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Trust embedded business model of Online Service Network (OSN)

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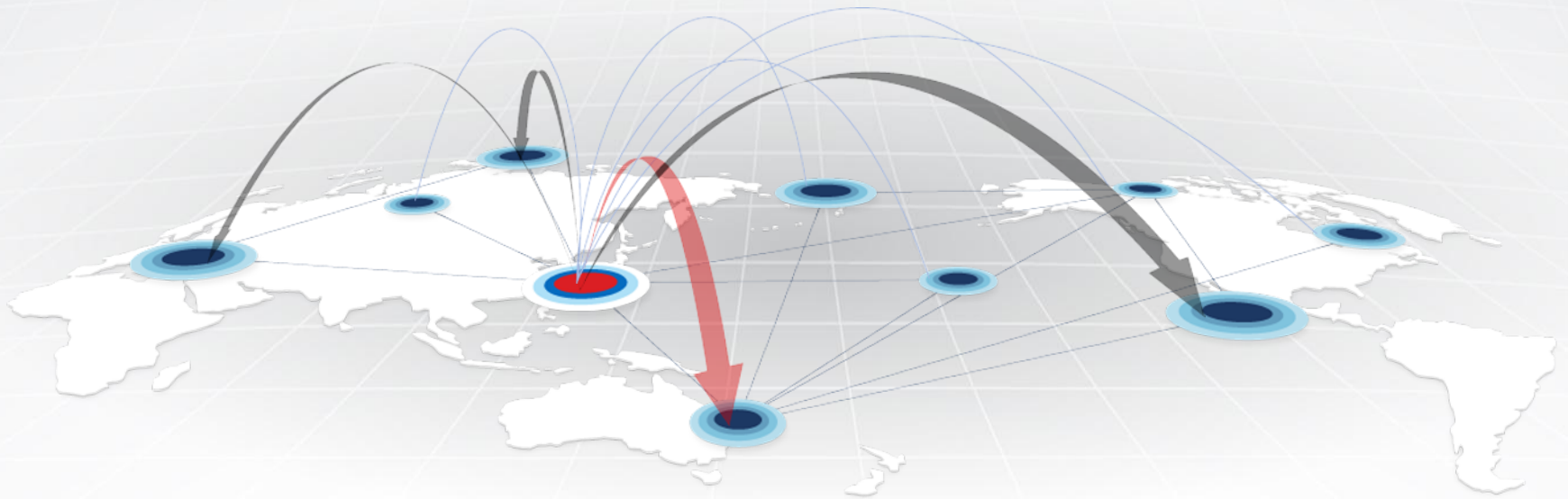
Contents

Definition of Online Trust

Meaning of Trust

Trust is   신뢰 (信賴)

(believe)   (rely on)

$$Vertrauen = \sqrt{\left(\frac{Glauben \cdot Information}{Bewertung}\right) - \frac{Mehrwert}{Risiko}}$$

Trust in Online World, same as Offline

"The trust is not a relation itself

but a second order property

qualifying first order relation"

- '**Trust**' in connected world

  is an instance of

  this **second-order property.**

  - It is the dominating element

  of the online communications.

The common factor of offline & online trust is that both are based on the trustee's trustworthiness and that **transparency** and **honesty** is the two of trust's main features.

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Trust in Computer Science: System Perspective

- **Coming from the** security **domain.**

  *"the expectation that
  a system will faithfully behave
  in a particular manner
  to fulfill its intended purpose".*

  The "system" trust is supported by software- and hardware-based solutions.


