Getting Started With Enterprise Search using Apache Solr

Why Solr and Enterprise Search?

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Why Watch This Course?

- **To learn how to implement search using Solr**
- **Search is an incredibly useful feature**
  - People take it for granted
  - Unless missing or poorly implemented

- **While there is a lot information about search engines & Solr**
  - IMHO not simple enough to get people started and scattered
  - Although Solr's Wiki is very complete
- **And the commercial search engines can be hugely expensive**
  - Solr #1 choice (again IMHO and a few thousand more…)
- **And I have a promise for you…**

I promise…

That in the next couple of hours I will teach you to build things that might take you weeks to learn on your own and we will create together a search experience that could cost thousands of dollars to build

- *Not bad for something that comes as part of a Pluralsight subscription, right?*
- *Albeit not a fully advanced and complete app, a great start!*

What to Expect: Full Training Agenda

- M1: Why Solr and Enterprise Search?
- M2: Architecture of an Enterprise Search Application
- M3: Solr Configuration
- M4: Content: Schemas, Solrconfig and Indexing
- M5: Searching & Relevance
- M6: Making it all Work: Put a UI on it!
- M7: Takeaway

Ready to Watch and Learn Solr?

Who's with me?

Who's NOT with me

Agenda

Why (Enterprise) Search	Why Solr? Famous Sites	Other Search Engines
History of Search	Functions of a Search Engine	Features & Scalability

Why Solr and Enterprise Search?

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Why (Enterprise) Search?

Definition

- **search (sûrch)*v.* searched, search·ing, search·es, searcha·ble *adj.*, searcher *n.***
  - *v.tr.***1.** To make a thorough examination of; look over carefully in order to find something;
  - **2.** To make a careful examination or investigation of; probe:
  - *v.intr.*To conduct a thorough investigation; seek:

enterprise search

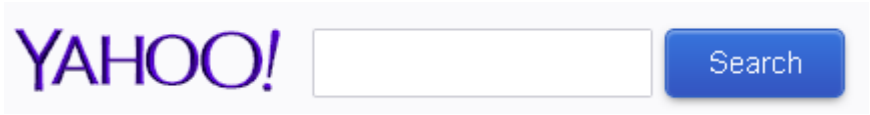
> **“practice of generating content and making it searchable to a defined audience out of multiple enterprise-type data sources like databases or CMS”**

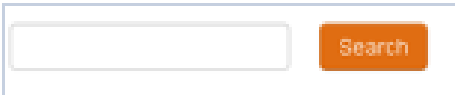
Why (Enterprise) Search?

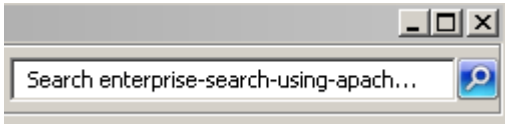
- **People *need to find* things (and fast)**
- **People *expect* to find things**
- **People crave *simplicity***

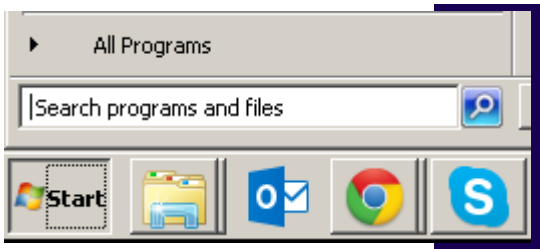
- **Internet search has an interesting side effect**
  - Expect search “Everywhere!”
  - Billions of people trained in search
  - And BOY are we ready to use it!
    - ~5,922,000,000 daily searches in 2013
- **Where else do we see search applications?**

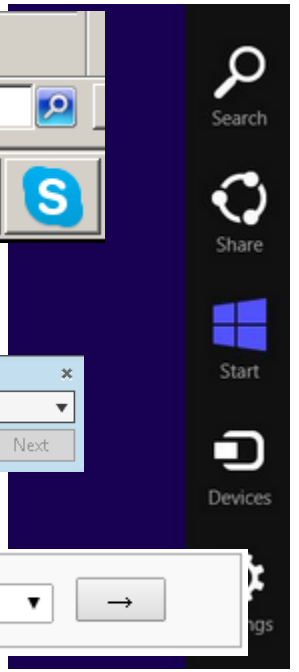
Search is Everywhere!



