iAD – information Access Disruptions

Dag Johansen
University of Tromsø and Fast Search & Transfer

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Outline

(1) Background

- Enterprise Search.

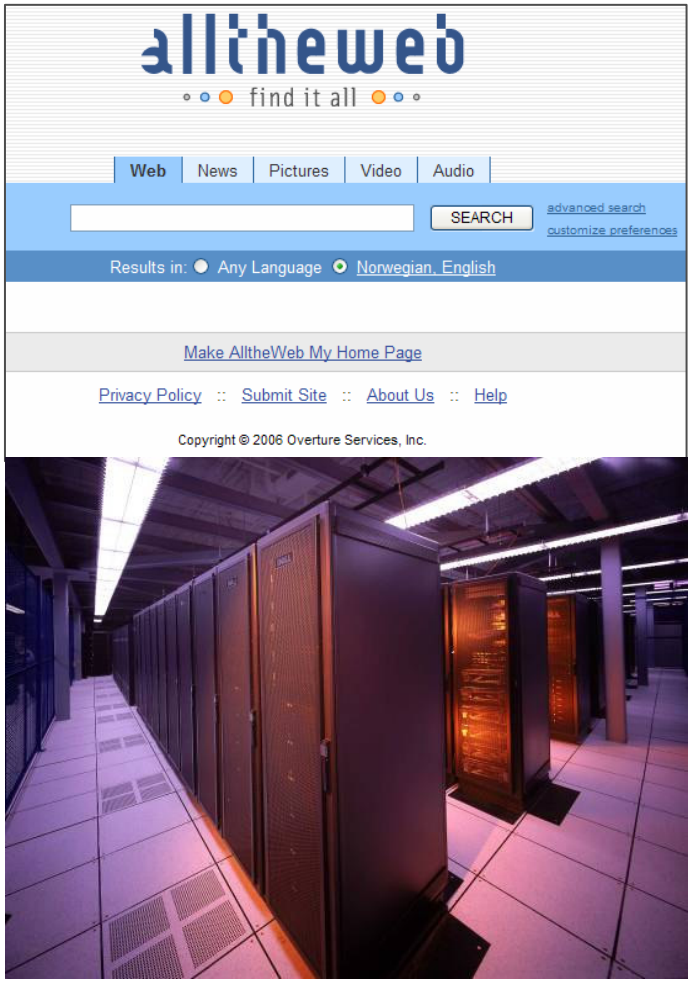
(2) Research Problems.

(3) The iAD project.

(1) Enterprise Search

– We used to provide an Internet search service:
  - More than x0M QPD.
  - Average: below 300ms.
  - 10+G index.

– From hosted service to enterprise *software*.



Applicability

- Search as interface to enterprise data:
  - Internal search service.
  - External search service.
  - Real-time filtering mechanism.
  - Database replacement.
  - Federation of multiple data sources.
  - Layer between data (stores) and analysis applications.

Beyond Search

- Enterprise search is beyond document retrieval.
- Embedded in a lot of business-critical applications:
  - Business intelligence.
  - e-commerce.
  - Surveillance and security.
  - Fraud detection.
  - Quality management.
  - …….

Example: Rakuten

“eBay of Japan”

楽天 RAKUTEN ICHIBA

Handling Extreme Query Volumes While Keeping the Catalog Up-to-date

- ✓ Handling 500 updates per second.
- ✓ Extreme performance requirements with 2,000 QPS during normal traffic, peak level of 3,000 QPS in real-time scenario.
- ✓ Generates $12M of transactions per day through search.

fast

Example: Comcast

The leading broadband provider of cable TV, Internet, and VoIP in the U.S.

