Data Curation at Scale: The Data Tamer System

Stonebraker et al., CIDR 2013

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15-799

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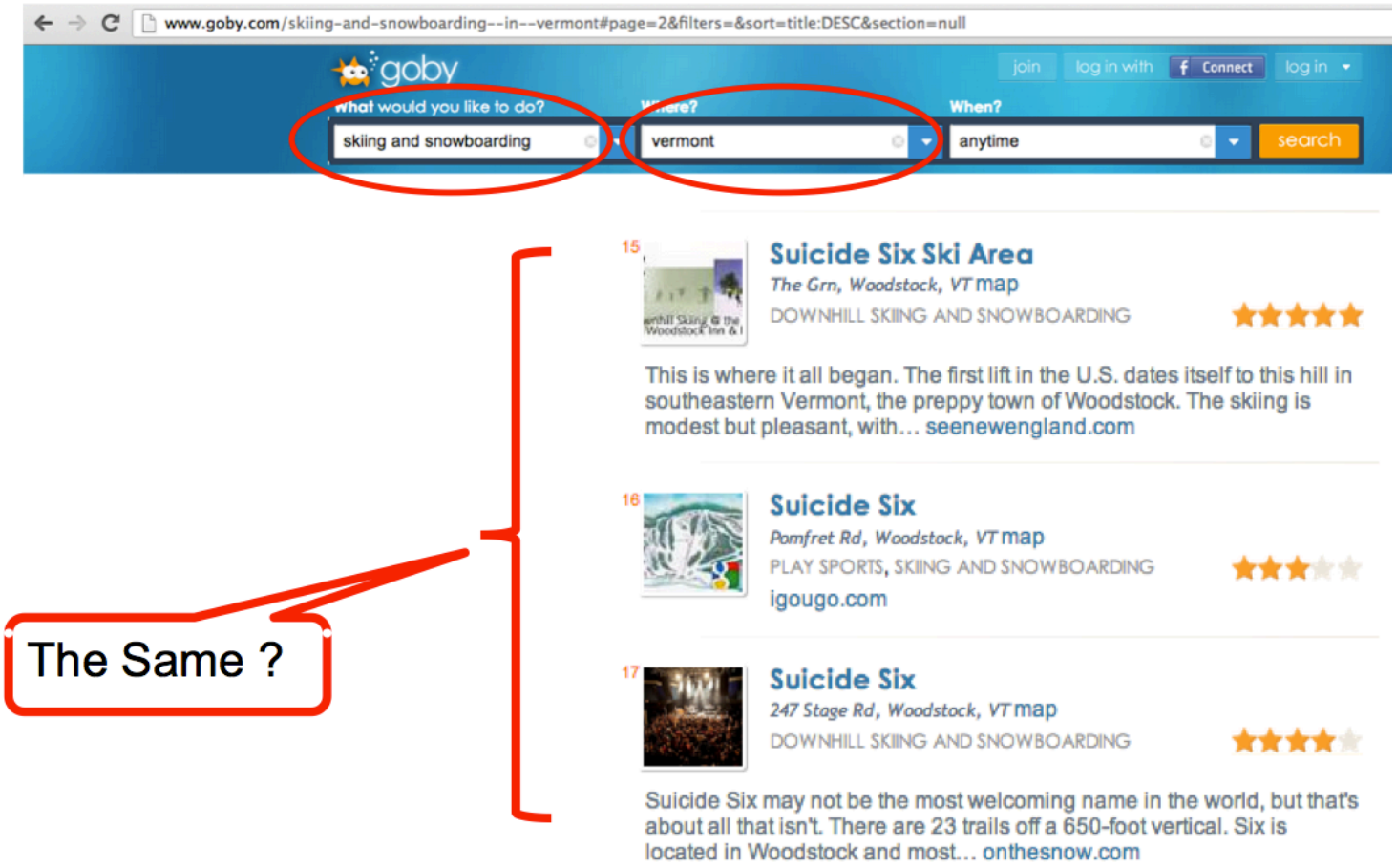
Data Curation

- Find/ingest a data source(s) of interest
- Clean
- Transform
- Deduplicate/consolidate