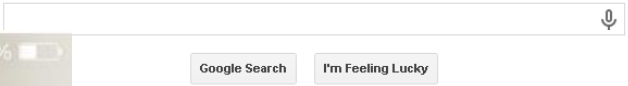


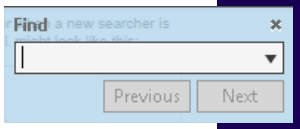


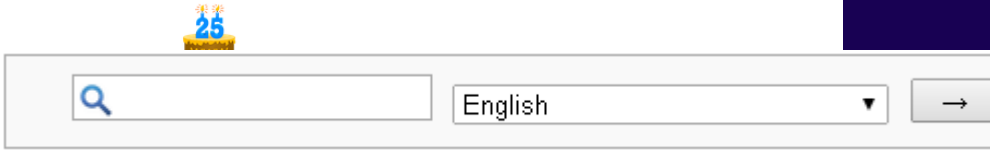




Google







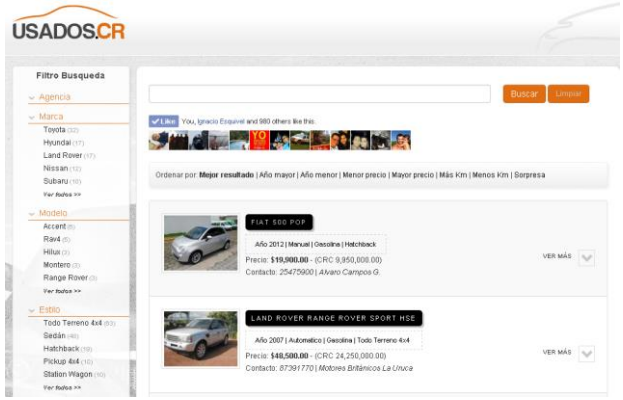
Why (Enterprise) Search?

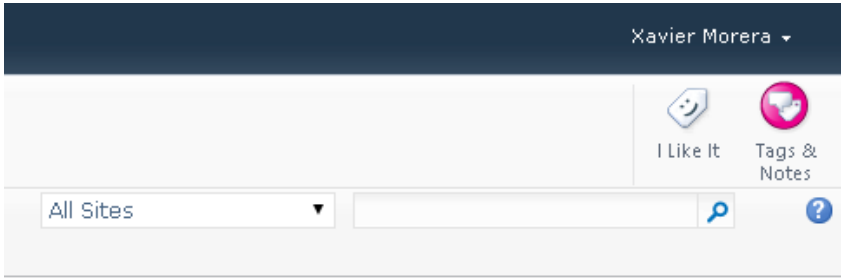
Search makes your life easy

- Personal Search (desktop, cell phone, tablet, tv, …)
- Enterprise Search: Extranet & Intranet
- Retailers: B2C & B2B
- eDiscovery/Compliance
- Recruiting
- Intelligence Analysis

Why (Enterprise) Search

- Two types: outside and inside the firewall
- Outside → Make money!
- Inside → Save money!





Why Solr and Enterprise Search?

Why (Enterprise) Search	Why Solr? Famous Sites	Other Search Engines
History of Search	Functions of a Search Engine	Features & Scalability

Why Solr?

- **Search used to be**
  - Not for the faint of heart
  - With a thin wallet
- **Solr changed it all**
  - Open source
  - Fast and sophisticated text search
  - Highly extensible
  - Highly scalable
  - Dynamic content
  - Great query speed (properly scaled)
  - Many more…

Why Solr?

"Solr has an active development community, both individuals and companies, who contribute new features and bug fixes"

Search Engines

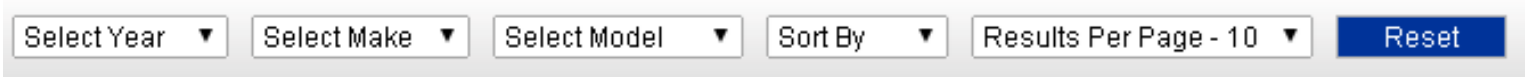
- **Search engines are a totally different animal**
- **You will fall in love with what you can do with them**
- **Or absolutely hate it if tackled head on without proper resources**
- **Efficient and fast because it searches an inverted index**
  - Instead of searching through the text

or

“I have Full Text Search in my SQL Server!”