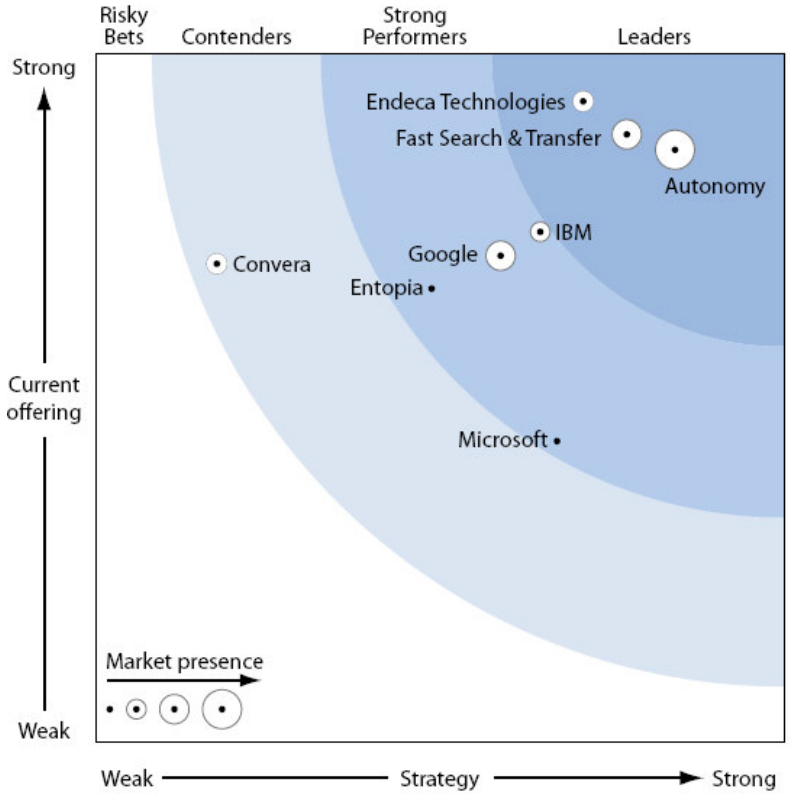
Providing information to more than 27 million customers

- ✓ The sixth busiest search engine on the Internet.
- ✓ Traffic is more than 3 million queries per day.
- ✓ Indexing 14 million Yellow Page records.
- ✓ Federating entertainment content of popular TV shows.

Many Industrial Players

FORRESTER

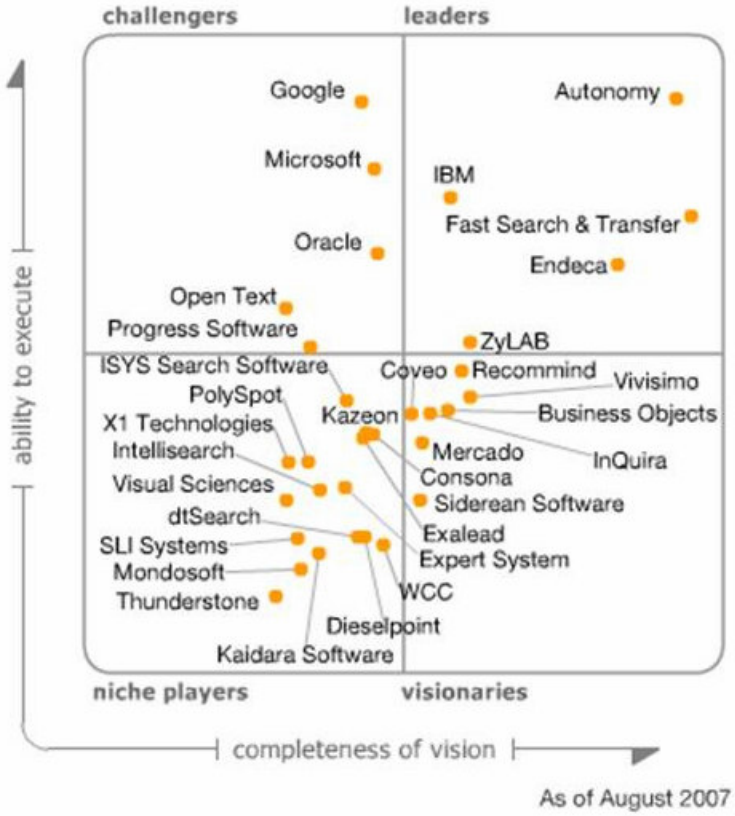
Forrester Wave™: Enterprise Search Platforms, Q2 '06



Source: Forrester Research Inc.

