

# Building Cognitive Applications\*

*\* creating visualizations using cognitive APIs*

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1. What is cognitive?
2. Demo some apps + look at code
3. Build our own visualization

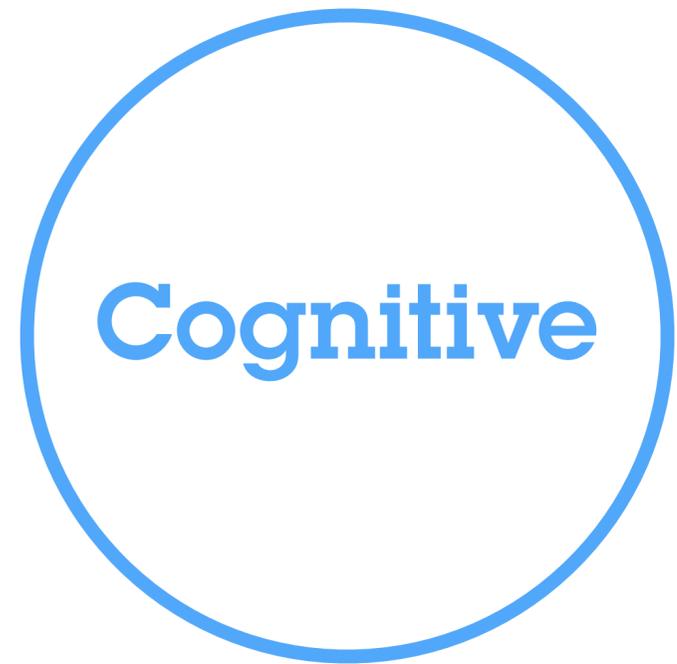
**What is cognitive?**

**“Cognitive computing, a **buzzword** and computing concept by IBM, aims at making human kinds of problems computable.”**

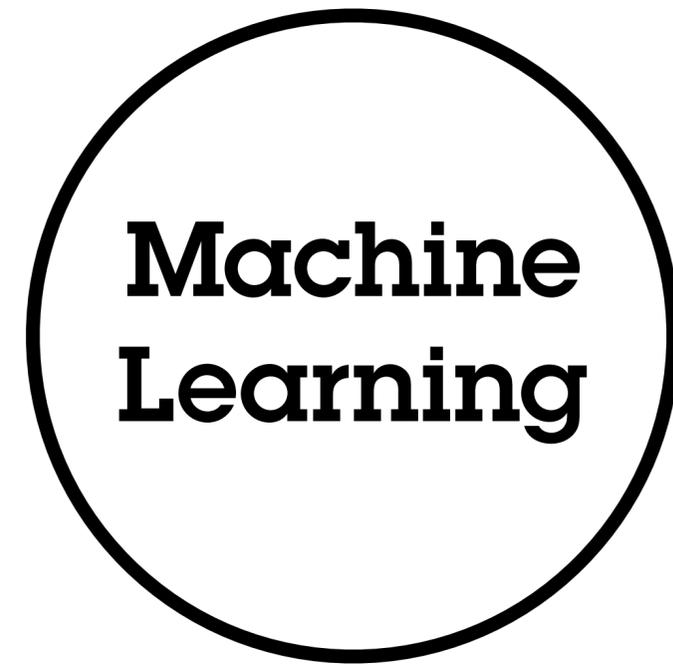
- Wikipedia [\[1\]](#)

