



Netflix's Viewing Data Microservices

# **How We Know Where You Are in House of Cards**

@zimmermatt





1m



49m



# Netflix Scale

@zimmermatt

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# Netflix Scale

62,000,000

# Netflix Scale

62,000,000

50+

# Netflix Scale

62,000,000

50+

3,000,000,000+

# Netflix Scale

62,000,000

50+

3,000,000,000+

1000+

# Netflix Scale

62,000,000

50+

3,000,000,000+

1000+

37%

# Viewing Data

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# Viewing Data: History

Who



# Viewing Data: History

Who,      What



# Viewing Data: History

Who,      What,      When



6/10/2015 11:55

# Viewing Data: History

Who,      What,      When,      Where



6/10/2015 11:55



# Viewing Data: History

Who,

What,

When,

Where,

How Long



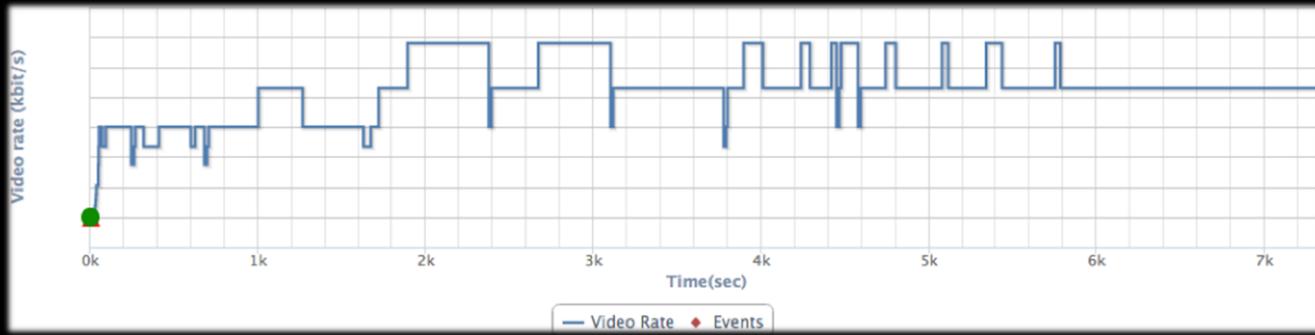
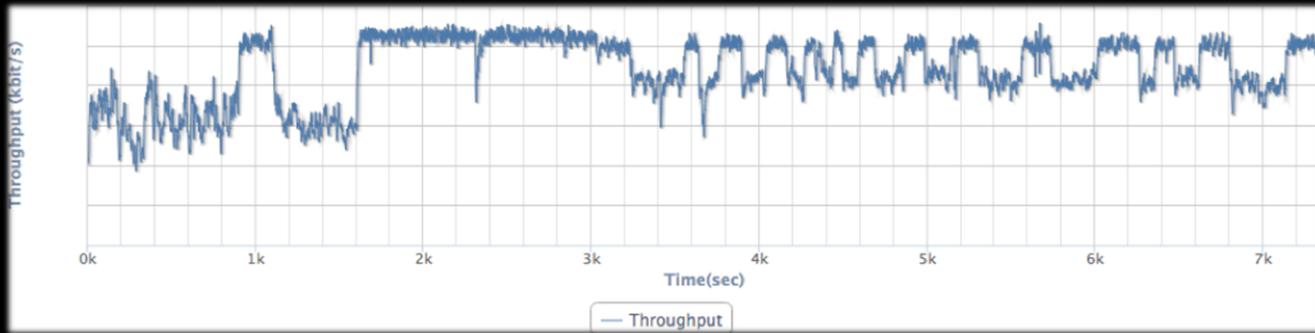
6/10/2015 11:55



Duration  
0:15:11

Latest Position  
14:41

# Viewing Data: Telemetry



# What have I watched?

Continue Watching for Matt



## My Activity

See recent account access

		Watching	Rating
5/13/15	Chef's Table: Season 1: "Massimo Bottura"		<a href="#">Report a problem</a> X
4/28/15	Bloodline: Season 1: "Part 13"		<a href="#">Report a problem</a> X
4/28/15	Bloodline: Season 1: "Part 12"		<a href="#">Report a problem</a> X
4/27/15	Bloodline: Season 1: "Part 11"		<a href="#">Report a problem</a> X
4/27/15	Bloodline: Season 1: "Part 10"		<a href="#">Report a problem</a> X
4/26/15	Bloodline: Season 1: "Part 9"		<a href="#">Report a problem</a> X
4/26/15	Bloodline: Season 1: "Part 8"		<a href="#">Report a problem</a> X
4/25/15	Bloodline: Season 1: "Part 7"		<a href="#">Report a problem</a> X
4/25/15	Bloodline: Season 1: "Part 6"		<a href="#">Report a problem</a> X

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# What have I watched?

Continue Watching for Matt



## My Activity

See recent account access

5/13/15	Chef's Table: Season 1: "Massimo Bottura"	Report a problem <span style="float: right;">X</span>
4/28/15	Bloodline: Season 1: "Part 13"	Report a problem <span style="float: right;">X</span>
4/28/15	Bloodline: Season 1: "Part 12"	Report a problem <span style="float: right;">X</span>
4/27/15	Bloodline: Season 1: "Part 11"	Report a problem <span style="float: right;">X</span>
4/27/15	Bloodline: Season 1: "Part 10"	Report a problem <span style="float: right;">X</span>
4/26/15	Bloodline: Season 1: "Part 9"	Report a problem <span style="float: right;">X</span>
4/26/15	Bloodline: Season 1: "Part 8"	Report a problem <span style="float: right;">X</span>
4/25/15	Bloodline: Season 1: "Part 7"	Report a problem <span style="float: right;">X</span>
4/25/15	Bloodline: Season 1: "Part 6"	Report a problem <span style="float: right;">X</span>

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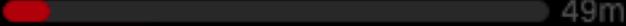
# Where was I at?



**Chapter 34**

**43m**

A hurricane endangers more than just the entire East Coast and Frank must make a difficult choice.

.4m  49m

# What else am I watching?

**Too many people are using your account right now.**

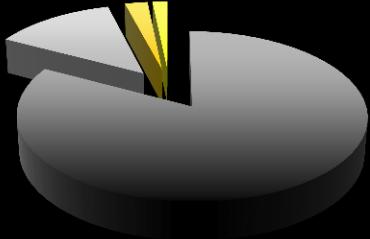
To watch House of Cards, stop playing on this screen:

iPhone - Orange Is the New Black (Doppelganger)

Retry

# What Happened?

Video Bitrate Usage



Whoops, something went wrong...

#### Internet Connection Problem

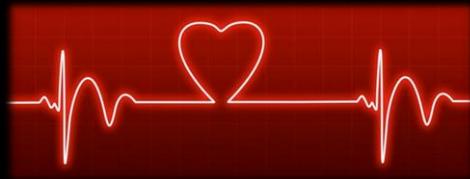
An Internet or home network connection problem is preventing playback. Please check your Internet connection and try again.



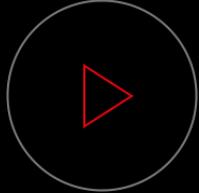
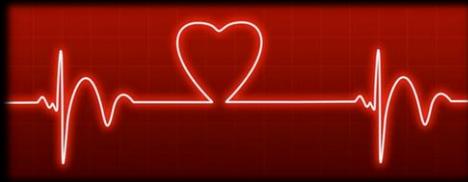
# Viewing Data Requests



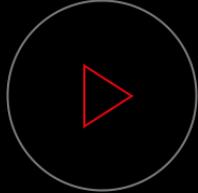
# Viewing Data Requests



# Viewing Data Requests



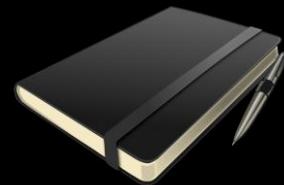
# Viewing Data Requests



Continue Watching for Matt



# Viewing Data Requests



Continue Watching for Matt



14m



49m

@zimmermatt

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**TOUCHING WIRES CAUSES  
INSTANT DEATH**