*Trusted Platform Module (TPM),
a cryptographic microcontroller system
enabling the TPM to be a root of trust
for validating the hardware and software
characteristics of a remote computer
on which the TPM is installed.*

http://www.hacker10.com/computer-security/trusted-platform-module-cryptochip-explained/

Trust in Computer Science: User Perspective

• **Coming from psychology and sociology**

"a subjective expectation an entity has about another's future behavior"
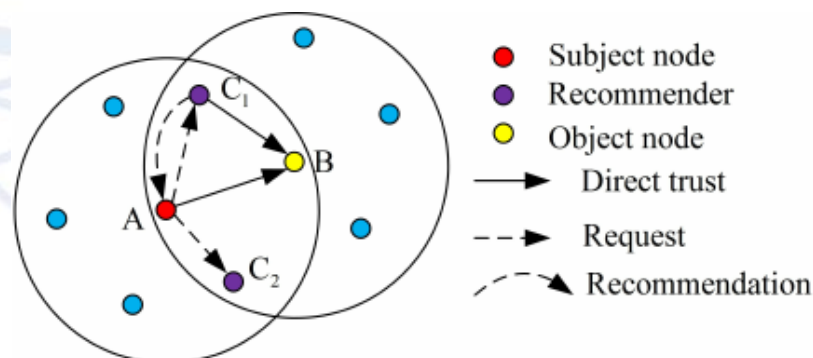
In online website, 'trust' is based on the feedback on past interactions betw. members.

• **'Trust' in online service has two types:**

  - "Direct" trust is based on the direct experience of the member with the other party.

  - **"Recommendation" trust** is based on experiences of other members

    in the social network with the other party.

Value of "Recommendation" as Online Trust

- **In social economy,
  members gather information
  about other members
  using their online social networks (OSNs).**

- **It is "referral networks".**

  Each peer models other peers in two ways:
  - Their trustworthiness can be as interaction partners. = Expertise
  - Their trustworthiness can be as recommenders. = Sociability

*After each interaction, the expertise of the interaction partner and
the sociability of the peers in the referral chain that led to the interaction are
updated to reflect the experience of the member in that interaction.
The immediate neighbors of the member are updated to reflect the
changes in the evaluated trust of those members.*

This is influenced by both the neighbor's expertise and sociability.

Analysis Framework for Trust OSN Business Model
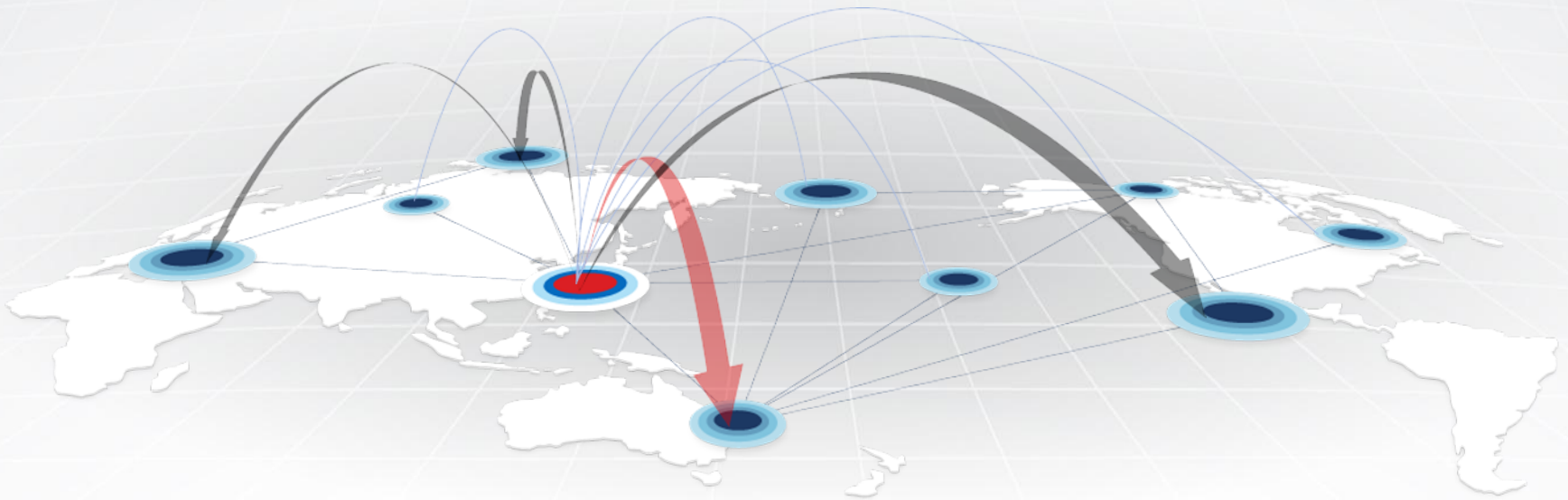
Three **Issues** in transition from **System** to **User** Perspective

- **Understanding of security and privacy**
  - The Trust itself is a way to measure the risk in interacting with unknown OSNs and users.

