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Applying Text Mining Services to Facilitate Discovery and Linking of Wheat Scientific Information and Data

Agroknow

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The scope of this presentation is to demonstrate the process of applying text mining services to support discovery and inter-linking of wheat scientific information. This is supported by a set of useful endpoints that can be used for in this process

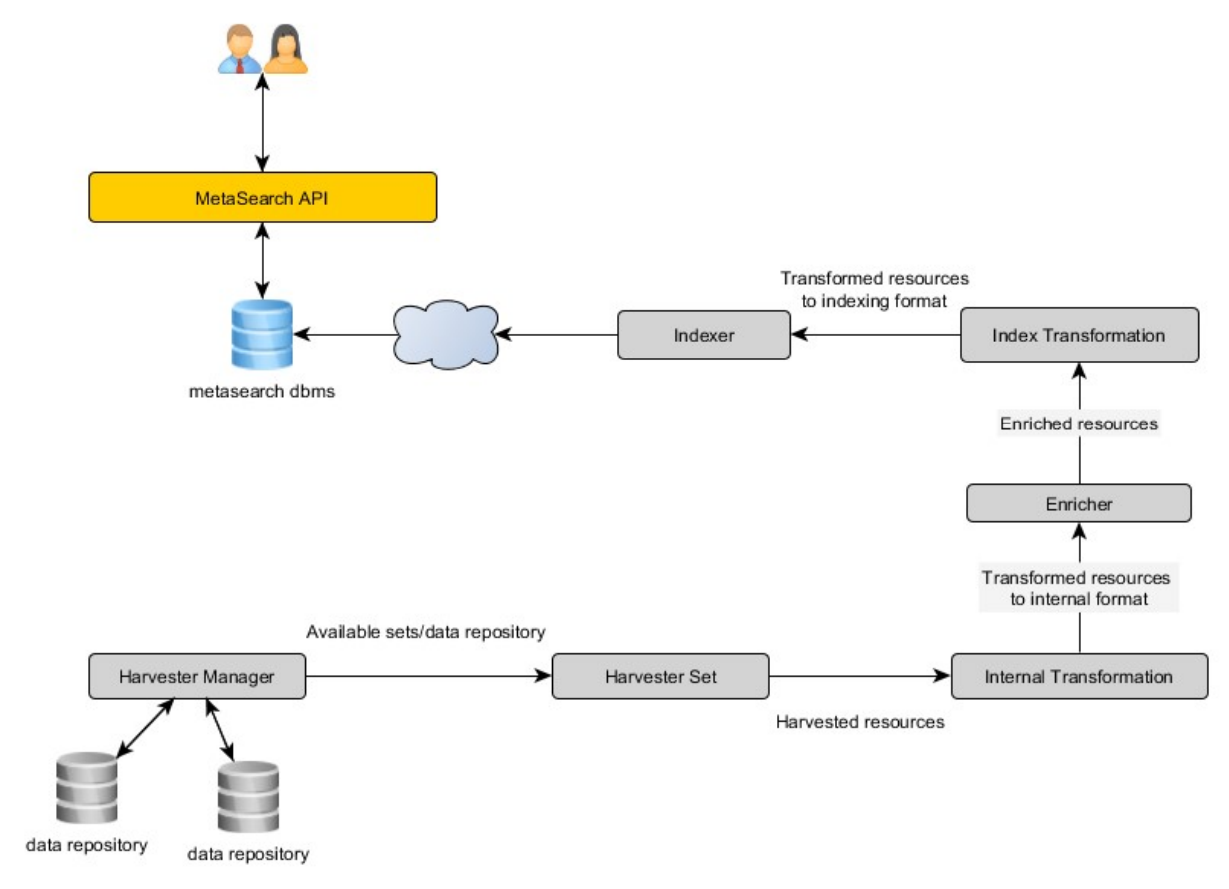
Specific Use Cases

- Let us consider a real-world problem.
- Consider an organization (perhaps yours?) having research information and data in different databases.
- How could we connect these data silos?
- Need to:
  - ✓ Define a workflow,
  - ✓ Design a data model,
  - ✓ Implement it!

Proposed Solution

- Develop a layer, running on top of the data silos:
  - ✓ Harvesting the data stored,
  - ✓ Aligning them in a uniform internal format,
  - ✓ Enriching/Interlinking them with external systems,
  - ✓ Indexing the enriched data,
  - ✓ Providing them back through a search api.