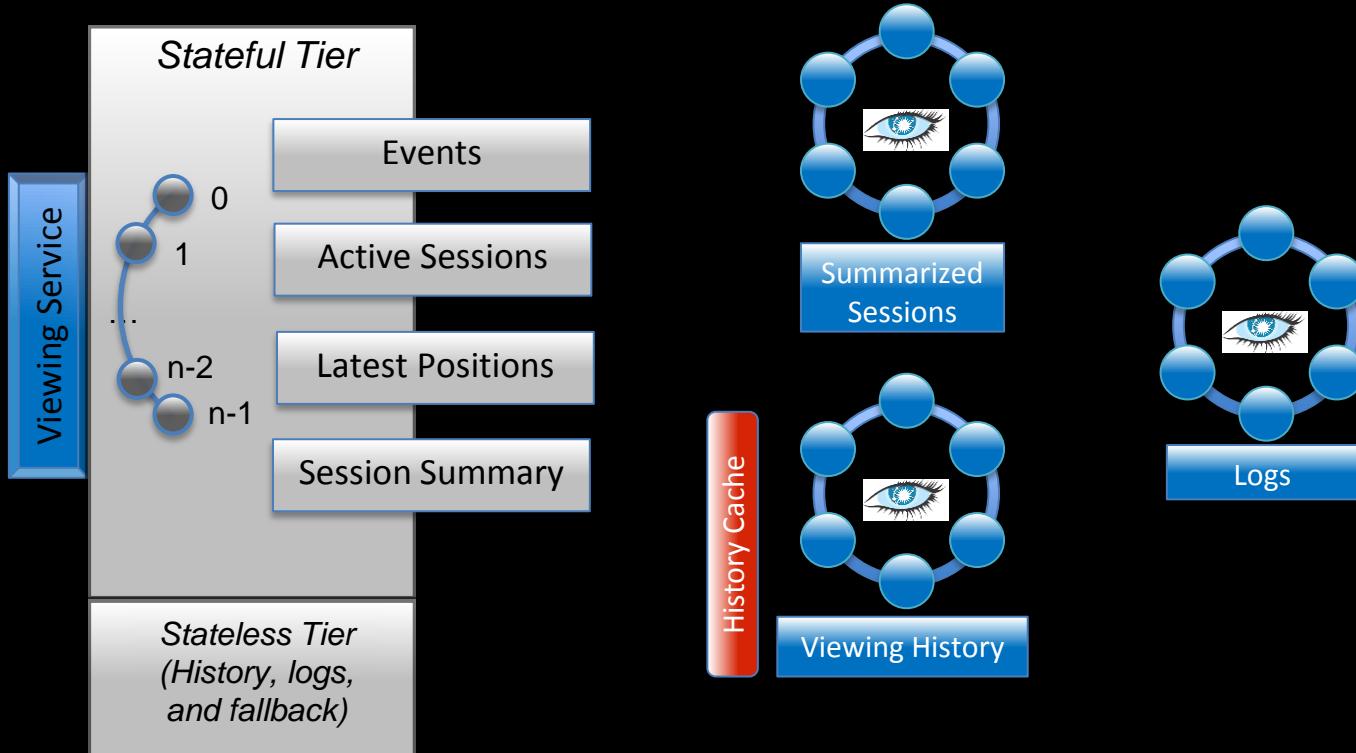


**\$200 FINE**

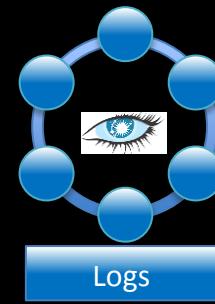


- Newcastle Tramway Authority •

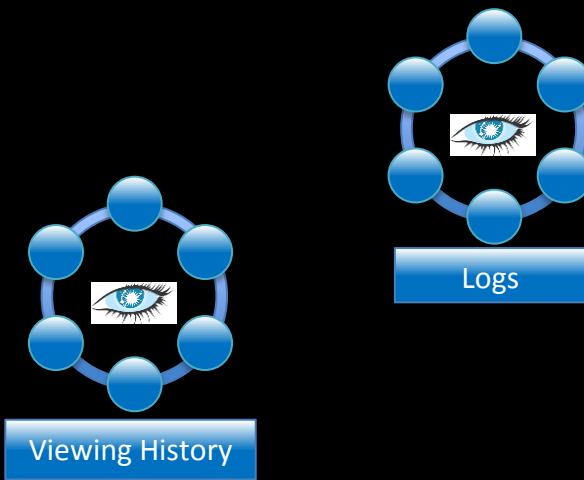
# Gen 3 (Existing) System



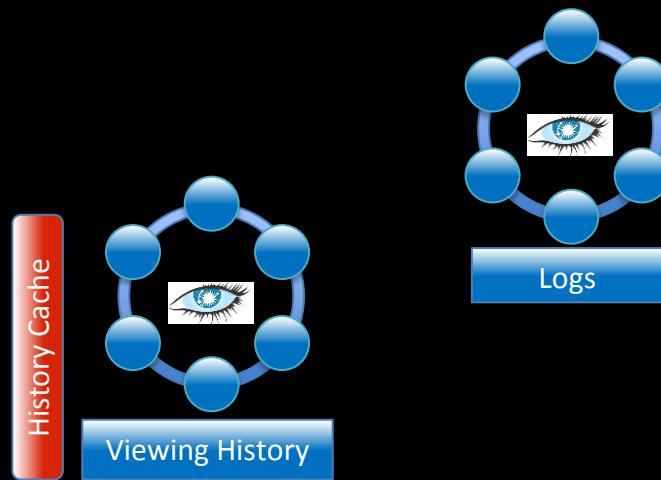
# Gen 3 System's Architecture & Scale



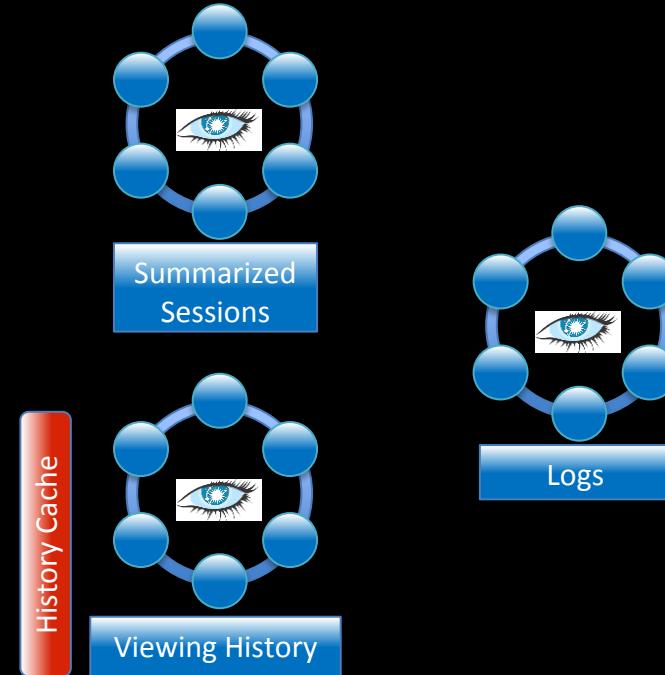
# Gen 3 System's Architecture & Scale



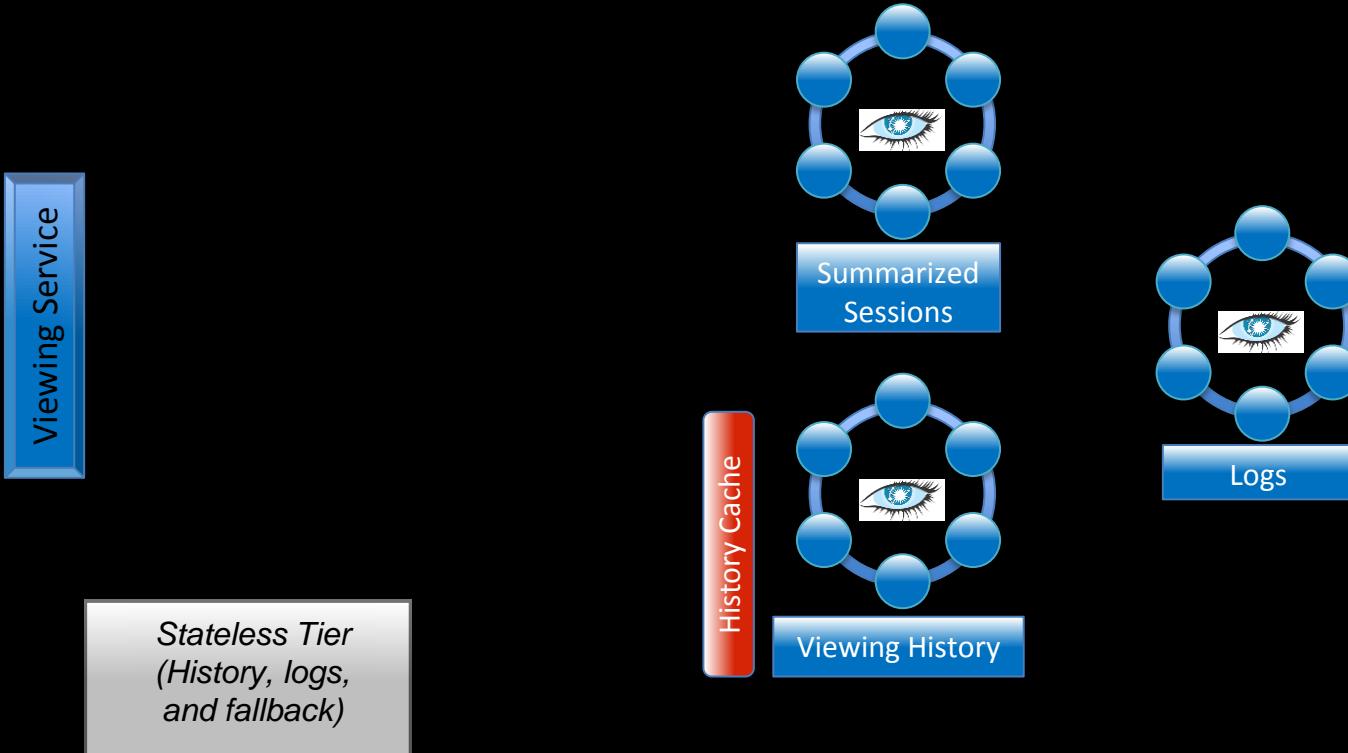
# Gen 3 System's Architecture & Scale



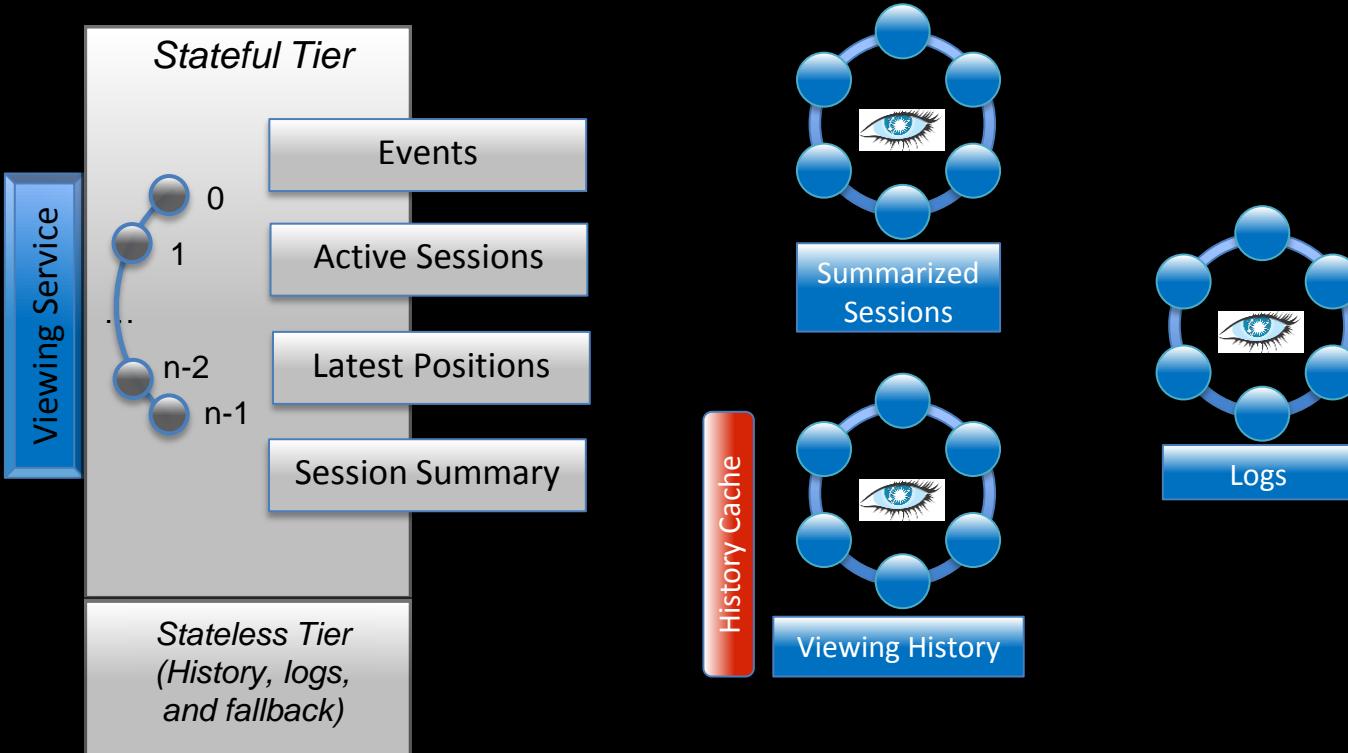
# Gen 3 System's Architecture & Scale



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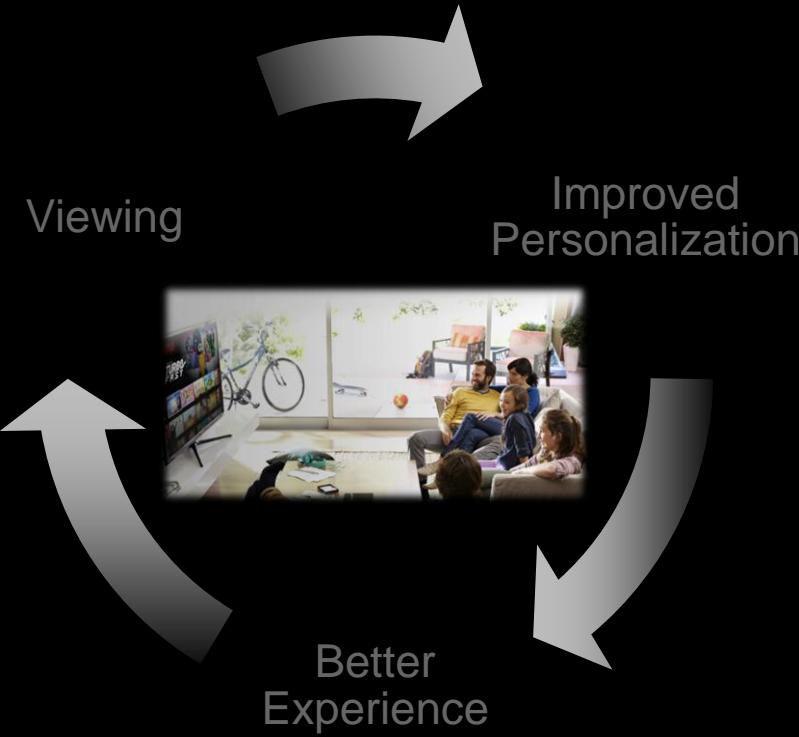


# Growth

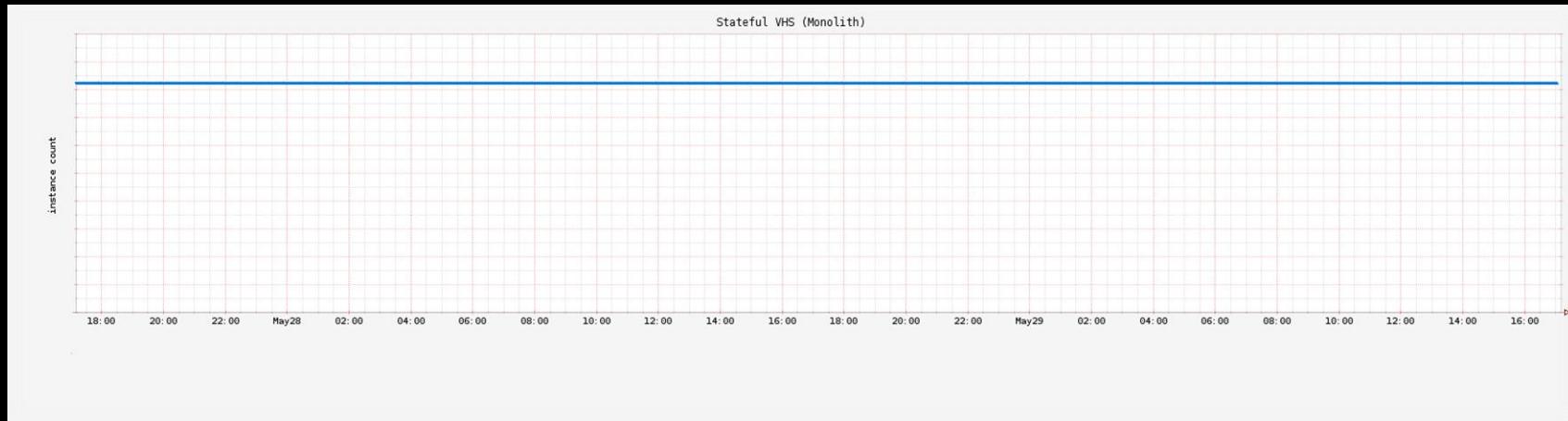


2015

# Virtuous Cycle



# Stateful Instance Count Over Time



# Guiding Lights

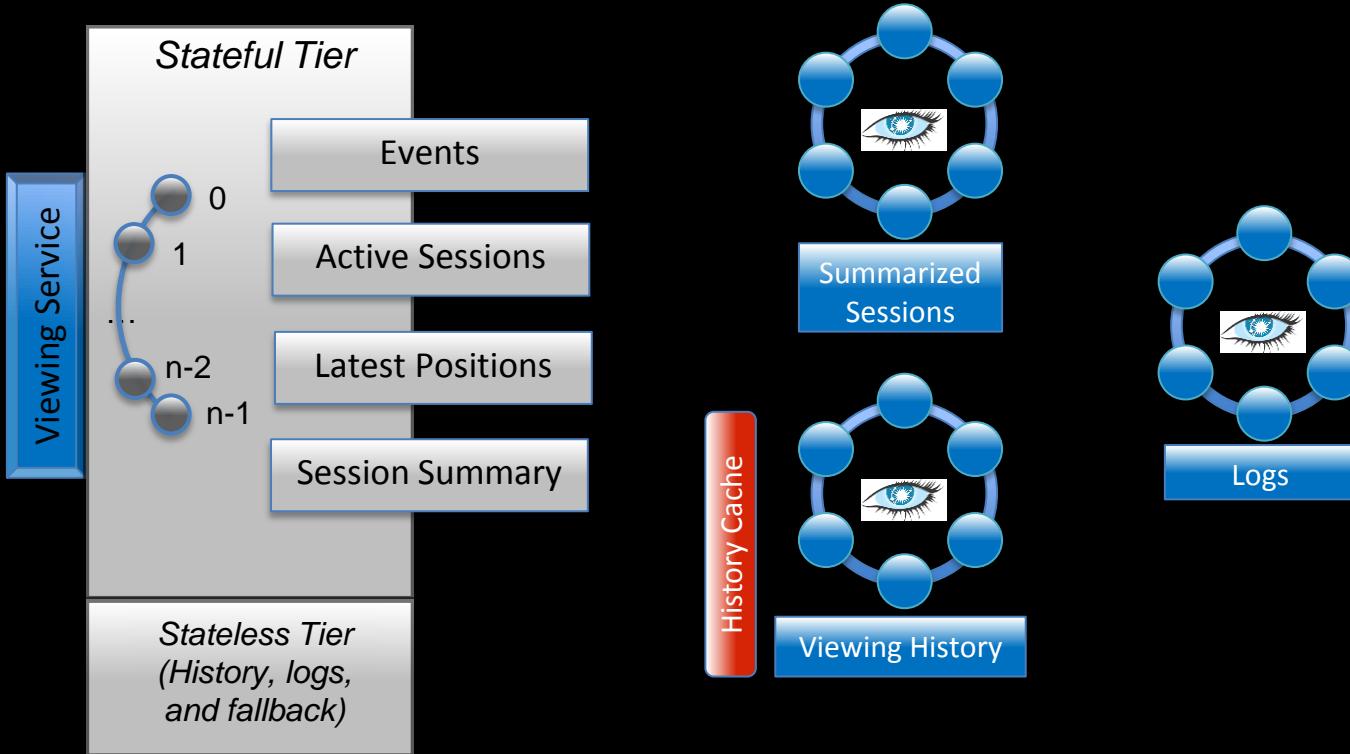




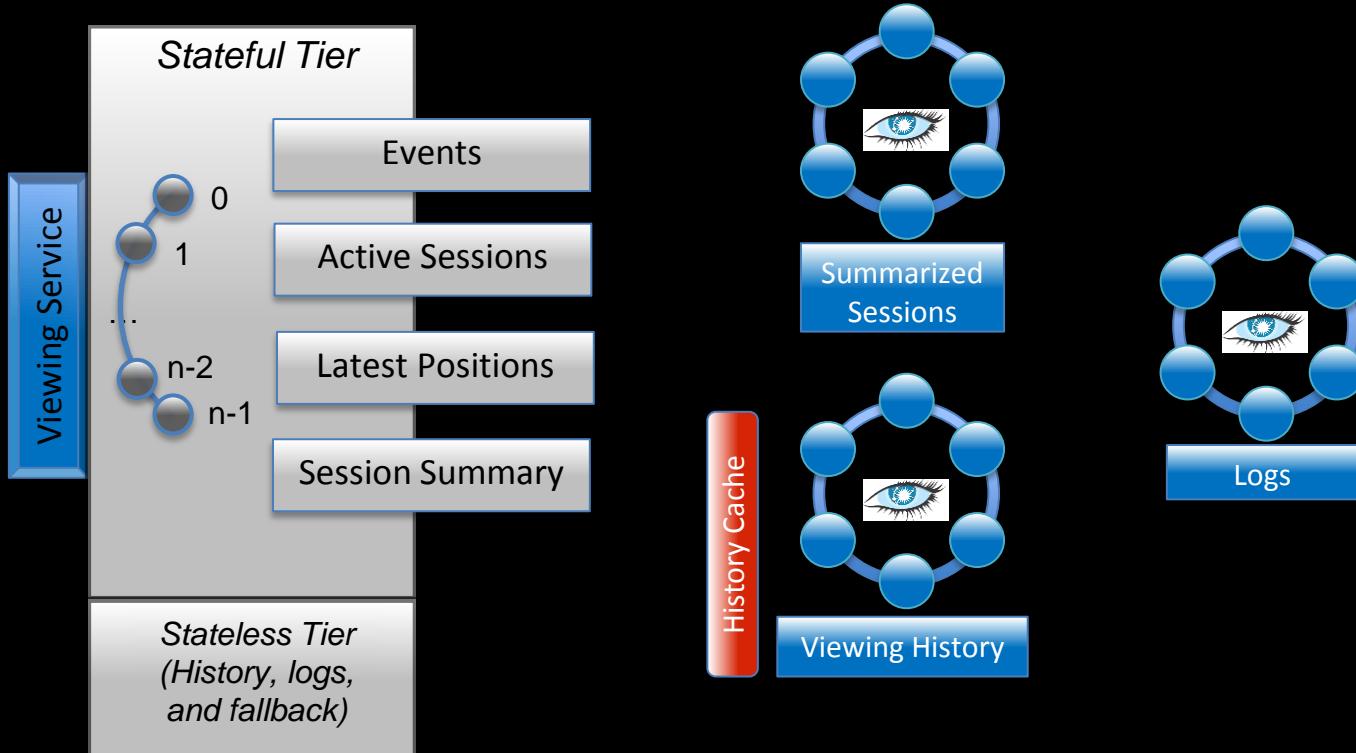




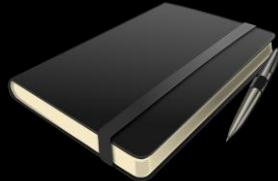
# Externalize State...



