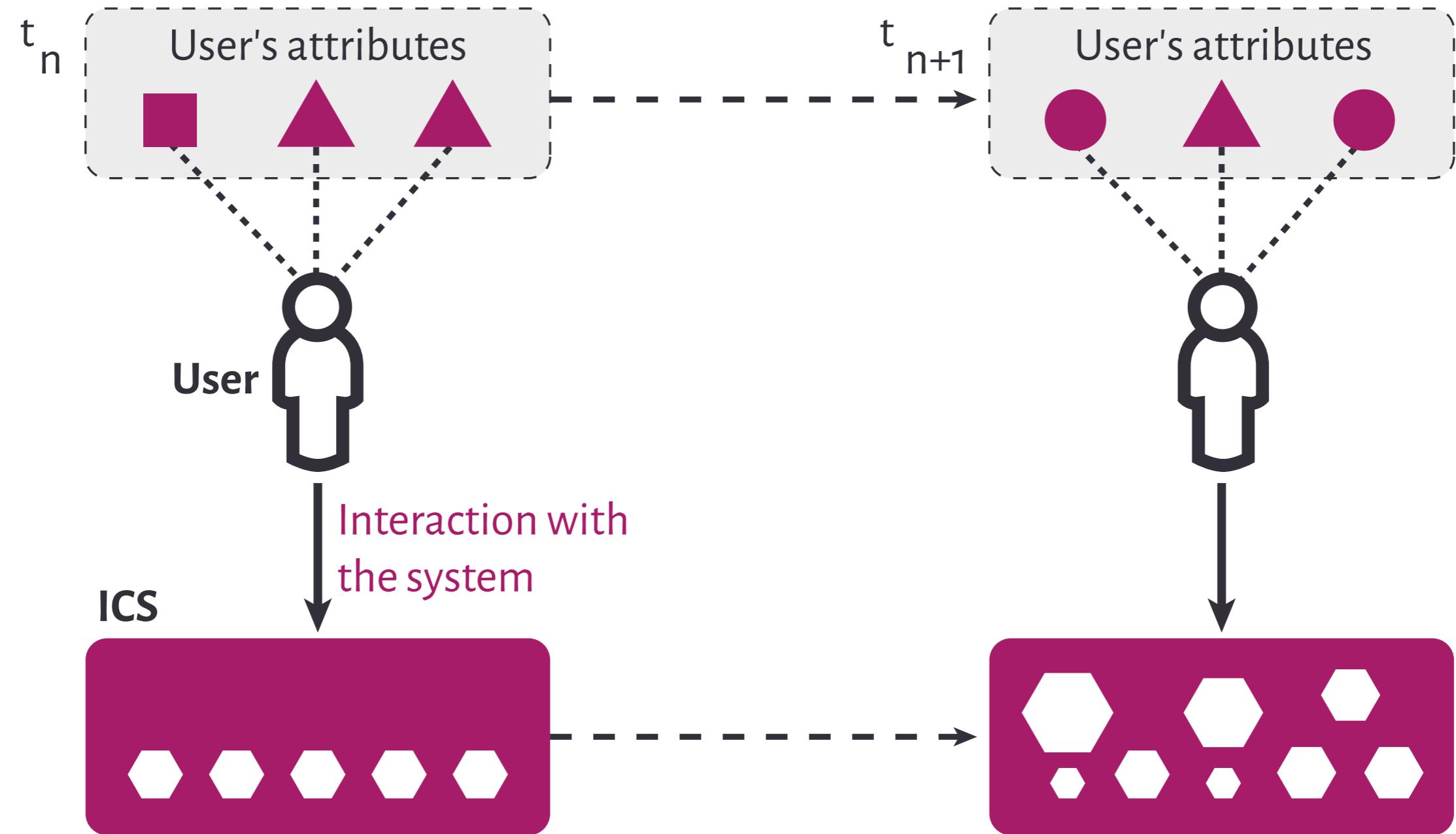
- Work & Education
- Family & Relationships
- Home & Living
- Health & Wellness
- Travel & Experiences

Life Event

- First Met...
- New Relationship...
- Engagement...
- Marriage...
- Anniversary...
- Expecting a Baby...
- New Child...
- New Family Member...
- New Pet...
- End of Relationship...
- Loss of a Loved One...
- Create Your Own...