Proposed Solution – Complete Picture

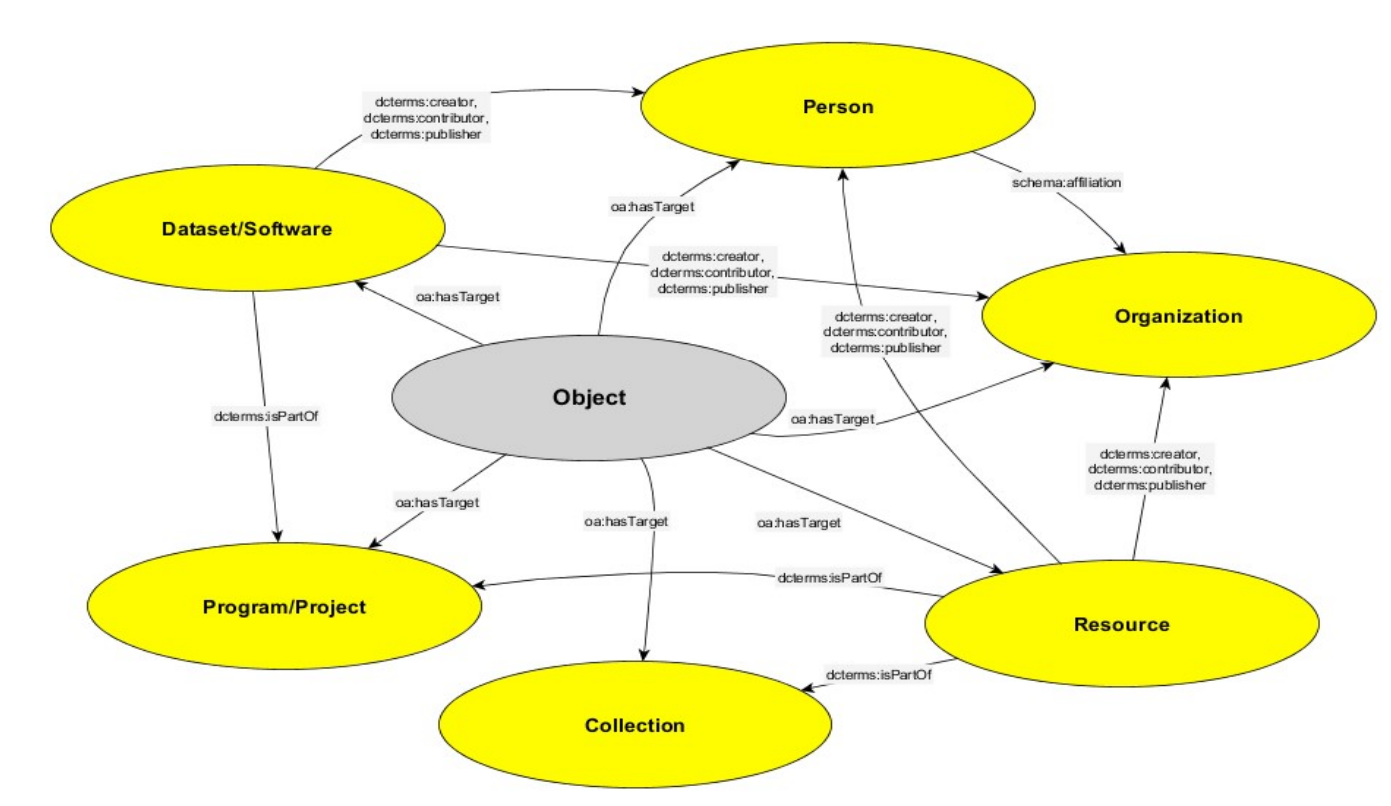


Need a data model to support our workflow

Data Model (1/2)

- Everything is an object.
- Each object has a specific type, with different properties.
- Of course everything is interlinked.
- Any new content type can be added on the second level with specific properties.

Data Model (2/2)



Enrichment Process

- **The process:**
  - ✓ use raw information stored in resources (title, abstract, author/publisher list, full-text etc.),
  - ✓ recognize entities using various endpoints,
  - ✓ interlinking them with both internal entities and external systems.

