



Social Networks for Enterprise Webs

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<http://www.verity.com>

Overview of this talk

- **What are Social Networks?**
- **Social Networks in an Enterprise**
- **Verity's Solution**
- **Verity in Action**

Milgram's Experiment

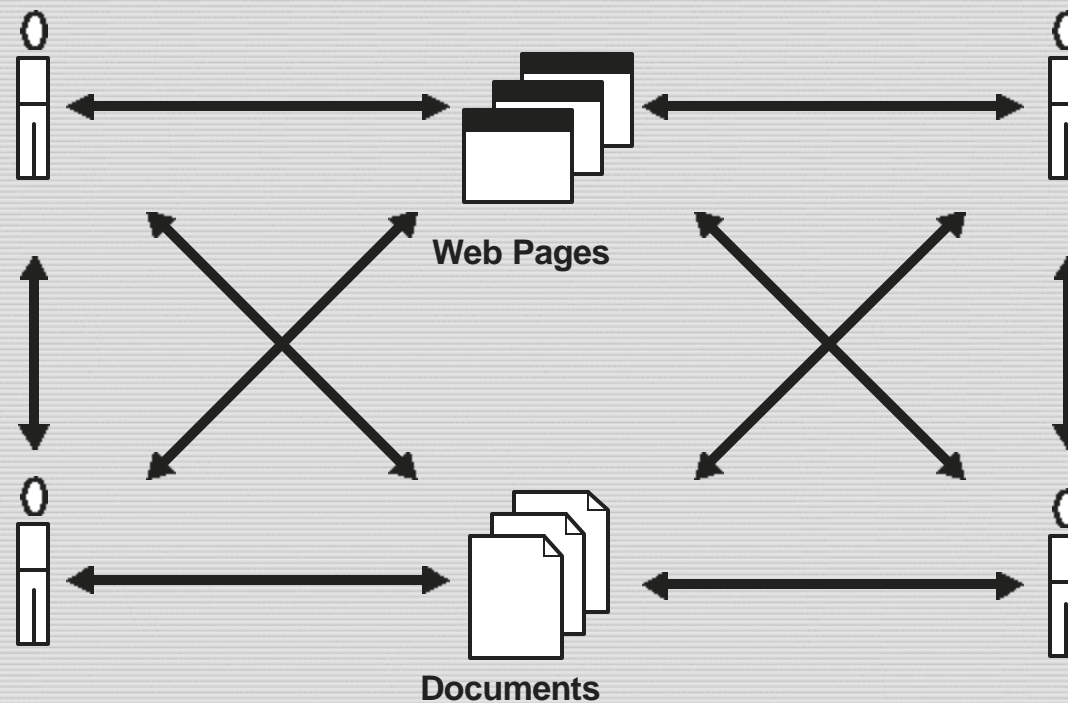
- **Asked volunteers in Omaha, NE to send a letter to a physician in Boston**
- **Could only forward to a known person**

Result:

- **Median path length of delivery was 6**
- **Led to famous “6 degrees of separation” folklore**

Primarily contain:

- a set of entities
- and associations between them



A Social Network model of the Internet

- Represents *web pages* and *users* as entities
- Web pages associated by their hyperlinks
- Access patterns associate users with web pages
- Similar access patterns associate users with other users

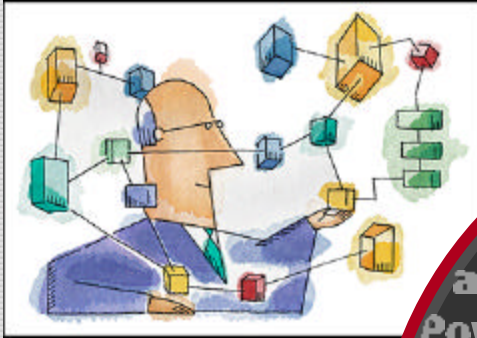
Google, Amazon, ReferralWeb, Phoaks, Yenta