- **Control over personal information**
  - Several Access control techniques are available and suitable for OSNs.

- **Protection against attacks**
  - Attacks in OSNs can be particularly insidious in stealing users' Identity.

https://www.linkedin.com/pulse/your-perception-privacy-security-internet-diego-pappalardo

http://www.techtimes.com/articles/105664/20151112/google-about-me-gives-you-more-control-about-what-personal-information-you-share-with-the-world.htm

http://www.itbusinessedge.com/slideshows/five-recommendations-for-protection-against-advanced-hacking-attacks.html

Two **Viewpoints** of Trust **Evaluation**

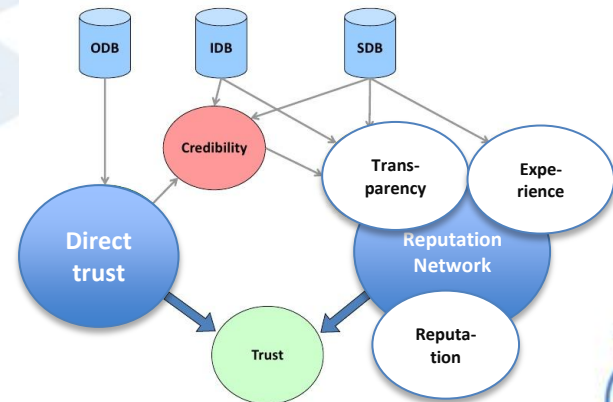- **Key characteristics of Institutional view in three Trust stages**

    - **(Source)** Scale, Authority, Position

    - **(Process)** Given by Institution

    - **(Result)** Hierarchy of Power
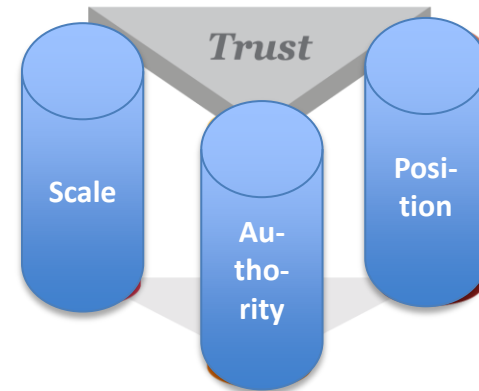
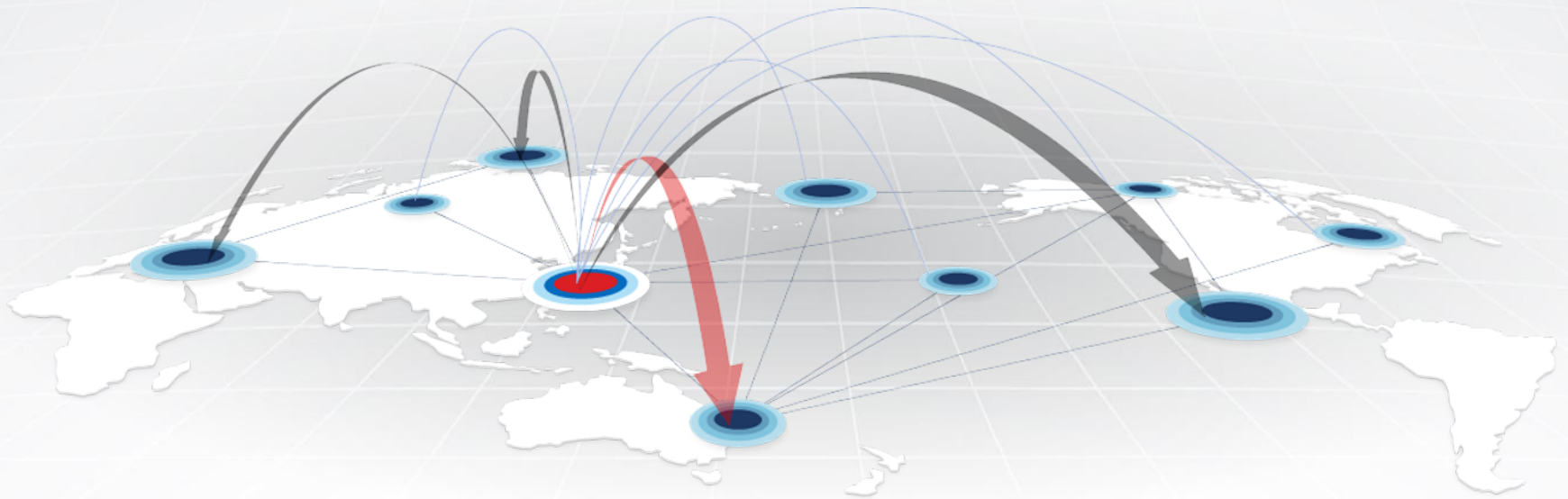- **Key characteristics of Social Networked view in three Trust stages**