Enrichment Process – Initial State

The potential for wheat production in Africa: analysis of biophysical suitability and economic profitability

Title:	The potential for wheat production in Africa: analysis of biophysical suitability and economic profitability
Author:	Asfaw Negassa; Shiferaw, B.; Koo, J.; Sonder, K.; Smale, M.; Braun, H.J.; Gbegbelegbe, S.; Zhe Guo; Hodson, D.P.; Wood, S.; Payne, T.S.; Abeyo Bekele Geleta
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Program:	Genetic Resources Program; Socioeconomics Program; Global Wheat Program
Pages:	viii, 64 p.
Place:	Mexico, DF (Mexico)
Publisher:	CIMMYT
Citation:	The potential for wheat production in Africa: analysis of biophysical suitability and economic profitability. 2013. Asfaw Negassa; Shiferaw, B.; Koo, J.; Sonder, K.; Smale, M.; Braun, H.J.; Gbegbelegbe, S.; Zhe Guo; Hodson, D.P.; Wood, S.; Payne, T.S.; Abeyo Bekele Geleta. : viii, 64 p.. Mexico, DF (Mexico). CIMMYT.

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Enrichment Process – Entity Recognition

The potential for wheat production in Africa: analysis of biophysical suitability and economic profitability

Title:	The potential for wheat production in Africa: analysis of biophysical suitability and economic profitability
Author:	Asfaw Negassa; Shiferaw, B.; Koo, J.; Sonder, K.; Smale, M.; Braun, H.J.; Gbegbelegbe, S.; Zhe Guo; Hodson, D.P.; Wood, S.; Payne, T.S.; Abeyo Bekele Geleta
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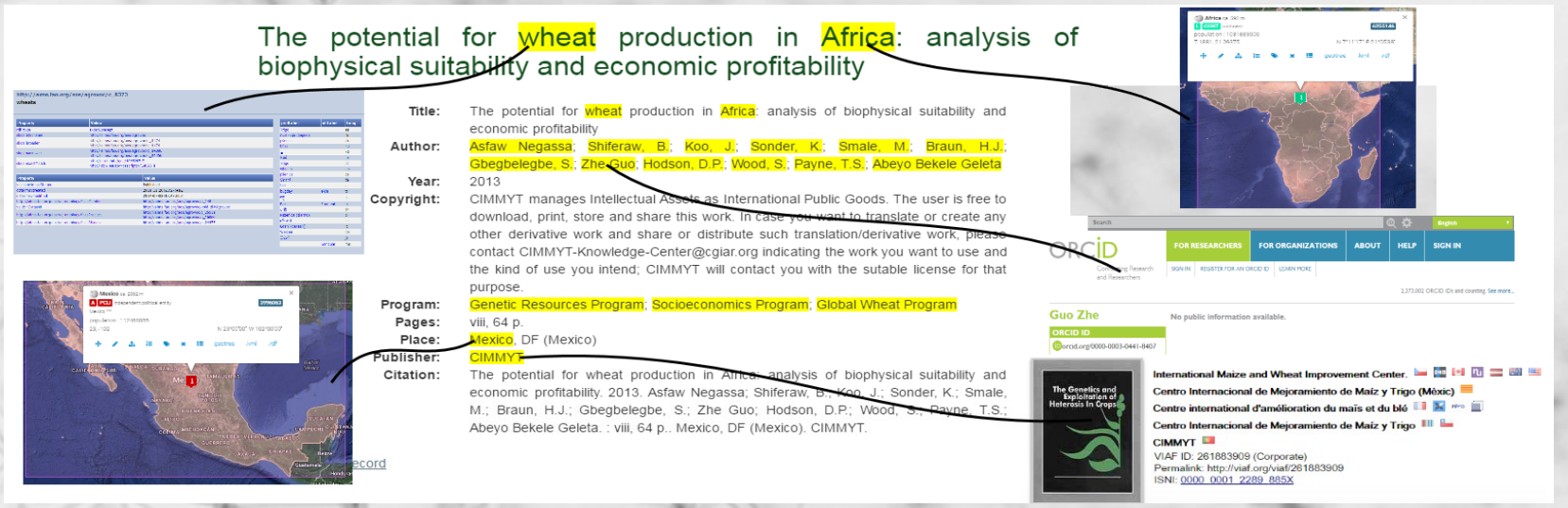
Enrichment Process – Entity Interlinking



Some statistics using this process (and only 3 endpoints):

3.9K
Resources integrated

33.9K
Entities extracted

270K
enrichments

Useful Endpoints (1/2)

- **FREME API**, used for topics extraction and annotation (against AGROVOC), and entity recognition (person, organization, location),
- **Geonames API**, for location extraction and interlink,
- **OpenAIRE mining service** (part of the OpenMinTed project), can be used to mine projects from text, data citation, classification, etc.

