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

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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

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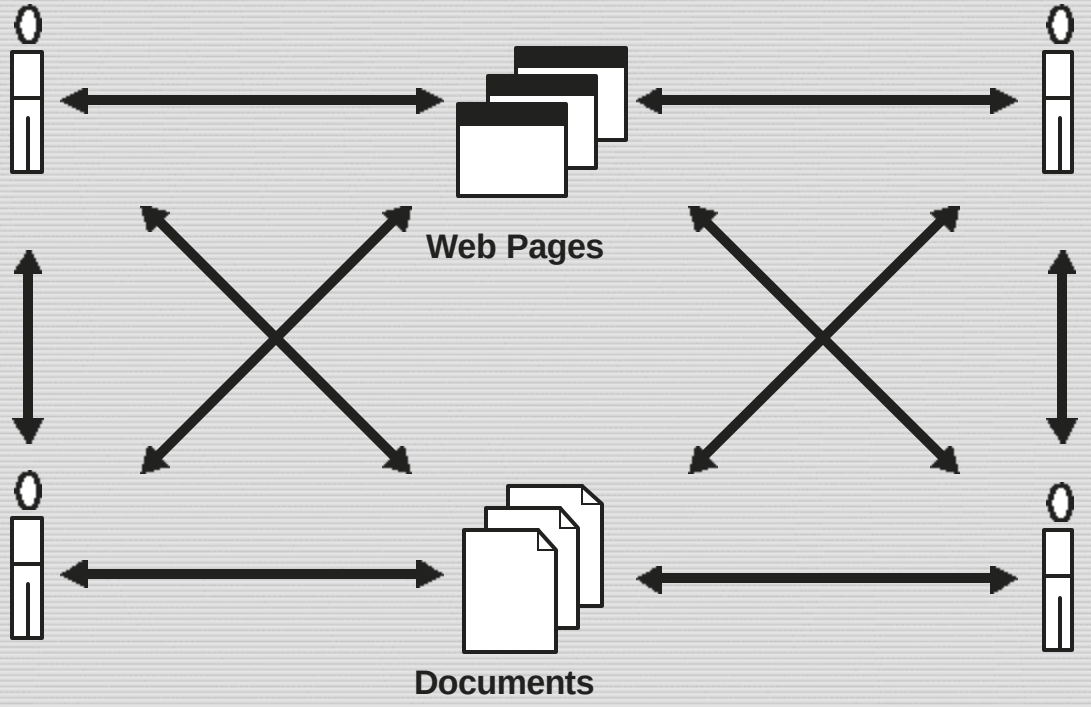
Social Networks

Primarily contain:

- **a set of entities**
- **and associations between them**



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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

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Applications

- 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

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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