    - **(Source)** Transparency, Experience, Reputation

    - **(Process)** Earned by Interaction

    - **(Result)** Reputation Network

Analysis Framework for Trust embedded OSN Biz. Model

'Trust' Stage	'Trust' Issues	Viewpoints of 'Trust' Evaluation	
		Institutional (centralized)	Social Networked (decentralized)
Source	Perception of Security & Privacy	Scale, Authority, Position	Transparency, Experience, Reputation
Process	Control of personal information	Given by institution	Earned by interaction
Result	Protection against attack	Hierarchy of Power	Reputation network

Tasks & Cases of Trust Biz Model

Tasks for Developing Trust Embedded OSN

Three Trust Issues

Understanding of Security & Privacy		Protection against attacks
OSN activities for users are **risk free**	Control of personal Information	Users must be **protected against attackers** for **malicious intents**
Trust is a way to measure this risk in interacting with OSNs & users.	OSN activities must be **controlled by owners**	Attacks in OSNs can be insidious in stealing users' **Identity**
	Access control techniques suitable for OSNs	
Task 1	**Task 2**	**Task 3**
Trust Management	Controlled Information Sharing	Identity Management

Reconstruction of (Carminati, Ferrari and Viviani 2014: 15)

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From Policy Centric To Social Approach

- **Policy centric mechanism**
    - Scale
    - Authority
    - Position

  "Trust is inherently subjective and relational."

- **"Social & soft" approach**
    - Transparency
    - Experience
    - Reputation

Security mindset ➡ **More Privacy mindset**

Web of Trust Model
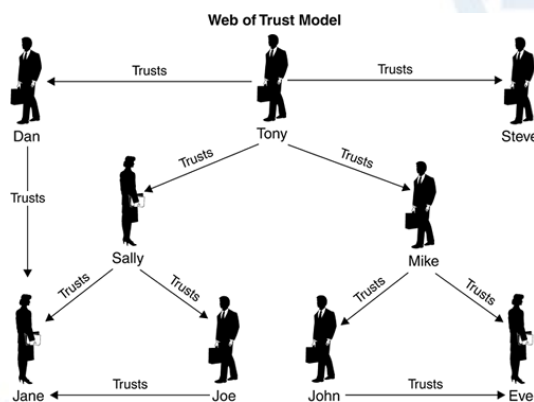
"Security in a system does not necessarily affect Trust."

POWER of SOCIAL TRUST

How often do we ask friends and family before buying new products and services?