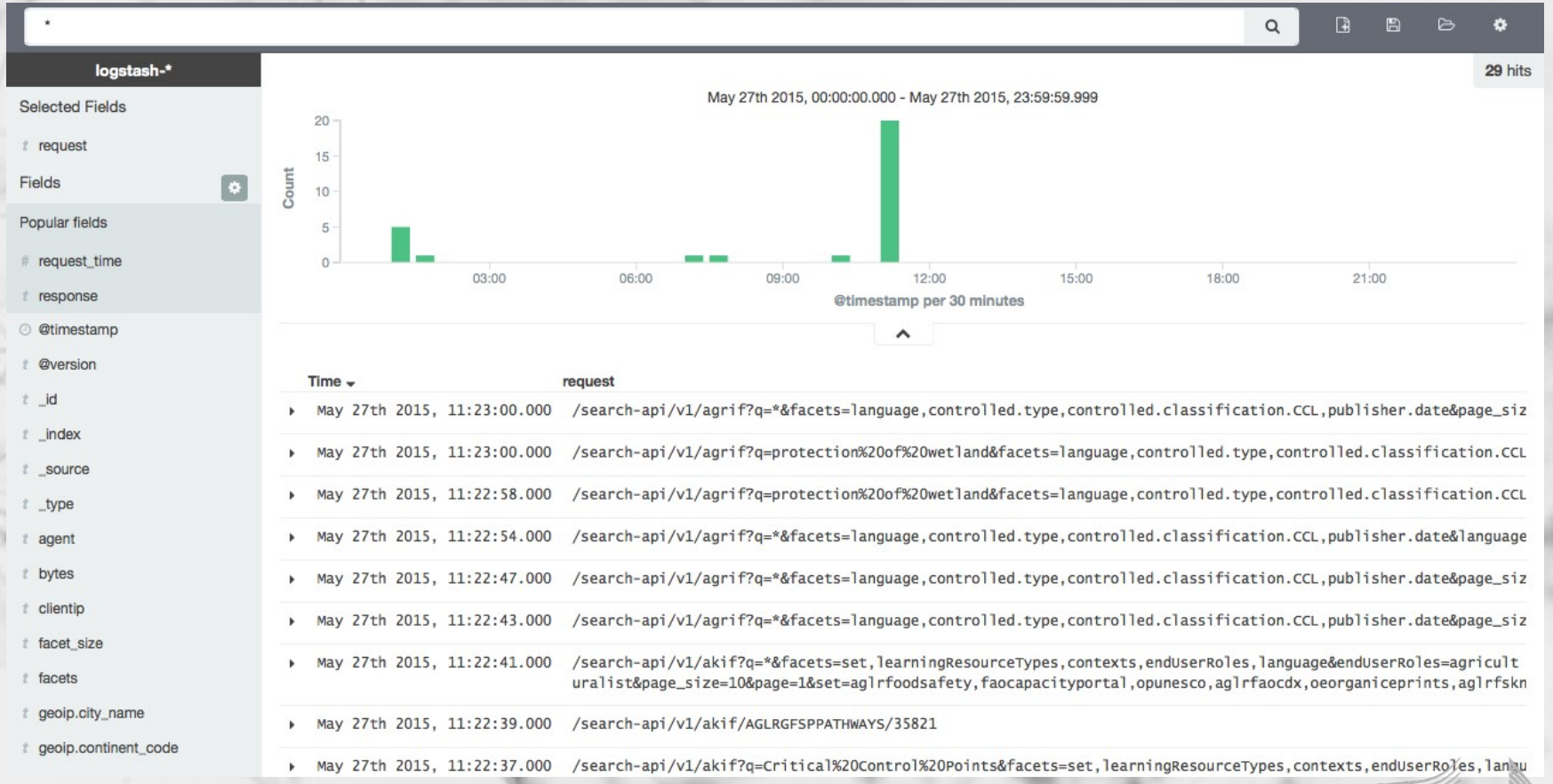
Useful Endpoints (2/2)