- **Yeah right…**
- **Check this link**
  - http://wiki.apache.org/solr/WhyUseSolr
  - Or Google “why use solr site:apache.org”
  - Solr vs. Relational Database

(Solr) vs. (Relational Database)



Hint: simplicity is the ultimate sophistication

Public Solr Sites

Netflix
Yellow Pages
Usados.cr
GPO
Sears
Whitehouse.gov
Instagram
Zappos
Comcast

eHarmony
Jobreez
Immonet
Chegg
The Guardian
FCC.gov
Comcast / xfinity
Jobuzu
Openindex

Buy.com
AOL Music
AOL NFL Sports
AOL Recipes
AOL Real Estate
AOL Autos
AOL Travel
AOL StyleList
News.com

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Other Search Engines

SharePoint

fast

Autonomy

ATTIVIO

SINEQUA

LucidWorks

amazon CloudSearch

ENDECA BY ORACLE

Rocket Folio/NXT

exalead

MarkLogic

cloudera

Content Analyst
Find | Organize | Discover

Vivísimo

HERITRIX

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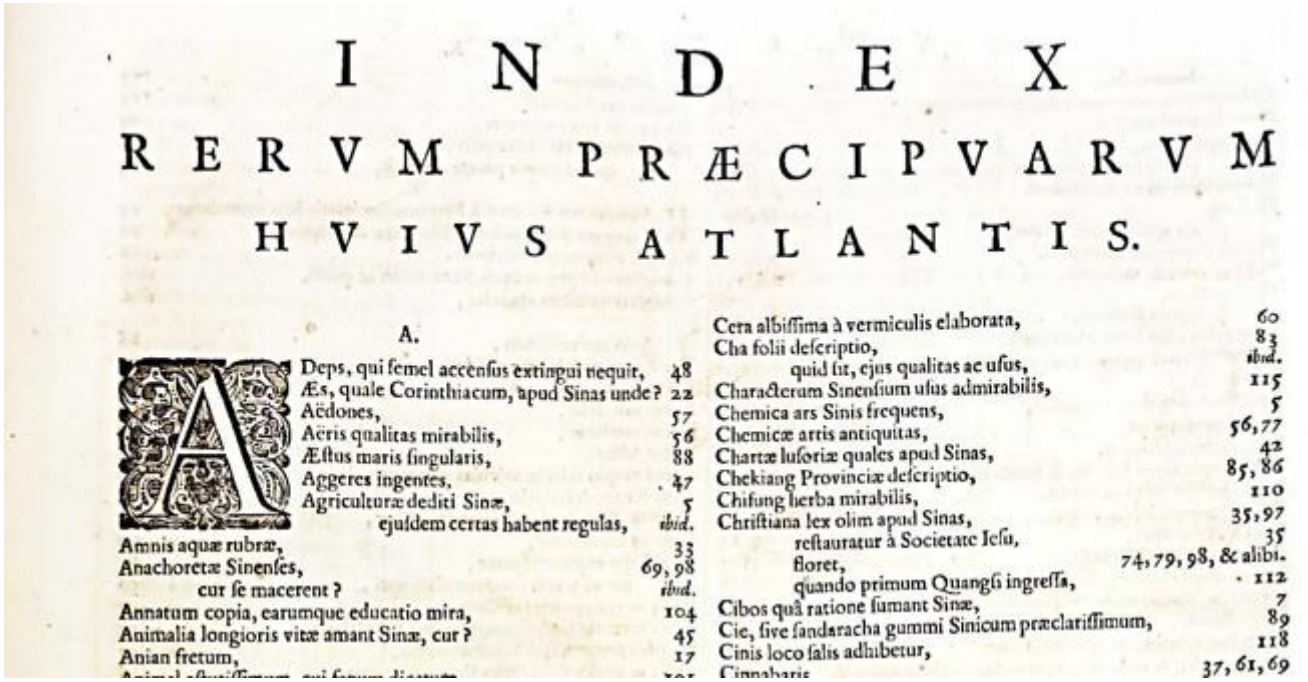
History of Search

- **Indexing has been around for quite a long time**
  - As early as 1500's



INDEX
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A.