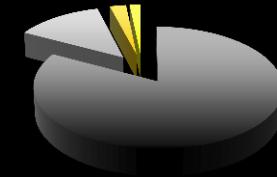
# Externalize State... DENIED!



# Service Decomposition



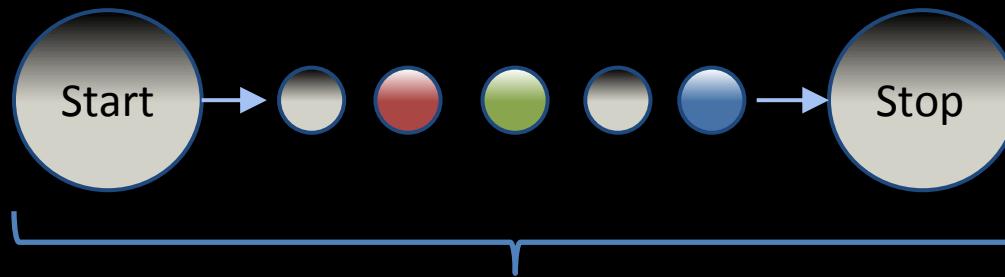
Video Bitrate Usage



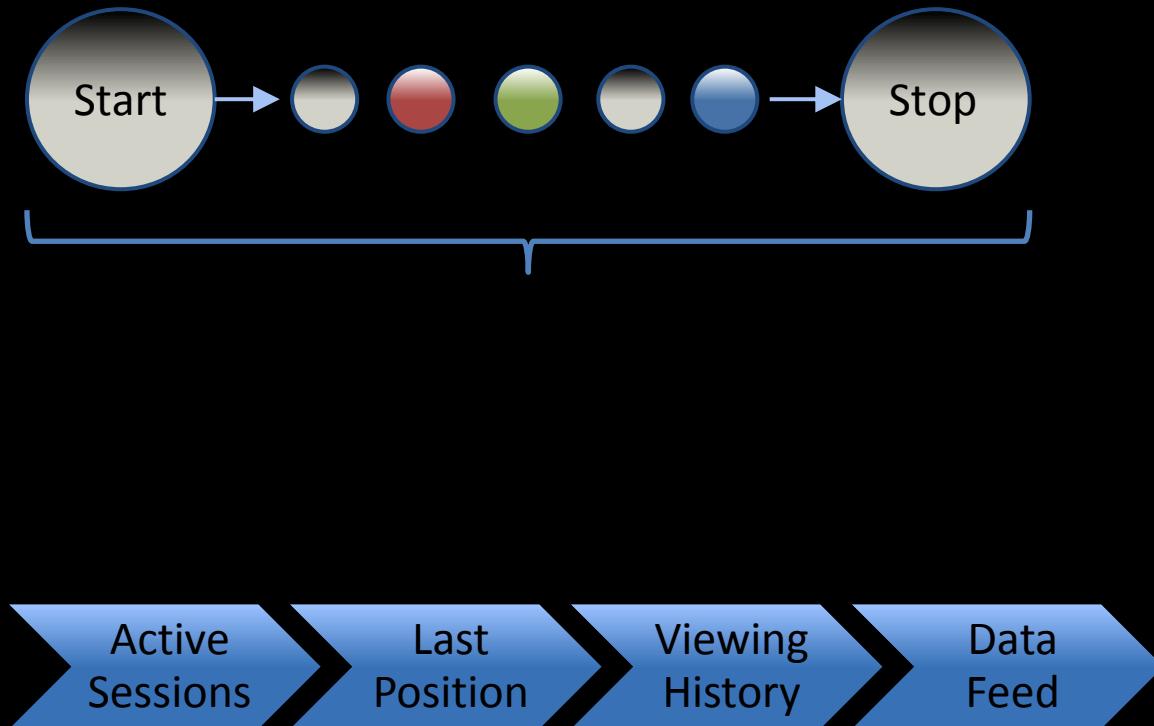
Continue Watching for Matt



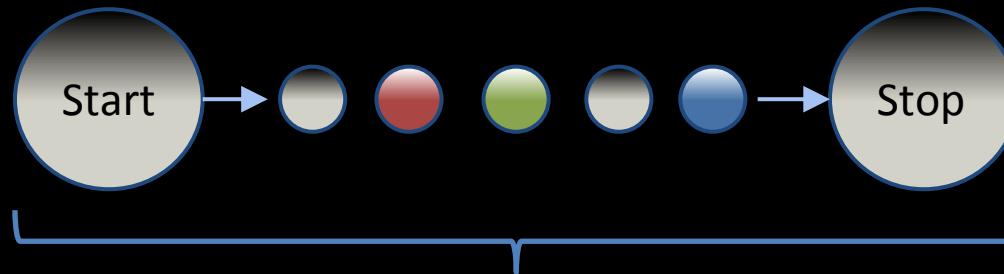
# Service Decomposition



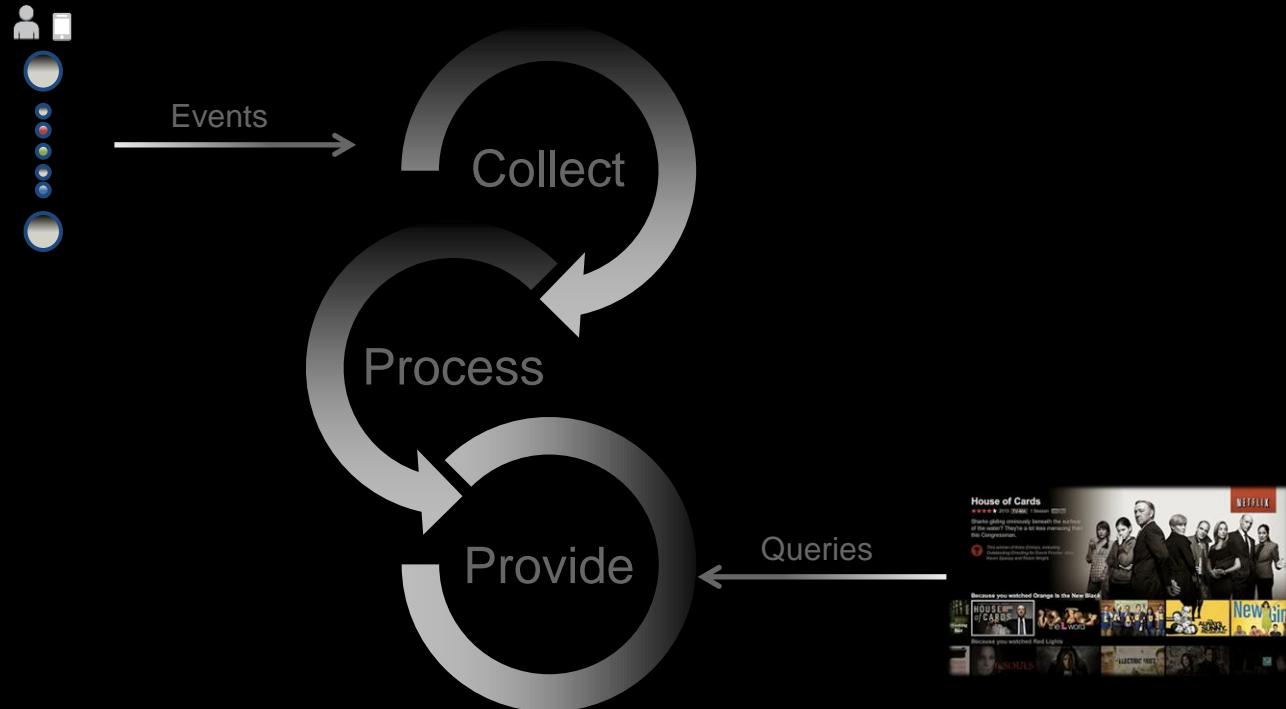
# Service Decomposition



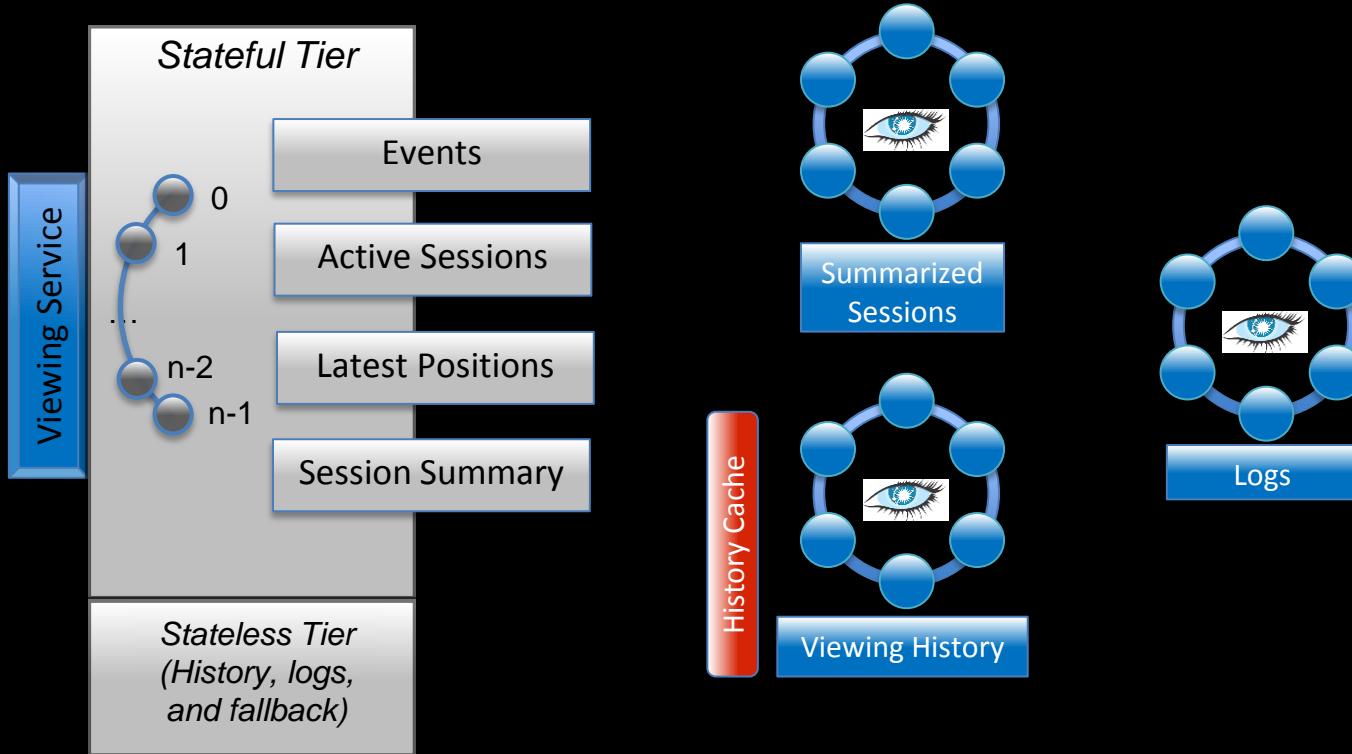
# Service Decomposition



# Service Decomposition



# Gen 3 Review



# Gen 4 Generic Architecture

Collector

Processor

Provider

# Gen 4 Generic Architecture

Collector

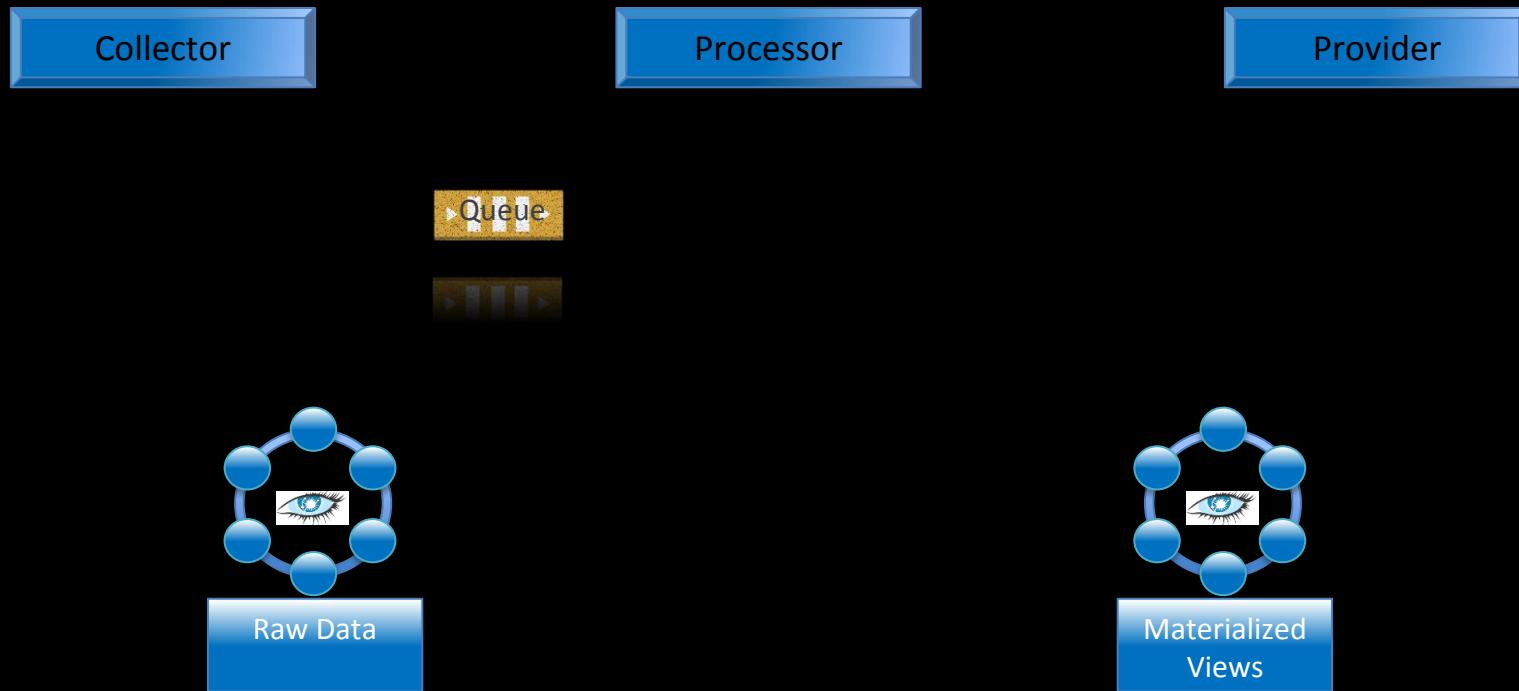
Processor

