



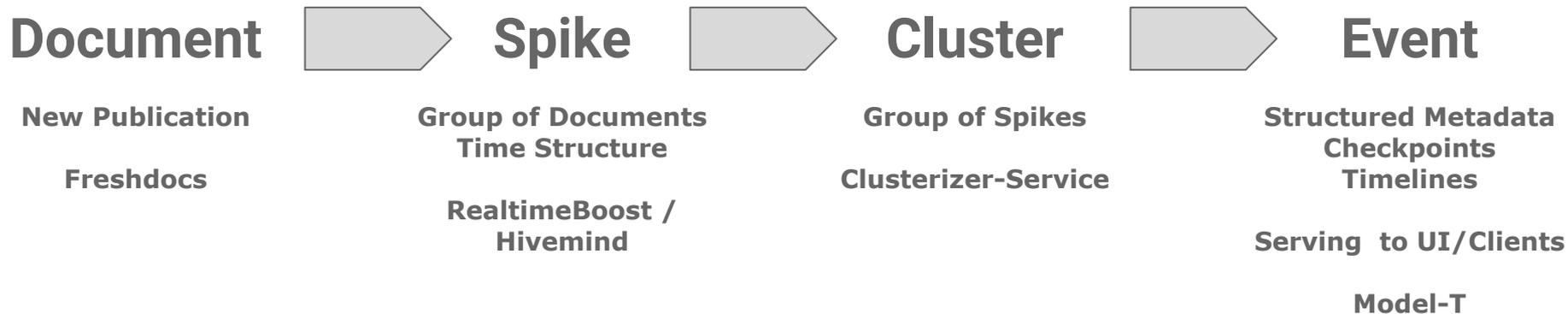
Realtime Events

May 16 2017 - felipeg@google.com

Design Doc: go/realtime-events-design

Demo: go/realtime-events

Event detection



 Every step in Realtime

Event detection

[brazil 3 0 paraguay]

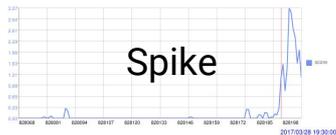


Image	Ranking	Score
	FIFA World Cup	200.54
	Brazil national football team	110.09
	Neymar	96.07
	Brazil	85.86
	2018 FIFA World Cup	76.78
	Football	48.63
	2014 FIFA World Cup	48.61
	Argentina national football team	45.45
	Phillipe Coutinho	45.05

≈

≈

[peru uruguay]

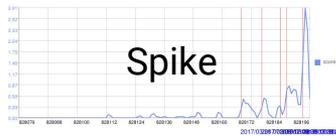


Image	Ranking	Score
	Uruguay national football team	180.70
	FIFA World Cup	138.02
	Luis Suárez	114.37
	beIN SPORTS	105.08
	2017 CONCACAF Gold Cup	96.92
	Argentina national football team	94.18
	2018 FIFA World Cup	58.09
	Peru national football team	55.81
	Football	55.81

qualify	200.54
qualify for	110.09
brazil	96.07
danger	85.86
becomes 1st	76.78
tite	48.63
paulinho	48.61
first team	45.45
brazilians	45.05
2018 world	42.93

qualify	180.70
heap	138.02
danger	114.37
national stadium	105.08
misery	96.92
qualify for	94.18
south american	58.09
edison flores	55.81
after scoring	55.81
brazil	51.76

Cosine similarity on related dimensions

Cluster



Aggregate Data from all similar Spikes

Event

Event Label

Brazil 1st to qualify for world cup

Event Summary

A resurgent Brazil squad under new management became the first team to qualify for the World Cup on Tuesday.

Queries

brazil vs paraguay live streaming

Questions

who scored in brazil vs paraguay

Image



Locations (from cv and nb)



Popularity (CV and NB lift)

Event detection

[brazil 3 0 paraguay]

Spike

qualify	200.54
qualify for	110.00
brazil	90.07
danger	85.00
becomes 1st	70.70
title	40.03
paulinho	40.01

Stored in Model-T

Metadata to be served to the UI

[peru uruguay]

Spike

qualify	100.00
heap	100.00
danger	114.17
national stadium	100.00
misery	90.01
quality for	94.23
south american	80.00
edison flores	90.01
after scoring	90.01
brazil	90.00

Cluster

uruguay football
Spike 4 hours 44 min ago

brazil uruguay
Spike 4 hours 44 min ago

brazil 3 0 paraguay
Spike 6 hours 14 min ago

peru uruguay
Spike 4 hours 44 min ago

ecuador world cup
Spike 4 hours 44 min ago

Dimensions

Cosine similarit

Aggregate Data from all similar Spikes

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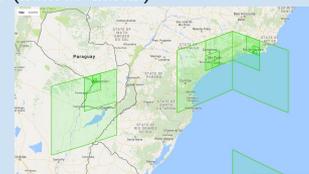
Questions

who scored brazil vs paraguay

Image



Locations (from cv and nb)



Popularity (CV and NB lift)

Timelines - Hierarchy

Timelines

Connecting multiple events that are separate in time



Checkpoints, Updates and Timelines

([query](#))

(Document is 15 hs old, and related to the main event below)

Zaza Pachulia dirty play: Kawhi Leonard injures ankle (Video)

14 hours 48 min ago - <https://www.si.com/nba/2017/05/14/zaza-pachulia-dirty-play-kawhi-leonard-ankle-injury-video>

Kawhi Leonard was knocked out of Game 1 of the Western Conference Finals in the third quarter after turning his ankle for a second time, and a close review of ...

