

# Finding the needle in a Haystack

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@expediahaystack

# The Who

The logo for Expedia Group, featuring the words "expedia group" in a white, lowercase, sans-serif font, followed by a small "TM" trademark symbol. The logo is centered within a solid blue rectangular background.

expedia group™

Bringing the world within reach



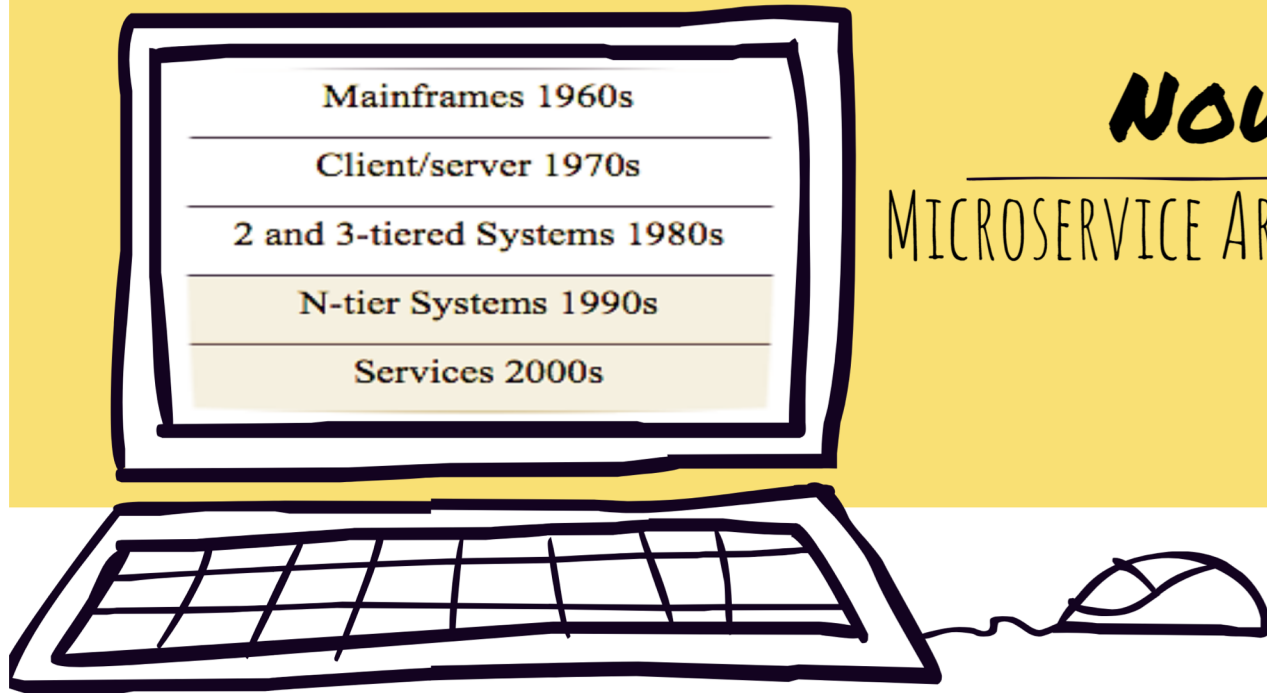
# The What



# Haystack

A resilient, scalable tracing and analysis system

# The Why

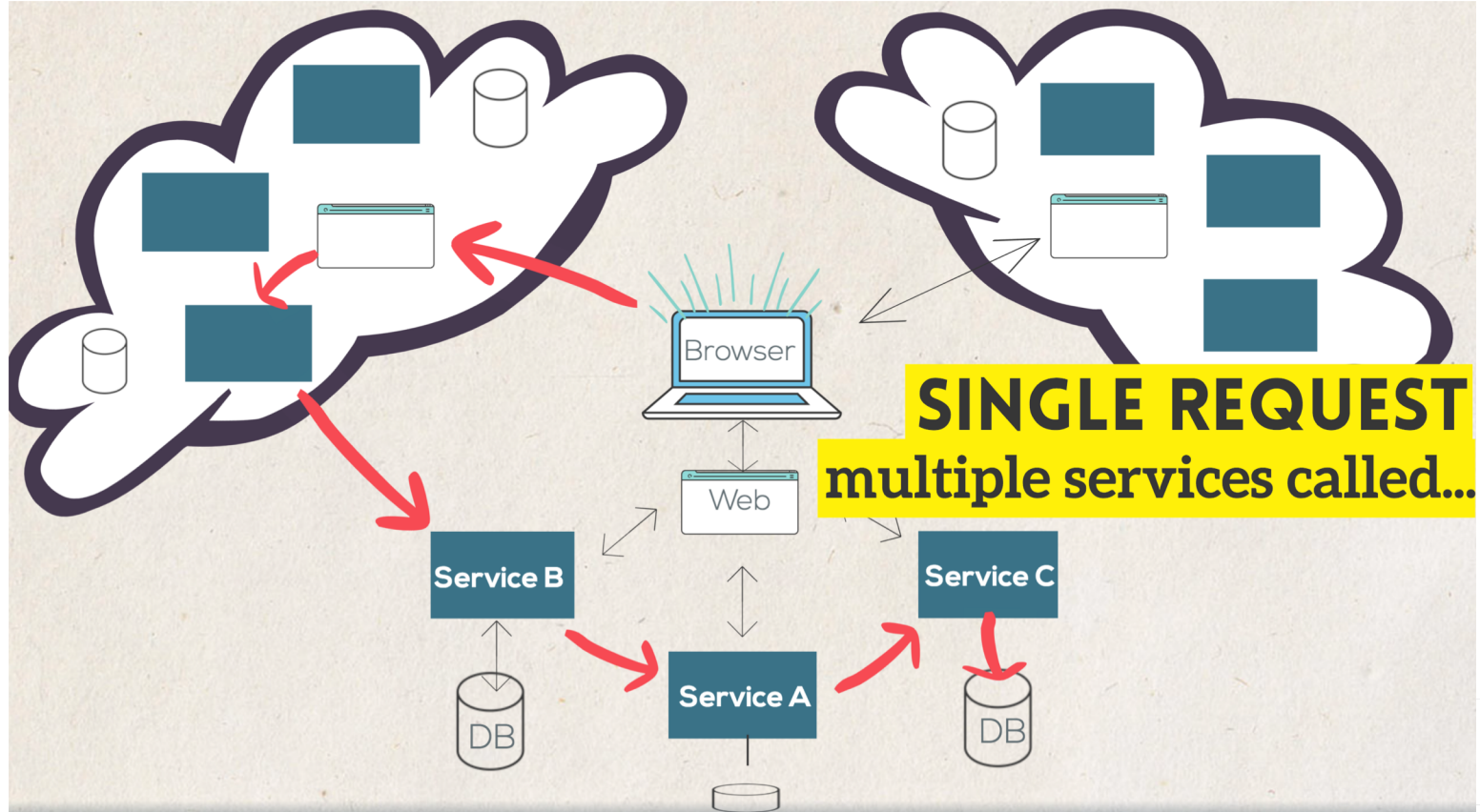


***NOW***

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MICROSERVICE ARCHITECTURE

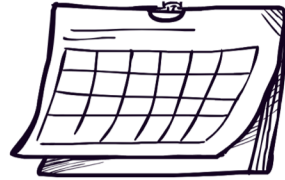
# The Why continued



# The final Why

Why?

