What’s A Friend’s Worth?

Ching-Yung Lin
Project Lead, Social Informatics and Collective Intelligence
IBM T. J. Watson Research Center

November 19, 2009
Web 2.0 Expo New York 2009 keynote talk
Valuable Colleagues

“A critical question is being asked by customer. If I know who among our 400,000 worldwide colleagues knows the answer, a million dollar deal signing may be only one phone call away…” — an IBM CHQ Sr. VP in 2003, showing how desperately IBM needs a novel expertise location tool…
Gartner 2003 – Personal Network preferred source for information

**Personal Network**

**Preferred / primary mode**

**Practitioner** with task in project / delivery environment

**Forces:**
- Time Constrained
- Delivery activity focus
- What gets measured gets done
- Expedience
- Perceived value (return on time investment)

**High reliance on:**
- Personal networks
- Hard-drive materials
- What has worked for them previously (personal experience)
How to Unlock the power of our existing networks -- automatically?
Where does knowledge reside?

Emails, Instant Messages, Calendars, Databases, Wikis, Blogs, Microblogging..
SmallBlue (Lotus Atlas Services) unlocks the Power of Business Networks and Protects Privacy

**Ego:** Show my personal network evolution and social capital

**Whisper:** Social Network enabled personalized live recommender..

**Expertise:** Search for people who know "xyz" in my networks.

**Net:** See how experts or community connect

**Social Network Analysis & Visualization, Expertise Mining, and Multi-Channel Human Network/Behavior Analysis**

**Reach:** helps me to understand this person and my formal and information paths to Reach him..

**Synergy:** Personalized Search

**Productivity:** Social Network Analysis Service helps company understand how to enhance productivity.

- Live Data from 10,000+ Distributed Social Sensors in 76 countries
- 20,000,000 Emails & Instant Messages
- 1,000,000 Web 2.0 and Databases (blogs, file sharing, bookmark) data
- 200,000 people’s consulting financial databases
- 400,000 IBMers organization/demographic data
- 400,000 webpages and knowledge assets
It is possible to solve the privacy and security issues

- Global Privacy Officer / Committee Review
- European Privacy Officer Review and Labor Union Review -- country by country

**European Union**

**Russia**
- Federal law on Pers Data (January 2007)

**APEC**

**U.S. – Sectoral**
- Children’s Privacy: COPPA (1999)
- Financial Sector GLB (2001)
- Health Sector; HIPAA (2002)
- California Privacy; (2005)

**Canada**
- PIPEDA (2001 - 2004)

**Dubai**
- Data Protection Law (January 2007)

**Chile**
- Protection of Private Life Law (1999)

**Argentina**
- Protection of PD Law (2000)

**Australia**
- Privacy Amendment Act (2001)

**New Zealand**
- Privacy Act (1993)

**Taiwan**

**South Korea**

**Japan**
- Personal Data Protection Act (2005)
SmallBlue Ego – personal social network capital management [an application only visible to the user himself]

- What is a friend's social capital to me?

It can also show the evolution of my social network...

How many people are in my personal networks?

SmallBlue finds dynamic existing social networks of every employee – possible to calculate social distance from me to anyone

My personal social network automatically found by SmallBlue with social distance
SmallBlue Finds knowledgeable colleagues

- E.g.: Search for the most knowledgeable colleagues within my 3-degree network for who knows ‘healthcare’. (or within a country, a division, a job role, or any group/community)

My shortest path to Susan

As a user, you can only see their public information. Private info is used internally to rank expertise but private data can never be exposed.
SmallBlue Reach – social paths & dashboards

- Is Tom a right person to me? Shortest Social Paths to any person within 6-degrees..