Provider

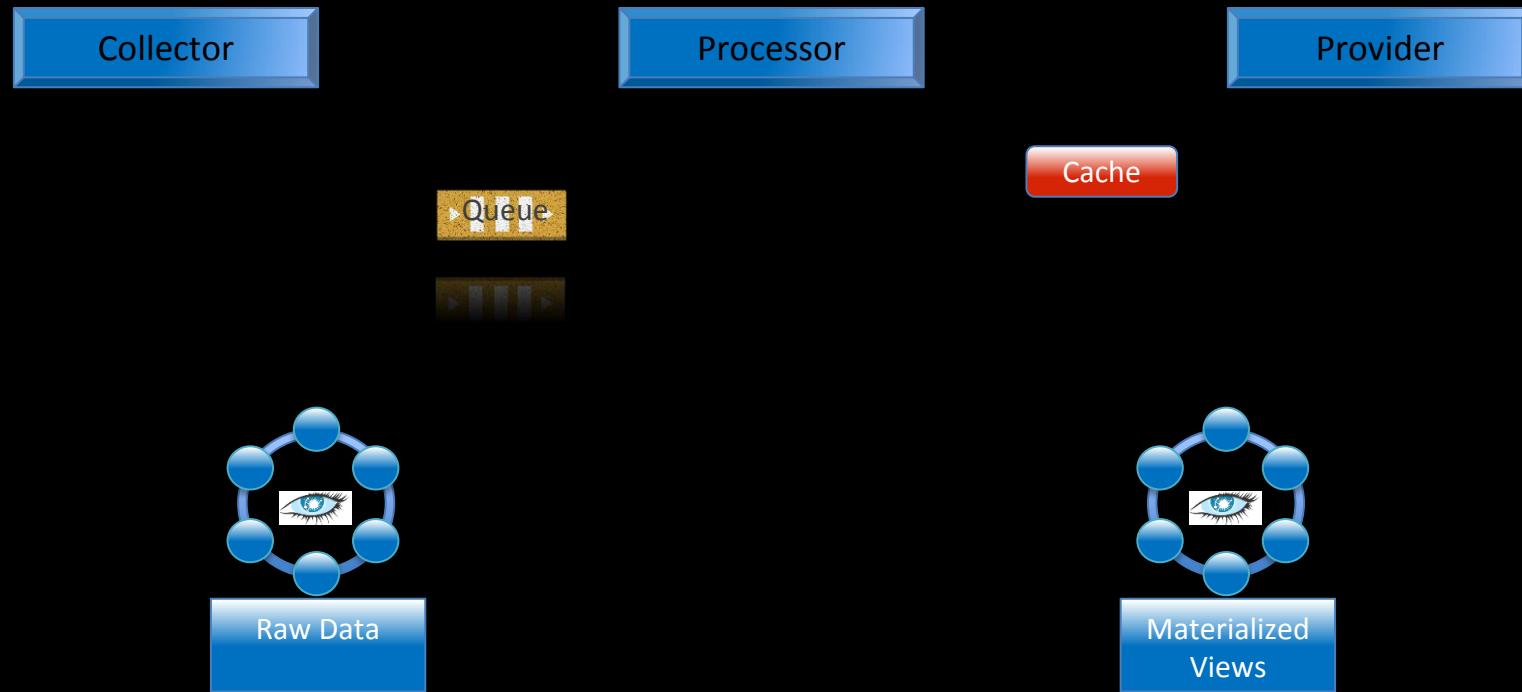
▶ Queue

▶ Queue

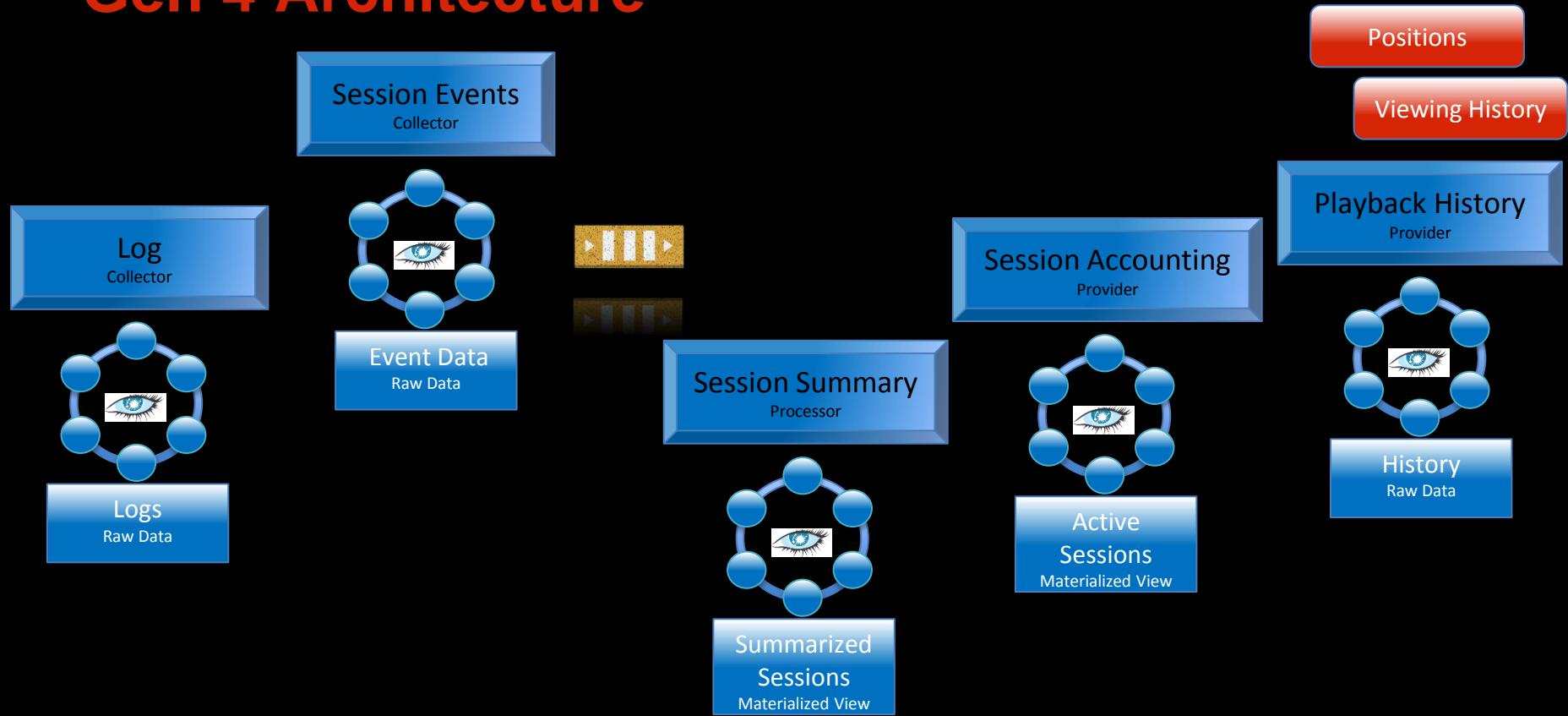
# Gen 4 Generic Architecture



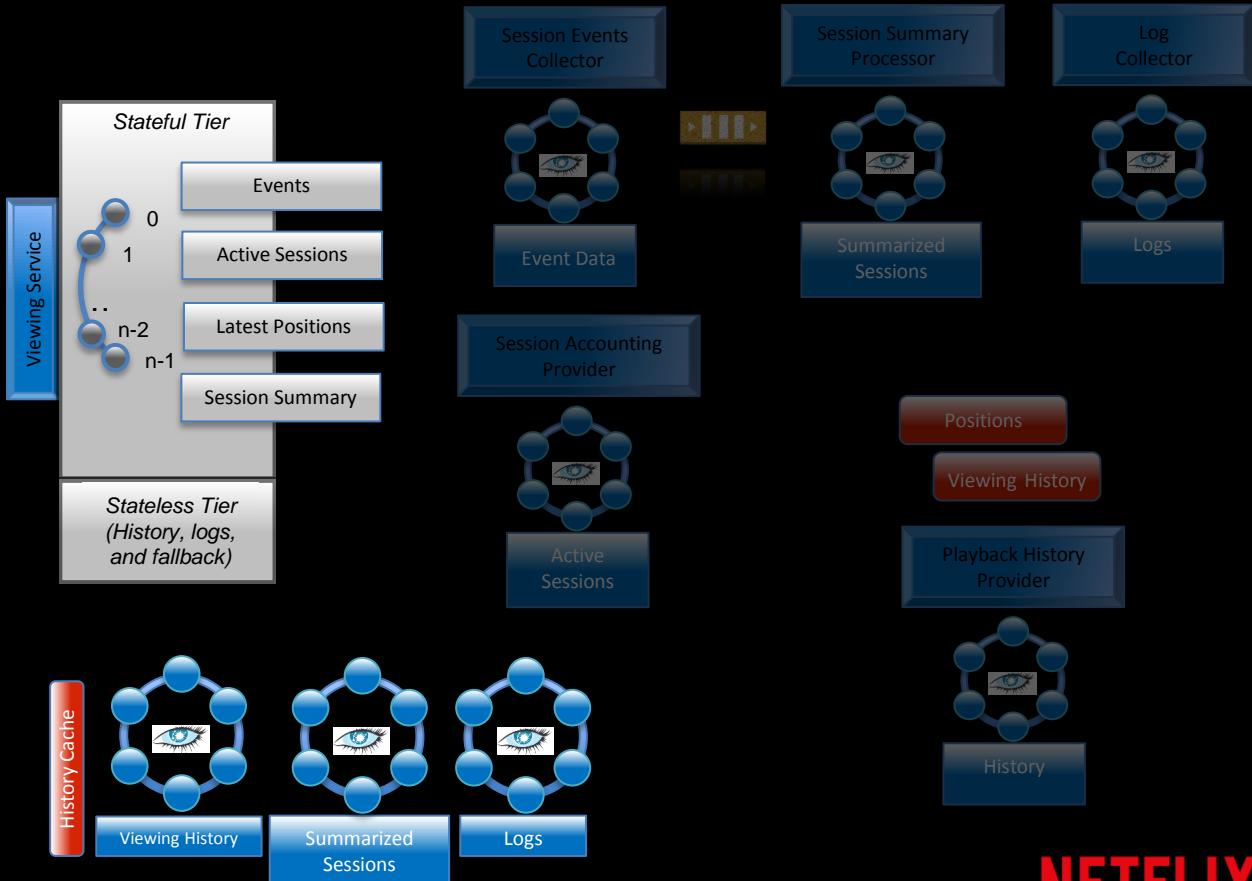
# Gen 4 Generic Architecture



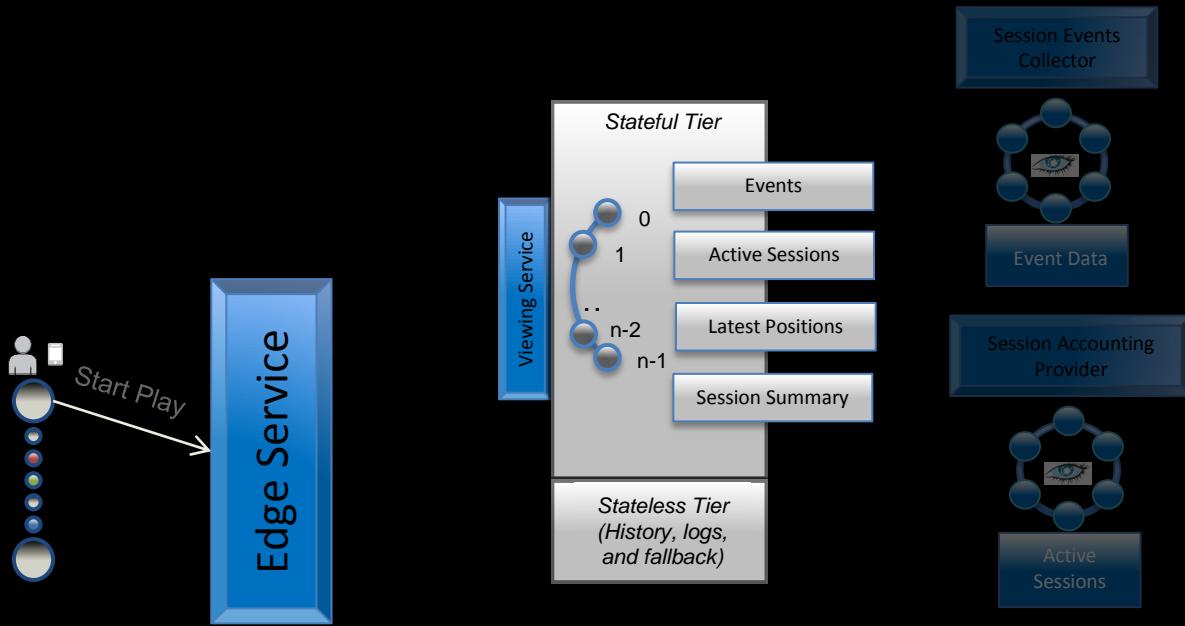
# Gen 4 Architecture



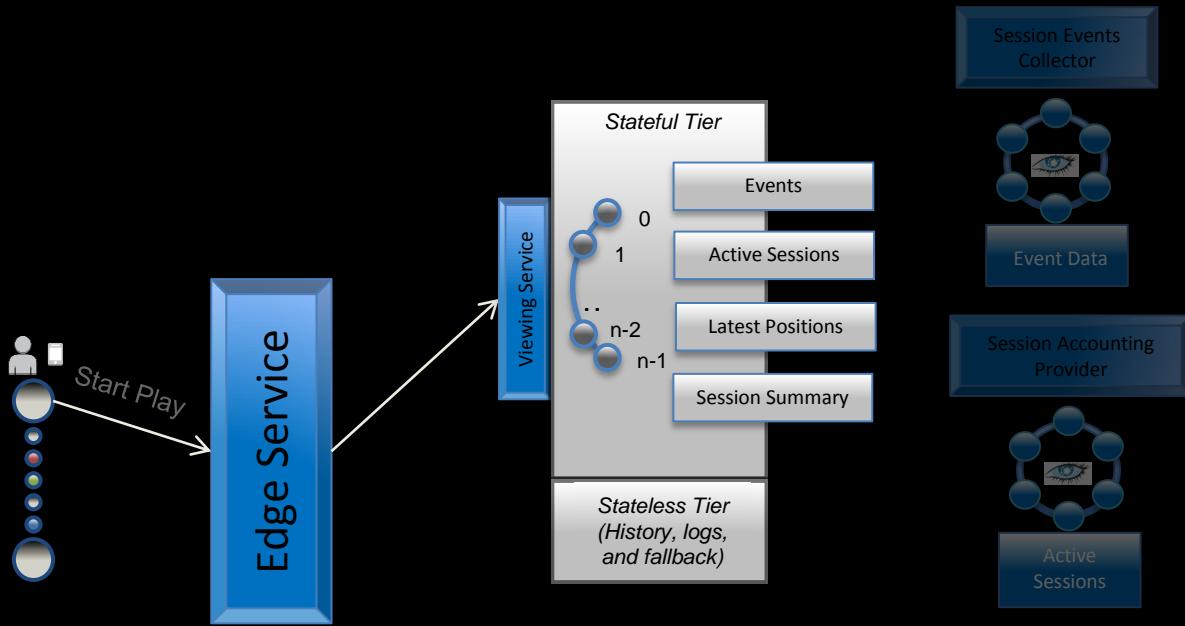
# Shadow Testing



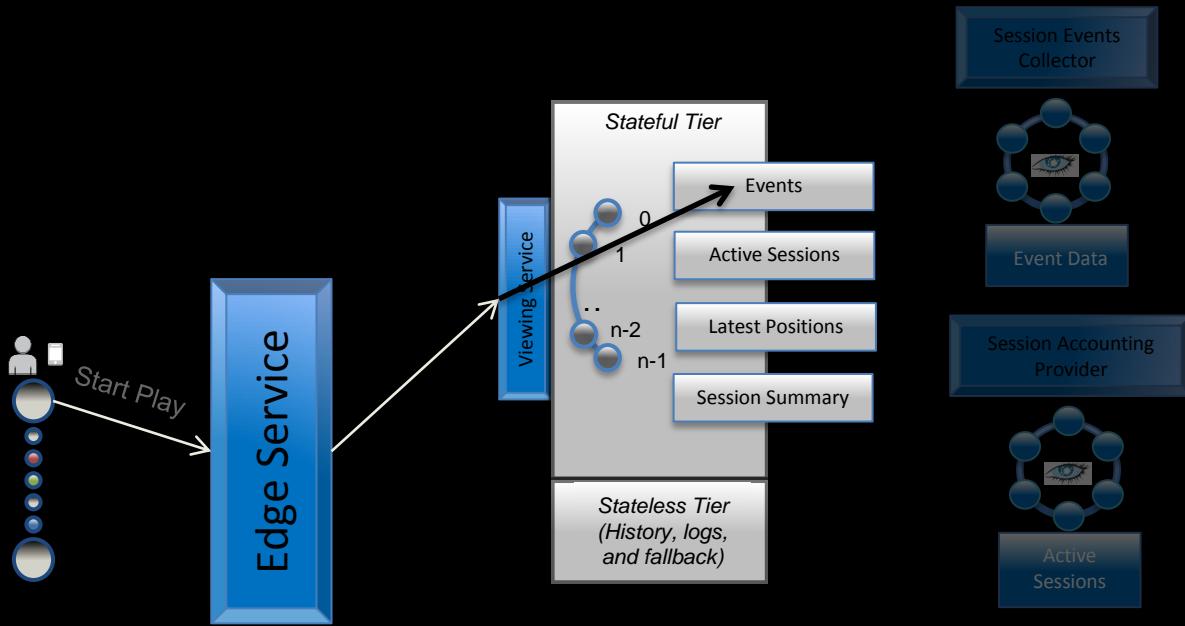
# Shadow Testing: Start Play Event



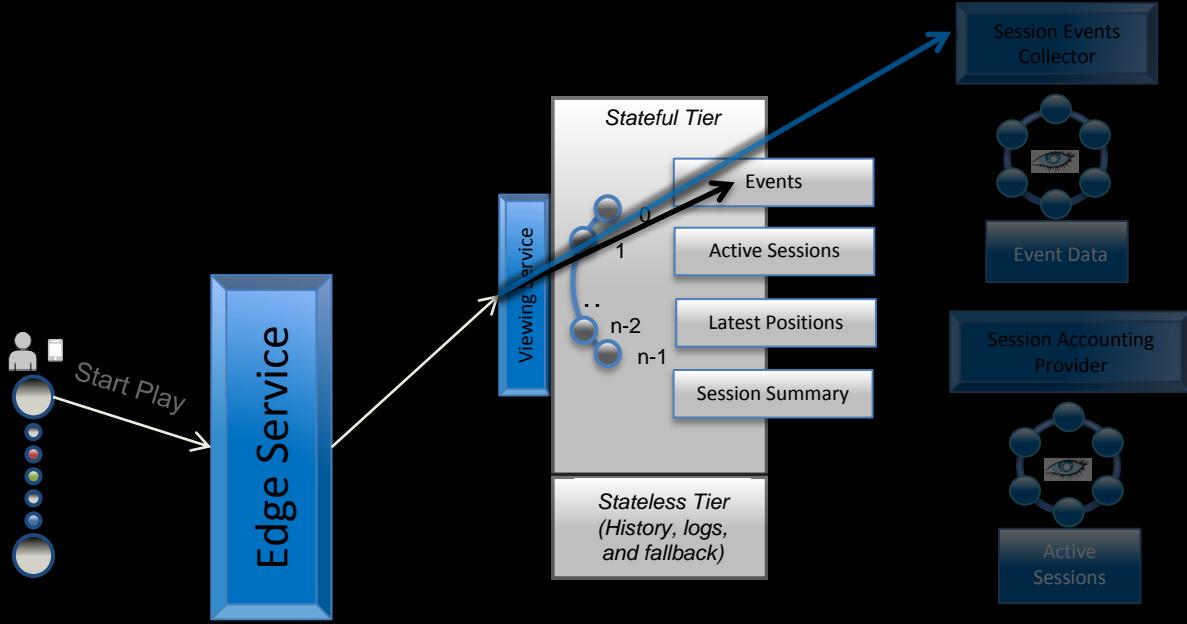
# Shadow Testing: Start Play Event



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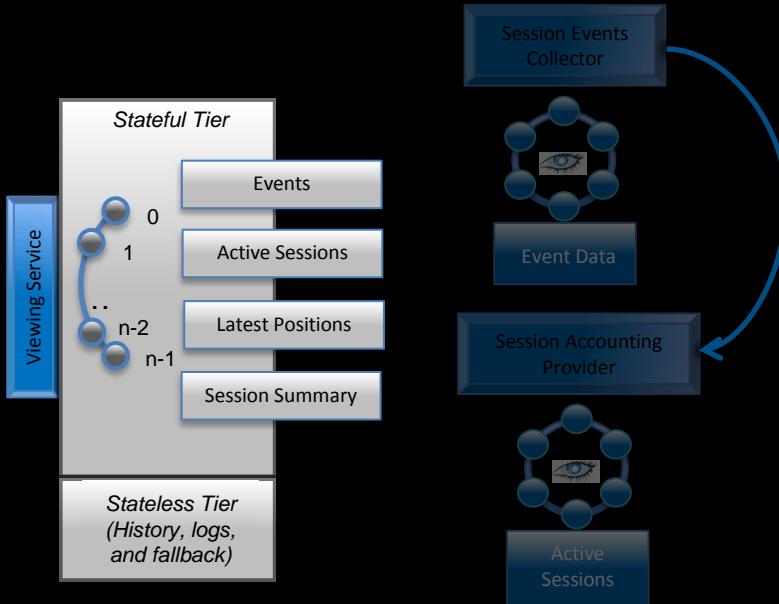
# Shadow Testing: Start Play Event