[See UX Design Doc here](#)

Story Timeline (related to the document)

2 hours 11 min ago
Zaza Pachulia Injures Kawhi Leonard



14.1

Did Zaza Pachulia Intentionally Injure Kawhi Leonard (nba Wcf Game 1)

Kevin Durant and Stephen Curry respond to Twitter commenters claiming Zaza Pachulia intentionally tried to injure Kawhi Leonard in Game 1.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 17255.8

15 hours 48 min ago
Kawhi Leonard Ankle Injury



324.9

Spurs Kawhi Leonard Re Injures Left Ankle Done Early Game 1

Stephen Curry scored 40 points and hit a tying 3-pointer with 1:48 remaining, and the Golden State Warriors rallied from way down after Kawhi Leonard was lost to an ankle injury to beat the San Antonio Spurs 113-111 on Sunday in Game 1 of the Western Conference finals.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 13824.3

18 hours 3 min ago
Golden State Warriors Vs Spurs Live Stream



43.8

Warriors Comeback Vs Spurs Rewards Bettors

Golden State Warriors interim head coach Mike Brown, right, gestures next to forward Andre Iguodala (9) during the first half of Game 1 of the NBA basketball Western Conference finals against the San Antonio Spurs in Oakland, Calif., Sunday, May 14, 2017.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 84.1

1 day 15 hours ago
Gregg Popovich Steve Kerr



17.9

Warriors Kerr Return 1st Time In 3 Weeks

Ailing Golden State coach attended the Warriors' press conference on Monday morning, returning to the sidelines for the first time in more than three weeks.

[Inspect Event Data - Search Similar Events](#)
Story Similarity

(Followup event -

people are wondering

if the other player intentionally tried to injure Kawhi)

(main event)

Events - Questions

([query](#))

Frequently Asked:

- Where is zaza pachulia from
- Was zaza pachulia dirty
- Zaza pachulia dirty play?

Frequently Asked:

- What happened to kawhi leonard
- What happened to kawhi leonard today
- Where is zaza pachulia from

Story Timeline (related to the document)

2 hours 11 min ago
Zaza Pachulia Injures Kawhi Leonard



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[Inspect Event Data - Search Similar Events](#)
Story Similarity

(Followup event - people are wondering if the other player intentionally tried to injure Kawhi)

(main event)

Events - Questions - Temporal Topicality

Frequently Asked:

- Where is zaza pachulia from
- Was zaza pachulia dirty
- Zaza pachulia dirty play?

Frequently Asked:

- What happened to kawhi leonard
- What happened to kawhi leonard today
- Where is zaza pachulia from

Temporal Topicality

- How topical is this question for the current time.
- Rank the questions based on the salient terms of the Spikes in the Event.
- The Spike salient terms are ranked by hivemind lift-score.
 - "How important the salient term compared to the background distribution".
 - Rank higher if they are specific the exact topic happening during the time of the query.

2 days later - More updates

([query](#))

- Pachulia is out of Game 2 for dangerous play
- Spurs coach is irate with Patchulia
- Warriors vs Spurs Game 2 is on

Story Timeline

10 hours 16 min ago
Golden State Warriors Vs San Antonio Spurs
Game 2



Warriors Trounce Spurs Without Leonard For 2-0 Series Lead

Stephen Curry had 29 points, seven rebounds and seven assists in three quarters and the Golden State Warriors trounced on the Spurs missing Kawhi Leonard, running away from San Antonio for a 136-100 rout Tuesday night and 2-0 lead in the Western Conference finals.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 148.5

1 day 2 hours ago
Popovich Pachulia



(The Sports Xchange) – San Antonio star forward Kawhi Leonard will miss Tuesday night's Game 2 of the Western Conference finals at the Golden State Warriors, leaving Spurs coach Gregg Popovich irate over what he felt was an avoidable injury.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 9233.2

1 day 19 hours ago
Gregg Popovich Zaza Pachulia



Gregg Popovich Says Kawhi Leonard Likely Out For Game 2 Rips Zaza Pachulia For 'dangerous' Play

NBA analyst Sekou Smith joins Tiki and Tierney to discuss if Golden State Warriors center Zaza Pachulia's play on San Antonio Spurs forward Kawhi Leonard should be considered dirty.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 7555.0