My various paths to Tom. SmallBlue can show the paths to any colleagues up to 6-degree away

His official job role, title, contact info

His self-described expertise

His public interest groups, communities

Formal vs. Informal Paths

His blogs, forum, postings..
SmallBlue Net – corporate social network analysis

- How are company’s top healthcare experts link with each other? Who are the key bridges? Who are the social hubs?
SmallBlue Usages inside IBM

- Stable Internal Usages since October 2008

Usage statistics of the original four SmallBlue applications

Users welcome such automatically mining – no employee needs to spend to make it work.
Relationship Between Network Topology and Productivity

- Network size is positively correlated with performance.
  - Each person in your email address book at work is associated with $948 dollars in annual revenue.

$74.07 \textit{increase} \text{ in monthly revenues} \text{ or } $948 \text{ annual revenues}

Std error = (26.38)***
Significant at $p < 0.01$
Which one is better -- Structural Diverse Networks or Cohesive Networks?

- Structural diverse networks with abundance of structural holes are associated with higher performance.
  - When friends of your friends are not friends of each other or belong to the same social group.

1 standard deviation increase in network diversity
Diversity = (1-constraint)

276.64% increase in monthly revenues
Std error = (113.88)
Significant at p < 0.01
Linking to Managers – Does it matter?

Having **strong links** to **managers** is correlated with performance

- strong links to anyone else is not correlated with performance

**$588.2 increase in monthly revenues**

- Std error = (389.4)
- Significant at p < 0.1

**$98.48 decrease in monthly revenues**

- Std error = (53.49)
- Significant at p < 0.1

*Selectively cultivate a few relationships with management.*
Project Team Composition—Managers

The number of managers in a project exhibit an inverted-U shaped curve.
1. Having managers in a project is correlated with team performance initially.
2. Too many managers in a project is negatively associated with team performance.

\[
\text{revenue} = \alpha + \beta_1 \cdot \text{mgr} + \beta_2 \cdot \text{mgr}^2 + \gamma_1 \cdot \text{otherfacto} + \gamma_2 \cdot \text{otherfacto} + r_k + \epsilon
\]
Our Next Steps

- U.S. Government is collaborating with ~ 100 professors & researchers in 30 academic and industrial organizations to establish four new Network Science Research Centers to understand the fundamental science of networks – Communication, Information, Social and Cognitive Networks (2009 to 2014 or 2019).

Our initial tasks:

- Understanding ‘Trust’
- Dynamic and Evolutionary Networked Events
- Computational Social Science

SmallBlue World version (Internet) – early 2010

http://smallblue.research.ibm.com
Acknowledgements

- Dr. Spiros Papadimitriou (IBM Watson)
- Dr. Zhen Wen (IBM Watson)
- Lynn Wu (IBM Watson, MIT Sloan Management)
- Prof. Sinan Aral (NYU Stern Management)
- Prof. Erik Brynjolfsson (MIT Sloan Management)
- Dr. Yingzi Jin (IBM Watson, Univ of Tokyo)
- Dr. Yusuke Matsumura (IBM Watson, Hokkaido Univ)
- Rich Thompson (IBM Watson)
- Dr. Ravi Konuru (IBM Watson)
- Dr. Ramesh Gopinath, Dr. Ellen Yoffa, Dr. Nagui Halim (IBM Watson)
- Vicky Griffiths-Fisher, James Stupak (IBM Global Business Services)
- Chris Desforges, Bill Kirduff, Scott Bentley, Mike Martin (IBM Lotus Services)
- Dr. Kate Ehrlich (IBM Cambridge), Dr. Shi Xia Liu (IBM Beijing), Dr. Lei Shi (IBM Beijing), Dr. Mary Henlander (IBM Watson), Yi Gu, Yi Jie Xu, Jun Liu, Yuan Tao Sun, Dong Lei Fu (IBM Shanghai)
- Prof. Boleslaw Szymanski (RPI), Prof. Xifeng Yan (US Santa Barbara)
- Dr. Belle Tseng (Yahoo), Dr. Xiaodan Song (Google), Prof. Ming-Ting Sun (U. Washington)