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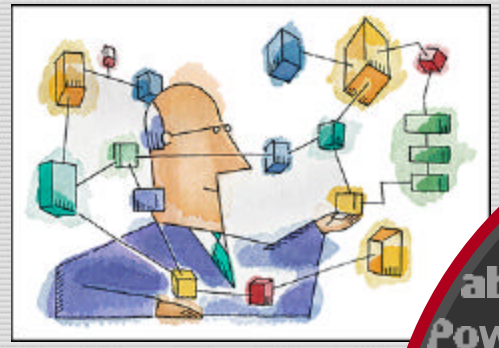
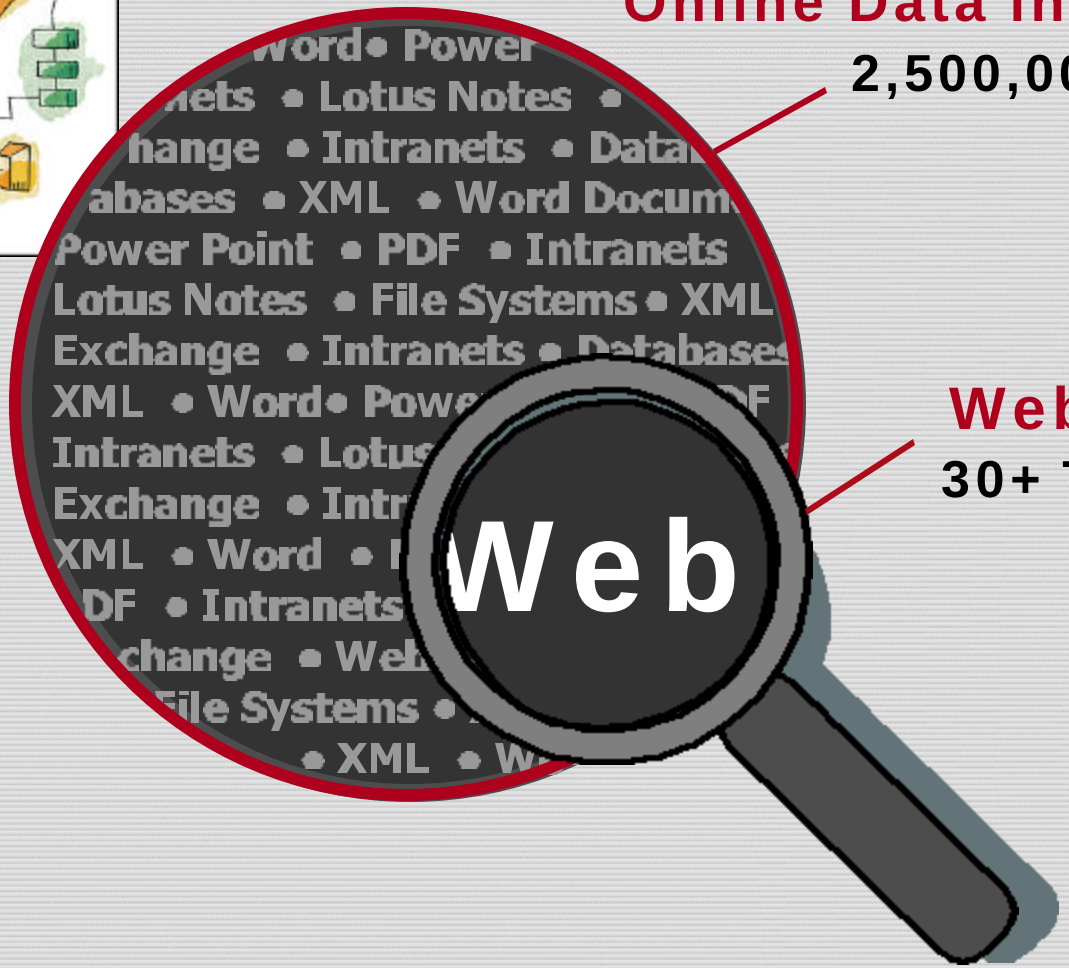
The Web, in Context





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Enterprise Data

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

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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

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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

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Value of Social Networks in an Enterprise

Increase productivity of workers by providing them

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

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The Solution

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

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The 3 Tiers of Knowledge Management

- Personalization
- Expert Location
- Recommendation
- Community
- Profiling
- Peer to Peer

- Automatic Rules
- Business Rules
- Concept Maps
- Relational Taxonomy

- Advanced Search
- Universal Index
- Parametric Search
- Universal Viewing
- Structured Search
- Federated Search
- Keyword Search
- Languages

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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

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User Profile

Seeded from

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

Learned from

- search history
- documents viewed and rated

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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,...

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Content and context

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 ...