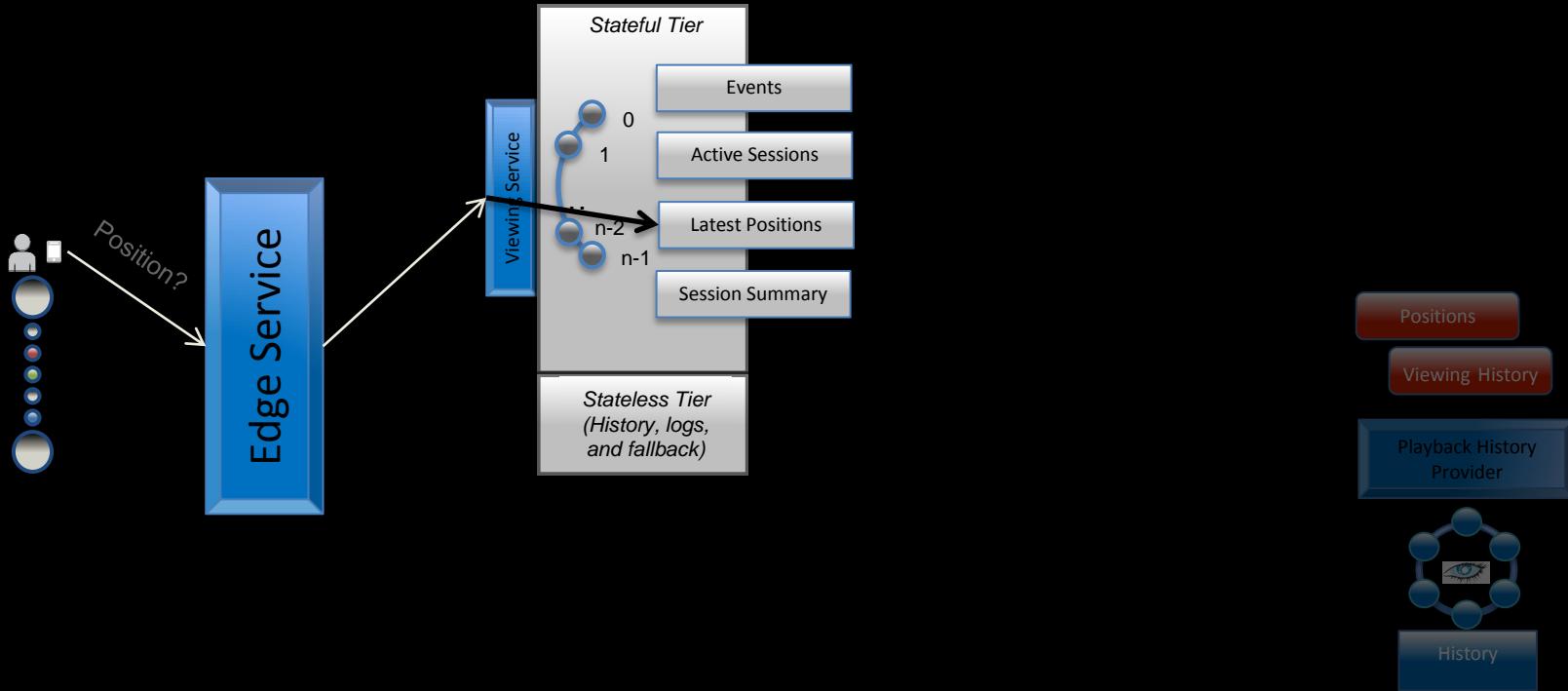
# Shadow Testing: Start Play Event



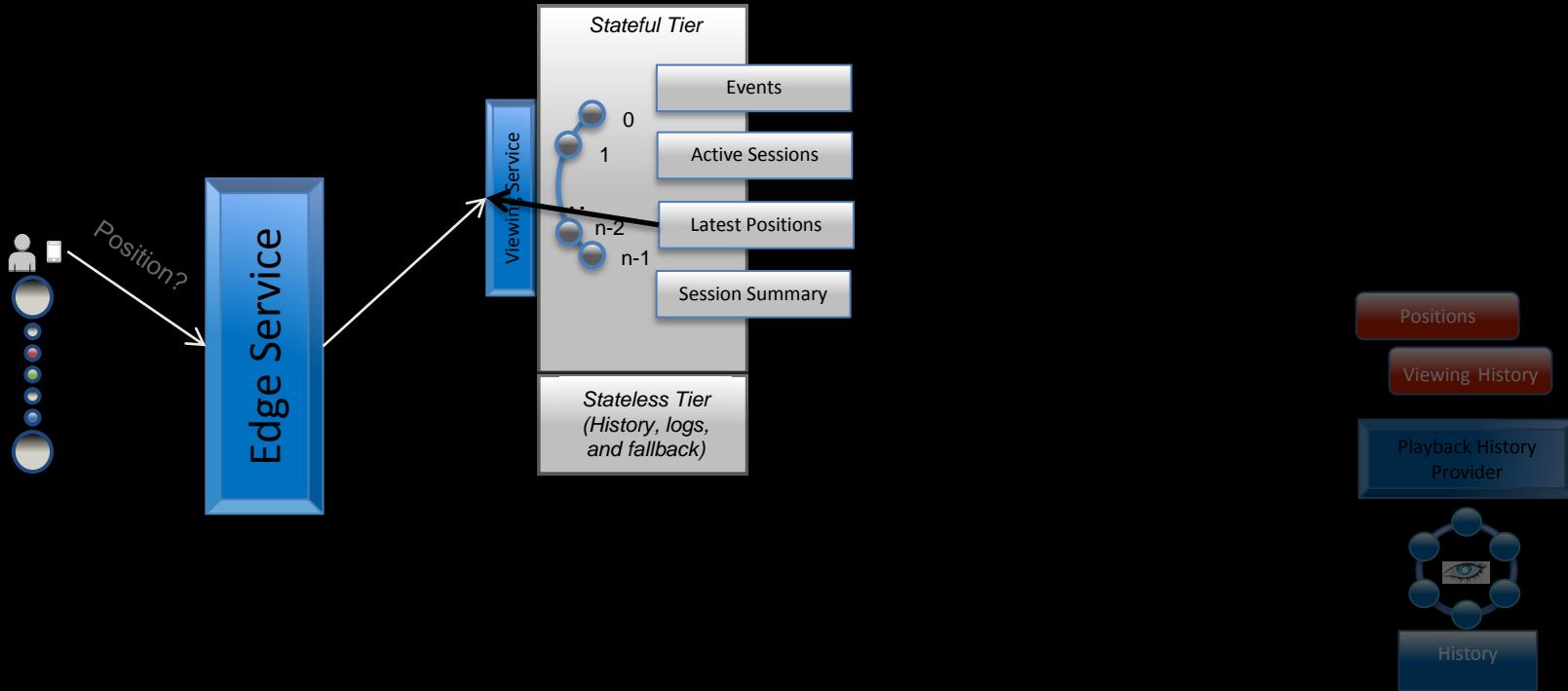
Edge Service



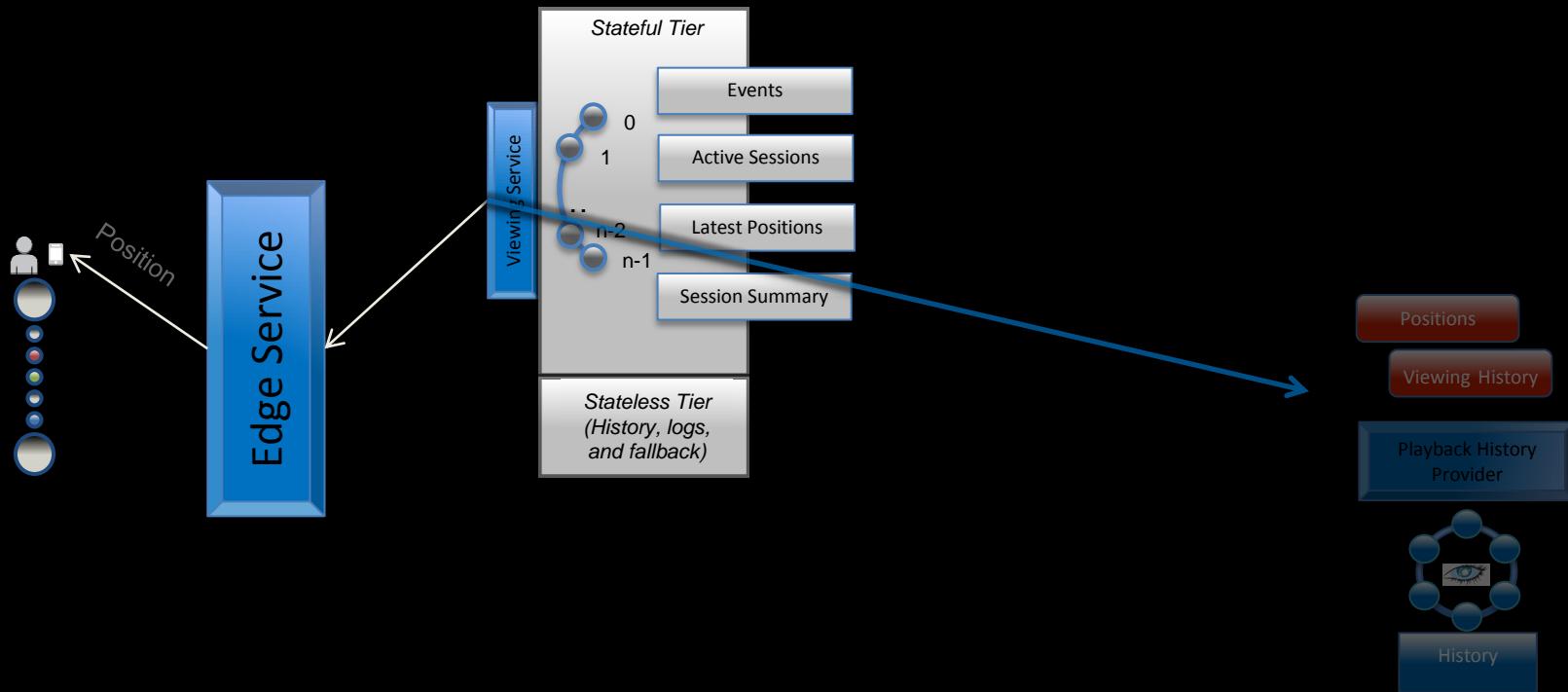
# Shadow Testing: Read Latest Position



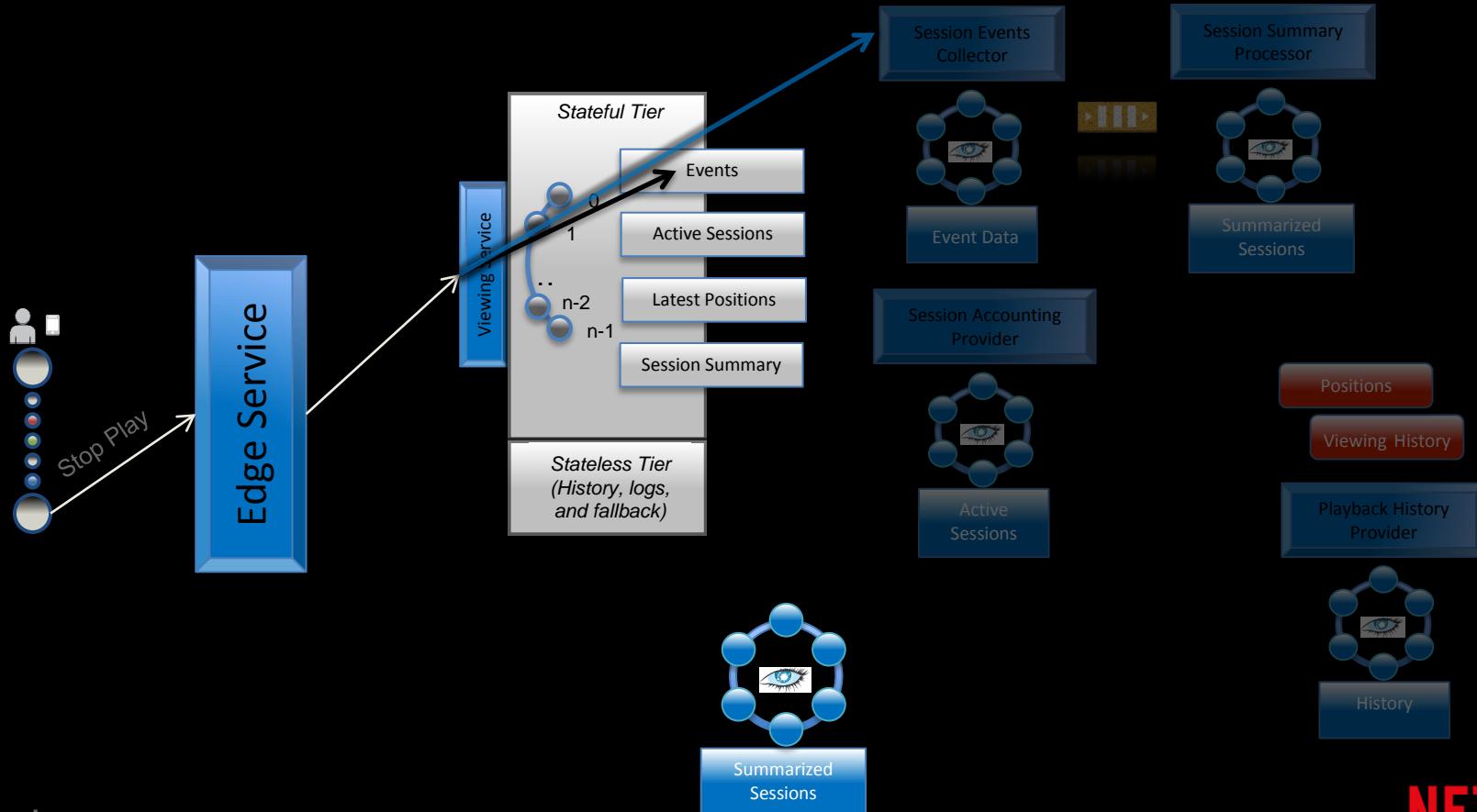
# Shadow Testing: Read Latest Position



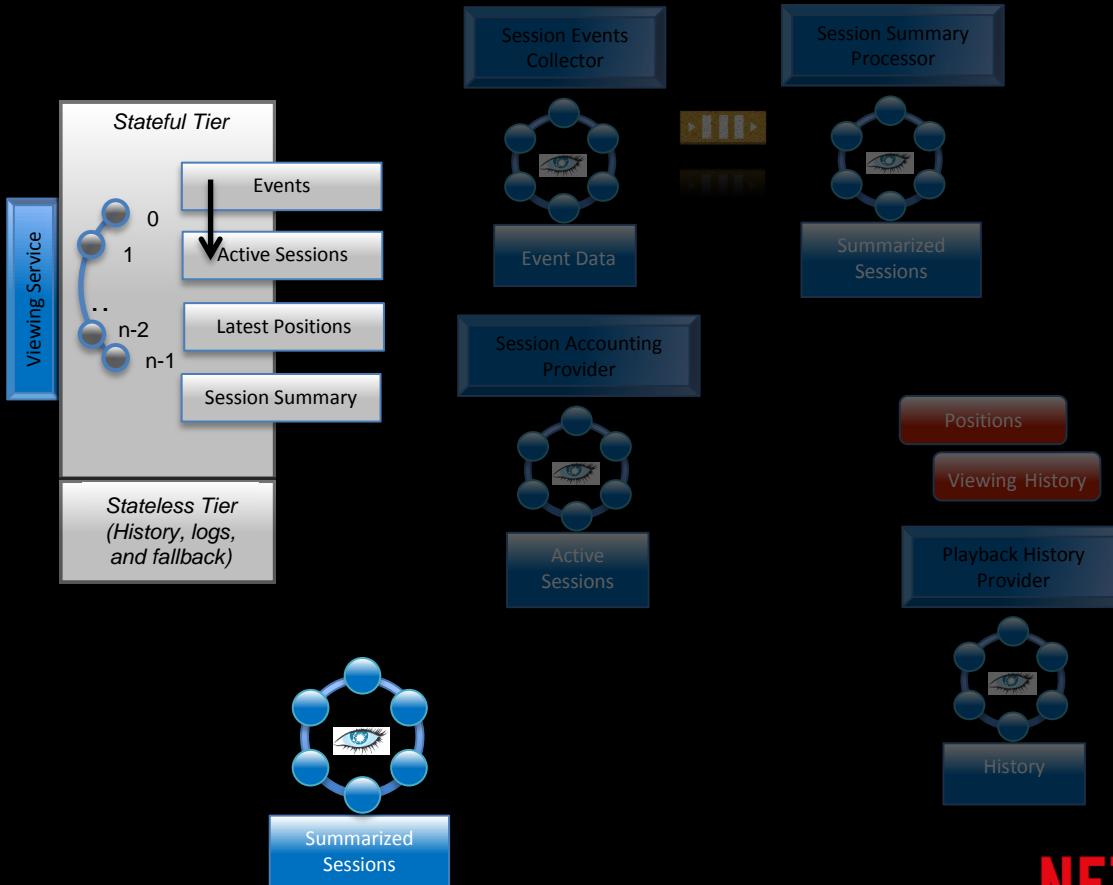