A Brief History of Search - Vision

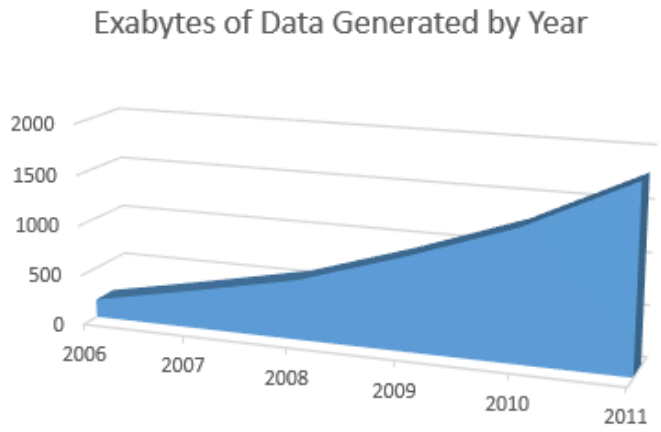
- **Long before the internet existed (1945)**
  - Vannevar Bush head of the U.S. Office of Scientific Research and Development (OSRD) during World War II said:
    - "The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships".
    - "Our ineptitude in getting at the record is largely caused by the artificiality of the systems of indexing it"

A Brief History of Search – Achieving the Vision

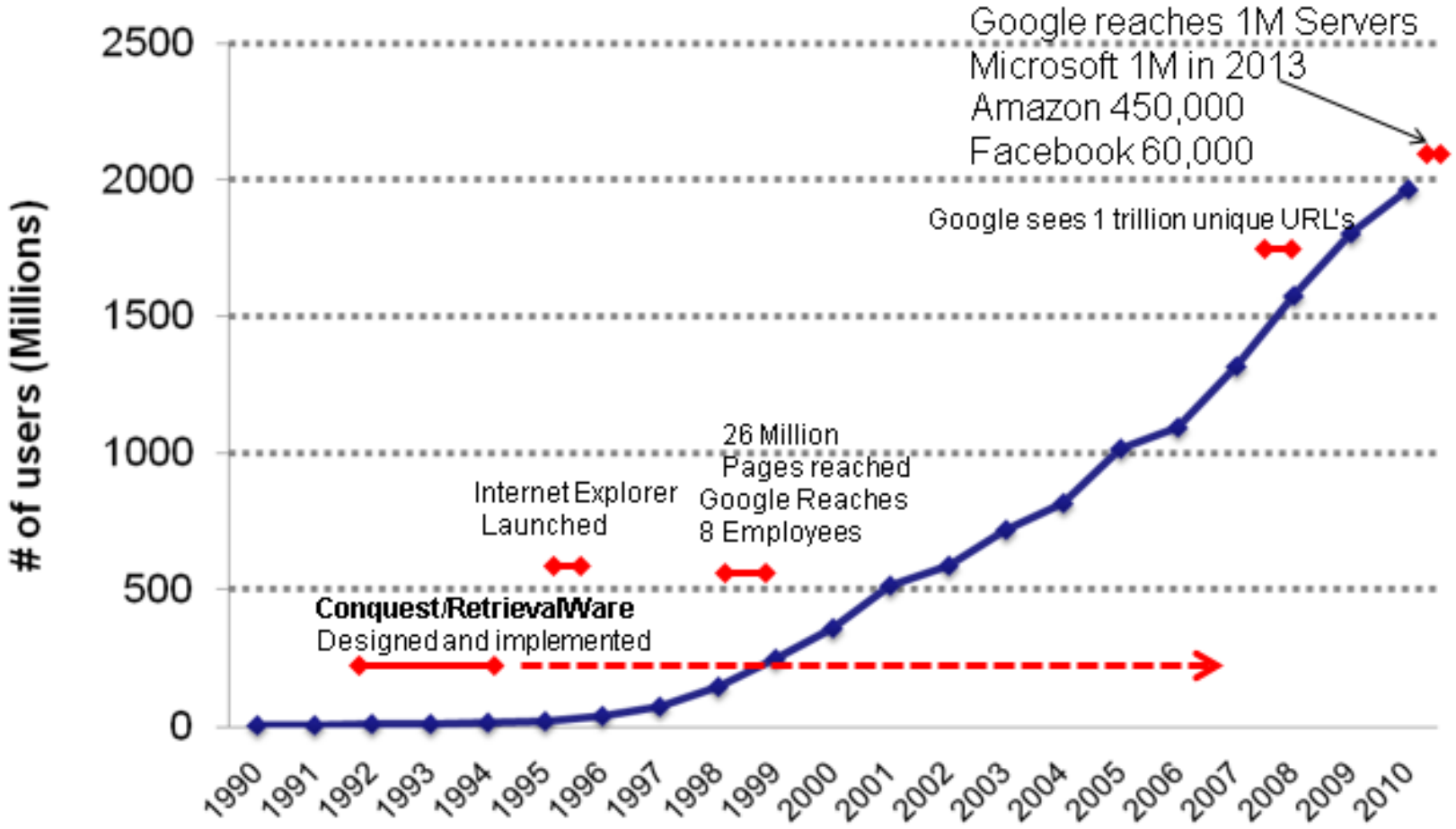
- **First 'modern' indexer of text**
  - Professor Gerard Salton (Harvard / Cornell)
  - *Automatic Information Organization and Retrieval*, (1968)
  - System for the Mechanical Analysis and Retrieval of Text
    - Invented Vector Space Model
      - A way of indexing, finding similar content
    - Invented TF/IDF
      - Relevance ranking
  - A Theory of Indexing (1975)