2 days 2 hours ago
Zaza Pachulia Injures Kawhi Leonard



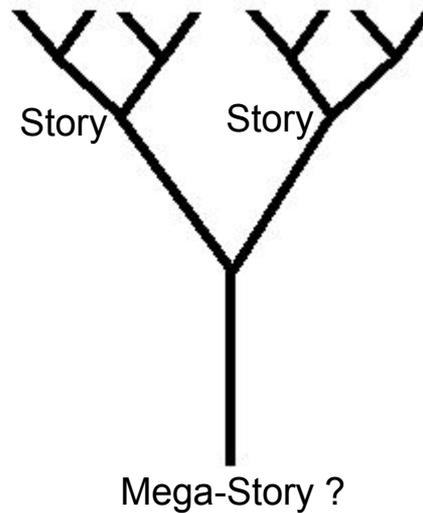
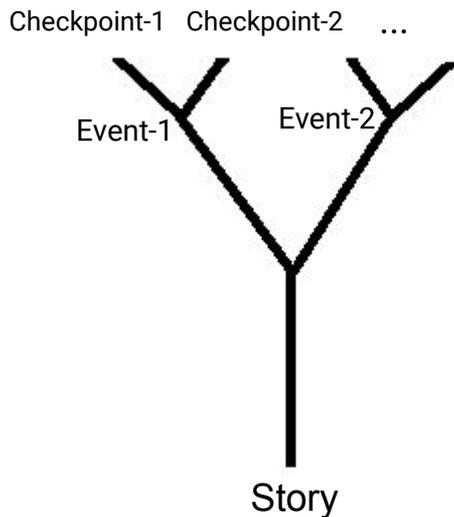
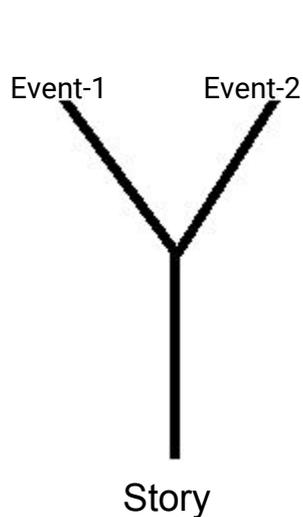
Did Zaza Pachulia Intentionally Injure Kawhi Leonard (nba Wcf Game 1)

Kevin Durant and Stephen Curry respond to Twitter commenters claiming Zaza Pachulia intentionally tried to injure Kawhi Leonard in Game 1.

[Inspect Event Data - Search Similar Events](#)
Story Similarity Score: 37708.0

Story vs Event vs Checkpoint: Granularity

- Story can develop over many days, even months
- Event is a new development inside a Story
 - Takes place over a few hours, not more
- Checkpoints are intra-Event “snapshots”
 - Can be used to track the user’s state in the Event/Story on a minute level



RTB Story Granularity

Main Story: Legarrette goes from Patriots to Eagles

Legarrette Blount Eagles Contract

2 hours 29 min ago | Score: 105.3

LeGarrette Blount
American Football Running back

Rb Legarrette Blount Joins Eagles On 1 Year Deal

The Eagles have added more power to their backfield, signing RB LeGarrette Blount to a one-year contract. The 30-year-old rushed for a career-high 1,161 yards and an NFL-best 18 touchdowns for the Super Bowl champion Patriots in 2016.

Frequently Asked:

- How old is legarrette blount?
- Did the eagles sign lagareet blount?
- What team is lagrant blount on eagles?

News Cluster IDs: Queries: CV Documents: NB Documents:

Legarrette blount eagles
Eagles legarrette blount
Legarrette blount eagles

693a8c3642ca1d
af7a8e271fa0b8-5
65977529606967b

07a61e271fa0b8-5
ab82761eaf448718
a6113b1e71302033

Inspect Event Data - Search Similar Events

Very Specific

Only about Eagles and Patriots dealings players' contracts (high similarity threshold - [query](#))

Story Timeline

5 days 23 hours ago
New England Patriots

Best Fits For The Top 7 Nfl Free Agents Still Available

The New England Patriots issued \$1.1 million tender to free agent running back LeGarrette Blount on Tuesday, multiple media outlets reported Wednesday.

Inspect Event Data - Search Similar Events
Story Similarity Score: 1833.9

6 days 20 hours ago
Legarrette Blount News

Source Pats Issue Rare May 9 Tender To Blount

The New England Patriots have issued a May 9 tender to free-agent running back LeGarrette Blount, according to a league source.

Inspect Event Data - Search Similar Events
Story Similarity Score: 2785.3

Very Broad - Everything about Football - (low similarity threshold - [query](#))

Story Timeline

3 hours 27 min ago
Tom Brady Concussion History

Gisele Bundchen Tom Brady Had A Concussion Last Year

Gisele Bundchen, the supermodel wife of New England Patriots quarterback Tom Brady, said her husband suffered a concussion last season and in other years.

Inspect Event Data - Search Similar Events
Story Similarity Score: 16.9

5 days 17 hours ago
Undrafted Free Agents

Titans Agree To Terms With 12 Undrafted Free Agent Rookies

The Tennessee Titans have agreed to terms with 12 undrafted free agents before starting a rookie minicamp.