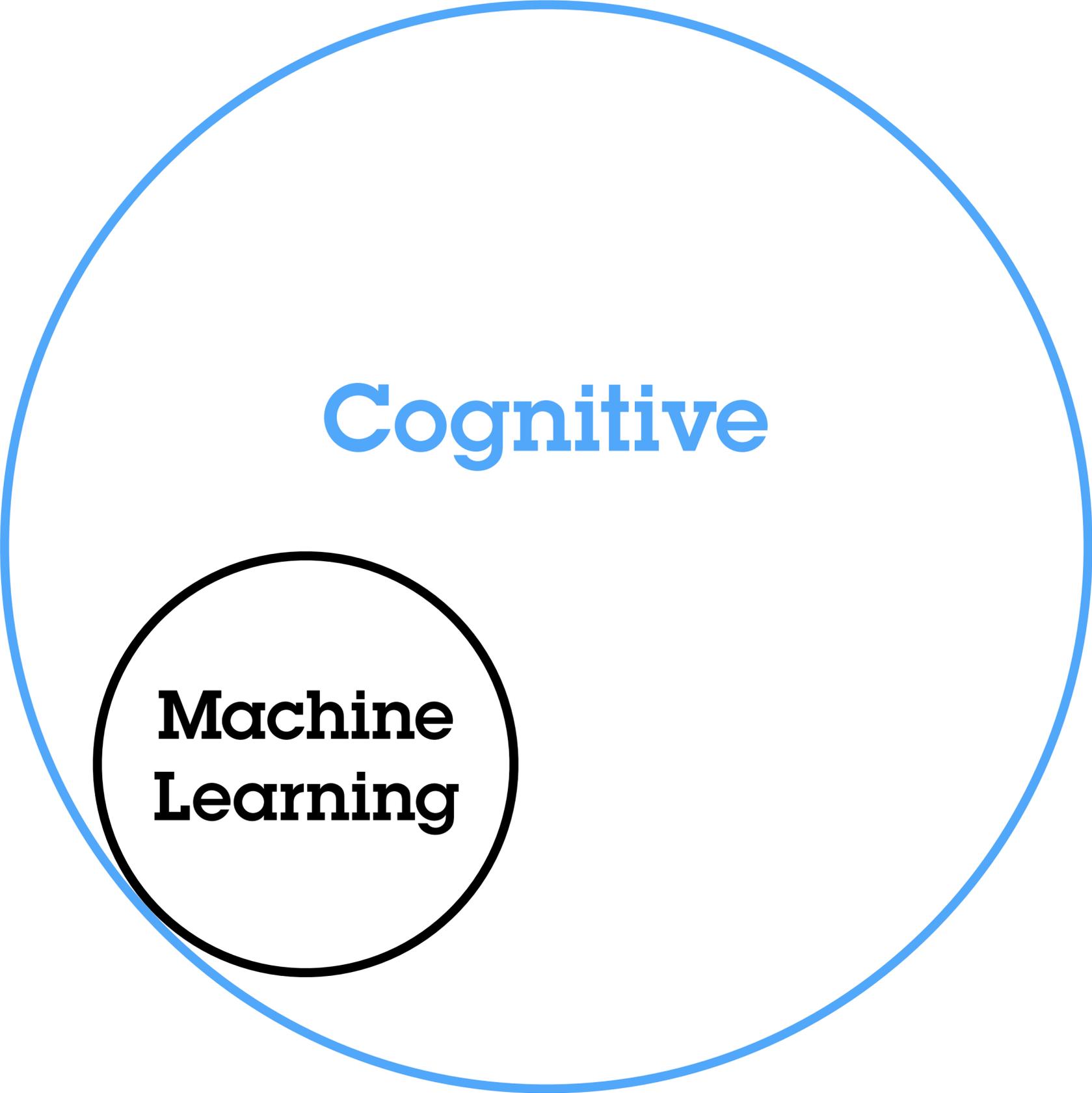
**“Cognitive systems are **probabilistic**. They generate not just answers to numerical problems, but **hypotheses**, reasoned arguments and recommendations about more complex — and meaningful — bodies of data.”**

- Dr. John E. Kelly III [\[2\]](#)



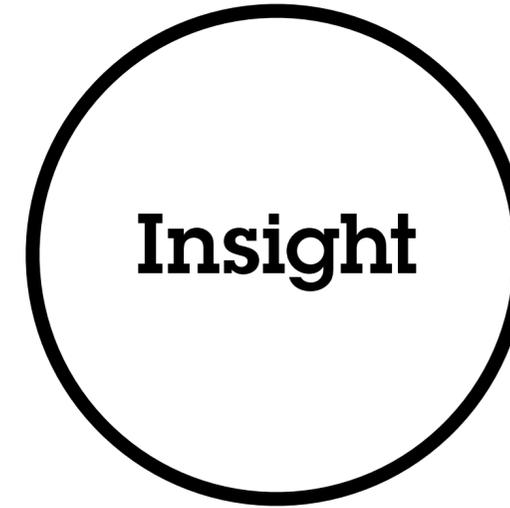
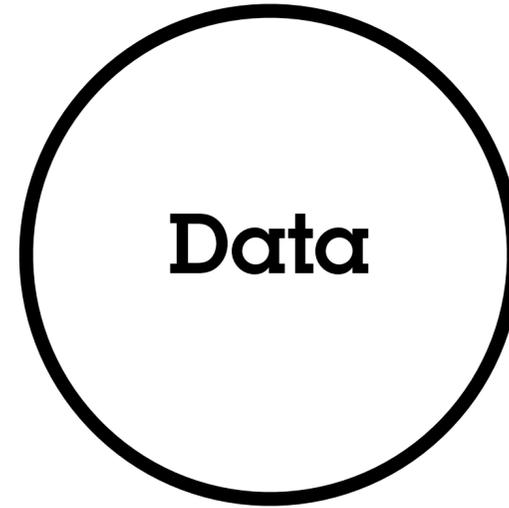
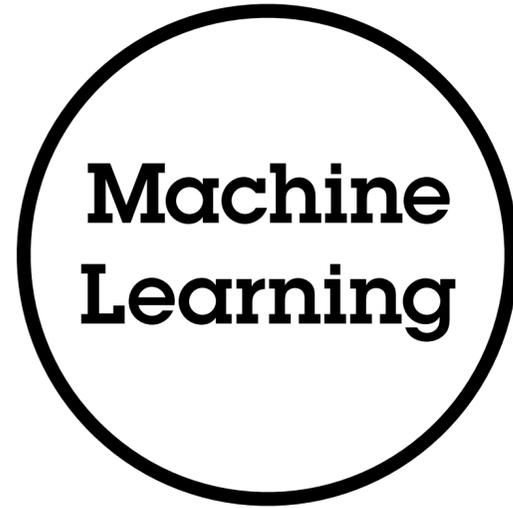
===