**Diagnosing issues  
across multiple  
regions is becoming  
more difficult & time-  
consuming.**



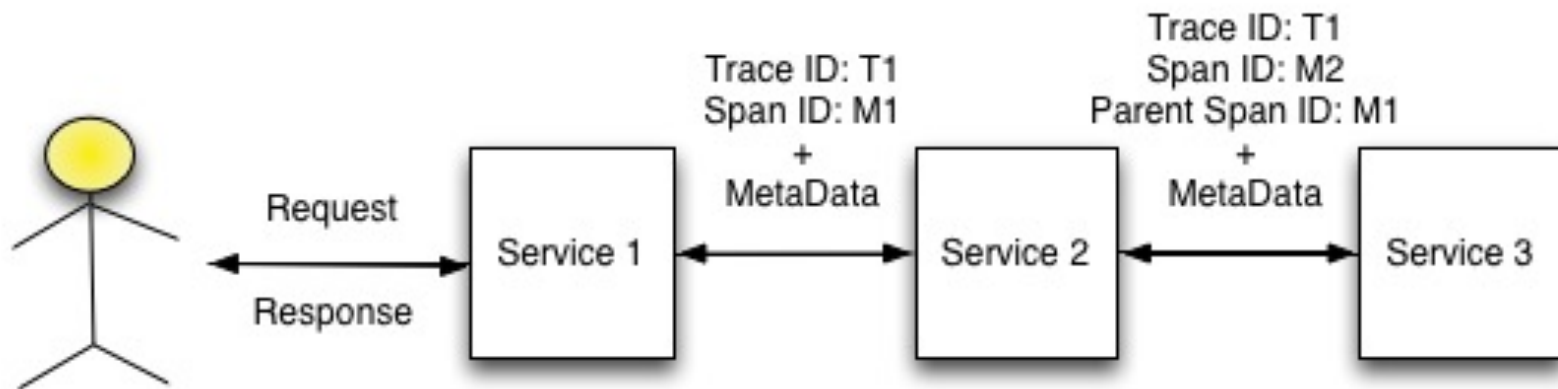


# Finding the needle in a Haystack

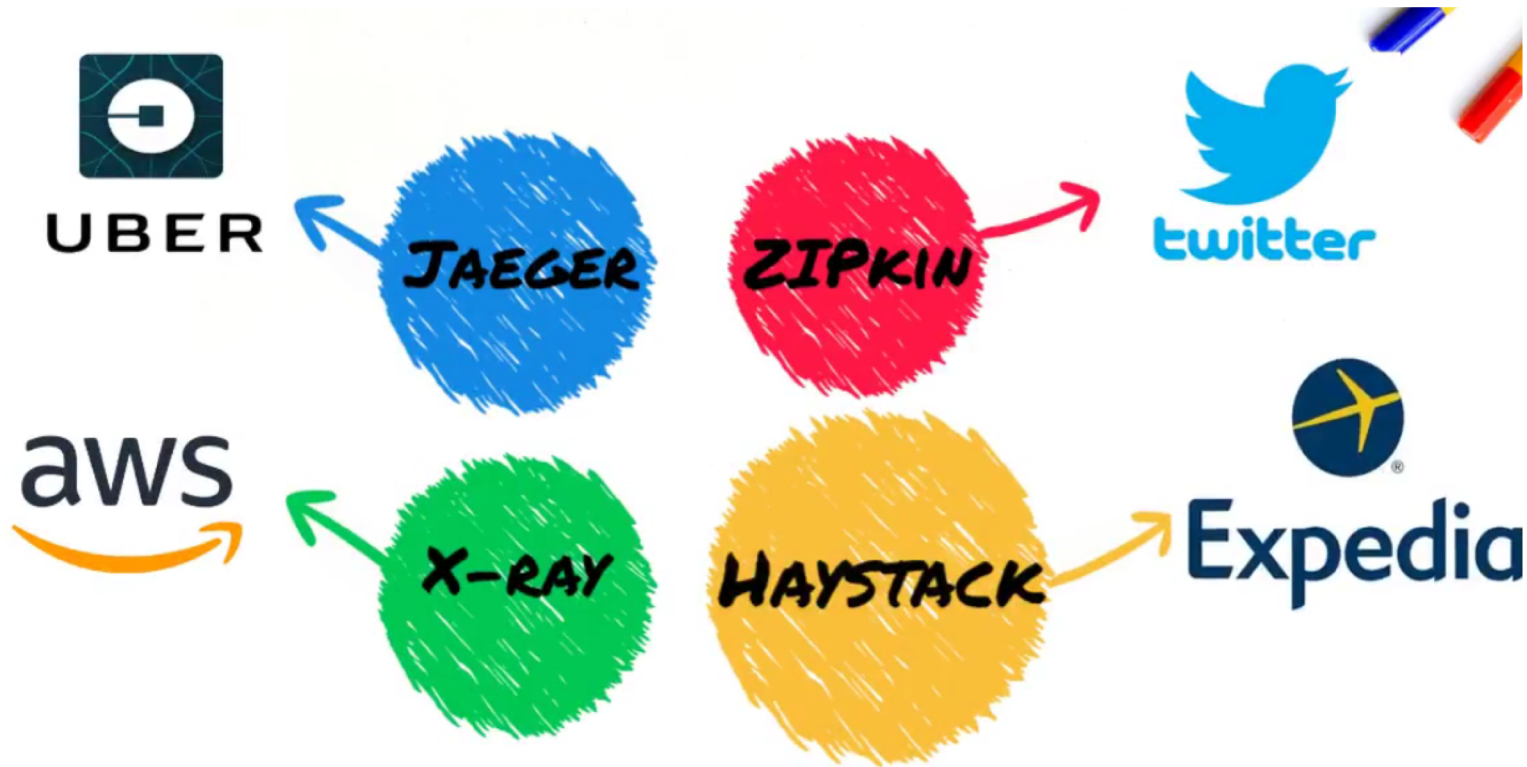


# The How

## Distributed Tracing by Google



# The Where and when



# The Why again: Build our custom solution

## UUID Support

- Existing solutions did not support UUID's as identifiers for Span

## Extensible Platform

- Ability to build more systems to make use of this immensely useful data stream

## Open Tracing

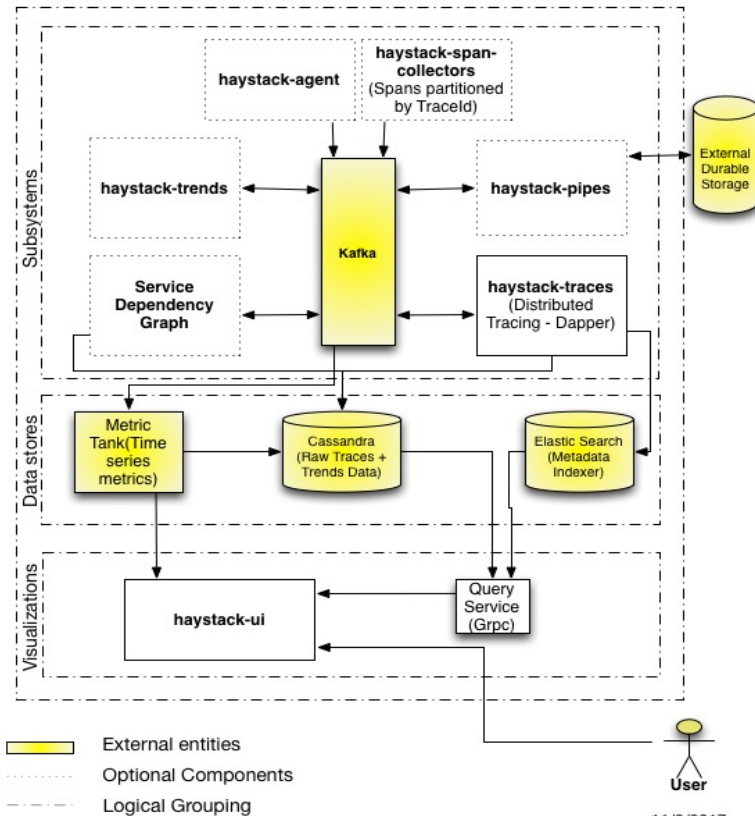
- Open Tracing Compliance so the organization is not coupled to a single implementation