ALWAYS 33%
FREQUENTLY 33%
SOMETIMES
RARE

PRODUCTS   SERVICES
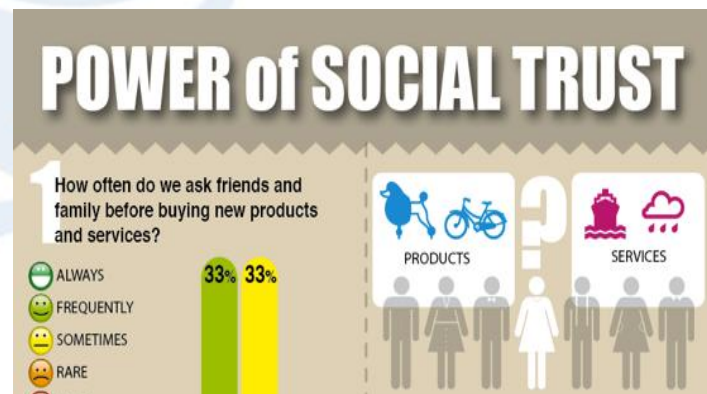
Recommendation Trust Provision: *eBay, Facebook..*

- **Recommendation (based) trust is connected to reputation.**

  - Trust builds business reputation & there are OSNs with **reputation system** (2010) .
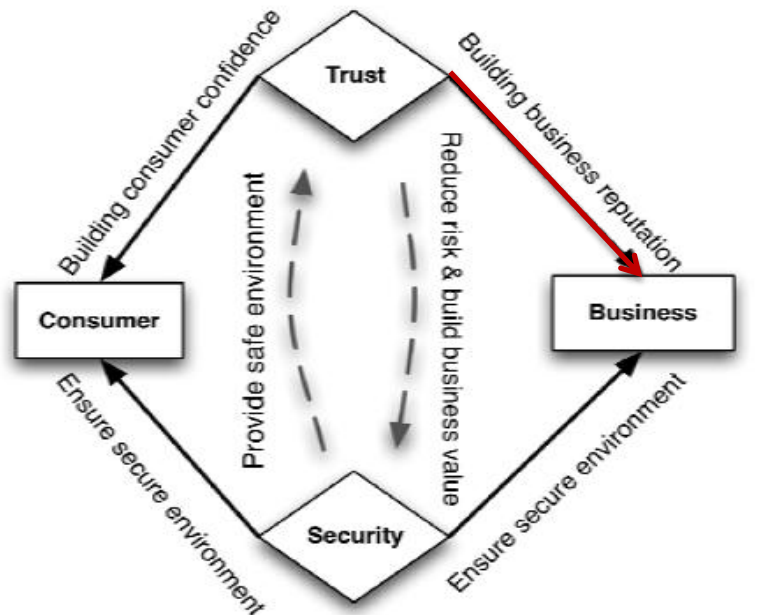
➢ Commerce sharing: eBay

➢ Opinions sharing : Epinions, Del.icio.us, LastFm

➢ Jobs sharing: LinkedIn, Ryze.com

➢ SNS: Facebook, Friendster

➢ News sharing: Zdnet, Slashdot, Kuroshin.org

➢ Semantic Web as for anyone

   who publish anything (decentralized way)

➢ P2P networks

   where peers share opinions about other peers

Alnemr, R. et al,(2010: 62)

From System-specified To User-specified

- **System-specified Policy**
  - Given by Institution
    - Discretionary Access Control
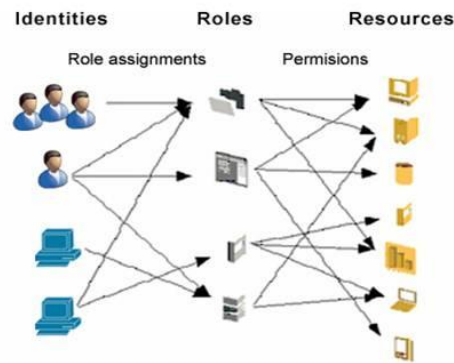   - Mandatory Access Control
    - Role-Based Access Control

"Decentralized solutions allow users to have more control over their own data"

- **User-specified Policy**
  - Earned by Interaction
    - Relationship-Based Access Control
      - ➢ User-to-user access control
      - ➢ Multiple-users access control
      - ➢ Multi-level access control

Permission mindset   →   **More Protection mindset**

Role Based Access Control (RBAC)

Identities   Roles   Resources

Role assignments   Permisions

"The system must collect Individualized policies along with system-specified policies."