**Cognitive**

**Machine  
Learning**



Probabilistic Hypotheses & Recommendations

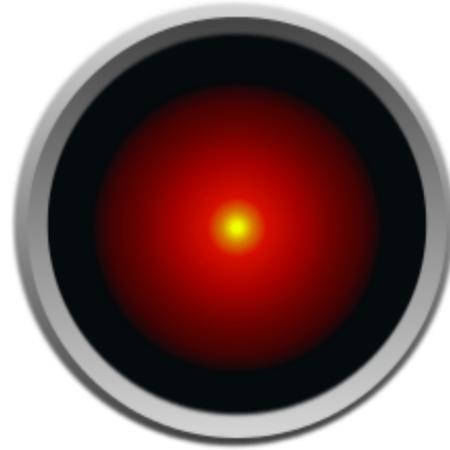
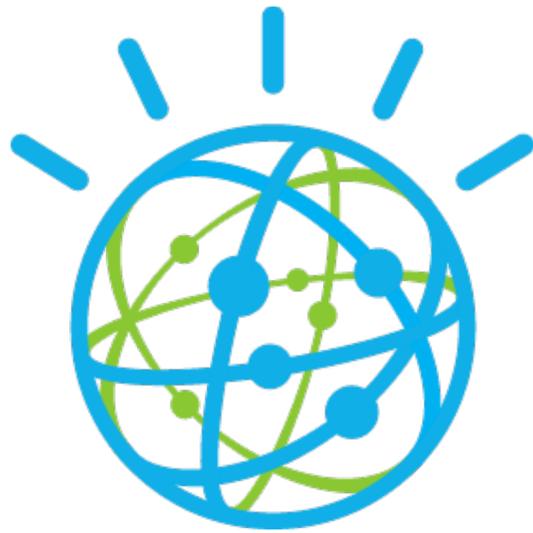
# Cognitive Spectrum