## Open Source

- Opportunity to contribute to the open-source community



# Haystack Architecture



11/2/2017

# Haystack Components

Traces

Trends

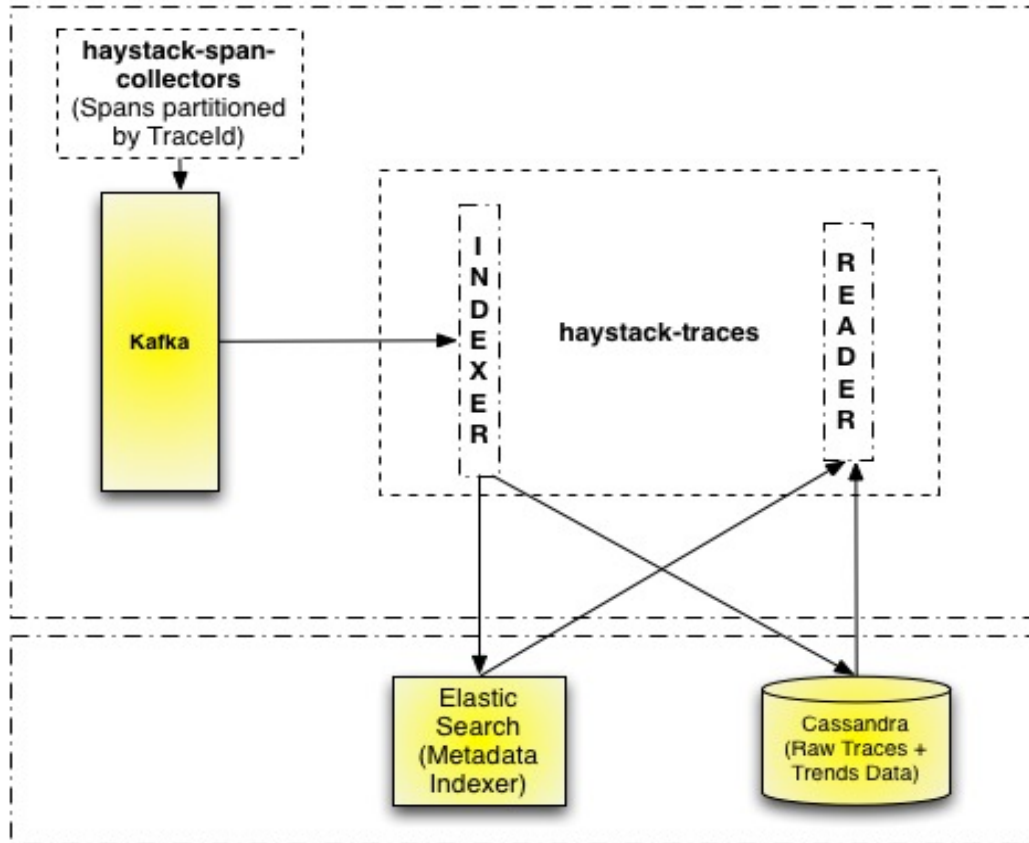
Service Graph

Latency Cost

Alerts

Pipes

# Traces component Architecture



# Traces component



serviceName root-service x

Search tags and services...

last 1 hour

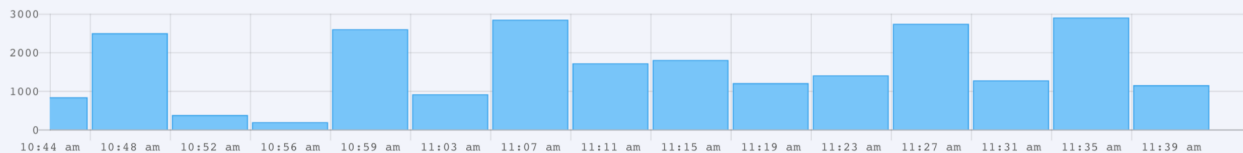


Traces

Trends

Alerts

Service Graph



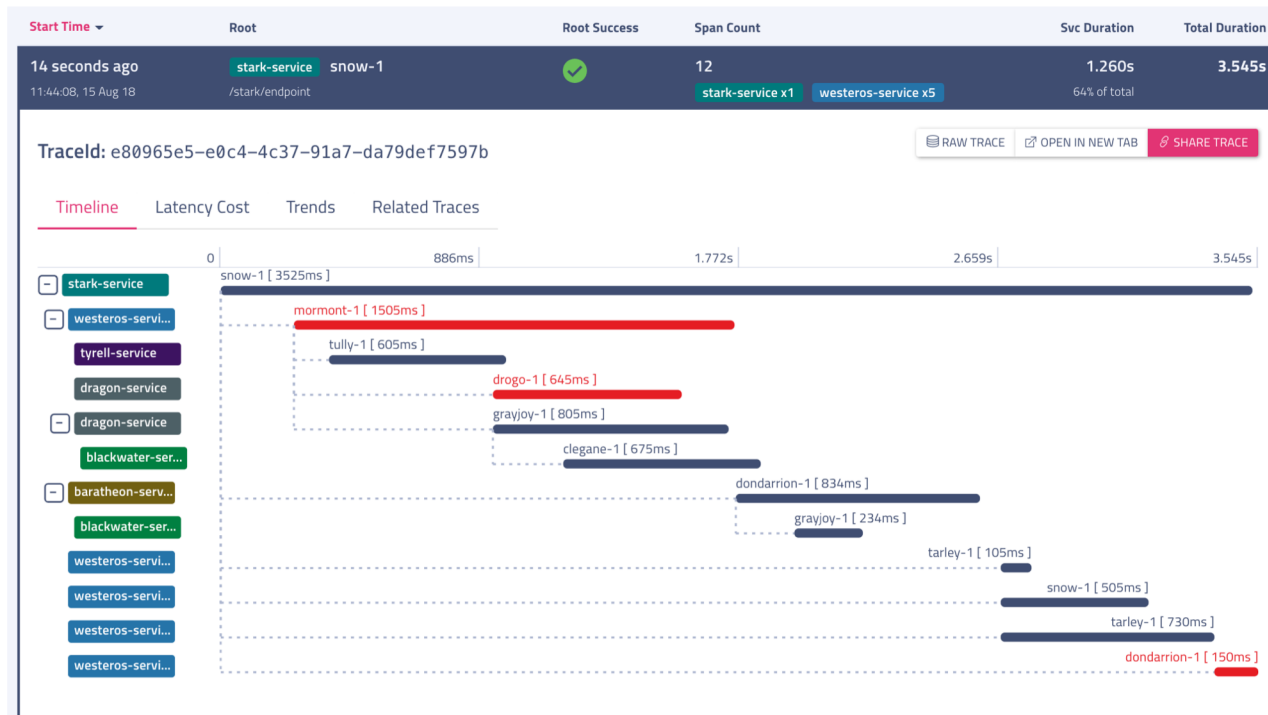
Showing latest 9 traces out of total 24436 for time window. Select a timeline bar to drill down.