# Shadow Testing: Read Latest Position



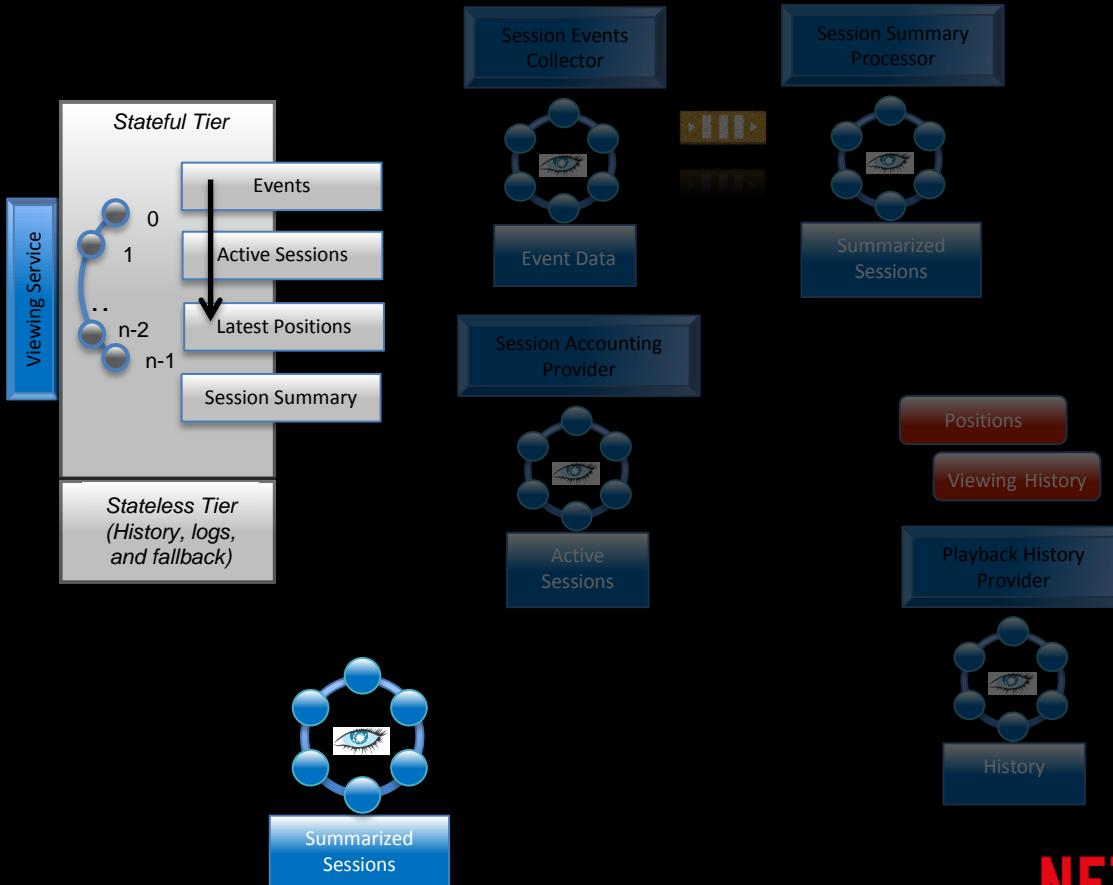
# Shadow Testing: Stop Event



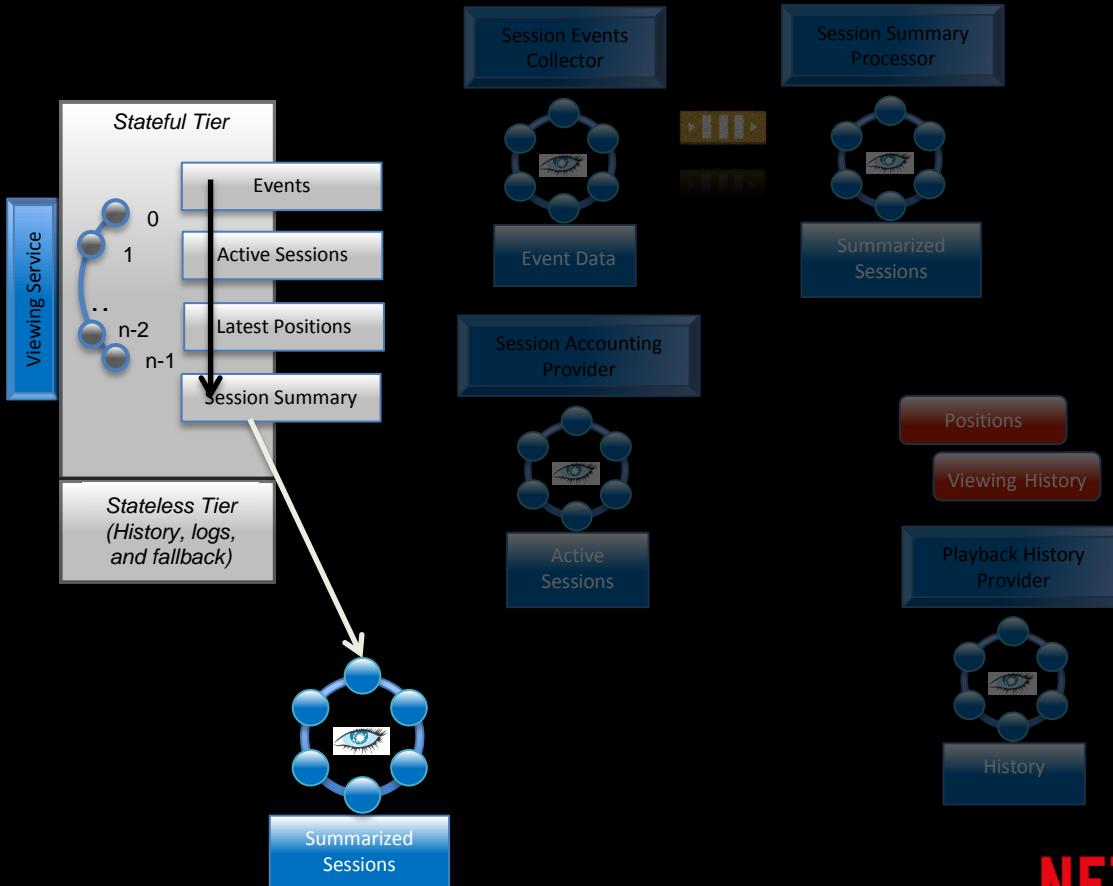
# Shadow Testing: Stop Event



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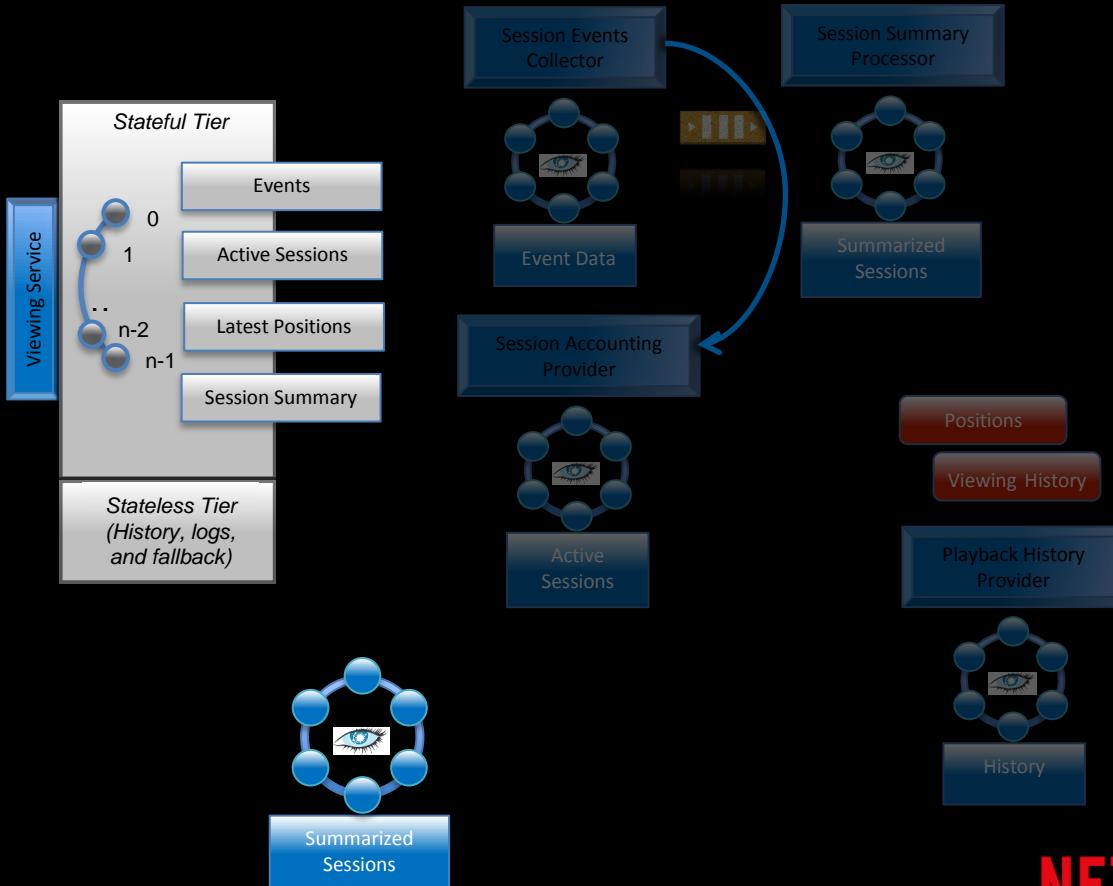
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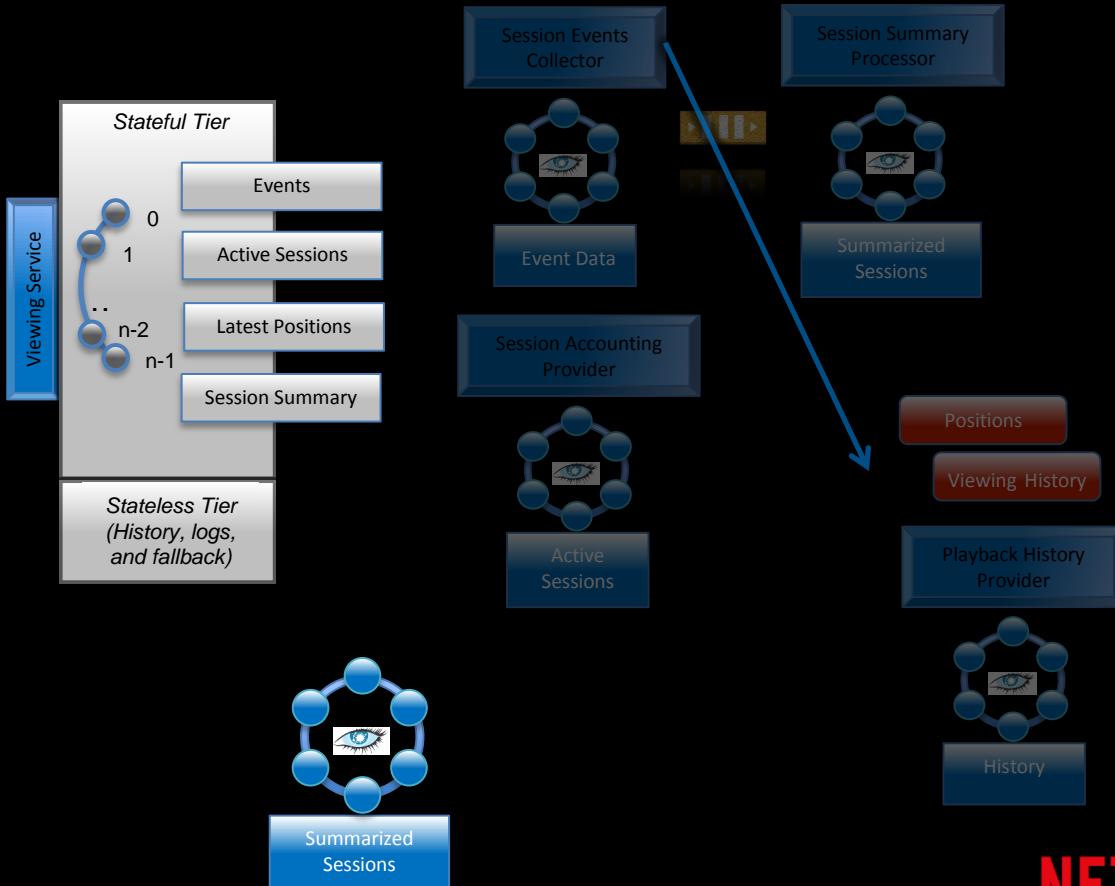
# Shadow Testing: Stop Event