**Mildly  
Cognitive**

**Deeply  
Cognitive**

↑  
Demos in  
this Talk





**Watson**





Alchemy  
Language



Concept  
Expansion



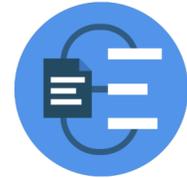
Concept  
Insights



Conversation



Dialog



Document  
Conversion



Language  
Translation



Language  
Classifier



Personality  
Insights



Relationship  
Extraction



Retrieve  
& Rank



Tone  
Analyzer



Speech  
to Text



Text to  
Speech



Alchemy  
Vision



Visual  
Insights



Visual  
Recognition

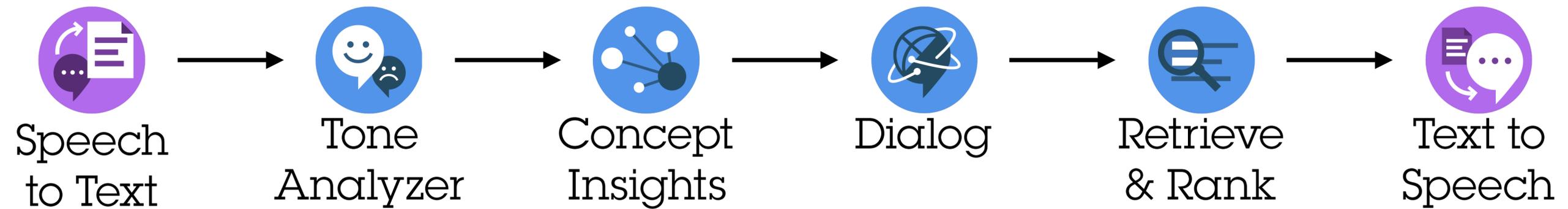


AlchemyNews



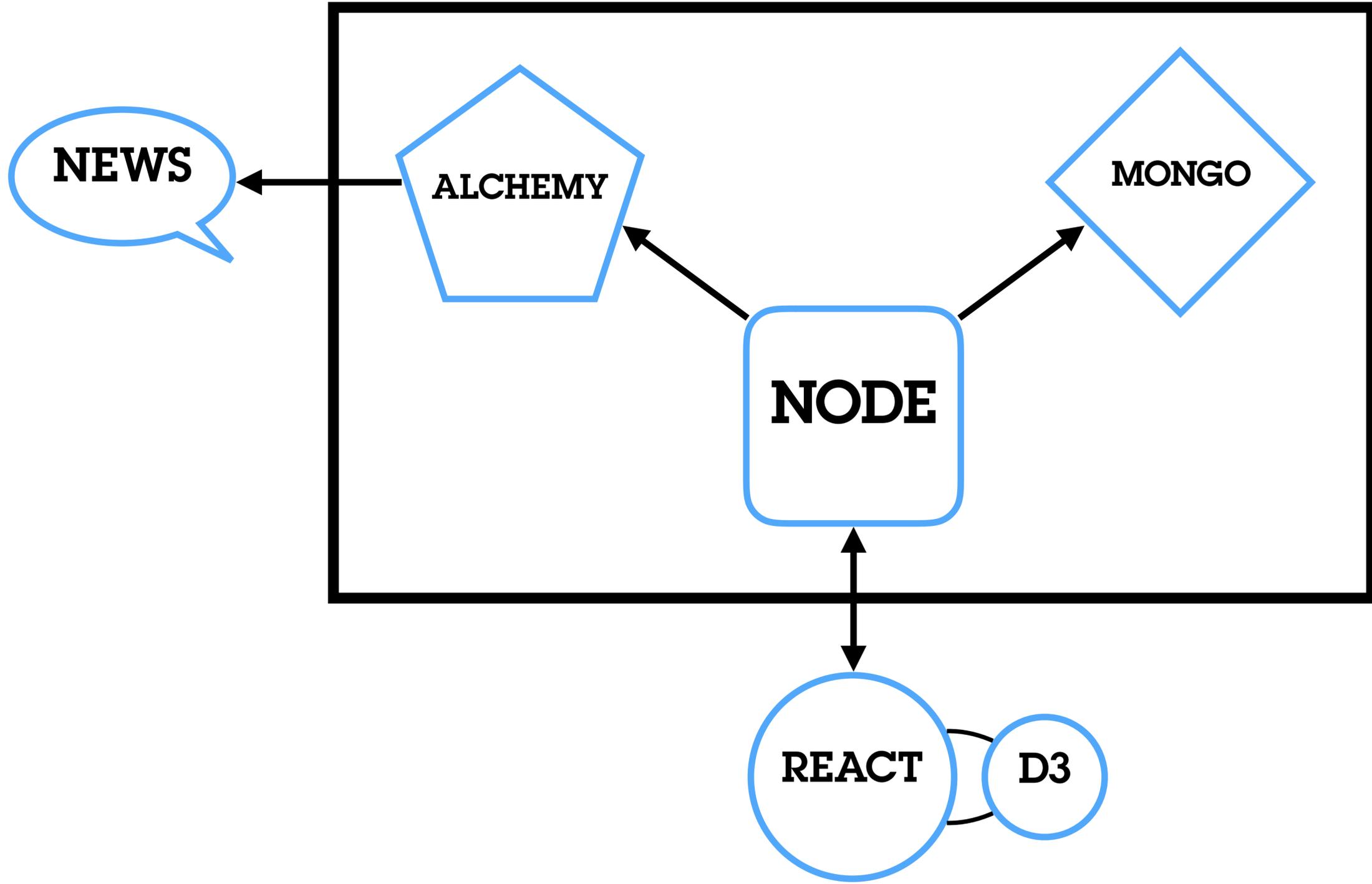
Tradeoff

# Build Insight



# Demo Apps







AlchemyAPI<sup>TM</sup>  
An IBM Company

+



**IBM Bluemix**

```
q.enriched.url.enrichedTitle.taxonomy.taxonomy_  
|label=elections,score=>0.75|
```

```
{
  "status": "OK",
  "totalTransactions": 13,
  "result": {
    "docs": [
      {
        "id": "NjA4MDQ2NzM4M3wxNDQ4ODk0MDAy",
        "timestamp": 1448894002,
        "source": {
          "enriched": {
            "url": {
              "title": "Tech Active Runners in IBM, Frontier Communications Corporation (NASDAQ:FTR), NXP Semiconduc
              "url": "http://streetwisereport.com/tech-active-runners-in-thrust-international-business-machines-corp
              "enrichedTitle": {
                "entities": [
                  {
                    "count": 7,
                    "sentiment": -0.333,
                    "text": "International Business Machines Corporation",
                  },
                  ...
                ]
              }
            }
          }
        }
      }
    ]
  }
}
```

```
{
  "count": 7,
  "sentiment": -0.333,
  "text": "International Business Machines Corporation",
  "date": "2015-11-30T09:09:33:22.0000Z"
}

{
  "count": 3,
  "sentiment": 0,
  "text": "President",
  "date": "2015-11-30T09:09:33:22.0000Z"
}

{
  "count": 2,
  "sentiment": 0.469637007,
  "text": "School District",
  "date": "2015-11-30T09:09:33:22.0000Z"
}
```

**MONGO DB**

- 1. QUERY ENTITIES BY DATE**
- 2. GROUP THEM BY TEXT**
- 3. AVERAGE THE SENTIMENT**
- 4. SUM UP THE COUNT**
- 5. SORT BY THE SUMMED COUNT**
- 6. LIMIT TO AN ARBITRARY NUMBER**

**TRADITIONAL**  
**MAP REDUCE**

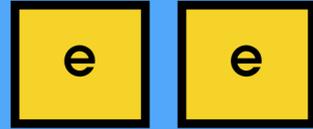
# **MONGO**

## **AGGREGATION PIPELINE**

```
function aggregateEntities(start = 0, end = 999999999999999, limit = 100) {
  return new Promise((resolve, reject) => {
    Entity.aggregate(
      { $match: { date: { $gte: new Date(start) , $lt: new Date(end) } } },
      { $group: {
        _id: { $toLowerCase: '$text' },
        value: { $sum: '$count' },
        sentiment: { $avg: '$sentiment' }
      } },
      { $sort: { value: -1 } },
      { $limit: limit },
      (err, res) => {
        if (err) { reject(err); }
        else { resolve(res); }
      }
    );
  });
}
```

```
[{
  "_id": "President",
  "sentiment": -0.09158288680865387,
  "value": 270
}, {
  "_id": "United States",
  "sentiment": -0.03118193632258064,
  "value": 125
}, {
  "_id": "Mauricio Macri",
  "sentiment": -0.09327133250000001,
  "value": 112
}]
```