TRACES VIEW

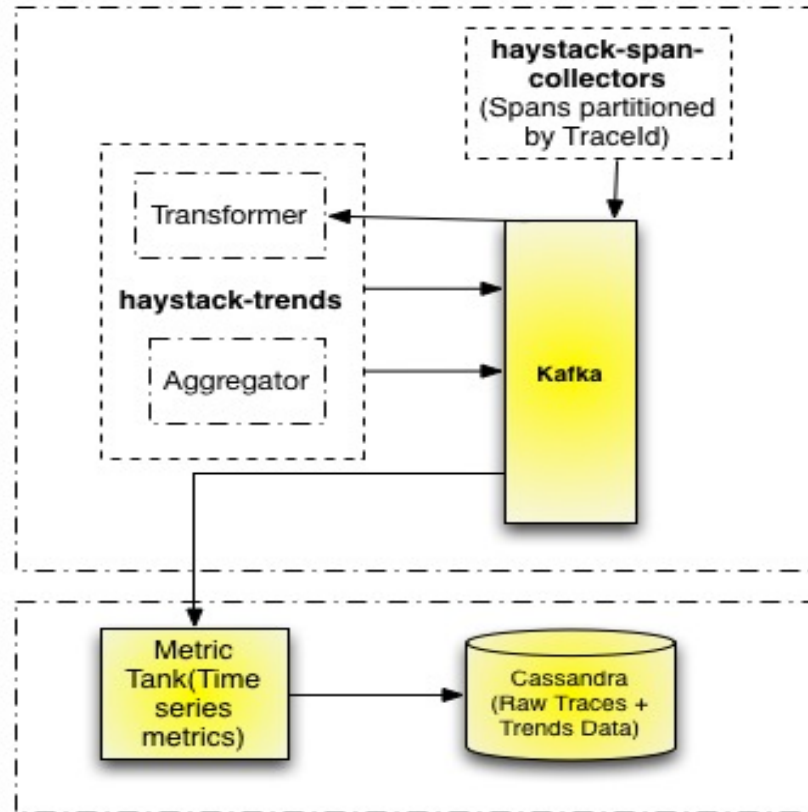
SPANS VIEW

Start Time	Root	Root Success	Span Count	Svc Duration	Total Duration
just now	stark-service snow-1	✓	12	1.260s	3.545s
11:44:08, 15 Aug 18	/stark/endpoint		stark-service x1 westeros-service x5	64% of total	
10 seconds ago	stark-service snow-1	✓	34	23ms	240ms
11:44:00, 15 Aug 18	/stark/endpoint		stark-service x16 targaryen-service x18	99% of total	
15 seconds ago	rob-service mormont-1	✓	9	590ms	850ms
11:43:55, 15 Aug 18	/rob/endpoint		stark-service x1 rob-service x8	64% of total	
18 seconds ago	gendry-service dondarrion-1	✓	44	5.990s	3.500s
11:43:52, 15 Aug 18	/baratheon/endpoint		tyrell-service x22 renly-service x22	64% of total	
18 seconds ago	stark-service clegane-1	✓	30	120ms	126ms
11:43:52, 15 Aug 18	/stark/endpoint		stark-service x1 tyrell-service x29	64% of total	
30 seconds ago	stark-service grayjoy-1	✓	30	5.990s	3.500s
11:43:40, 15 Aug 18	/east/endpoint		stark-service x1 jon-service x29	88% of total	