At the bottom right, there are year markers: 2000, 1996, and 1993. A note at the bottom right says "Facebook images from author's profile".

ADAPTABILITY, EXPANDABILITY AND USABILITY



ADAPTABILITY, EXPANDABILITY AND USABILITY

Write

Gallery 57

Calligraph #Calligraph Please like

Like · Comment · Share

Tell Us What You Think

1 of 15

How much do you agree with this statement?
I wouldn't want to miss this post.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

June 6 at 9:51am · FarmVille ·

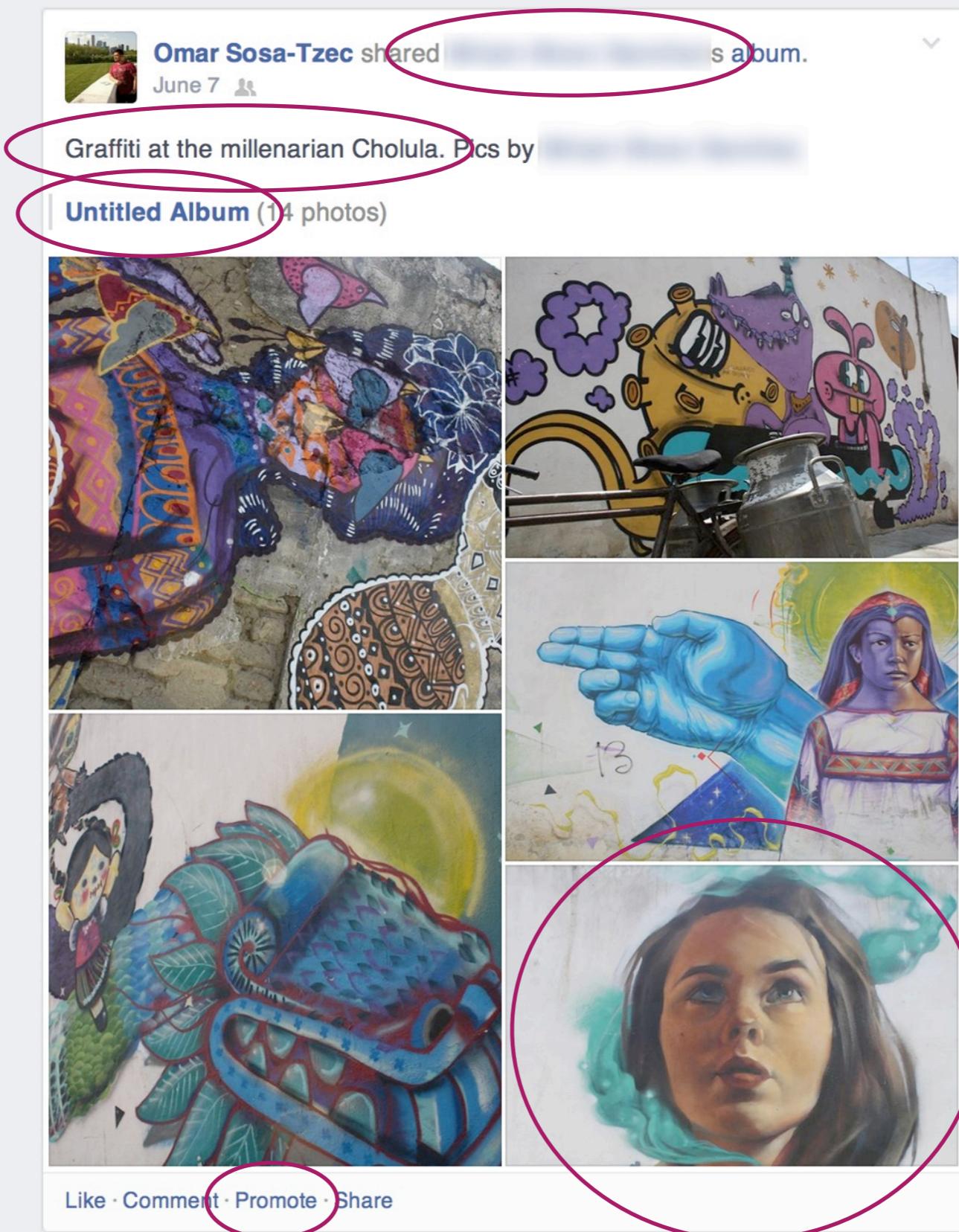
 Roy needs your help!
Join your friends in FarmVille, the world's biggest farming game! Grow hundreds of crops, trees, and animals! More added every day
NEEDS HELP SELLING THEIR RUBBER DUCKIE SET....