**Article - May 25**



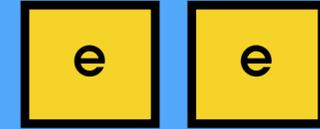
**Article - June 1**



**Article - May 23**



**Article - June 6**



**Article - May 27**



**Article - May 29**



**Article - June 4**



**Article - May 20**



**Article - June 2**



**Article - June 3**



**Article - June 3**



**Article - April 8**



## Article - May 25

TRUMP  
18  
0.5

HC  
4  
0.3

## Article - June 1

TRUMP  
7  
-0.1

HC  
1  
0.2

BERN  
1  
0.6

## Article - May 29

TRUMP  
8  
0.3

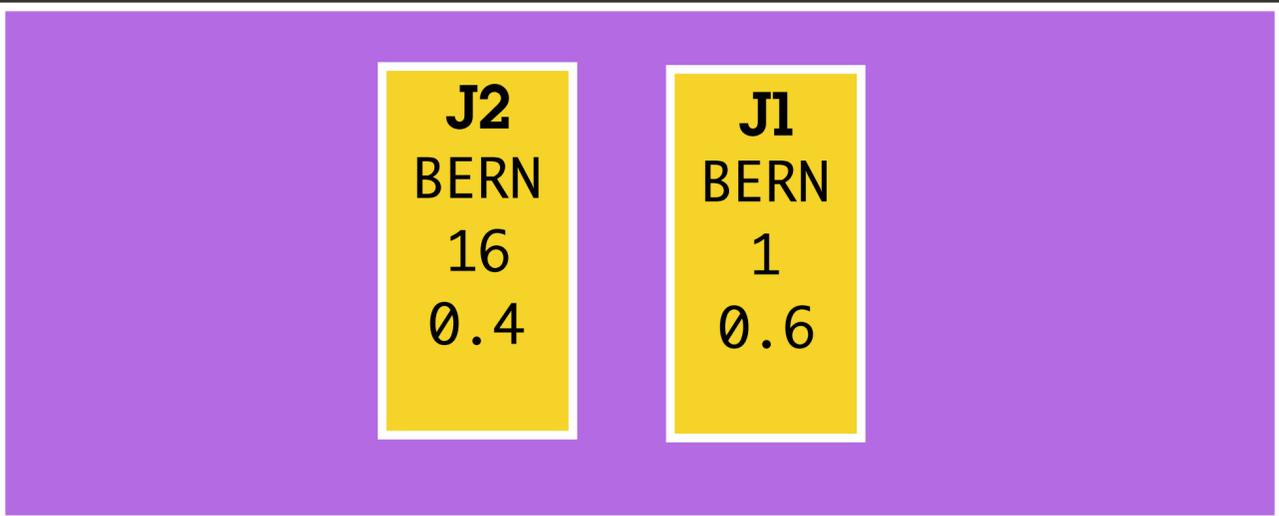
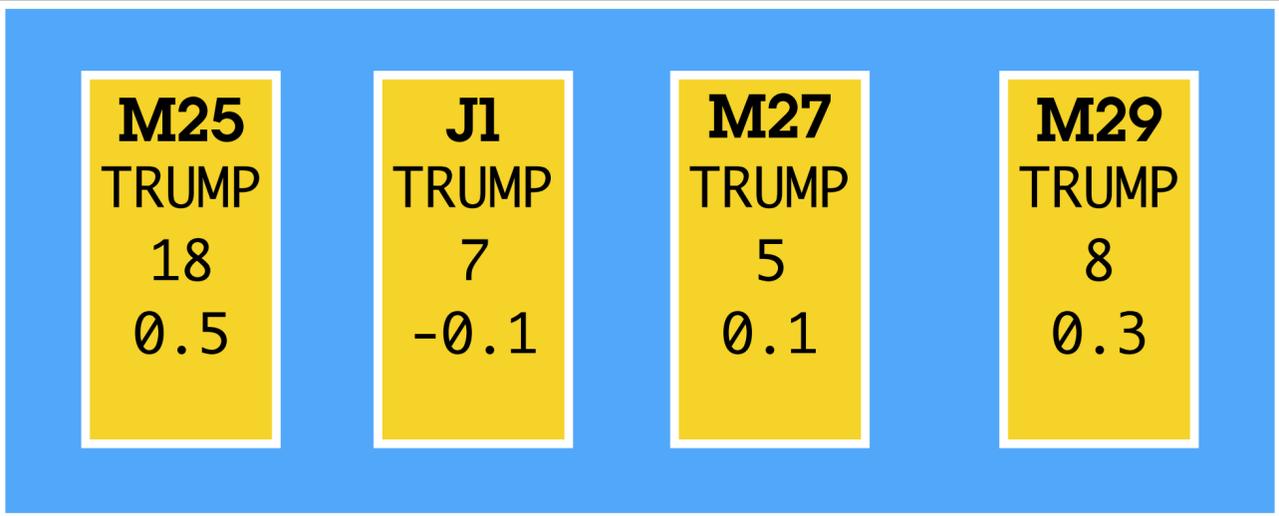
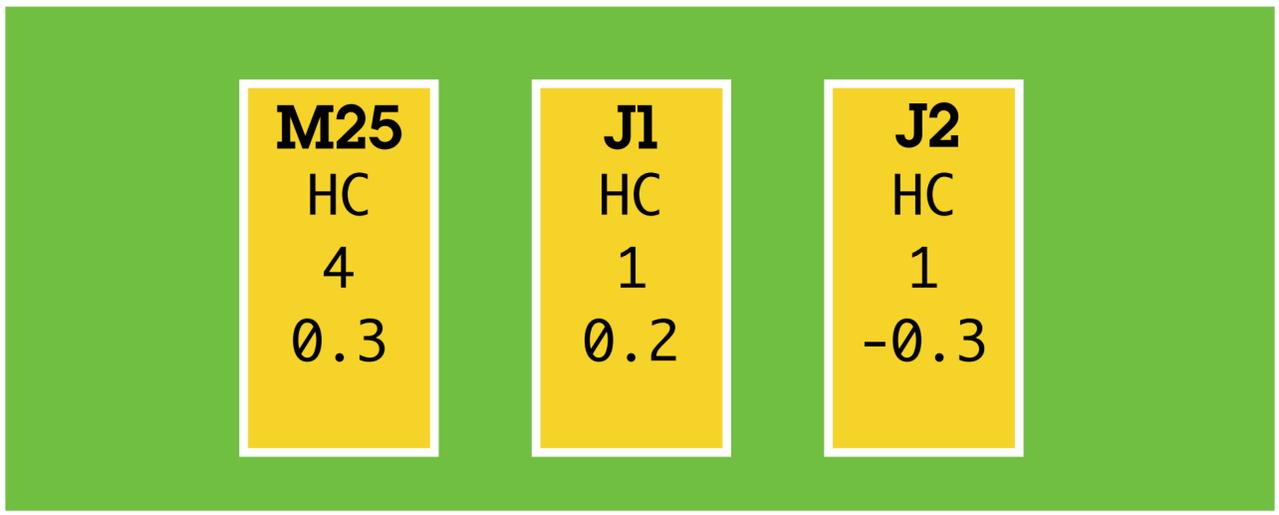
## Article - June 2