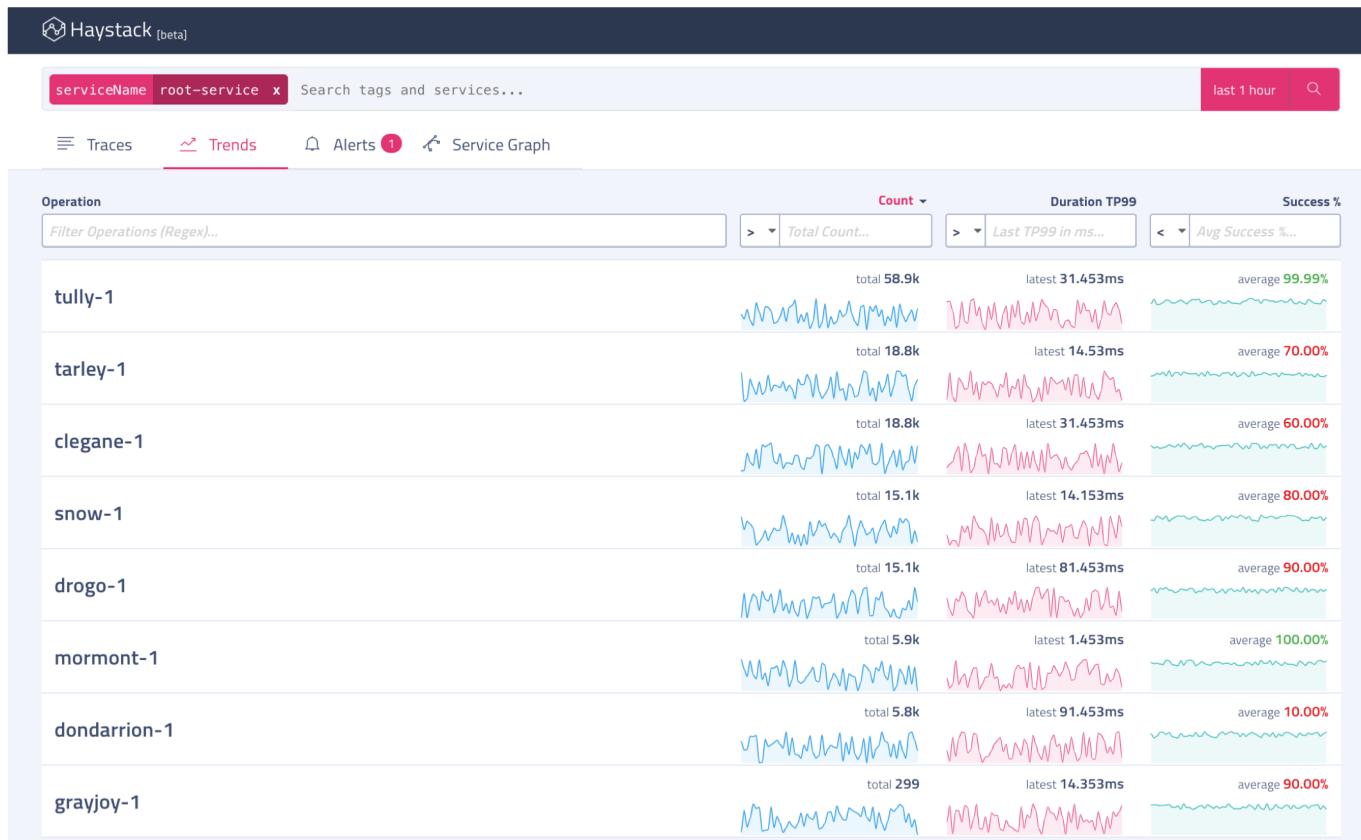
# Traces Waterfall View



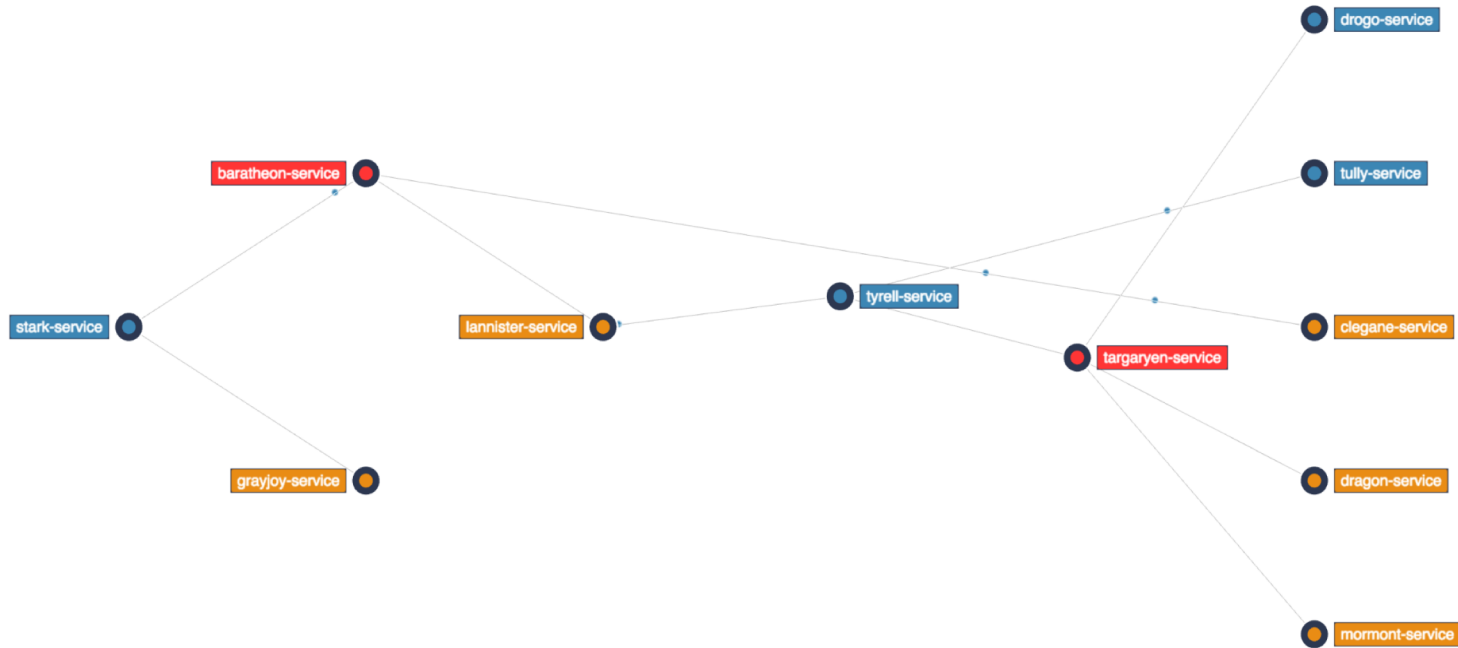
# Trends component Architecture



# Trends component



# Service Graph component





# Network Latency Cost component

TraceId: e80965e5-e0c4-4c37-91a7-da79def7597b

RAW TRACE

OPEN IN NEW TAB

SHARE TRACE

Timeline

**Latency Cost**

Trends

Related Traces

SINGLE TRACE LATENCY

AGGREGATED LATENCY

Network time **996ms** (10 measured out of 11 calls)