- **CropOntology**, can be used to extract wheat trait entities,
- **PDF Text Extraction** (and annotation) service, used to extract text from pdf files and annotate it using various endpoints (1st prize in 1st AgroHackathon, Montpellier, 29/6-1/7/2016)

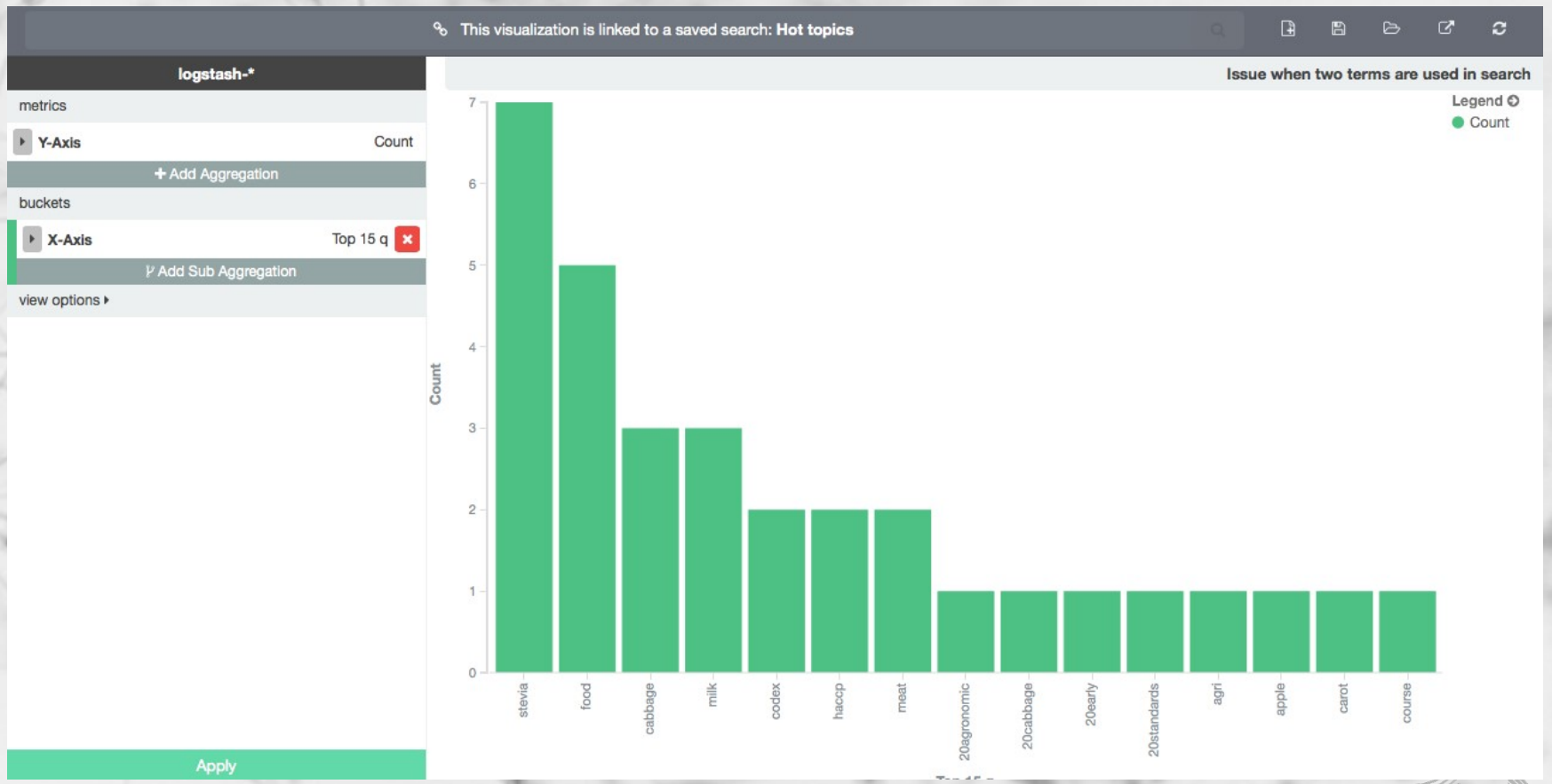
Outcomes Using these Technologies

- **AKIF Search API**
- **CIMMYT MetaSearch API**

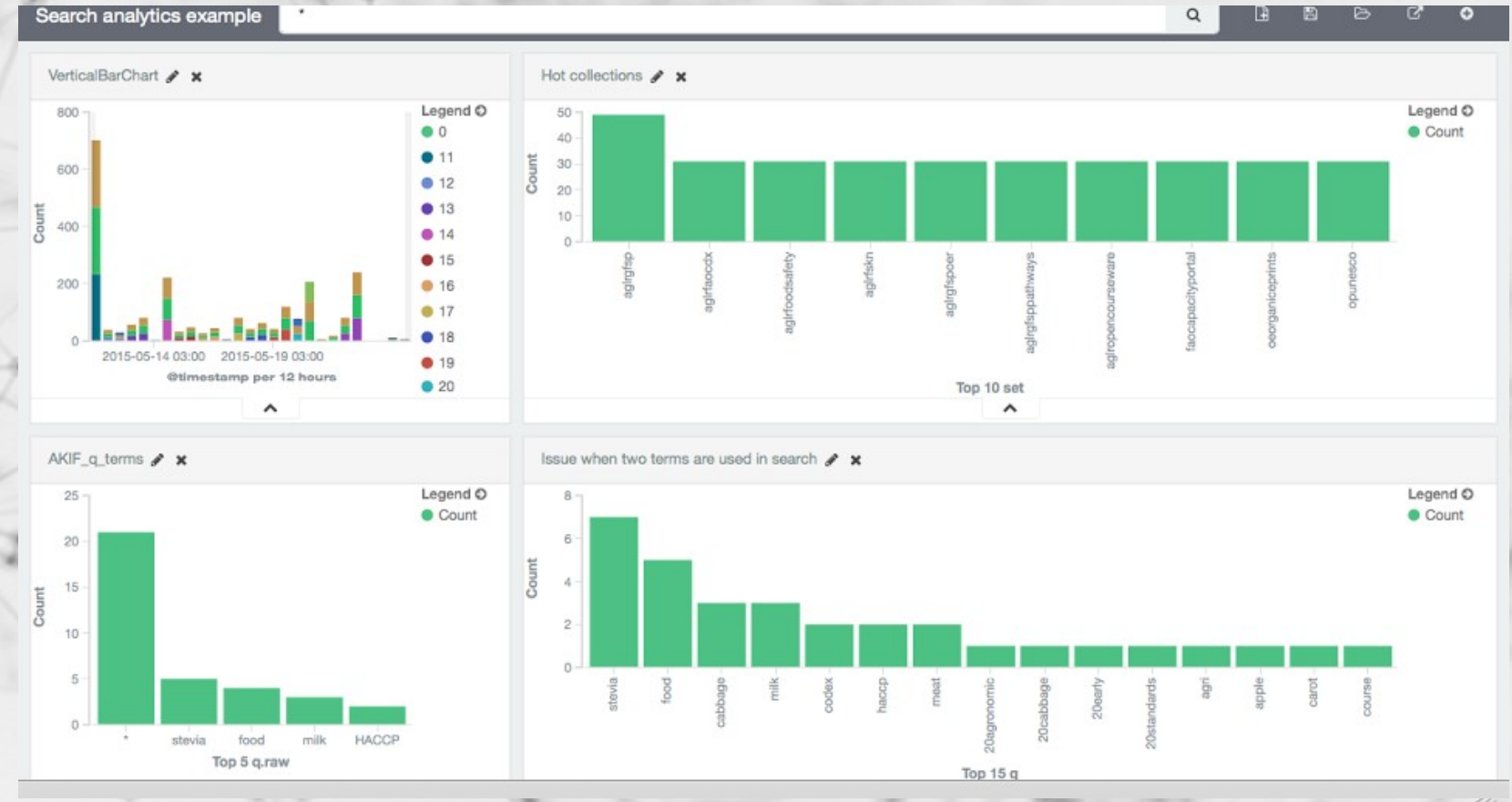
Analytics (1/3)



Analytics (2/3)



Analytics (3/3)



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