Inspect Event Data - Search Similar Events
Story Similarity Score: 1.2

5 days 23 hours ago
New England Patriots

Best Fits For The Top 7 Nfl Free Agents Still Available

The New England Patriots issued \$1.1 million tender to free agent running back LeGarrette Blount on Tuesday, multiple media outlets reported Wednesday.

Inspect Event Data - Search Similar Events
Story Similarity Score: 1833.8

6 days 14 hours ago
Blaine Gabbert Contract

Ap Source Cardinals Qb Blaine Gabbert Agree On 1 Year Deal

Source: Cardinals, QB Blaine Gabbert agree on 1-year deal.

Inspect Event Data - Search Similar Events
Story Similarity Score: 0.0

6 days 20 hours ago
Legarrette Blount News

Source Pats Issue Rare May 9 Tender To Blount

The New England Patriots have issued a May 9 tender to free-agent running back LeGarrette Blount, according to a league source.

Inspect Event Data - Search Similar Events
Story Similarity Score: 2785.3

8 days 19 hours ago
Dan Skuta

Chicago Bears Sign Lb Dan Skuta To Year Contract

Veteran linebacker Dan Skuta has signed a one-year contract with the Chicago Bears.

Inspect Event Data - Search Similar Events
Story Similarity Score: 0.1

8 days 21 hours ago
49ers Rookie Minicamp

49ers Sign 3 Players After Rookie Camp Tryouts

The San Francisco 49ers have signed safety Chancellor James, receiver BJ Johnson III and offensive lineman Richard Levy to three-year deals after tryouts at the team's rookie minicamp.

Inspect Event Data - Search Similar Events
Story Similarity Score: 2.1

8 days 23 hours ago
Rawleigh Williams III

Arkansas' Rawleigh Williams III Football Career After Injury

Arkansas running back Rawleigh Williams III who rushed for 1,360 yards and 10 touchdowns last season, announced he is giving up football after second neck injury.

Inspect Event Data - Search Similar Events
Story Similarity Score: 0.0

Trump Fires Comey - News Cluster

([news cluster link](#))

The Original Cluster has been transformed into everything Comey/Russia/Trump

Mishmash of new developments:

- Comey Memo / Russia probe
- FBI next pick
- Russia Leaks / Classified info

News Cluster is active for 8 days

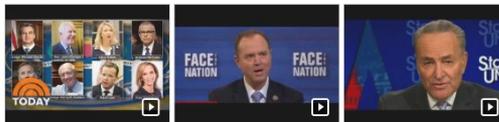
- 18,549 articles so far

Realtime Coverage

Chaffetz: I'm ready to subpoena for Comey memo

fox8.com - 35 minutes ago

House oversight committee chairman Jason Chaffetz said Tuesday that if a memo FBI Director James Comey wrote detailing President Donald Trump's request to end an investigation exists, then his committee is willing to issue subpoenas to get it. .



If the president isn't hiding anything, what is the need for his secrecy?

Las Vegas Sun - 4 hours ago

Trump: FBI job hunt on fast track

Northwest Arkansas Democrat-Gazette - May 16, 2017

Americans Deserve To Know About Russian US Election Meddling | Senator Casey

Newsweek - May 15, 2017

Most important editorial of the weekend: It's time to consider impeachment

The Progressive Pulse - May 15, 2017

Democrats continue to pressure Trump over FBI boss' axing

SBS - May 14, 2017

Show recently hidden articles

In Depth

Key Moments of Trump-Comey Clash and What's Come After

New York Times - 5 hours ago

WASHINGTON — The standoff between President Donald Trump and his former FBI director intensified with the news of James Comey's memo saying that Trump asked him to shut down the agency's investigation into ousted national security adviser Michael ...

Will Firing Comey Cost Trump?

Daily Beast - May 14, 2017

While supporters of the president are arguing that he was within his legal right to fire Comey, there could be other repercussions. Michael Waldman. 05.13.17 11:29 PM ET. In the frenzied days since Donald Trump fired James Comey, all the original ...

Trump, GOP control FBI chief pick despite Democrats' calls

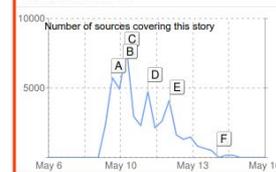
Washington Post - May 15, 2017

WASHINGTON — While Democrats may trot out any number of demands or maneuvers to influence the selection of the next director of the FBI, here's a reality check: Republican President Donald Trump fired James Comey, and he and his party will decide ...

