Intranet Search With Nutch

Doug Cutting
<doug@nutch.org>

Lucene is...

- A mature Apache open-source project;
- Java library for text indexing and search;
  - Not an application;
- A large community of contributors;
- The search technology behind a lot of web sites & applications.
- http://jakarta.apache.org/lucene/
- A book out this summer!

Nutch is...

- A young open-source project;
- Web search application software;
- A few part-time paid developers;
- A growing number of contributors;
  - paid and un-paid.
- Behind a growing number of sites.

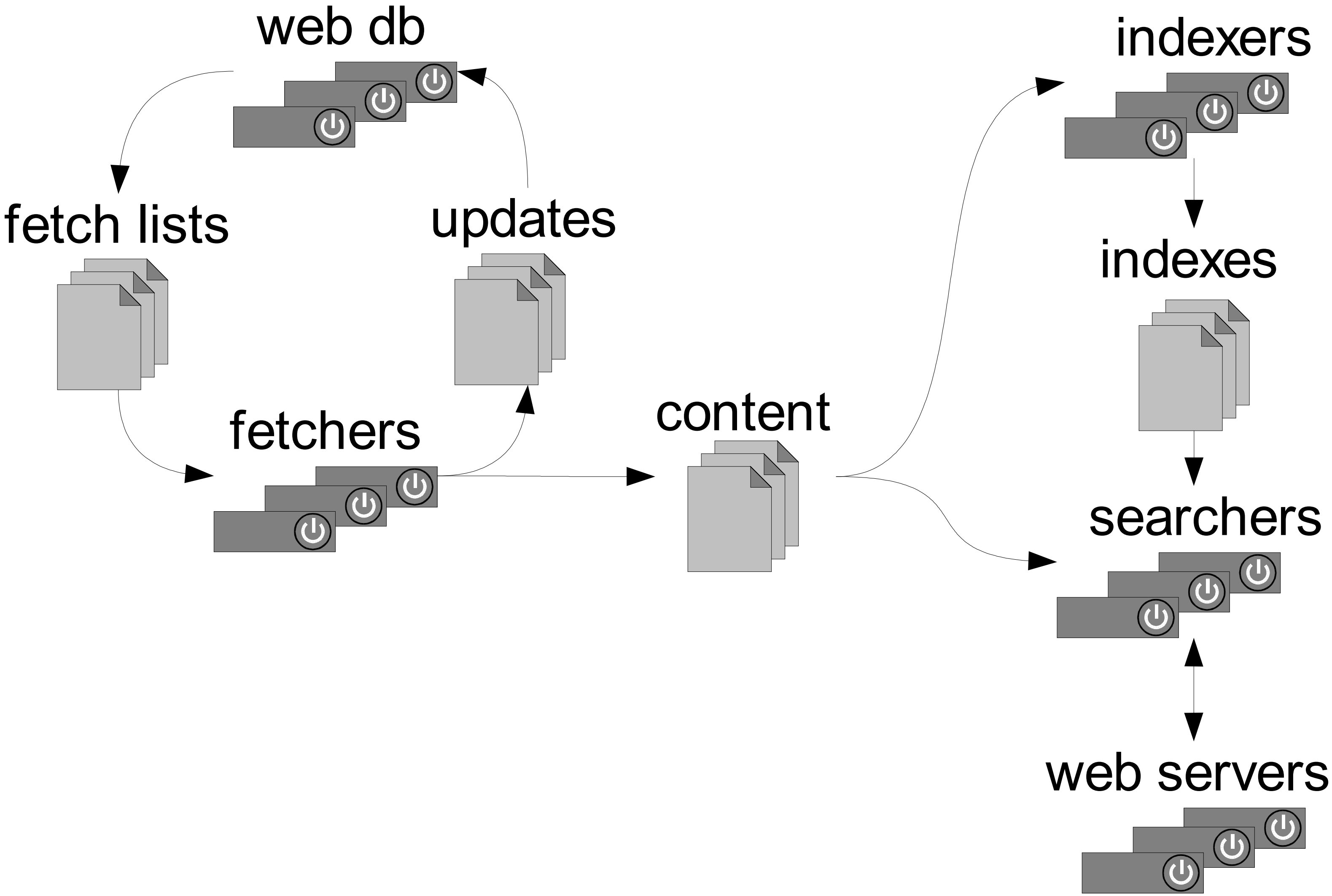
Nutch isn't...

- A business;
  - But is a non-profit legal entity to own copyright;
  - No employees.
- A search site;
  - But want to power lots of search sites;
  - From domain-specific, to whole-web.
- A research project.
  - But want to be platform for research.

Nutch Design Goals

- Scale to entire web
  - pages on millions of different servers
  - billions of pages
  - complete crawl takes weeks
  - very noisy
- Support high traffic
  - thousands of searches per second
- State-of-the-art search quality

Nutch Architecture



Web Database

- Page Database
  - Used for fetch scheduling.
- Link Database
  - Represents full link graph.
  - Stores anchor text associated with each link.
  - Used for:
    - Link analysis;
    - Anchor text indexing.

Scalability

- To meet scalability goals:
  - multiple simultaneous fetches
    (100+ pages/second / CPU, ~10M / day)
  - parallel, distributed db update
    (100M pages @ 100 pages/second / CPU)
  - distributed search
    (2-20M pages, 1-40 searches/second / CPU)

But intranets are different!
Part 1: Scale

- Fetch, DB & search can all run on one box.
- Complete crawl takes only hours.
- Handful of servers on LAN—easy to overload!
- Lessons:
  - need to throttle fetcher
  - need much simple operation—single command
  - can crawl deeper

But intranets are different! Part 2: Control

- cleaner content
- knowledge about structure of sites (cgi's, etc)
- lessons:
  - can index more dynamic content (cgi's, etc.)
  - can customize crawler better to site

But intranets are different! Part 3: Quality

- only ~1M pages
- lesson:
  - not great for link analysis
  - but plenty for anchor text

Intranet How To
Step 1: Install

- Nutch requires only Java & JSP.
- Download & unpack.
- No admin GUI (yet)
  - command line
  - config files

Intranet How To
Step 2: Configure

- Specify root URLs.
- Specify URL filters.
  - a separate config file, containing regexps
  - each either includes or excludes URLs
  - first matching pattern determines fate of each URL
- Optionally, add a config file specifying:
  - delay between fetches
  - num fetcher threads
  - levels to crawl

URL Filter Example

```
# skip image and other suffixes
-\.(gif|jpg|pdf|doc|sit|rtf|exe)$

# skip URLs w/ certain characters
-[?*!@=]

# accept hosts in nutch.org
+^http://([a-z0-9]*\.)*nutch.org/

# skip everything else
-.
```

Intranet How To
Step 3: Test Run

- Crawl just a few levels deep, ~5
- Examine output log for:
  - warnings
    - exclude some file types?
  - sites hit too hard (e.g., infinite sites)
    - exclude some hosts or paths
  - sites not hit?
    - add more root urls

Intranet How To
Step 4: Finish up

- customize the look and feel
  - by default, uses XSLT template
  - or can roll your own.
- perform a full crawl (depth = ~10)
- tell folks about it!

Advantages

- Free!
- Scalability & quality.
- Open source easier to:
  - Customize
    - e.g., file formats, ranking, operators, fields
  - Debug
    - You've got the full source!
  - Extend
    - Non-HTTP content, etc.

Demonstrations

- http://labs.yahoo.com/demo/nutch/
- http://www.mozdex.com/search.html
- http://www.objectssearch.com/en/search.html
- http://devjr.cws.oregonstate.edu:8080/
- http://www.nutch.org/