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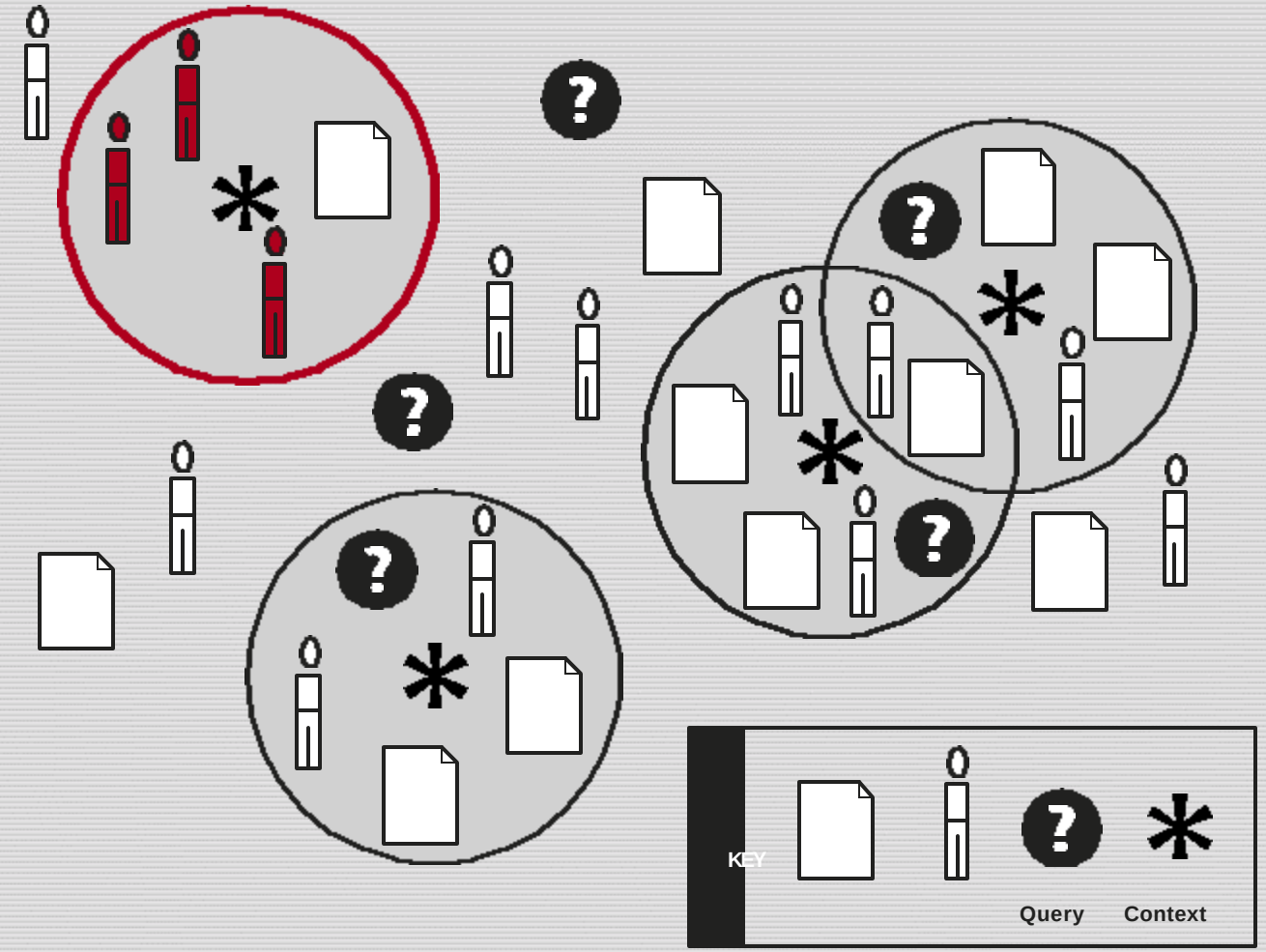
Content and context