Yes, Trump Thinks He Can Defeat The Russia Probe

Washington Post - May 15, 2017

Timeline of articles



F Clapper: US govt 'under assault' by Trump after Comey firing
Boston.com - May 14, 2017

E The Daily 202: Trump's warning to Comey deepens doubts about his respect for the rule of law
Washington Post - May 12, 2017

D Comey firing could spur new review of Clinton case, immunity deals, ex-agent says
Fox News - May 11, 2017

C Late night comes for President Trump over James Comey firing
USA TODAY - May 10, 2017

B The Latest: Pence says firing unrelated to Russia probe
New York Daily News - May 10, 2017

A Trump ax falls on FBI's Comey in midst of Russia probe
Atlanta Journal Constitution - May 9, 2017

Trump Fires Comey - RTB Event

(query)

- **Original Event is only about Trump firing Comey**
 - Precise in time and in topic
 - Trump leaking confidential information to Russia is a different story
- **Timeline brings new developments**
 - Still very related to Trump firing Comey

Trump Fires Fbi Director Comey

7 days 16 hours ago Score: 1632.8



Director of the Federal Bureau of Investigation
Government Office or Title

President Donald Trump Fires Fbi Director James Comey

President Donald Trump abruptly fired FBI Director James Comey Tuesday, dramatically ousting the nation's top law enforcement official in the midst of an FBI investigation into whether Trump's campaign had ties to Russia's meddling in the election that sent him to the White House.

Frequently Asked:

- Why did trump fire the fbi director?
- Why did james comey get fired?
- Why was james comey fired?

News Cluster IDs: 00003000a6e65fbb - See in Google News
00003000a6e995de - See in Google News
00003000a6e993c88 - See in Google News

Queries: Fbi director james comey
Trump Fires Fbi director
Trump Fires james comey

CV Documents: 98f088539de0abd
5cd3b91f468b1200
125177ee671fba6a

HB Documents: 5c9b3c0a3d8d0163
278986cf106a1278
3ae915d013a55c52

Inspect Event Data - Search Similar Events

Story Timeline

<p>1 day 13 hours ago Chris Pratt Ellen Degeneres</p>  <p>0.7</p> <p>Spicer: Comey "lacked judgment" for the job.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 2548.0</p>	<p>2 days 18 hours ago David Frum</p>  <p>1.3</p> <p>Conservative Media In Denial Over Comey News</p> <p>Outspoken Trump critics Bruce Bartlett and David Frum tackle the mixed messages coming from conservative media outlets.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 2372.7</p>	<p>4 days 2 hours ago Alice Fisher Fbi</p>  <p>30.9</p> <p>Trump Say It S Possible He Could Pick Fbi Head By Next Week</p> <p>President Donald Trump said Saturday that he could announce his pick for FBI director by late next week, before he leaves on his first foreign trip since taking office.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 3336.1</p>	<p>4 days 14 hours ago Trump Warns Comey</p>  <p>5.7</p> <p>Hinting At Secret Tapes Trump Warns Ousted Fbi Director</p> <p>Raging against a political firestorm, President Donald Trump on Friday shot a sharp warning at his ousted FBI director about possible "tapes" of their disputed private conversations, raising the provocative possibility that recording devices have been installed in the White House.</p> <p>Inspect Event Data - Search Similar Events</p>	<p>6 days 8 hours ago Trump Supporters Comey</p>  <p>0.5</p> <p>Americans Split Along Party Lines On Firing Of Fbi Director</p> <p>Opinions on President Donald Trump's firing of FBI Director James Comey are dividing along familiar partisan lines: Republicans and Trump supporters see it as necessary, while Democrats view it with suspicion.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 5683.7</p>	<p>7 days 16 hours ago Who Appointed comey As Fbi Chief</p>  <p>107.2</p> <p>Some Names Trump Might Consider In Picking New Fbi Chief</p> <p>With James Comey ousted as FBI director, President Donald Trump will have an opportunity to select a replacement for a new 10-year term.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 4401.0</p>	<p>7 days 19 hours ago Fbi Director James Comey</p>  <p>164.0</p> <p>Fbi Corrects Comey Testimony On Clinton Aide Huma Abedin</p> <p>The FBI has sent a letter to Congress correcting the record on Director James Comey's testimony on Huma Abedin, a top aide to Hillary Clinton.</p> <p>Inspect Event Data - Search Similar Events Story Similarity Score: 15540.6</p>
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Trump pulling out of Paris agreement

([query](#))

Trump Paris Climate Accord

3 hours 36 min ago | Score: 196.5



Paris Agreement

White House Official Says Trump Expected To Withdraw Us From Paris Climate Accord

President Donald Trump is expected to withdraw the United States from the Paris climate accord, a White House official said Wednesday, confirming a move certain to anger allies that spent years negotiating the landmark agreement to reduce carbon emissions.

Frequently Asked:

- Why withdraw paris climate agreement?
- What is the paris climate accord?
- What is the paris climate deal?

News Cluster ID: 00003000afebe4e2 - See in Google News
00003000b02e4f96 - See in Google News
00003000b038e45c - See in Google News

Queries: Trump paris climate accord
Paris climate accord
Paris climate accord

CV Documents: 1fd75f9990c3cb68
ac183449f581de63
69336f727d919e27

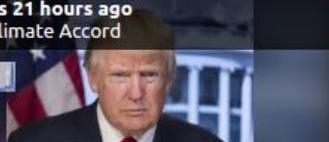
NB Documents: 4ce7223de4932218
605c4dc23ae68c
ff0b4b6f4482bfae

Inspect Event Data - Inspect Cluster Data - Search Similar Events

And 21 days earlier, he said he would decide on the agreement after the G7 summit, which he just did.
(also from the timeline)

21 days 21 hours ago Paris Climate Accord

13.8



Trump Will Make Decision On Paris Climate Pact After G7 Summit

On Tuesday, the White House has said that US President Donald Trump will not make a decision on whether the US should remain in the Paris climate agreement until after he returns from the G7 summit.