- **Google exploits the web's hyperlink structure**
- **Amazon analyzes buying patterns to recommend products**
- **ReferralWeb builds a network of researchers from co-authorship to find experts**

A Social Network in an Enterprise

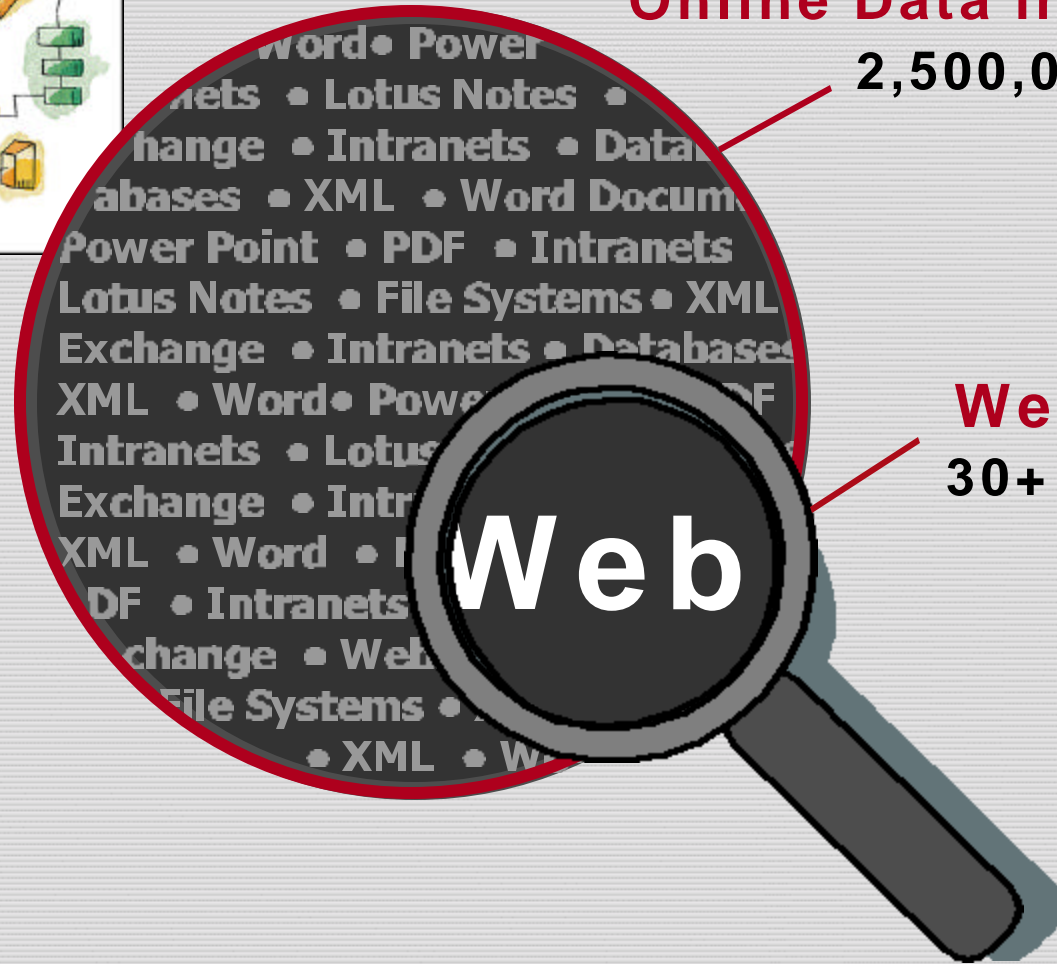
- **Entities are:**
 - data objects in various repositories
 - employees, customers and partners of the organization
- **Associations between entities**
 - some relationships between users are natural (organizational), other associations are implicit
 - data across repositories is not linked