Example

- Web aggregator: 80,000 URLs



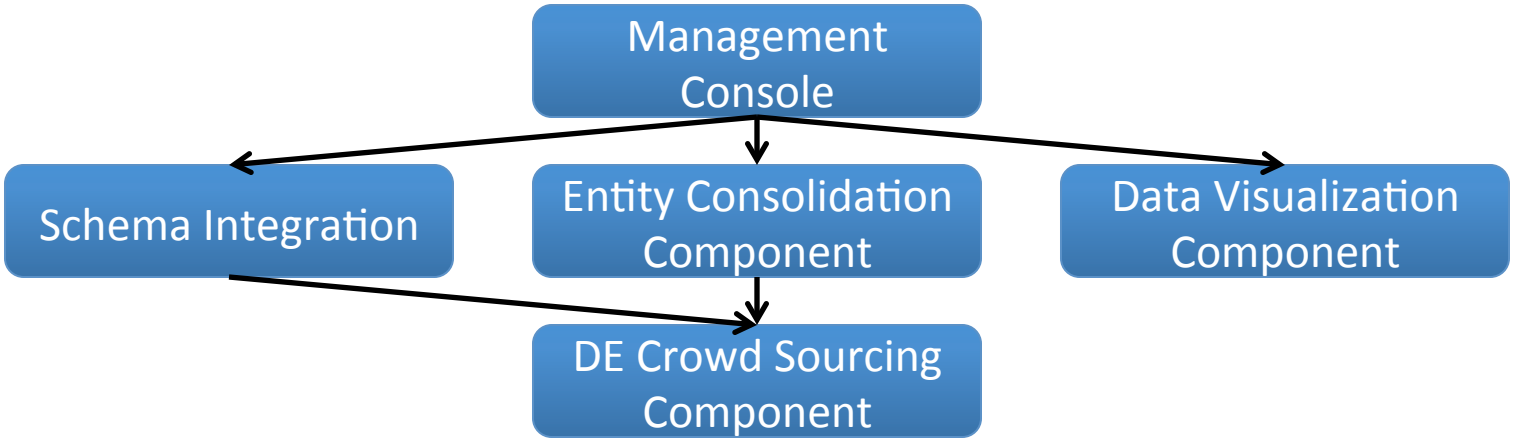
Courtesy: Prof. Stonebraker's slides

Motivation

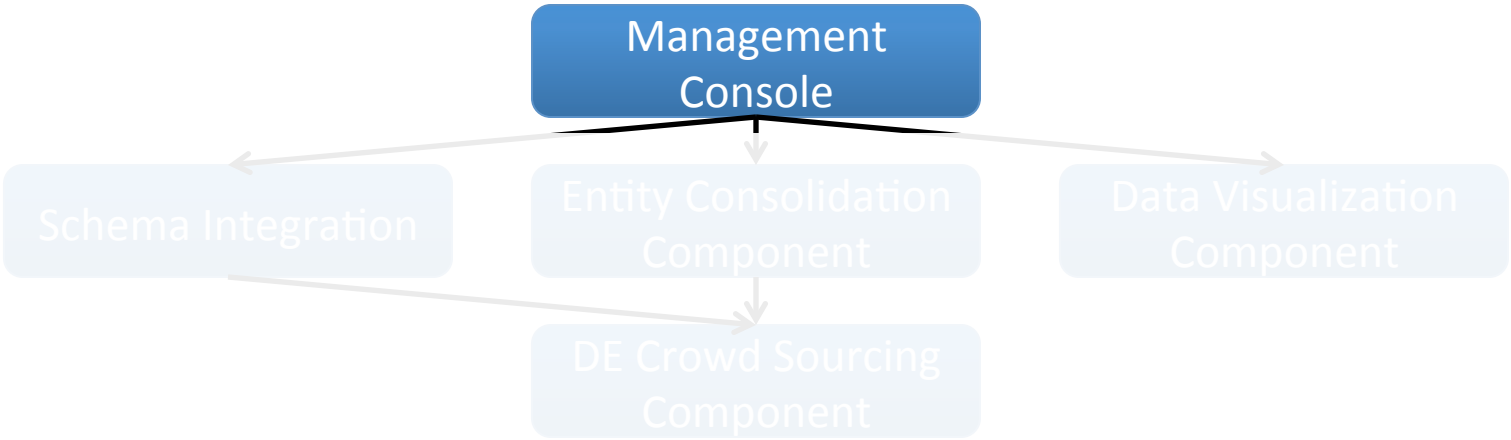
- Problem: Little work on an end-to-end system that collects all the curation components

- Proposal: *Data Tamer*
  - End-to-end curation system with machine learning and statistics to make automatic decisions
  - Transform, clean, **deduplicate** incoming data