Inspect Event Data - Search Similar Events
Story Similarity Score: 1760.5

Story Timeline

4 days 4 hours ago Paris Climate Agreement Trump Rally

12.5



G 7 Source Us Gets More Time On Out Climate Pact Answer

Seven wealthy democracies ended their summit Saturday in Italy without a unanimous agreement on climate change, as the Trump administration plans to take more time to say whether the U.S. is going to remain in the landmark Paris accord that fights climate change.

Inspect Event Data - Search Similar Events
Story Similarity Score: 2354.2

4 days 4 hours ago Paris Climate Agreement Trump

9.5



Trump Says He'll Decide On Paris Climate Deal Next Week

President Donald Trump faced new controversies over his team's possible ties to Russia as he closed out his first trip abroad Saturday, a grueling five-stop sprint that ended with the promise of an imminent decision on the much-discussed Paris climate accord.

Inspect Event Data - Search Similar Events
Story Similarity Score: 1111.4

5 days 3 hours ago What Is The Paris Climate Accord

7.9



Europeans Making Sales Pitch To Trump On Climate Accord

White House Correspondent Julie Pace reports that President Donald Trump's views on climate change are "evolving" following discussions with European leaders who are pushing for him to stay in the Paris climate accord.

Inspect Event Data - Search Similar Events
Story Similarity Score: 401.2

5 days 6 hours ago Trump At G7 Meeting

7.8



Migration Crisis Looms At G7 Meeting | Dn News

Talks between U.S. President and other leaders of the G7 summit on Friday were "robust" and "challenging" as Trump lambasted NATO allies and German trade policies at a

Inspect Event Data - Search Similar Events
Story Similarity Score: 401.2

Realtime Boost Events

- **Realtime** - Realtime detection of news-events - Under 5 minutes after event started.
- **Event Understanding**
 - Build Correlations in multidimensional space
 - Temporal locality
 - Temporal topicality
 - Entities / Salient-Terms / Summary / Label / Queries / Questions / Videos, etc...
 - Event Popularity (CV / NB) and importance
- **Query Understanding** - Search currently trending Events for the Query
 - Also for Query-less, using list of Entities / Salient Terms / Google-Now profile
- **Statefulness** - Understand Story updates and checkpoints
- **Fine Grained and precise in time**

News Clusters catch-up plan ?

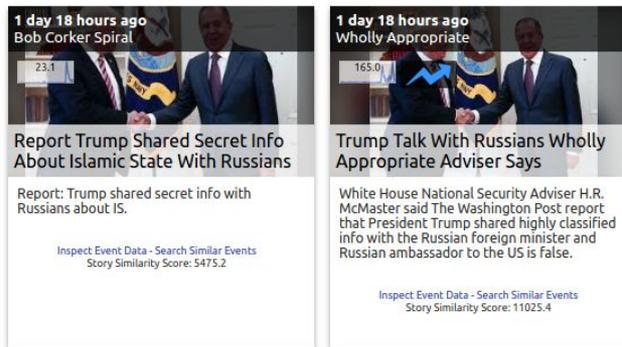
If we were to improve News Clusters to get to where RTBoost Events is right now.
(Hypothetically without using Hivemind or RTBoost Spikes for the sake of argument.)

- Use modern-day document tokens: Entities and Salient Terms
- Improve Granularity and Time precision
 - Understand them in much more detail than we currently do
 - Spikes inside the current NewsCluster granularity ?
- Make cluster id stable (no splitting or merging)
- Build links between clusters (Stories)
- Integrate NB, CV, MiniSessions data pipelines into NewsClusters
- Build correlations with Temporal topicality
 - Use TF-DF over background distribution of terms in the corpus (in realtime?)

We would need to work on all of these integrations, to get to the same point we are with RTBoost Events.

RealtimeBoost Events - Known Issues

- **Underclustering** - Sometimes too fine grained
 - likely a bug in the clustering
- **Entity Intrusion**
 - Some articles contains Anchors to other non-related headlines in the middle of the centerpiece text.
 - Fix is not hard.



ENTITY Show all elements

img_x*	Name_x*	Score_x*	Numerator_x*	Denominator_x*
	Caffeine /m/01_2/ Chemical compound	453.94	4754	14542
	Mountain Dew /m/0sp88 Brand	196.66	303	941
	Cape Canaveral /m/0776c Cape	178.53	129	319
	Energy drink /m/0203vw Beverage type	175.38	856	4886
	Caffeinated drink /m/02w6k0 Beverage	140.01	189	779
	Jeffrey Dahmer /m/044b5 Man	128.36	76	240

Boy died of caffeine overdose.
 Some articles contained a link to the SpaceX
 Cape Canaveral launch that just happened.
 The entity leaked to the caffeine Event.