The Web, in Context



Online Data in the World

2,500,000+ TB



Web HTML

30+ TB

- **Content management systems**
- **Company databases**
- **Technical manuals**
- **Group email forums and lists**
- **Bibliographic databases**
- **Internal documents**
- **Individual resumes and home pages**

Enterprise level challenges

- **Information resides in heterogeneous**
 - formats (pdf, word, email...)
 - repositories (lotus, databases, exchange..)
 - applications (HR, ERP, Siebel, ...)
- **Data security**
 - document access is governed by ACL's

Differences

- **Most of the valuable data is not found in html pages**
- **Many formats in heterogeneous repositories**
- **Most enterprise content has no links**
- **The implicit links that do exist are inherently different from the web hyperlinks**
- **Documents have access rights which have to be respected by the Knowledge Management application**

Value of Social Networks in an Enterprise

Increase productivity of workers by providing them

- **the right information (documents)**
- **the right people (experts)**

The Solution



Verity has built a scalable generalized framework to represent its Social Network model in the top layer of a 3 tier architecture.

The 3 Tiers of Knowledge Management



- Personalization
- Recommendation
- Profiling

- Expert Location
- Community
- Peer to Peer



- Automatic Rules
- Concept Maps

- Business Rules
- Relational Taxonomy



- Advanced Search
- Parametric Search
- Structured Search
- Keyword Search

- Universal Index
- Universal Viewing
- Federated Search
- Languages



Verity's Social Network Technology

- **Represents users, documents, categories and queries in a dynamic multidimensional Tensor Space**
- **Entities are seeded from existing enterprise data**
- **The model continually learns explicit and implicit links between them**

Seeded from

- documents and public email authored by user
- title, role in the organization

Learned from

- search history
- documents viewed and rated

Document Representation

Is influenced by:

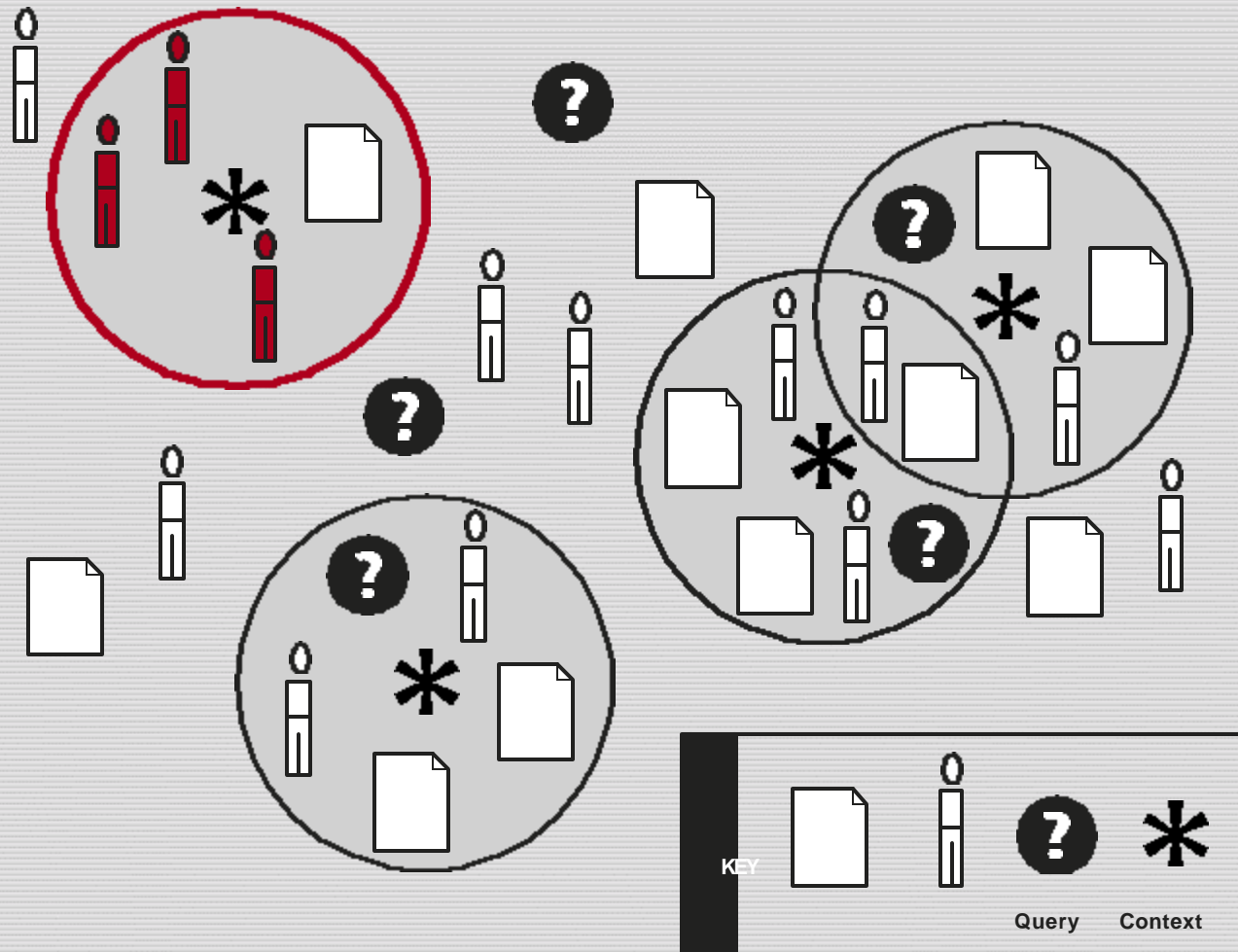
- **its content**
- **co-occurrence with other documents in a category**
- **membership in a set of documents**
- **user feedback**
 - **explicit - rating, voting,...**
 - **implicit - clickstream analysis,...**