BERN  
16  
0.4

HC  
1  
-0.3

## Article - May 27

TRUMP  
5  
0.1

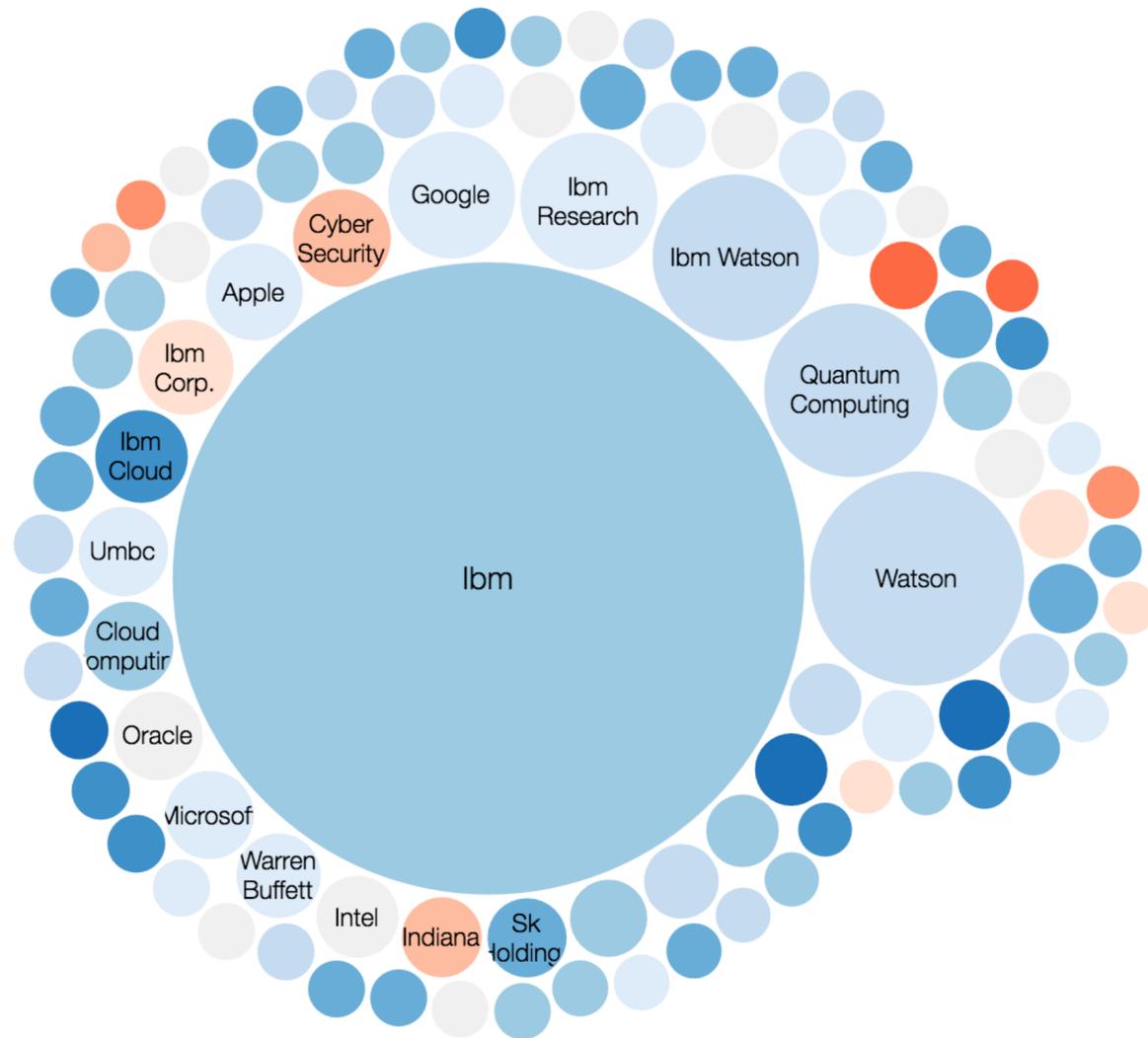
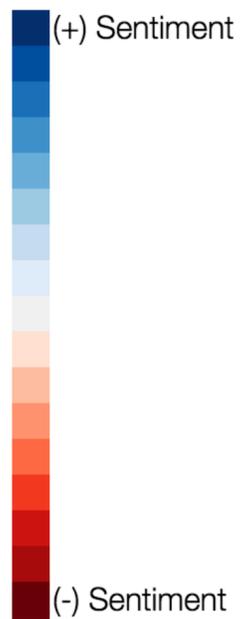


```
{
  "_id": "Donald Trump",
  "value": 38,
  "sentiment": 0.294736842
}
```

```
{
  "_id": "Bernie Sanders",
  "value": 17,
  "sentiment": 0.411764706
}
```

```
{
  "_id": "Hilary Clinton",
  "value": 6,
  "sentiment": 0.183333333
}
```