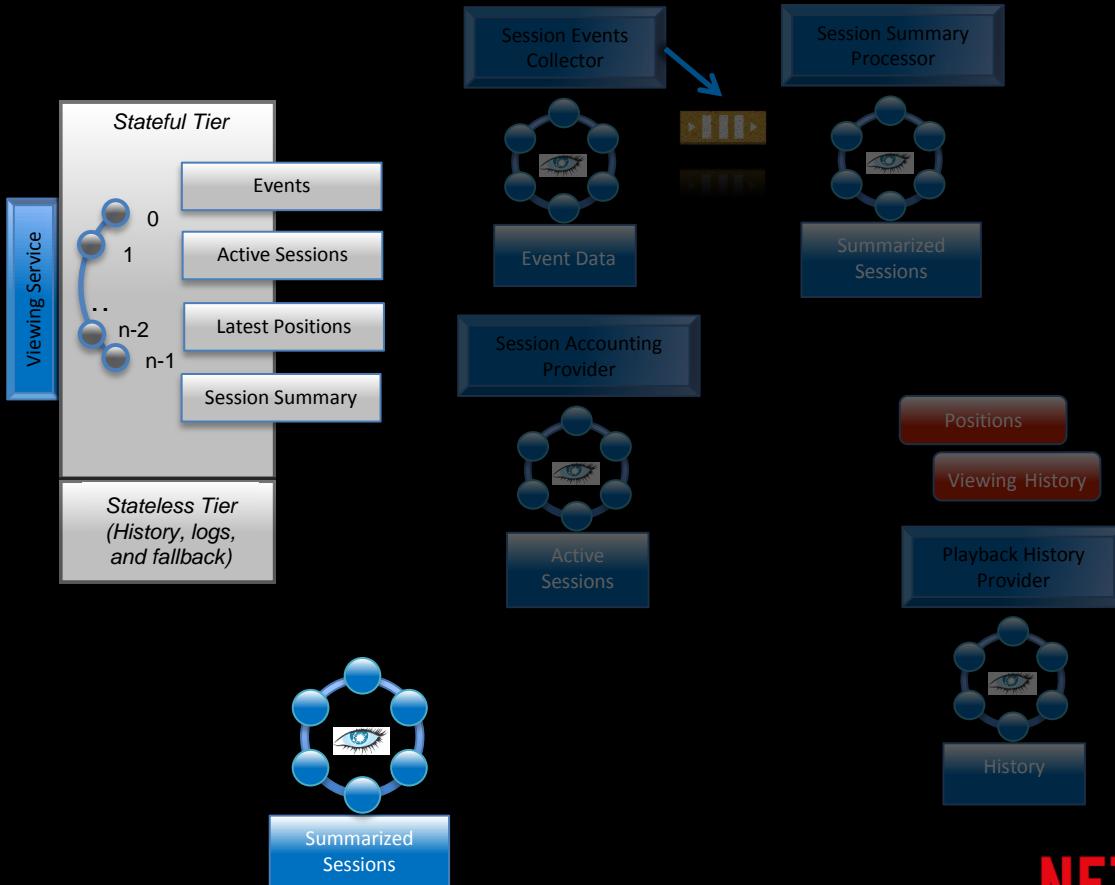
Edge Service



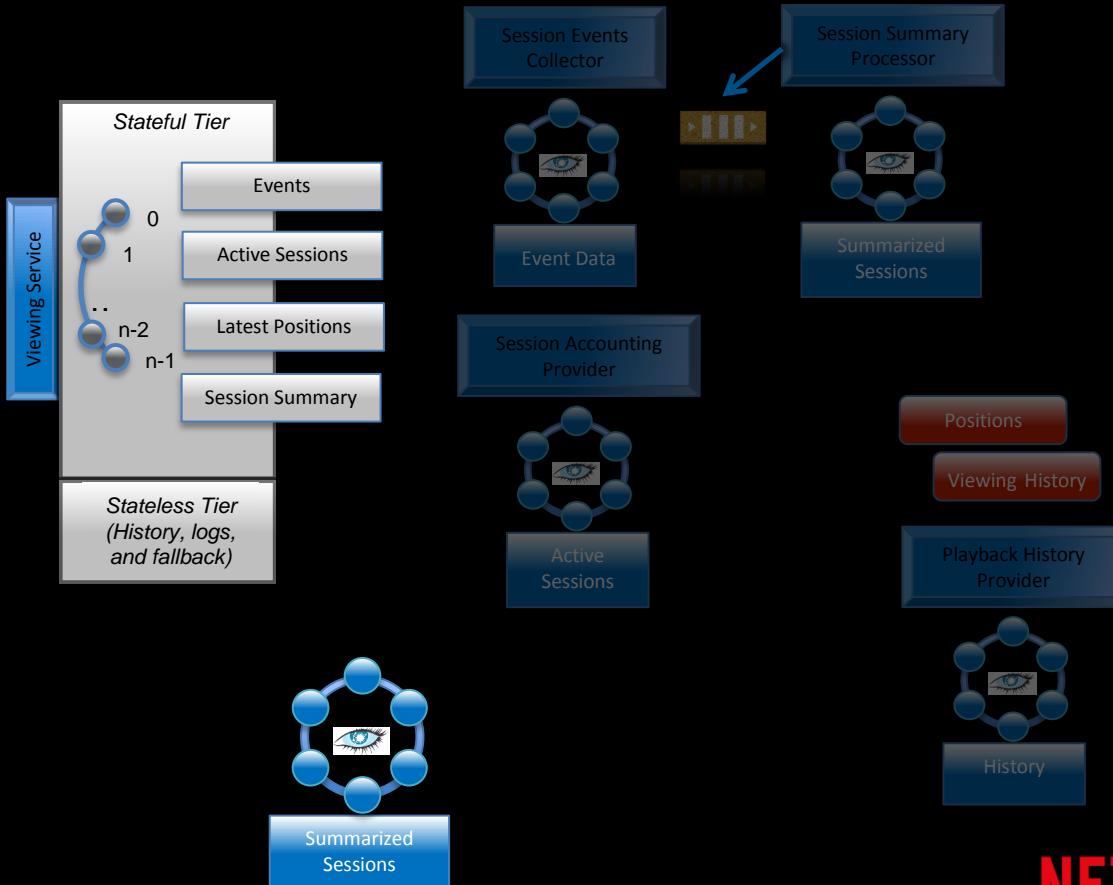
# Shadow Testing: Stop Event



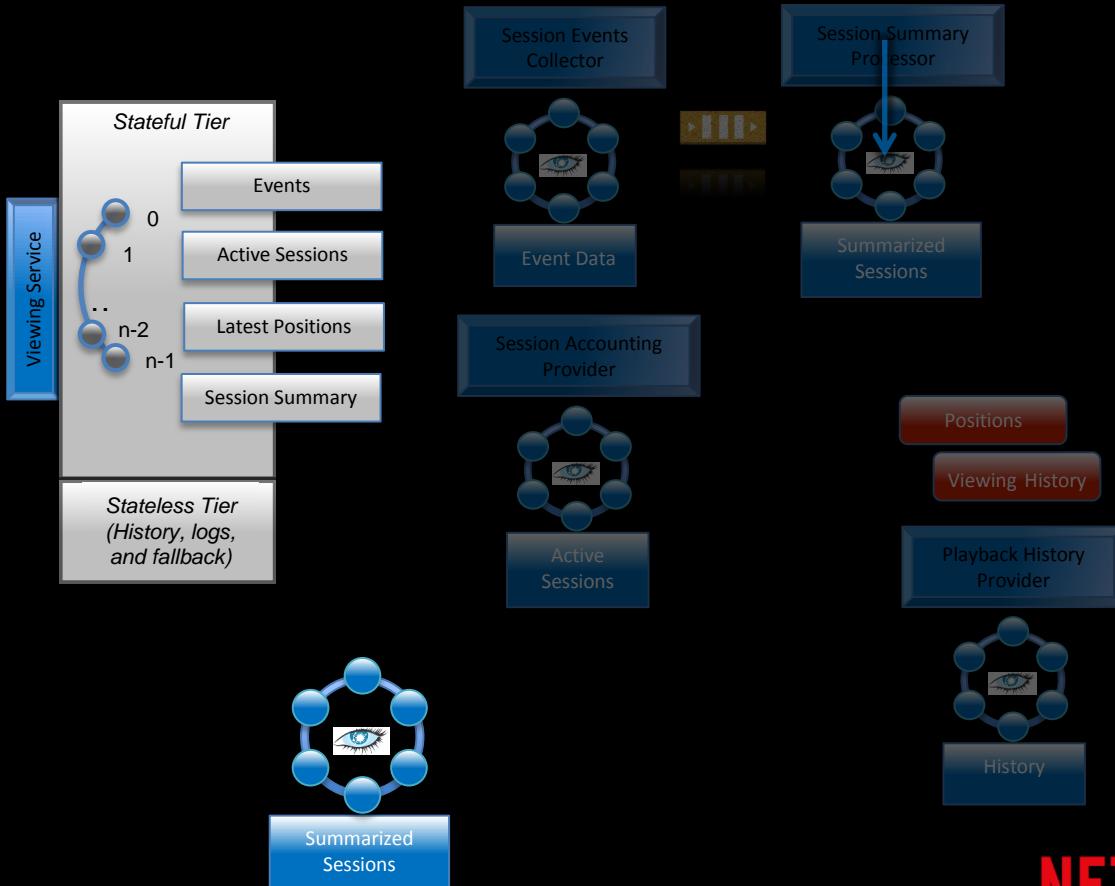
# Shadow Testing: Stop Event



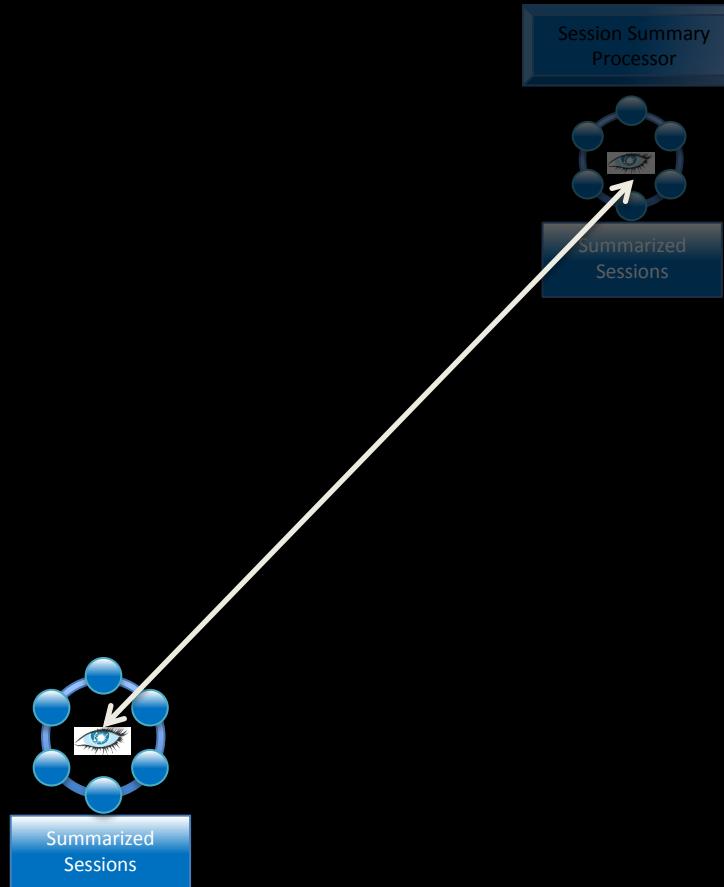