- **Local News coverage**

Model-T Cost

Currently we use the Freebie Quota: 10 QPS

We already requested 40KQPS for production deployment.

- Average Document Size:
 - Realtime Event Corpus: **400KB / doc**
 - Can be much smaller if we want
 - Newsstand corpus : **45KB / doc**
- Indexing Memory Usage
 - Realtime Event: **4GB**
 - Newsstand: **64GB**
- Muppet CPUs Per Query
 - Realtime Events: **0.4 CPUs / Query** [\[link\]](#)
 - Also can be improved
 - Newsstand: **1.1 CPUs / Query** [\[link\]](#)

Ready for Launch

Need greenlight from leads to go ahead with 40KQPS for production deployment.

ModelT Query API is ready and available [here](#).

Integration inside FCS Stories is to be decided with AlexK.

ATTIC

Model-T Events Retrieval

Online Retrieval from Model-T

Can be queried by:

- SQuery / Entity / Terms
- **Spike** (bring Events for given spike)
- Weighted set of **Entities** (Google Now profile)
- Weighted set of **Locations** (What is trending here)
- **News Cluster ID** (bring Spike Events containing this news-cluster)

Document annotation

(Indexing in regular muppet)

- Annotate each news document with Event ID
Similar to what google news clusters do

Event

Event Label

Brazil 1st to qualify for world cup

Event Summary

A resurgent Brazil squad under new management became the first team to qualify for the World Cup on Tuesday.

Queries

brazil vs paraguay live streaming

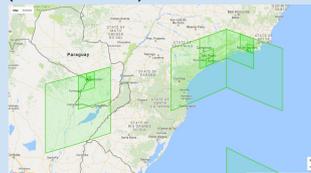
Questions

who scored brazil vs paraguay

Image



Locations (from cv and nb)



Popularity (CV and NB lift)

Model-T Events Retrieval

Online Retrieval

Flexible (can do complex queries)

- Trending events per Location etc

Breaking news events is guaranteed to be quickly indexed, retrieved, ranked

Can't index singleton-documents or non-spiking topics

Document annotation

Plays well with current ranking systems (FCS etc)

Rank singleton-docs and topics vs Events

Already contains all per-doc ranking signals we want

Might miss very fresh breaking news due to lack of signals on fresh docs

- Can be fixed with Spark / Crowding per Event-ID etc...

Model-T Events Checkpointing

Event-ID-X (timestamp 1)

Event Label

Brazil is playing for world cup

Event Summary

Brazil must win to qualify for the World Cup.

Queries

brazil vs paraguay live streaming

Questions

When does the match start

Image



Locations (from cv and nb)



Popularity (CV and NB lift)

Event-ID-X (timestamp 2)

Event Label

Brazil 1st to qualify for world cup

Event Summary

A resurgent Brazil squad under new management became the first team to qualify for the World Cup on Tuesday.

Queries

brazil vs paraguay live streaming

Questions

who scored brazil vs paraguay

Image



Locations (from cv and nb)



Popularity (CV and NB lift)

Keep checkpoints of the same Event-ID for multiple timestamps

Retrieve the checkpoint based on user-state

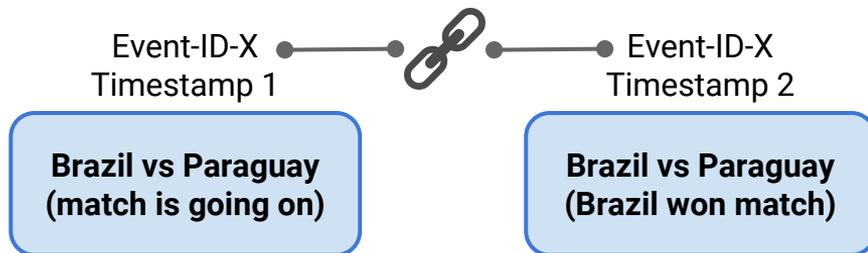
Works for bigger / long-running events

Might be harder for short or smaller events
(Less documents distributed across time)

Checkpointing VS Timelines - Hierarchy

Checkpoints

Multiple timestamps for same Event under development



Timelines

Multiple Events connected by common topic



Timelines - Hierarchy

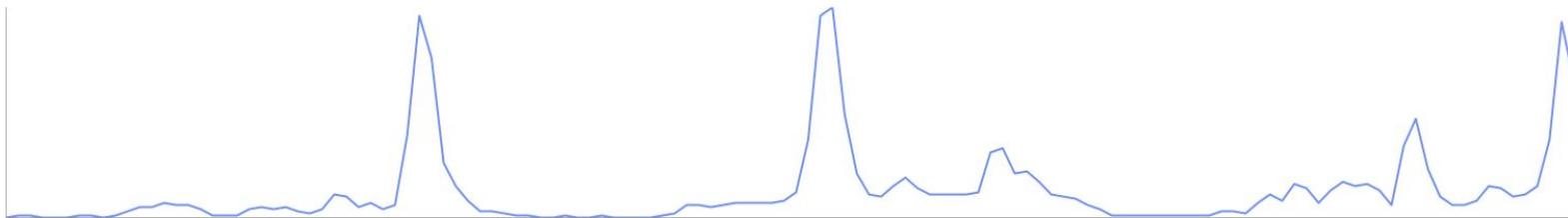
Timelines

- Model-T allows retrieval by cosine similarity of
 - Entities / Salient Terms / News Cluster ID / etc...
 - Start with Event-ID-X and retrieve Events by similar Entities etc ...