http://www.perisoftware.com/peri_case_studies_rolebased.php,
Retrieved on June 2016

Access Control Policy

User-specified Policy   +   System-specified Policy

Policy for Resource   Policy for User   Policy for Resource   Policy for User

Incoming Action Policy(Target Resource Policy)   Outgoing Action Policy(Accessing User Policy)   Incoming Action Policy(Target User Policy)

Kwon, K. et al. 2014; "+" added by presenter 2016

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Relationship Based Access Control Provision: *LinkedIn..*

- **Relationship based Access Control is evolving with user specified policies.**
  - Several OSN types: Personal, Status Update, Location, and Shared-Interest networks…

Social media profiles: What teens post — 2006 vs. 2012
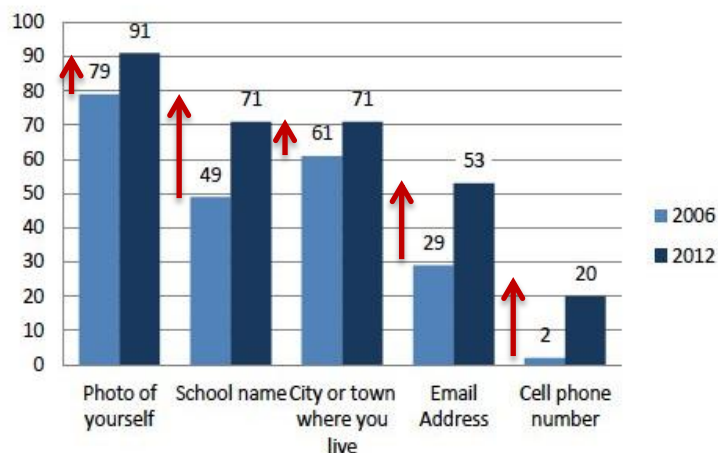
Source: Pew Internet Parent/Teen Privacy Survey, July 26-September 30, 2012. n=802 teens ages 12-17. Interviews were conducted in English and Spanish and on landline and cell phones. Margin of error for results based on teen social media users is +/- 5.1 percentage points. Comparison data for 2006 comes from the Pew Internet Parents & Teens Survey, October 23-November 19, 2006. n=487 teens with a profile online. Margin of error is +/- 5.2 percentage points.

Privacy Settings **of Online Resume**

Research Surveys
Settings for receiving requests to participate in market research surveys related to your professional expertise.

Connections Browse
Your connections are **allowed** to view your connections list.

Profile Views
Control what (if anything) is shown to LinkedIn users whose profile you have viewed.

Viewing Profile Photos
You can view **everyone's** profile photos.

Profile and Status Updates
Control whether your connections are notified when you update your status or make significant changes to your profile and whether those changes appear on your company's profile.

Service Provider Directory
If you are recommended as a service provider, you **will** be listed.

Partner Advertising
Control whether you will be shown LinkedIn Audience Network advertisements on partner websites.

Authorized Applications
See a list of websites or applications you have granted access to your account and control that access.

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From Identity 1.0 To Identity 2.0

- **Identity 1.0**
  - Hierarchy of Power
    - Isolated user identity model
    - Centralized user identity model
    - Federated user identity model
      - ➤ Single Sign-On (SSO)

"Think of Several Identity attacks!"

- **Identity 2.0**
  - Reputation Network
    - Presentation of oneself
    - Protection of user identity
      - ➤ Identity disclosure
      - ➤ Identity theft

Authentication(Who) mindset ➡ **More Authorization(What) mindset**
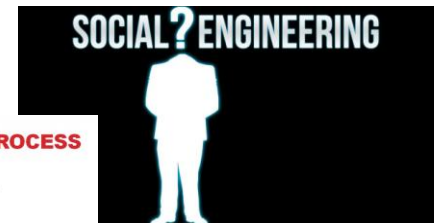

"Need to concentrate on Identity theft attacks which can be Particularly insidious in OSNs"

SOCIAL ? ENGINEERING

THE GAINING ACCESS PROCESS

Identification ➤

Authentication ➤

Authorization ➤

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Authorization Management Provision: *Google..*