International Business Machines Corporation x Apple Inc. x Google Inc. x Facebook, Inc. x Twitter, Inc. x Hide Company Names



x IBM

[CrowdStrike Inc. Partners with IBM to Launch Advanced Cyber Threat Intelligence Service](#)

CrowdStrike Inc., a global provider of security technologies and services identifying advanced threats and targeted attacks  
CrowdStrike Inc., a global provider of security technologies and services announced a partnership

[E647: IBM SmartCamp 2015 showcase: Winner CarForce; finalists gridComm & Bquate](#)

Your current browser is n't compatible with SoundCloud

[Dr. Watson, I presume? How IBM Watson may transform healthcare](#)

LAS VEGAS — to do

modern health care becomes too complicated for doctors and nurses

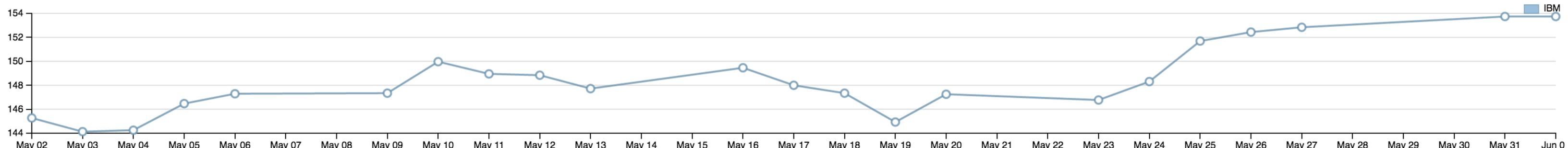
[Solutionary Appoints Former IBM Executive Consultant John Petrie as Chief Information Security Officer & Senior Security Strategist](#)

Solutionary, an NTT Group security company (NYSE: NTT) and leading cyber security services provider, announced the appointment of John F. Petrie III as the company's chief information security officer (CISO) and senior security strategist  
Petrie brings a unique perspective

[Sipchem and IBM sign IT deal | Zawya](#)

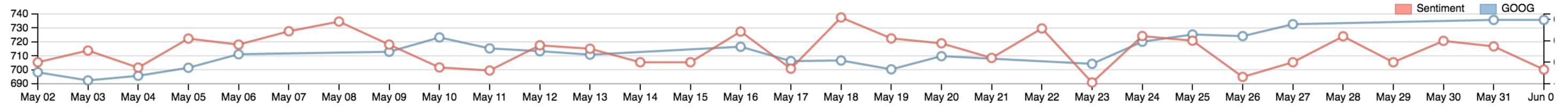
The agreement equips Sipchem  
Sipchem to drive greater efficiencies

[HELP! IBM ThinkPad T23 will not boot!!! - Forums](#)

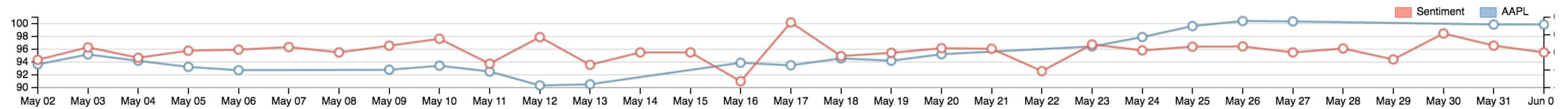


search for companies...