Data Tamer

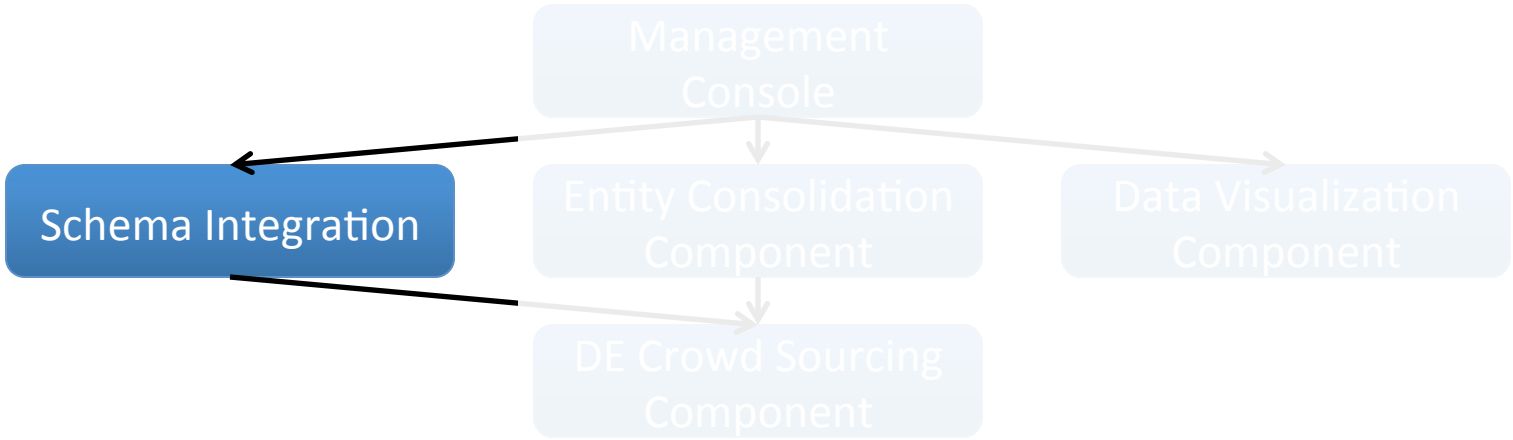

Management Console
Schema Integration
Entity Consolidation Component
Data Visualization Component
DE Crowd Sourcing Component

Data Tamer



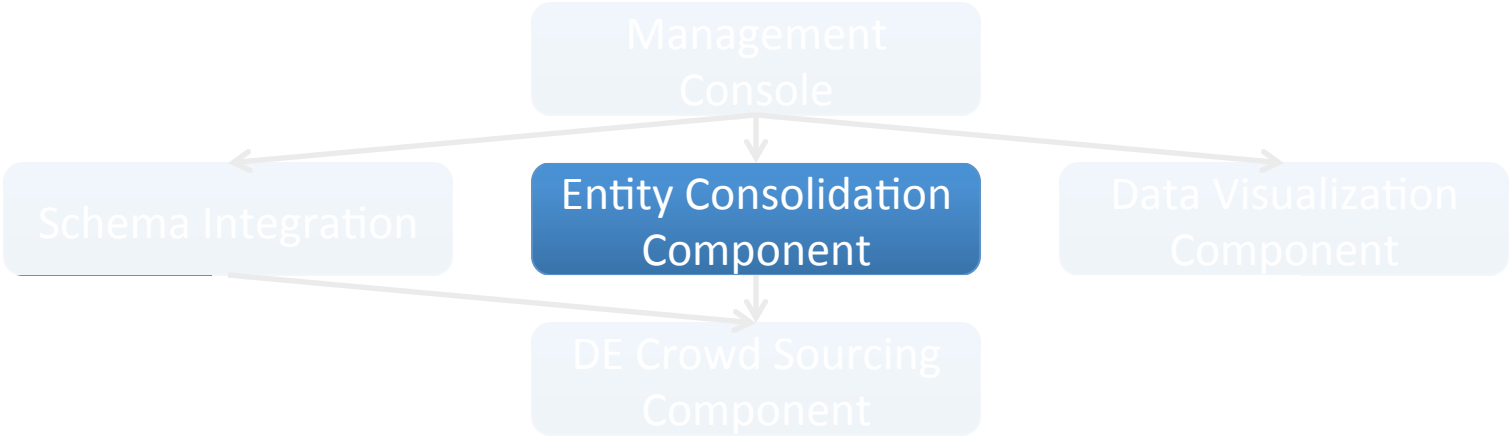
- GUI console for the DTA (Data Tamer administrator) to specify actions:
  - Ex: Sites or sources of data (e.g., URL)
  - Ex: Store incoming data into a Postgres database