- **An open standard for authorization with OAuth 2.0 in Identity 2.0 era**
    - It enables Resource Owners (=Users) to authorize limited 3rd party access
      to their server resources without sharing their credentials.
        - For instance, a Gmail user can allow LinkedIn to have access to their list of contacts
          without sharing their Gmail user name and password.
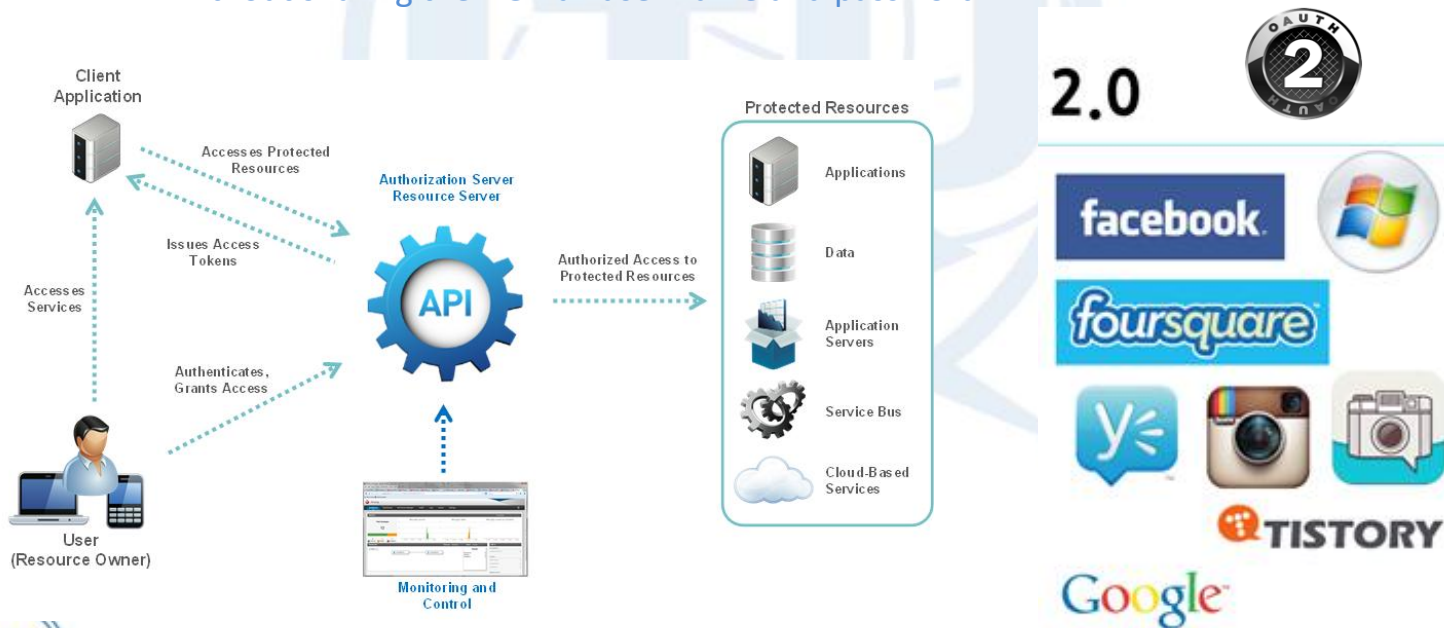
Three Tasks for Trust Embedded OSN Biz Model

- **1st Task: Trust Management**
    - From Policy centric Toward "Social & soft" Approach
    - More **Privacy** mindset, rather than Security mindset
    - Current Recommendation Trust Provision with **"Reputation System"**

- **2nd Task: Controlled Information Sharing**
    - From System-specified Toward User-specified
    - More **Protection** mindset, rather than Permission mindset
    - Current Relationship Based Access Control Provision with **"Privacy Settings"**

- **3rd Task: Identity Management**
    - From Identity 1.0 Toward Identity 2.0 (Identity Attack Management)
    - More **Authorization(What)** mindset, rather than Authentication(Who)
    - Current open standard for Authorization with **"Oauth 2.0"**