TweetRank

TweetRank is an attempt to apply the PageRank algorithm on Twitter statuses (tweets).

It uses a different rank calculation which considers attributes such as number of replies/retweets and hash tags.

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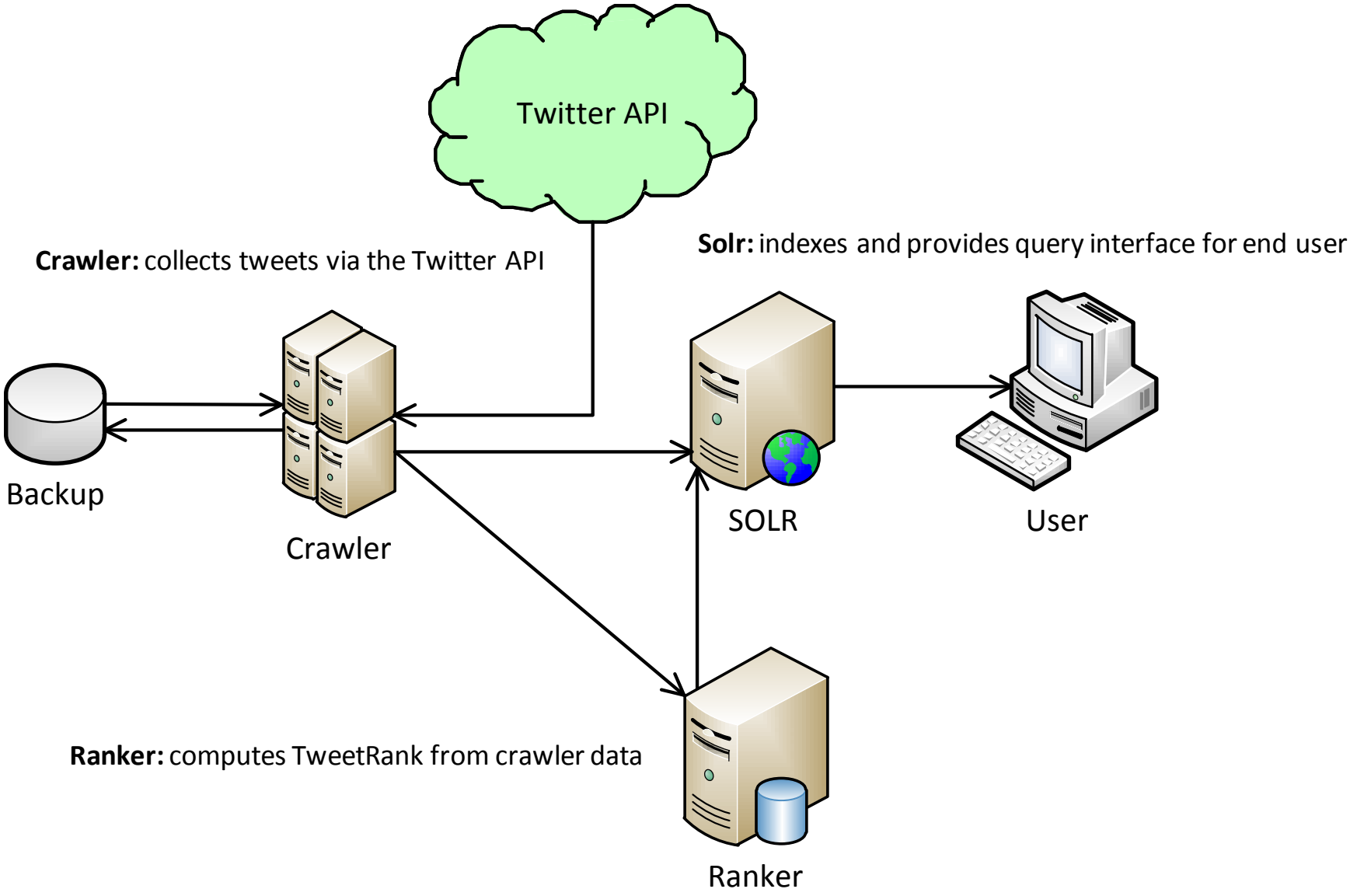
Components