Data Tamer



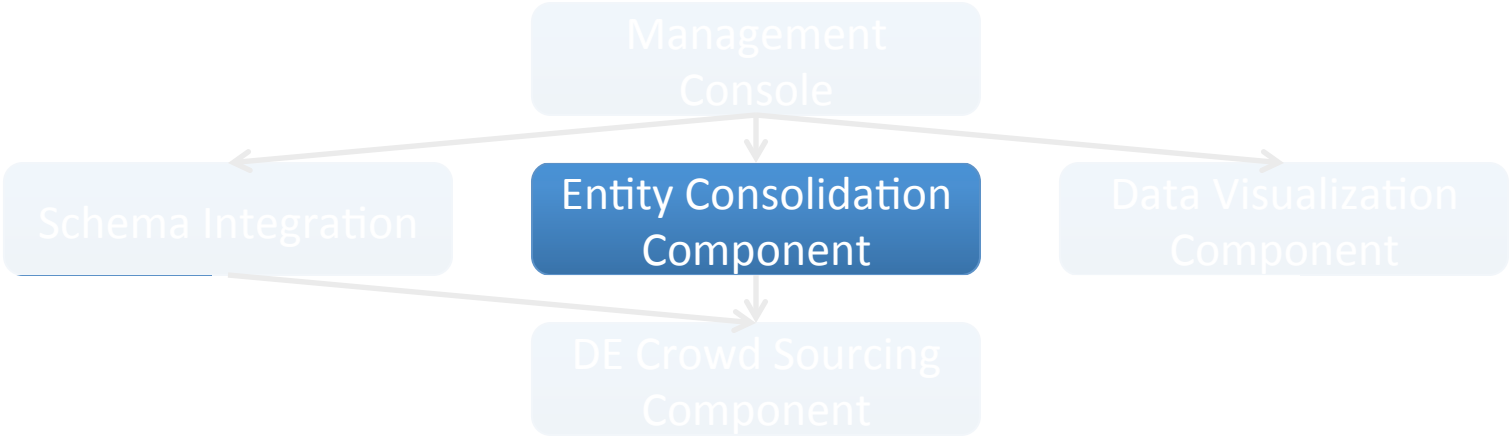
- Integrates data sources based on specified schemas (partial, complete, or nothing)
- Compares an attribute from a data source to a collection of other attributes
- Uses a **collection of algorithms** (experts)
  - Ex: Fuzzy string comparisons, Jaccard similarity, etc

Data Tamer

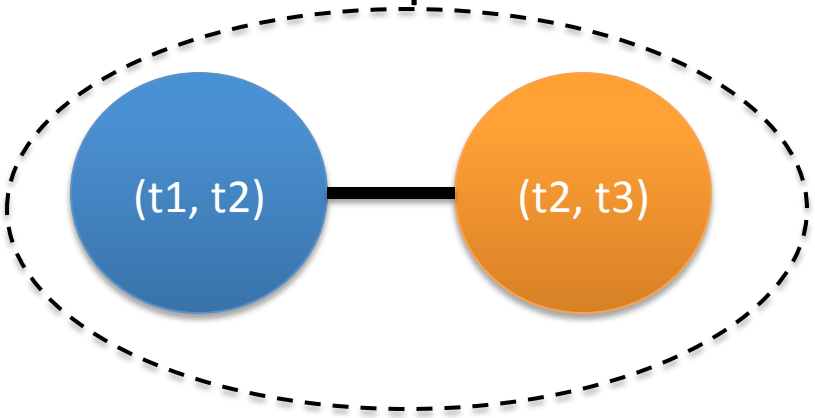


- Deduplication:
- 1. Obtains a training set of duplicates
- 2. Data categorization (k-means++)
  - Ex: western vs. eastern ski areas