Proliferation of Data – Can We Keep Up?

- **Google's Eric Schmidt**
  - Between the Dawn of Civilization and late 2003.
    - 5 Exabytes of data created globally (5 Million Tb)
  - In 2010 we were generating
    - 5 Exabytes every two days!
- **IDC**
  - Global Data (2020) will likely exceed
    - 35 Zettabytes
    - 3,500 Exabytes
    - 35 Billion Terabytes



Proliferation of Data and Millions of Users!



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Functions of a Search Engine

- Indexing: Organise “all” content for quick access
- Query Parsing : Understand what the user is looking for
- Search & Browse: Quickly find the information of interest
- Security: Filter out documents the user is not allowed to see
- Relevance Ranking: Order the information in useful ways

Search Engine… Be Helpful!

- Be Helpful: Show Snippets of info on hits, i.e. highlighting
- Be Helpful: Offer Query Suggestions
- Be Helpful: Offer Spelling Corrections
- Be Helpful: Offer refinement options to delve further, i.e. facets
- Be Helpful: Never suggest ‘dead ends’

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Solr Features

- Advanced Full-Text Search Capabilities
- Optimized for High Volume Web Traffic
- Standards Based Open Interfaces - XML, JSON and HTTP
- Comprehensive HTML Administration Interfaces
- Server statistics exposed over JMX for monitoring
- Near Real-time indexing
- Flexible and Adaptable with XML configuration

Solr Features

- Extensible Plugin Architecture
- A Real Data Schema, with Numeric Types, Dynamic Fields, Unique Keys
- Faceted Search and Filtering
- Highly Configurable and User Extensible Caching
- Performance Optimizations
- Multiple search indices
- And more…

Scalability via SolrCloud

- Linearly scalable, auto index replication, auto failover and recovery with no single point of failure
- Centralized Apache ZooKeeper based configuration
- Automated distributed indexing/sharding

- Near Real-Time indexing with immediate push-based replication (also support for slower pull-based replication)
- Transaction log ensures no updates are lost even if the documents are not yet indexed to disk
- Automated query failover, index leader election and recovery in case of failure

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Takeaway: We Learned…

- Why Enterprise Search is important
- Why Solr
- Solr is not the only choice, but IMHO (and many) the best
- About the History of Search
- The functions of a Search Engine
- The features of a Search Engine
- And that scaling is done via SolrCloud, which uses Zookeper