Network time cross datacenters **518ms** (5 measured out of 6 calls)

Datacenters involved

6

aws us-east-1

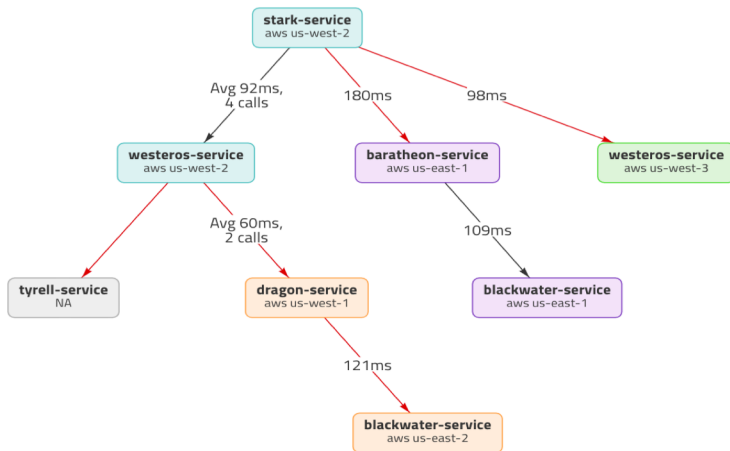
aws us-east-2

aws us-west-1

aws us-west-2

aws us-west-3

NA



# Alerts component

serviceName root-service x Search tags and services...

last 1 hour



Traces Trends Alerts Service Graph

Failure Count 0 Duration TP99 1 AA Duration 0

Auto Refresh ON OFF

## Operation

FilterOperation (Regex)...