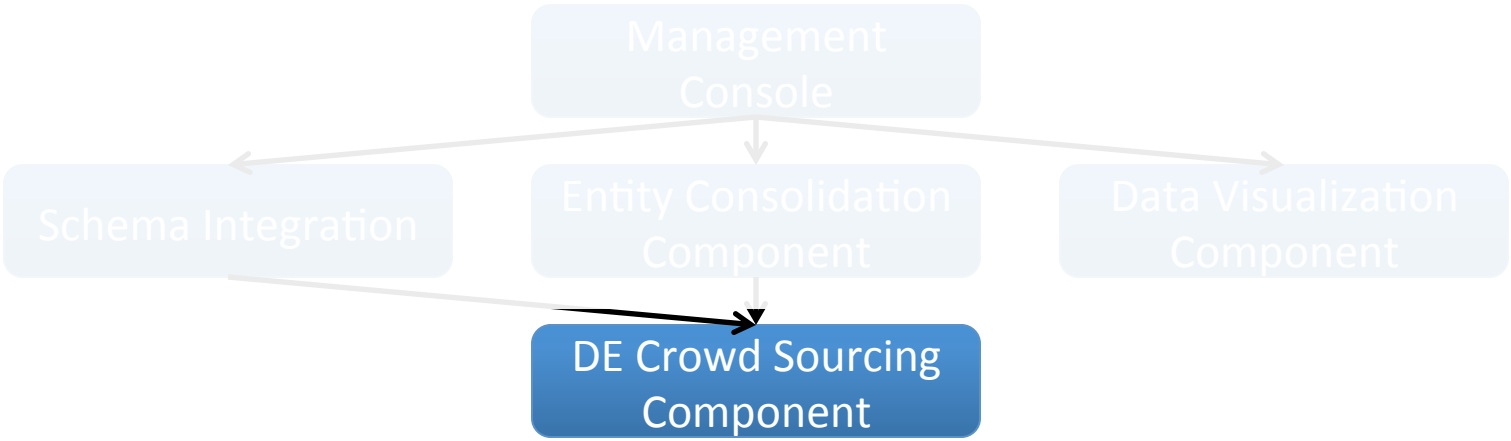
Data Tamer



- 3. Duplicate-tuple clustering
  - Ensures transitive deduplication results

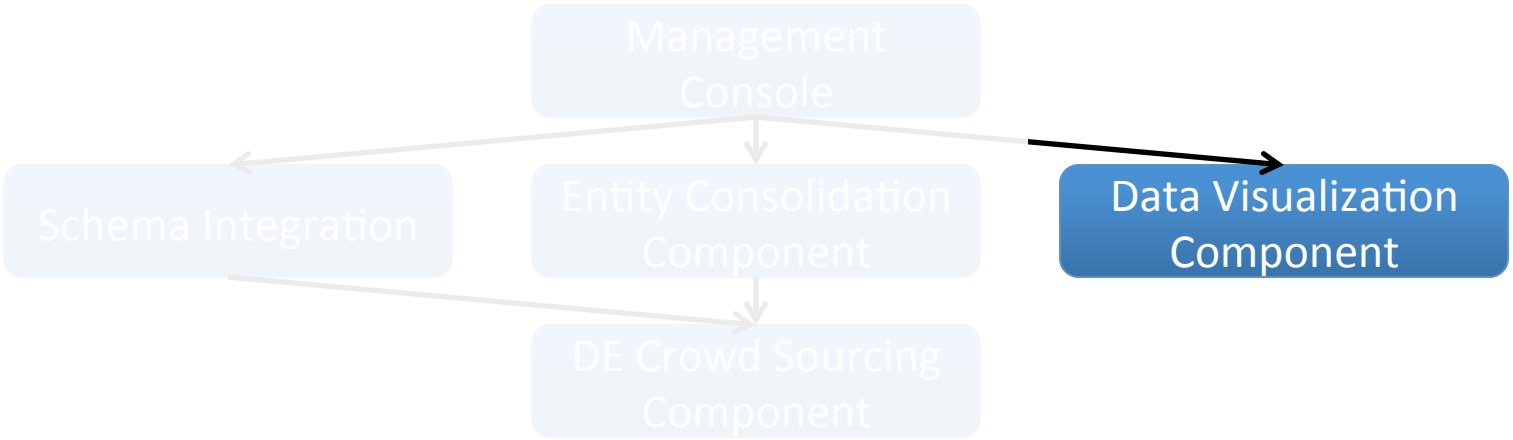


Data Tamer



- **Crowd sourcing mode** to increase confidence on the correctness of results
  - Asks DE (Domain Experts) for responses
  - Additional quality rating on their responses
  - *Economic incentive* to increase response rate

Data Tamer



- Displays data source

Evaluation

- Web aggregator data:

	Current	Data Tamer
Found duplicates	4%	98.9%
Precision	97%	100%