RealtimeBoost Spike Events vs News Clusters

- **Coarse grained** - News Clusters has longer time-span and contains multiple spikes
- **Fine grained** - Spikes are punctual in time, lasting 3 to 4 hours

We can use these ideas to build the Hierarchy



Event Detection - Current State

Clusterization Binary

- Index Events in Model-T (in realtime)
- Under development - ETA beginning of April

Model-T

- Already in place with Flex quota - [Getting Prod resources now](#)

Model-T Query Service

- Serve Events to Clients
- Simpler Query API than querying directly Model-T
- Under development - ETA beginning of April

Event Detection - Current State

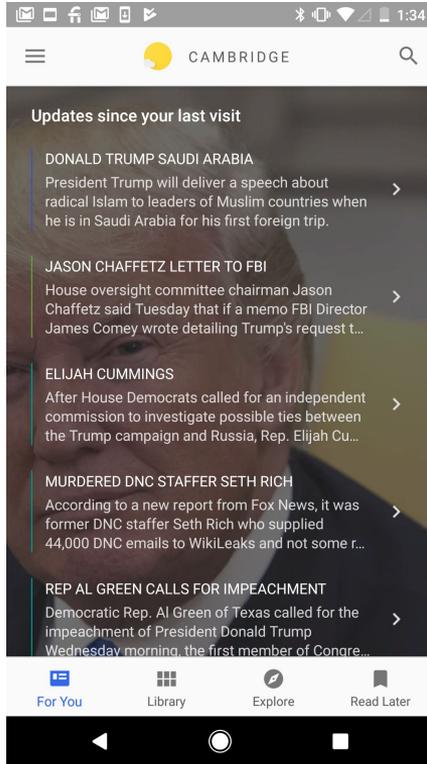
Current Features

- Entities / Salient Terms / Images / DocIDs / URLs / Titles / Summaries / Labels
- Locations by CV and NB
- HasVideo Tag
- Queries by NB and Mini-Sessions
- Popularity by CV and NB
- News Cluster ID
- Questions

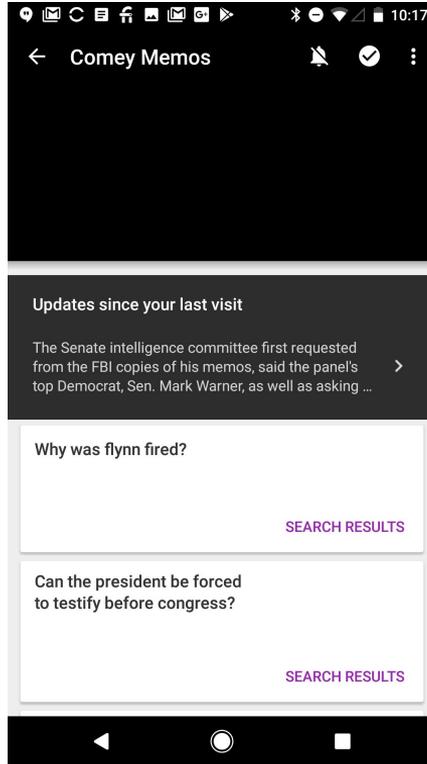
Planned Features

- Fact Checking / Sentence Understanding - ETA TBD
- Youtube Views - ETA TBD
- [Position Ranking signal](#) - ETA April

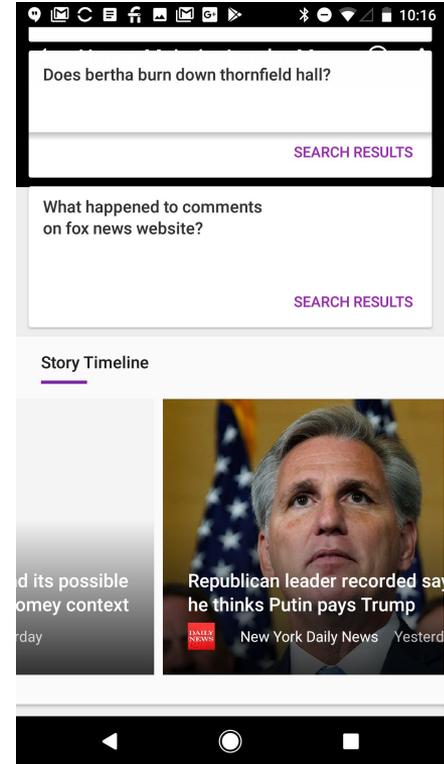
RT Events in 360



Personalized Scannable Briefing



Story Summary and Questions



Timeline