Content

- terms in a document
- links between documents
- documents in a taxonomy
- users access patterns
- users profile
- **Context**
 - search history
 - category in a taxonomy being browsed

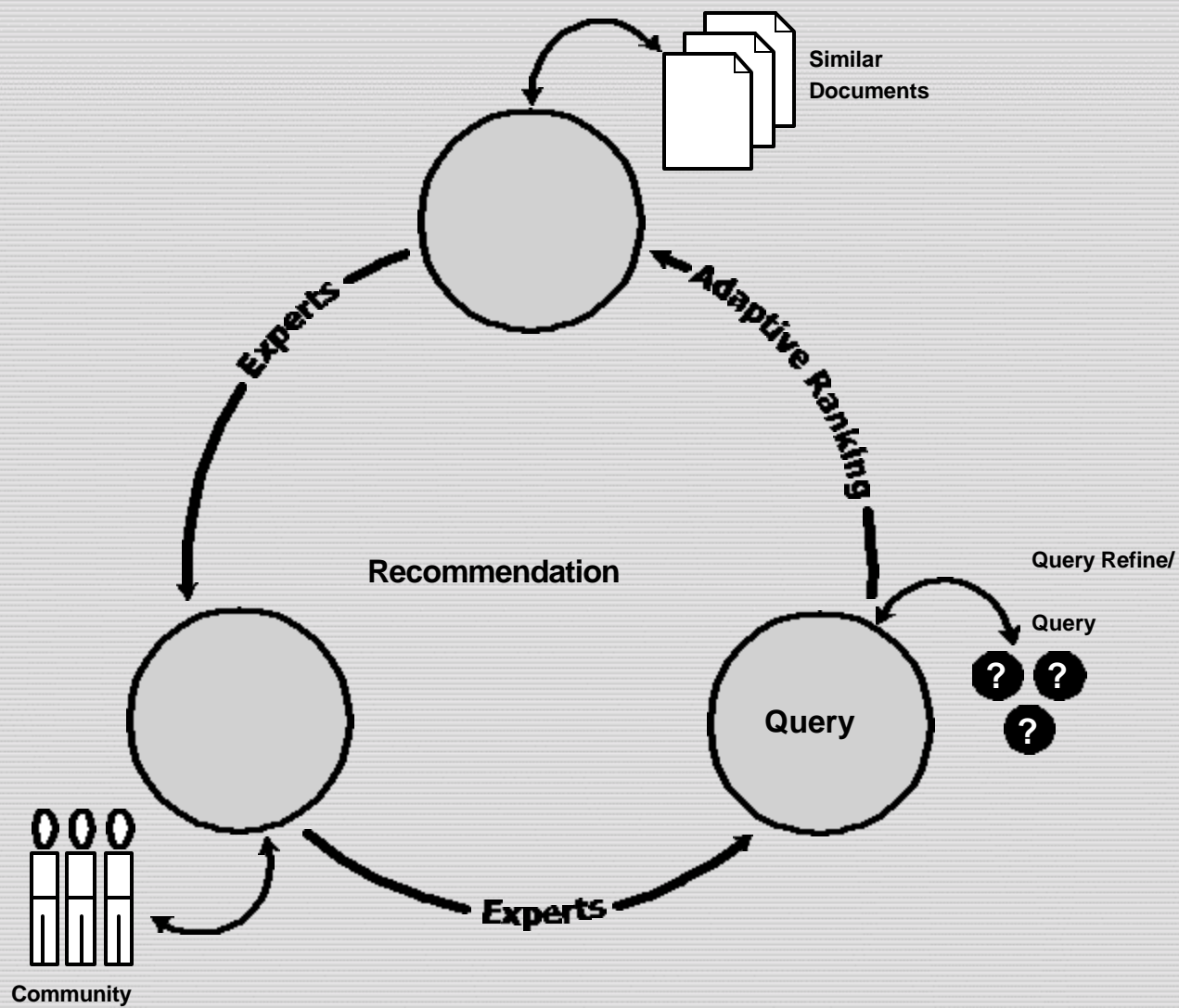
Each item is treated as a node ...

Content and context



... similarity metric between nodes is independent of node type

Verity's Recommendation Engine



Transactions capture user interactions with the system:

- **user selects or rates a document**
- **document is added to a category**
- **user authors a document**

A transaction can involve multiple entities, and impact their relationships

Transactions - API

```
// Create a transaction object
VTransaction vt= new VTransaction();

// Create the transaction entities from the HTTP request
// user identifier
String userName = request.getRemoteUser();
// the K2 document identifier
String docKey = request.getParameter("K2DocKey");
// the user's query
String query = request.getParameter("QueryText");

TxEntity u = new TxUser(userName, false); // don't hide this user
TxEntity d = new TxDoc(docKey);          // the document identifier
TxEntity q = new TxQuery(query);         // the user's query

Subtransaction s = new Subtransaction();
s.setTarget(u);          // use the default history for user
s.addSource(d,relDU); // set relevance of document to user
s.addSource(q,relQU); // set relevance of query to user

vt.addSubtransaction(s);
vt.submit(); // send the information to system
```



Recommendation Engine Import Interface

Mechanism to import data from various sources:

- **User Transactions**
- **CRM systems**
- **Directories such as LDAP repositories**
- **Organization Charts**
- **HR databases**
- **Web Server Log Files**
- **E-Commerce Databases**

Recommendation Engine Import Interface

```
<xaction type="updateEntity">  
  ...  
  <user id="tom" hide="False">  
    <query parser="Simple"><![CDATA[tree]]></query>  
    <doc id="../doc/htmldoc/k2entgs/k2gsovr4.pdf@samplecoll">  
      </doc>  
    </user>  
  
    <doc id="../doc/htmldoc/k2entgs/k2gsovr4.pdf@samplecoll">  
      <query parser="Simple" ><![CDATA[tree]]></query>  
    </doc>  
    ...  
</xaction>
```