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

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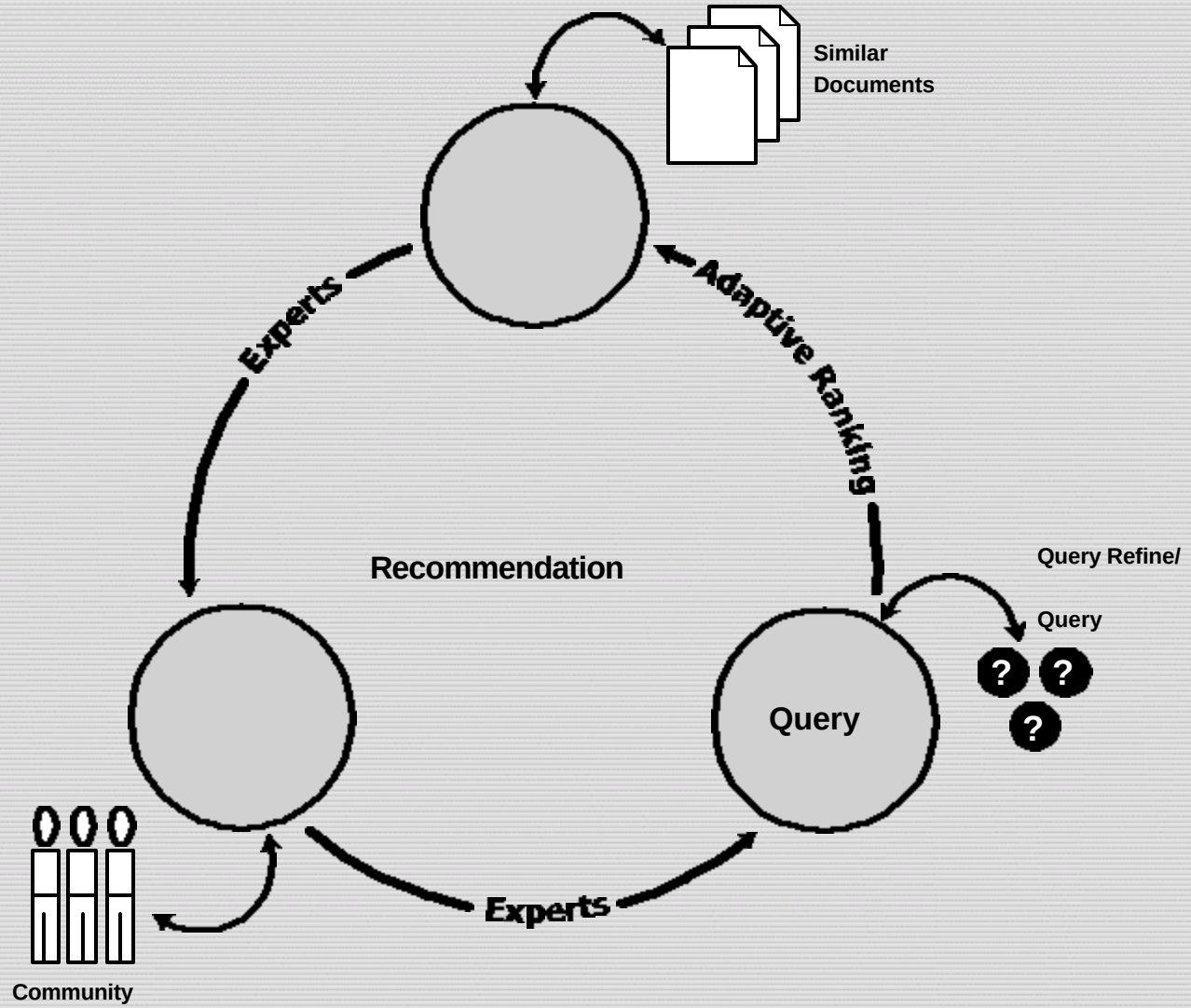
Verity's Recommendation Engine



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Transactions

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

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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
```

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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

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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>
```

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Summary

- 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

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Verity in Action

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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,…

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Verity Customers and Partners