Status

Status Changed

Trend (last 24 hours)

tarley-1

unhealthy

26 seconds ago at 11:45:00, 15 Aug 18



tully-1

healthy

23 seconds ago at 11:45:04, 15 Aug 18



dondarrion-1

healthy

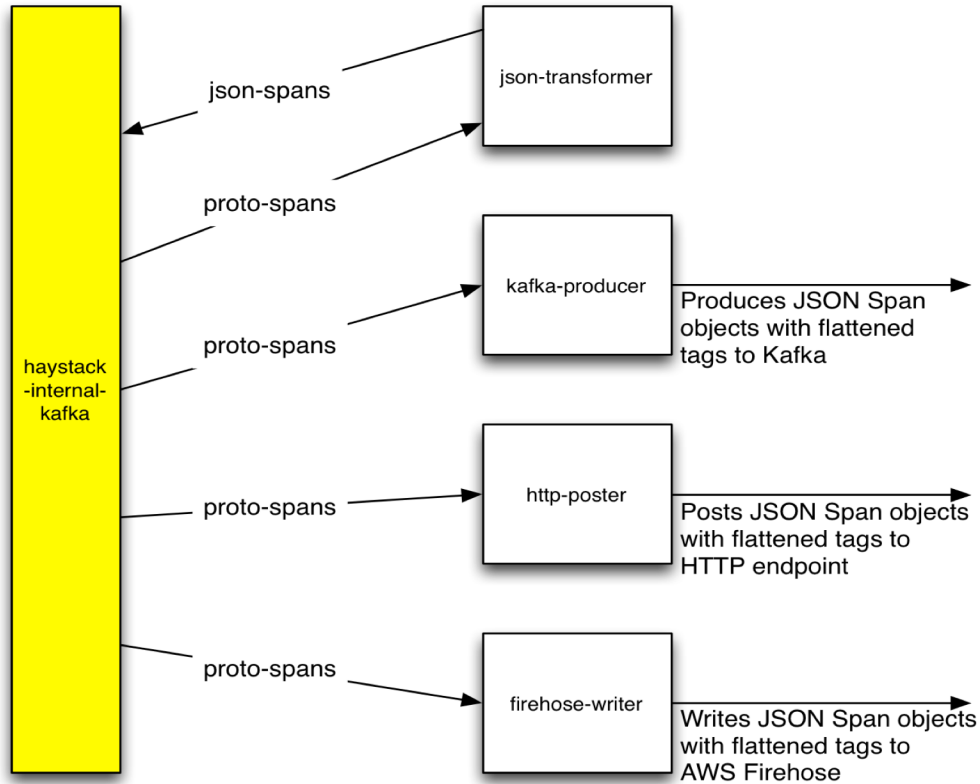
32 seconds ago at 11:44:55, 15 Aug 18



Showing alerts 1 to 3 out of 3

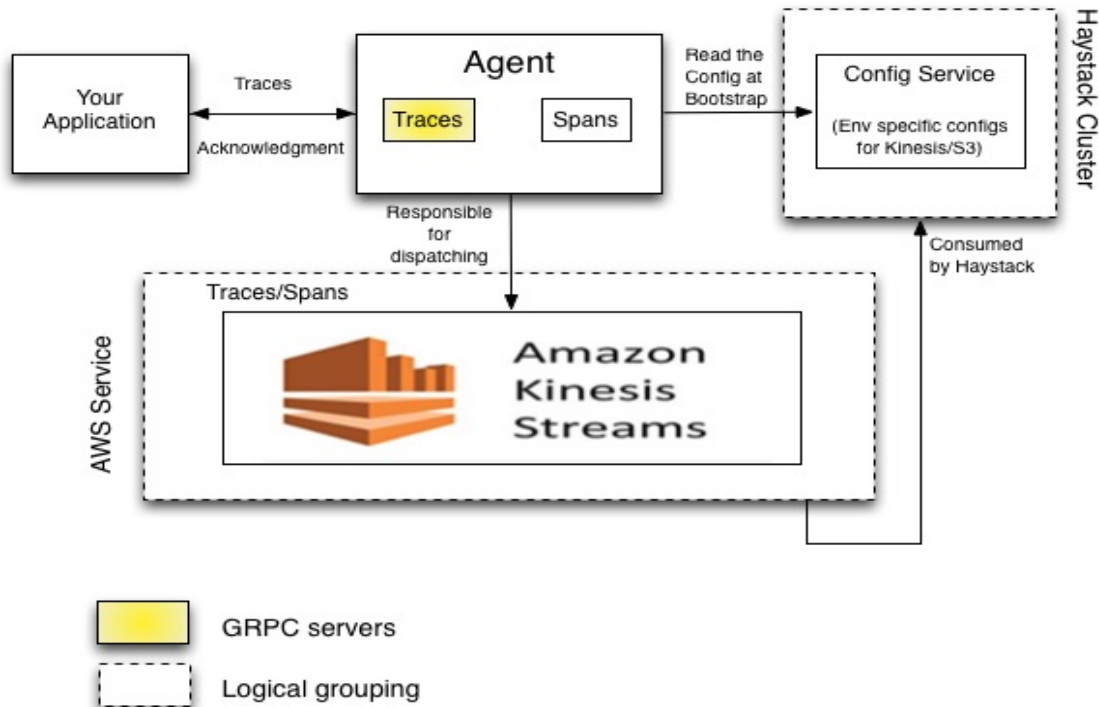
1

# Pipes component

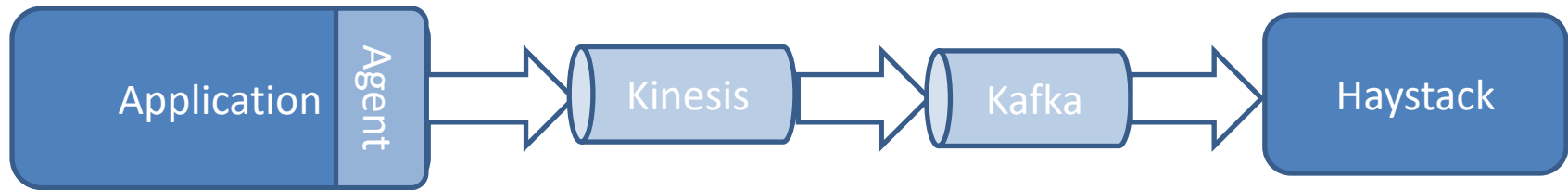


# How to onboard / Integrate: Agent

## V1 Trace and Blob dispatch Architecture



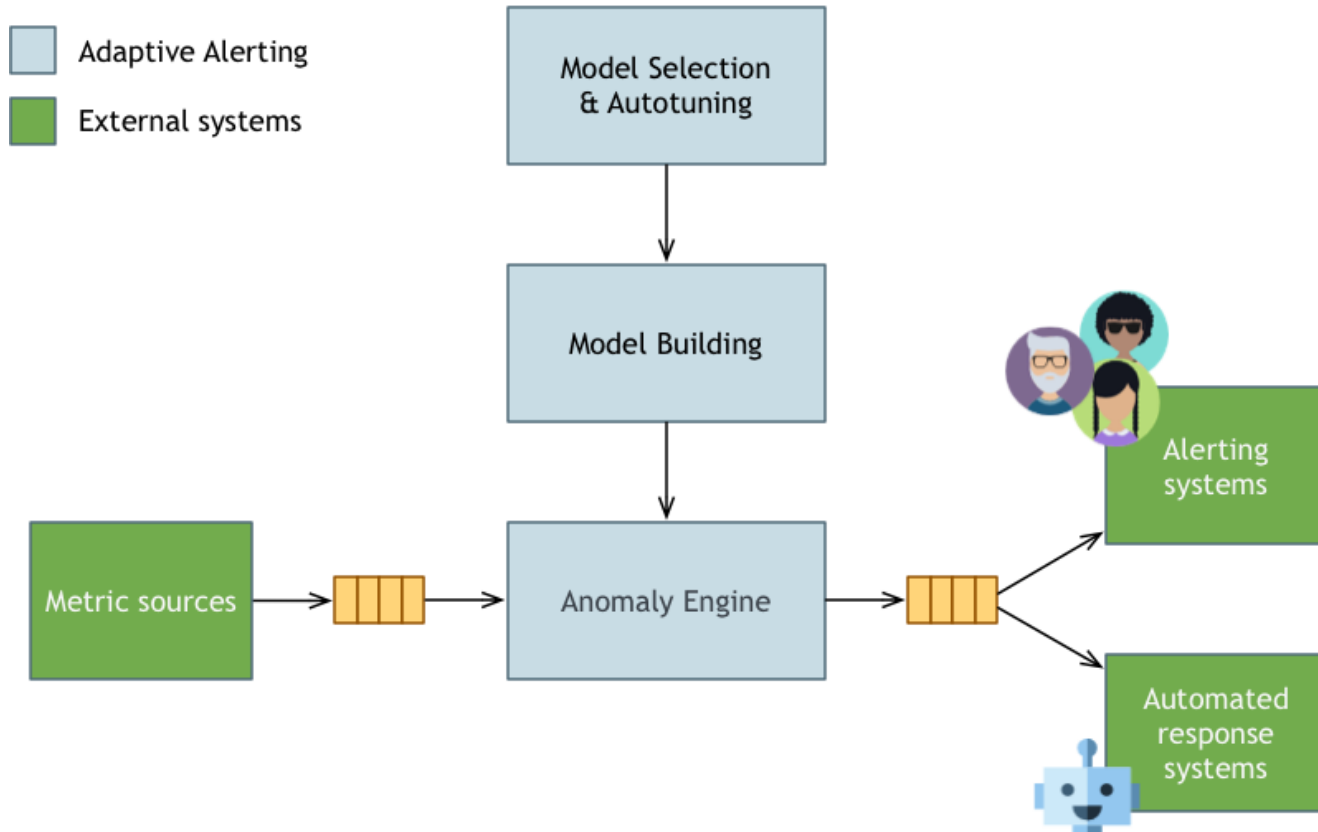
# Haystack flow



# Haystack @ Expedia Group

- **Multiple brands**
- **More than few hundred services**
- **210k/sec spans ingestion**
- **50 node c5.xlarge k8s cluster**
- **40 node Kafka cluster**
- **50 node c5.xlarge Cassandra**
- **Tens of ES node cluster**
- **Support OpenTracing clients in Java and NodeJS**

# Next steps: Adaptive Alerting



# References: Open Source Git repositories

<https://github.com/ExpediaDotCom/haystack>

<https://github.com/ExpediaDotCom/haystack-idl>

<https://github.com/ExpediaDotCom/haystack-commons>

<https://github.com/ExpediaDotCom/haystack-traces>

<https://github.com/ExpediaDotCom/haystack-client-java>

<https://github.com/ExpediaDotCom/haystack-agent>

<https://github.com/ExpediaDotCom/haystack-trends>

<https://github.com/ExpediaDotCom/haystack-collector>

<https://github.com/ExpediaDotCom/haystack-pipes>

<https://github.com/ExpediaDotCom/haystack-metrics>

<https://github.com/ExpediaDotCom/haystack-alert-management>

<https://github.com/ExpediaDotCom/haystack-service-graph>





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