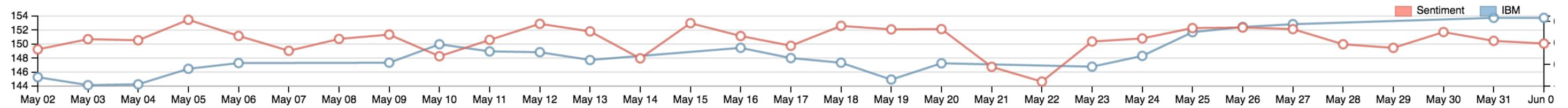
**GOOG**  
Google Inc.  
3.06  
735.72



**AAPL**  
Apple Inc.  
-0.49  
99.86



**IBM**  
International  
Business Machines  
Corporation  
0.9  
153.74



**<http://electioninsights.mybluemix.net/>**

**<http://stockinsights.mybluemix.net/>**

**<http://portfolioinsights.mybluemix.net/>**

**Build our own Visualization**

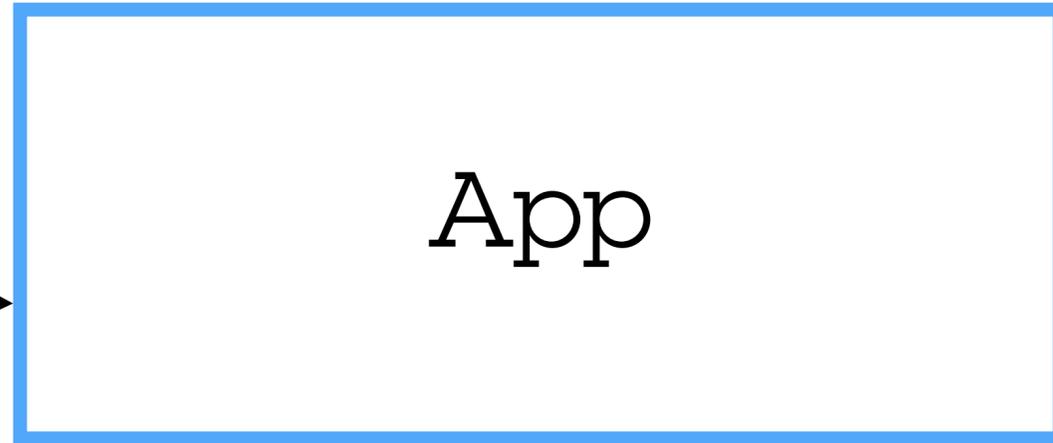
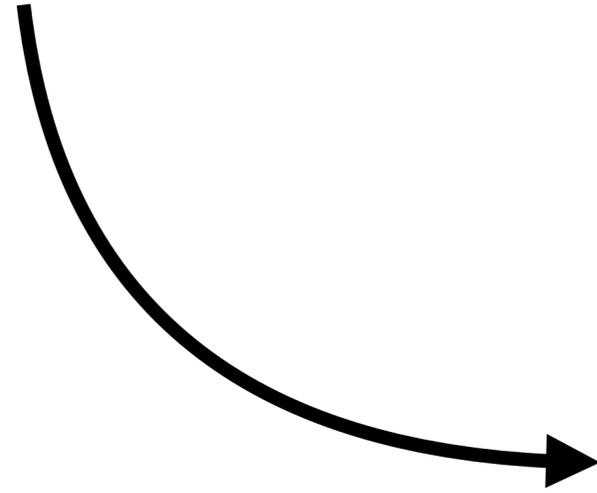


Tone  
Analyzer



Color

"I'm so so sad"



## emotional

anger  
disgust  
fear  
joy  
sadness

## social

analytical  
confident  
tentative

## writing

openness  
conscientiousness  
extraversion  
agreeableness  
emotional range

## Yellow

joy  
confident  
conscientiousness

## Blue

sadness  
tentativeness  
analytical

## Green

openness  
agreeableness  
disgust

## Red

anger  
fear

# References

**These Slides** <http://jk Kaufman.io/building-cognitive-applications-talk/>

**Tone App Permalink** <http://realtimetone.mybluemix.net/>

**Tone App Code** <https://github.com/kauffecup/realtime-tone>

**Election Insights** <http://electioninsights.mybluemix.net/>

**Election Code** <https://github.com/IBM-Bluemix/election-insights>

**Stock Insights** <http://stockinsights.mybluemix.net/>

**Stock Code** <http://portfolioinsights.mybluemix.net/>

**[1]** [https://en.wikipedia.org/wiki/Cognitive\\_computing](https://en.wikipedia.org/wiki/Cognitive_computing)

**[2]** [http://www.research.ibm.com/software/IBMResearch/multimedia/Computing\\_Cognition\\_WhitePaper.pdf](http://www.research.ibm.com/software/IBMResearch/multimedia/Computing_Cognition_WhitePaper.pdf)