1500+ Corporations

200+ OEM

175+ ECommerce Sites

80% of the Fortune 50

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

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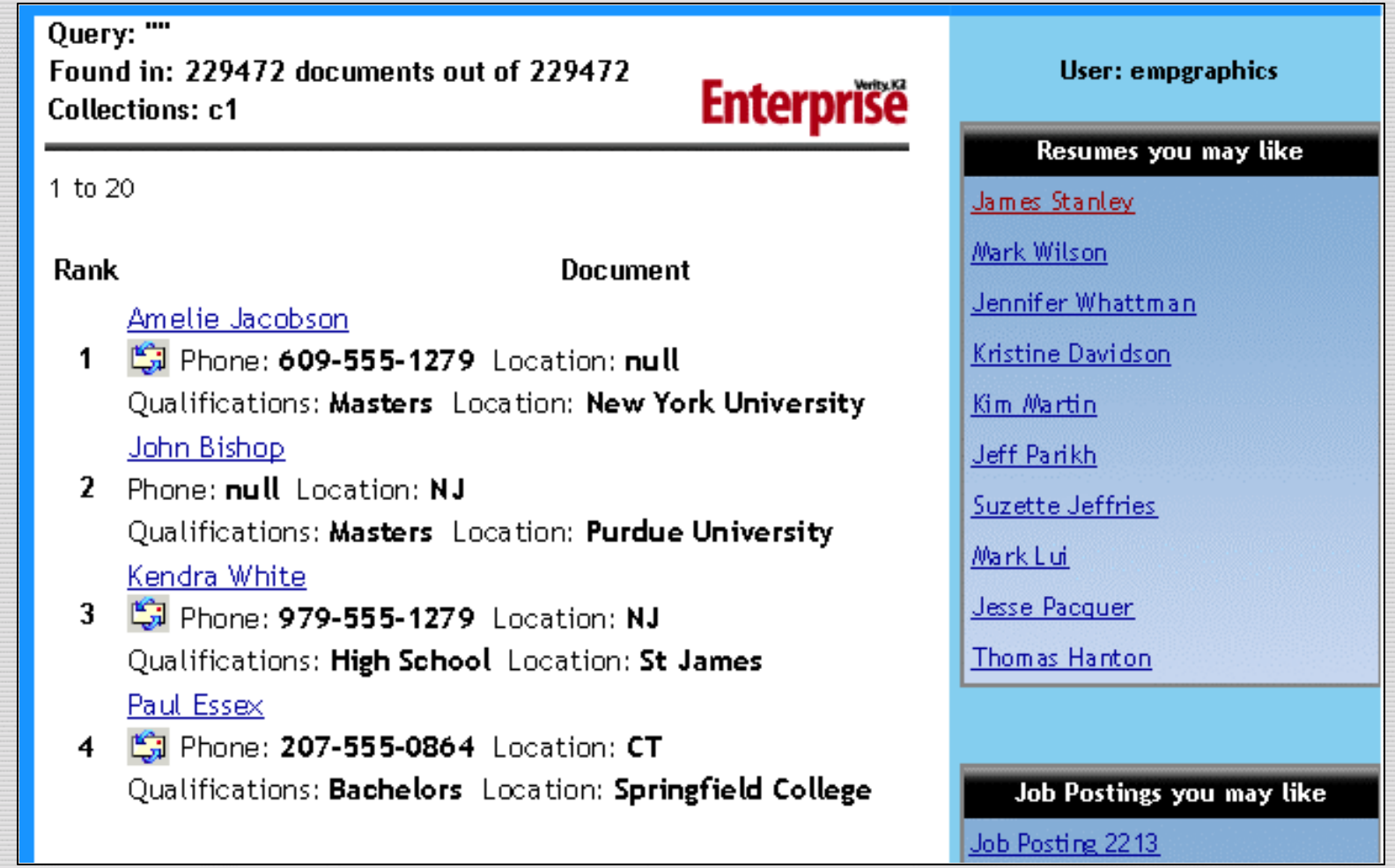
Intranet Application

Human Resources Application



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Powering Business Portals

Demo

Thank You

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B E R T E L S M A N N B U I L D I N G
LG
Time To Fly
virgin atlantic
SONY THEATRES
EIGHT O'CLOCK BEAN COFFEE
Virgin Cola
Hello Broadway...
The Company You Know The People You Trust.