- **Verity Recommendation Engine**
- **Builds social networks exploiting enterprise modalities**
- **Generalized framework to deal with entities of different types, e.g., users, documents,...**
- **Responds to user interactions**
- **Discovers implicit relationships**
- **Interface for importing data from enterprise repositories**
- **Can be deployed in different enterprise application scenarios**

Verity in Action



Sample Applications

- **Corporate Intranets**
 - Recommendation, finding domain experts,...
- **Intellectual Property**
 - Finding related research, consultations,...
- **Medical Applications**
 - Matching patients to doctors, clinical trials,...
- **Customer Relationship Management**
 - Matching customer problems to internal experts in Technical Support, Development,...
- **Recruitment**
 - Matching job postings to resumes, creating profiles from resumes,...

Verity Customers and Partners

**1500+
Corporations**

200+ OEM

**175+
ECommerce
Sites**

**80% of the
Fortune 50**



- Brassring
- Boeing
- PWC
- HP
- CSC
- E&Y
- IBM

Intranet Application

The screenshot displays a web application interface with a navigation bar at the top containing buttons for 'Previous', 'Next', 'Index', and 'Contents'. The main content area is titled 'Personalized Discovery' and includes a search bar, 'Manager', and 'Help' links. A 'Rate this page:' section shows five stars, with the third star selected. The main text describes the 'personalization' feature, which connects users to subject experts and recommends documents based on their past queries and documents. It mentions Verity's proprietary analysis engine and social networks. Below this, it states that K2 Enterprise's 'Personalization' and 'Adaptive Ranking' features contribute to 'personalizing' the search experience. A feedback window is open, showing a 'Thank you for your feedback tom' message with a circular logo containing 'ORGANIZE', 'CONNECT', 'DISCOVER', and 'Verity K2'. The right sidebar features a 'Powered by Verity' logo, a 'User: tom' indicator, a 'Similar Documents' section with links to 'Administering the Personalization Engine', 'Personalization Engine Internals', 'Introduction', 'Personalization Engine', and 'System Architecture', and an 'Interest Group' section listing users: tom, ben, leo, george, and ashley, each with a profile picture and contact icons.

Previous Next Index Contents

Search

Personalized Discovery

The **personalization** feature incorporated in Verity K2 Enterprise automatically connects your users to subject experts within your organization, and recommends documents based on the individual users' past and present queries and/or documents that are similar to selected documents. This highly-advanced technology is based on Verity's proprietary analysis engine that combines business rules with latent patterns in user behavior. It puts simple queries into the context of the social networks created by the interaction of users, information and queries in your organization.

K2 Enterprise's **Personalization** and Adaptive Ranking features all contribute to **personalizing** your users' search experience.

K2 Enterprise Recommendation Engine Feedback ...

File Edit View Favorites Tools Y? >>

ORGANIZE CONNECT DISCOVER Verity K2

Thank you for your feedback tom

Powered by Verity

User: tom

Similar Documents

- [Administering the Personalization Engine](#)
- [Personalization Engine Internals](#)
- [Introduction](#)
- [Personalization Engine](#)
- [System Architecture](#)

Interest Group

- tom
- ben
- leo
- george
- ashley

Human Resources Application

Query: ""

Found in: 229472 documents out of 229472




Collections: c1

Enterprise^{Verity, Inc.}

1 to 20

Rank

Document

- [Amelie Jacobson](#)
1  Phone: **609-555-1279** Location: **null**
Qualifications: **Masters** Location: **New York University**
- [John Bishop](#)
2 Phone: **null** Location: **NJ**
Qualifications: **Masters** Location: **Purdue University**
- [Kendra White](#)
3  Phone: **979-555-1279** Location: **NJ**
Qualifications: **High School** Location: **St James**
- [Paul Essex](#)
4  Phone: **207-555-0864** Location: **CT**
Qualifications: **Bachelors** Location: **Springfield College**

User: empgraphics

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Demo



Thank You