Gartner

Magic Quadrant for Information Access Technology, 2007



As of August 2007

Source: Gartner (August 2007)

Disclaimer:
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(2) (Some) Research Problems

- Scale and performance (in-house service).
- Data freshness and *time consistency* (time to market vital).
- Extreme precision (frequent changes, context).
- Data evolution (track temporal or spatial changes).
- Trends (zipf behaviour, related trends, group conformity).
- New data formats and types (semantic and automatic annotation).
- Security (user integrity and privacy).
- Mediation (deduce conclusions, syndication and aggregation).
- Proactivity and recommendation (push web).
- Autonomic computing (initial assembly, dynamic adaption).

(3) iAD - information Access Disruptions

– Norwegian cluster of academics and companies focussing on search:
  - NTNU (Trondheim) and University of Tromsø.
  - Fast Search & Transfer.
  - Yahoo.
  - Google.
  - Sesam (Schibsted).
  - ……

Innovation Key

– Innovation and research key to existence.

– Applied for Norwegian Centre of Excellence status with FAST as host

→ Large-scale Norwegian Research Centre for *information access*.

Who is FAST?

Key Facts

Founded in 1997.

Headquarters: Oslo & Boston.

Employees: 730.

Revenues 2006: USD 162M.

INFORMATION ACCESS DISRUPTIONS

http://www.iad-centre.no

sfi Centre for Research-based Innovation

Established by the Research Council of Norway

iAD – Goals

- Core research for next generation precision, analytics and scale in information access.
- Build international networks to identify and execute on global disruption opportunities.
- Educate 25 PhDs.
- **Timeline:** Jan 2007, duration: up to 8 years.
- **Budget:** €30m.

iAD – partners

iAD mobilizes…

Partner network

- FAST (host institution).
- Accenture as global partner to define next generation information management solutions.
- Schibsted to validate iAD results.

Customer experience

- Access to customer requirements of global Fortune 500 companies.
- Collaborative live laboratories.

Academic network

- Cornell University.
- AIC Dublin (DCU, UCD).
- Norwegian universities:
  - NTNU Trondheim.
  - U Tromsø.
  - U Oslo.
- Norwegian School of Management.

iAD: Customer Requirements

…and many more FAST customers.

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iAD – Sub Projects

Service

Technology

Collaboration

Schema agnostic indexing services (NTNU)

- Schema-agnostic end2end design.
- Consolidation of query model.

Processing high-speed data streams (Cornell)

- Capturing & extracting knowledge from data streams.
- Pervasive sensor networks, RFID readers, multimedia feeds, …

Scalable infrastructure for push and pull based computing (U Tromsø)

- Robust principles and services for next generation infrastructure for distributed information access.

Extreme precision and recommendation in multimedia access (Dublin)

- Extreme precision solutions for access to multimedia content.
- Social networks with recommender functions.

Understanding and managing the disruptive potential of iAD (Norw. School of Management)

- Analyze business and societal impact.
- Assess disruptive potential.

INFORMATION ACCESS DISRUPTIONS

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Summary

- Enterprise search is becoming a critical factor within the IT infrastructure of modern enterprises.
- Extremely complex software with hard research problems:
  - Performance and scaling requirements.
  - Security requirements.
  - Fault-tolerance requirements.
  - Deployment and maintenance requirements.
- Search is killer application with high impact on society:
  → *Economic, ethical, social, cultural, and political*.

Thank you – questions?