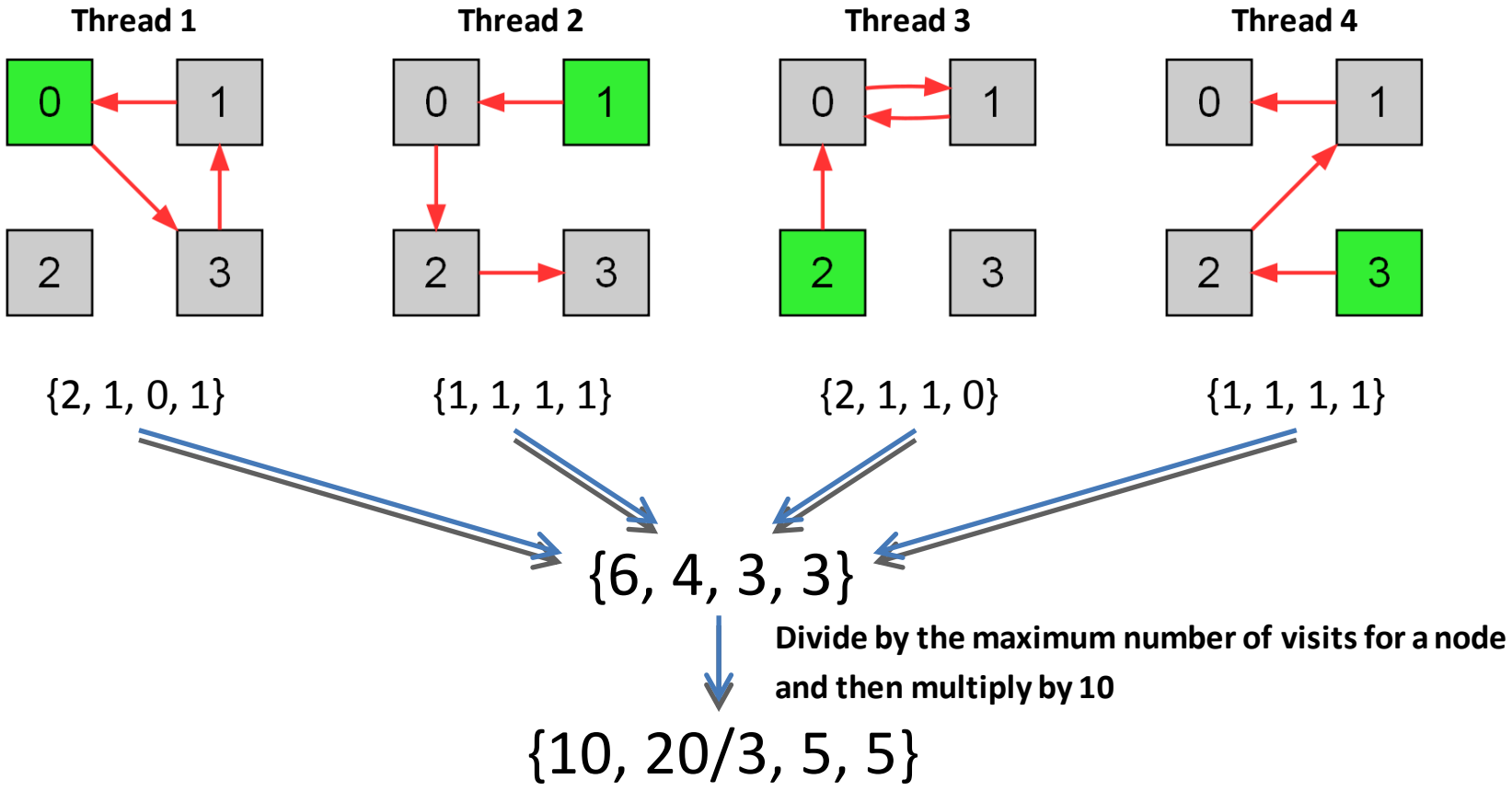

Twitter API
Crawler: collects tweets via the Twitter API
Solr: indexes and provides query interface for end user
Backup
Crawler
SOLR
User
Ranker: computes TweetRank from crawler data
Ranker

Crawler

- Uses the Twitter *HTTP REST* API
  - Twitter limits the number of queries to 150 per hour
  - Crawler gathers as much data as possible from each query
  - Use multiple proxies to bypass the query limit
  - Runs on multiple threads in multiple machines
- How does it work?
  1. Start with a queue of some users
  2. Pop the first user from the queue and query the Twitter API for tweets and friends for it
  3. Add friends and user mentions in each tweet to the user queue
  4. Send tweet data to Solr and the ranker
  5. Go to 2

Ranker

- Uses the complete path *Monte Carlo* algorithm, stopping at dangling nodes
- Starts a randomized walk from each node at least 100 times (at most total tweets / 100)
- Random path length - 20% chance at each node that the surfer stops
- Ranker runs on multiple threads, where each thread computes one walk at a time
- Final rank is calculated as the normalized sum of visits for each node from every walk:



Ranking algorithm (TODO)

Stochastic matrix built as a weighted sum of:

- Randomly accessing tweet j from tweet i.
- Accessing tweet j which is retweeted or replied by tweet i.
- Accessing author of tweet j mentioned by tweet i, and then accessing tweet j.
- Accessing author of tweet j followed by author of tweet i, and then accessing tweet j.
- Accessing a hashtag shared by tweet i and tweet j, and then accessing tweet j.

This matrix represents the total probability of accessing tweet j from tweet i.

TweetRank is the eigenvector of this stochastic matrix.

Solr / Lucene

- Handles indexing and searching.
- Crawler sends tweets to be indexed by Solr through *HTTP POST* requests (in XML format)
- Current TweetRank data is fetched from a text file on the server
  - Enables rank updates without having to replace (re-index) existing documents
  - Utilizes the *ExternalFileField* format in Solr
- Scores for individual statuses are calculated as a product of:
  - TweetTrank
  - *tf-idf* for terms, where matches against hash tags are boosted

(INSERT QUERY INTERFACE SCREENSHOT)

Results (TODO)