Like · Comment · Share · Help Now!

 Write a comment...

Facebook images from author's profile

UNINTENTIONAL DISCLOSURE

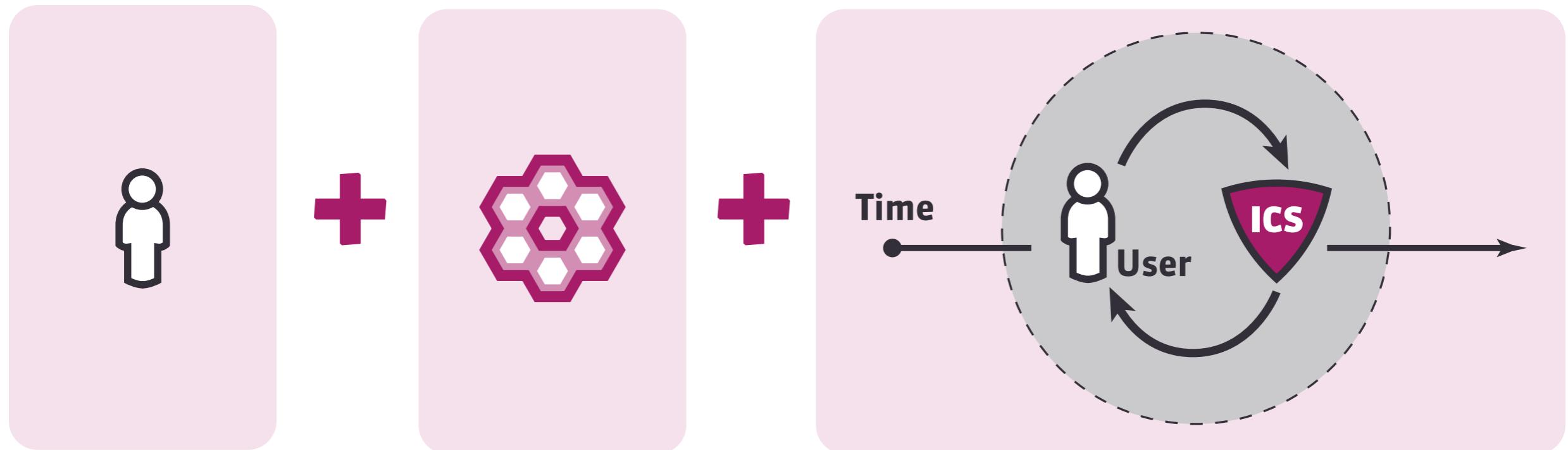


Facebook images from author's profile

5. Implications



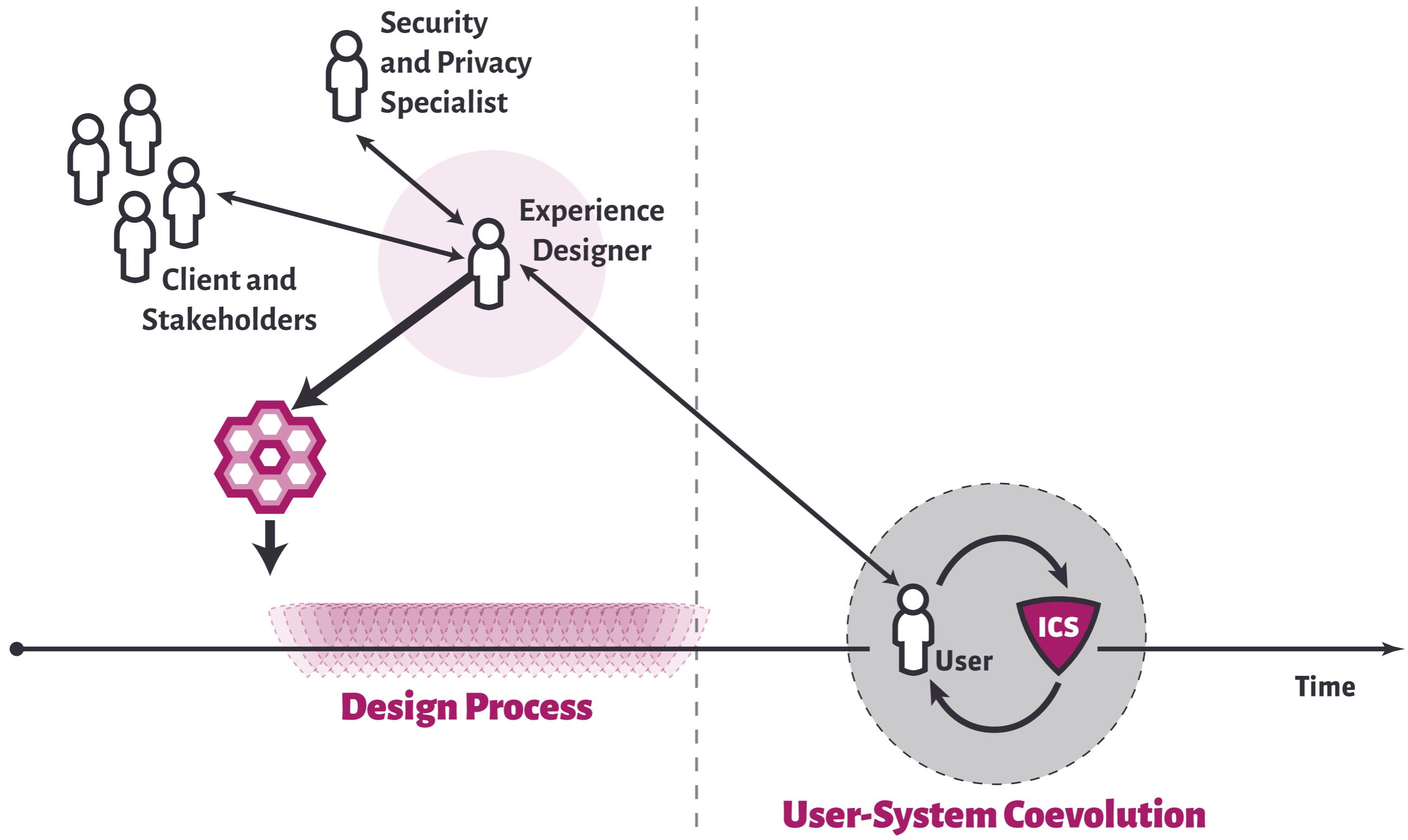
WHAT IS THE MEANING OF THIS RELATION?





The experience designer as **translator and communicator** of knowledge







ICSs entail a challenge for
both **design practice**
and **design pedagogy**

6. Conclusions



A complex network of white lines on a dark red background, forming a mesh-like structure.

We proposed an experience
design framework constituted
by **six security and
privacy principles**

Security and Privacy Matters

Personalization

Adaptability

Expandability

Usability

Avoid Unintentional Disclosure

Complex Systems

Heterogeneity of Users

Multiple and Evolvable Use Scenarios

User-System Coevolution

Security and Privacy

Experience Design

A complex network of thin, light-colored lines forming a mesh-like structure, resembling a molecular or neural network, set against a dark red background.

Our attempt is to open
a **conversation about security**
and privacy, and also about the
implications of user-system
coevolution in ICSs
for experience design.

Questions?

Thank you!

azadnema@indiana.edu

<http://mypage.iu.edu/~azadnema/>

omarsosa@indiana.edu

<http://tzec.com/>

Paper available at:

<http://goo.gl/qZ7qsA>