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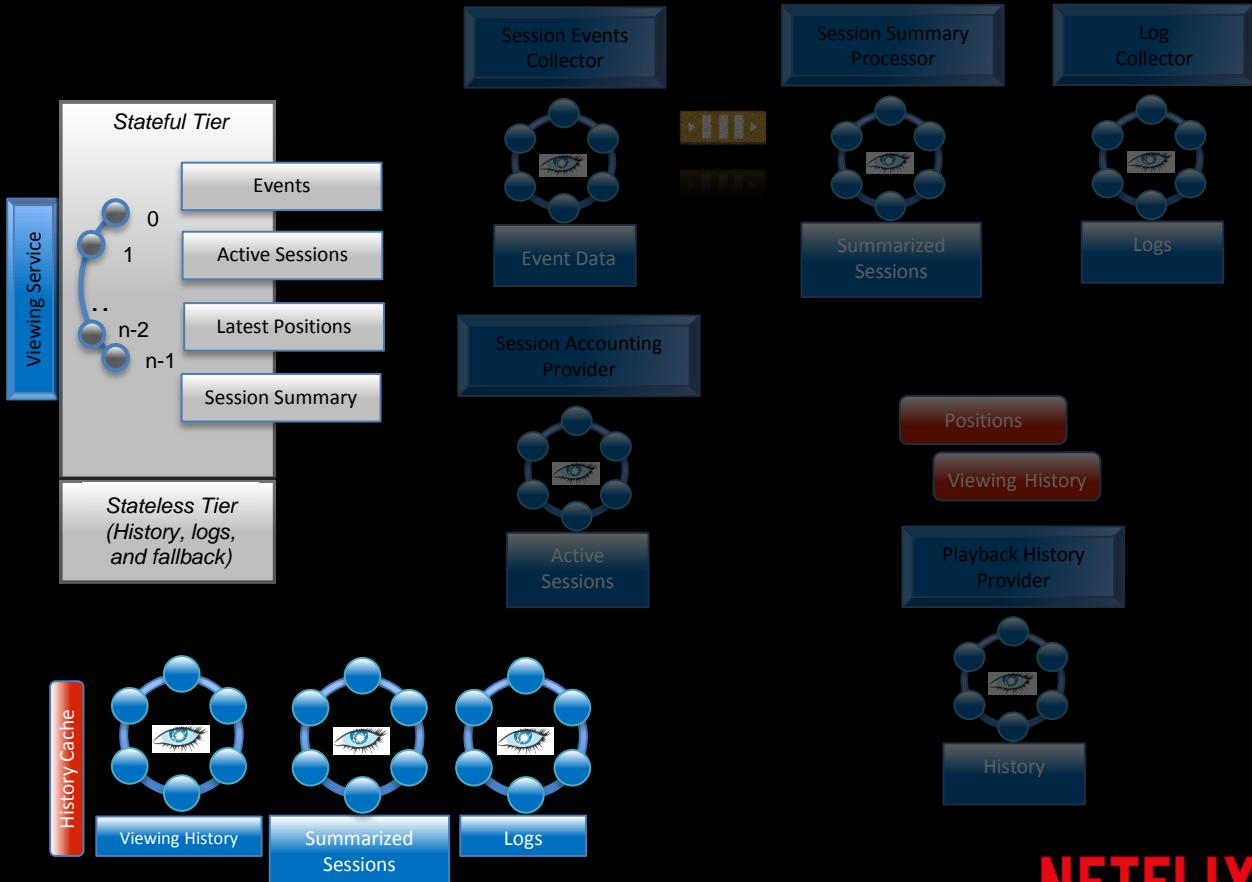
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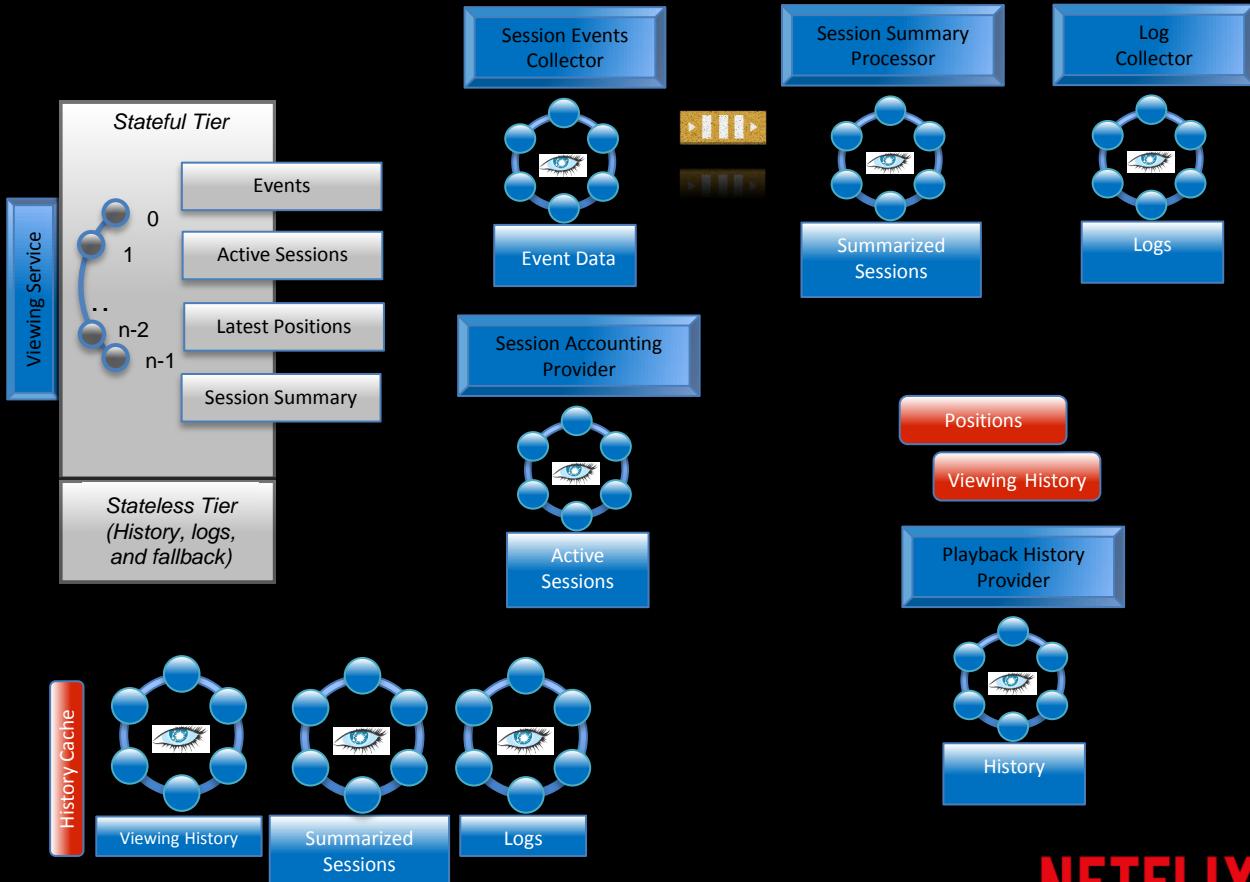
# Shadow Testing



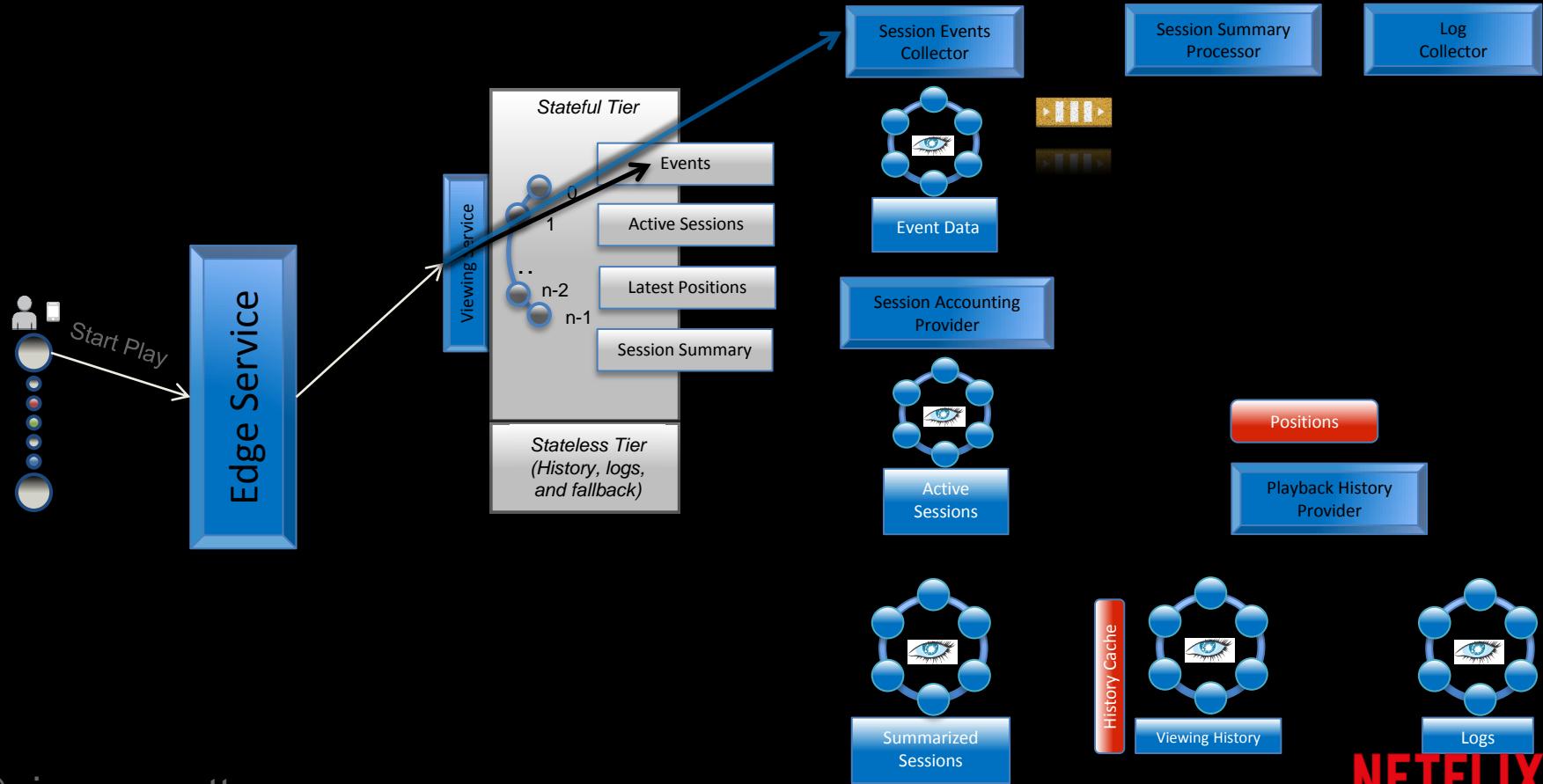
Edge Service



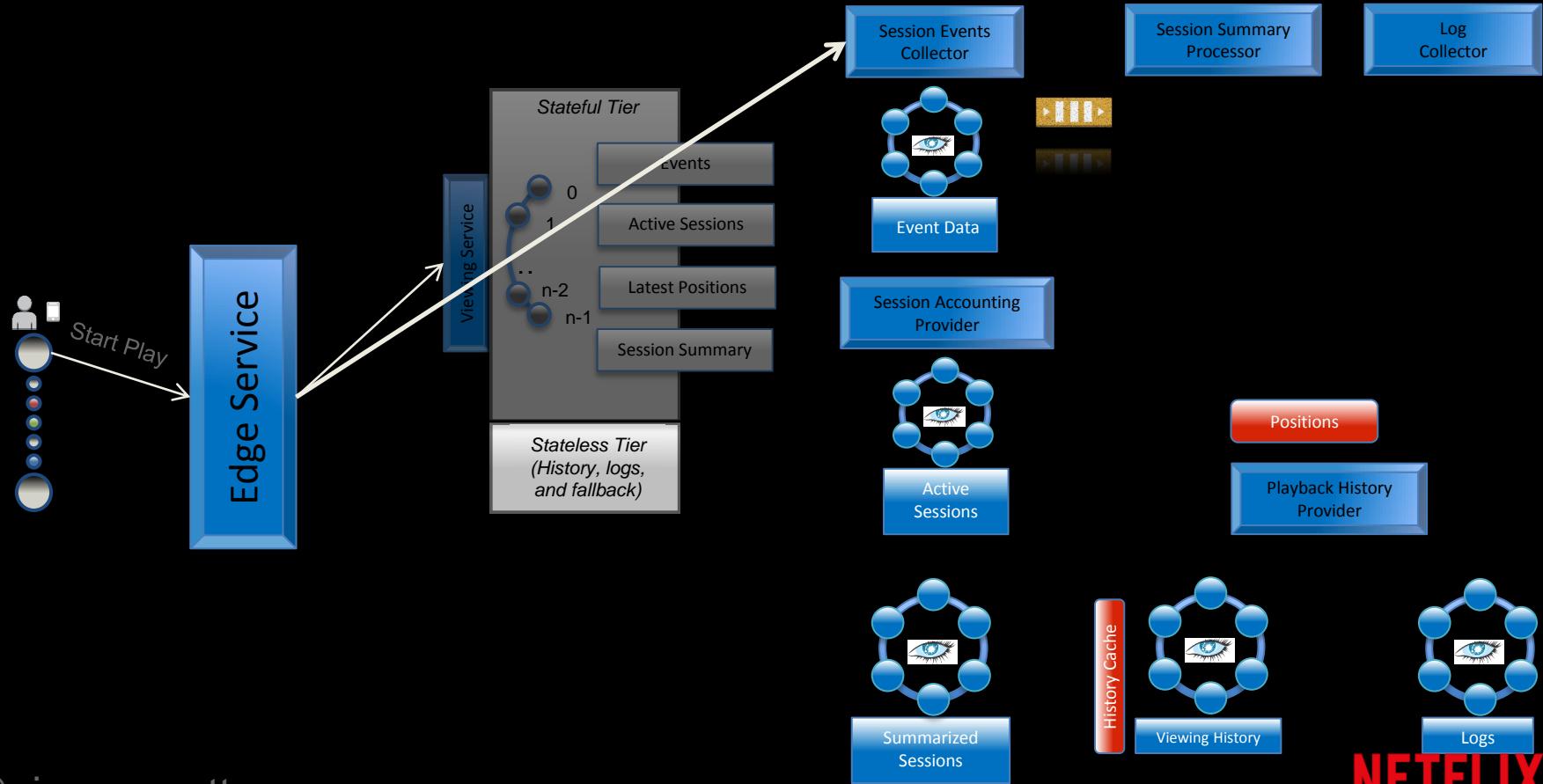
# Traffic Dial



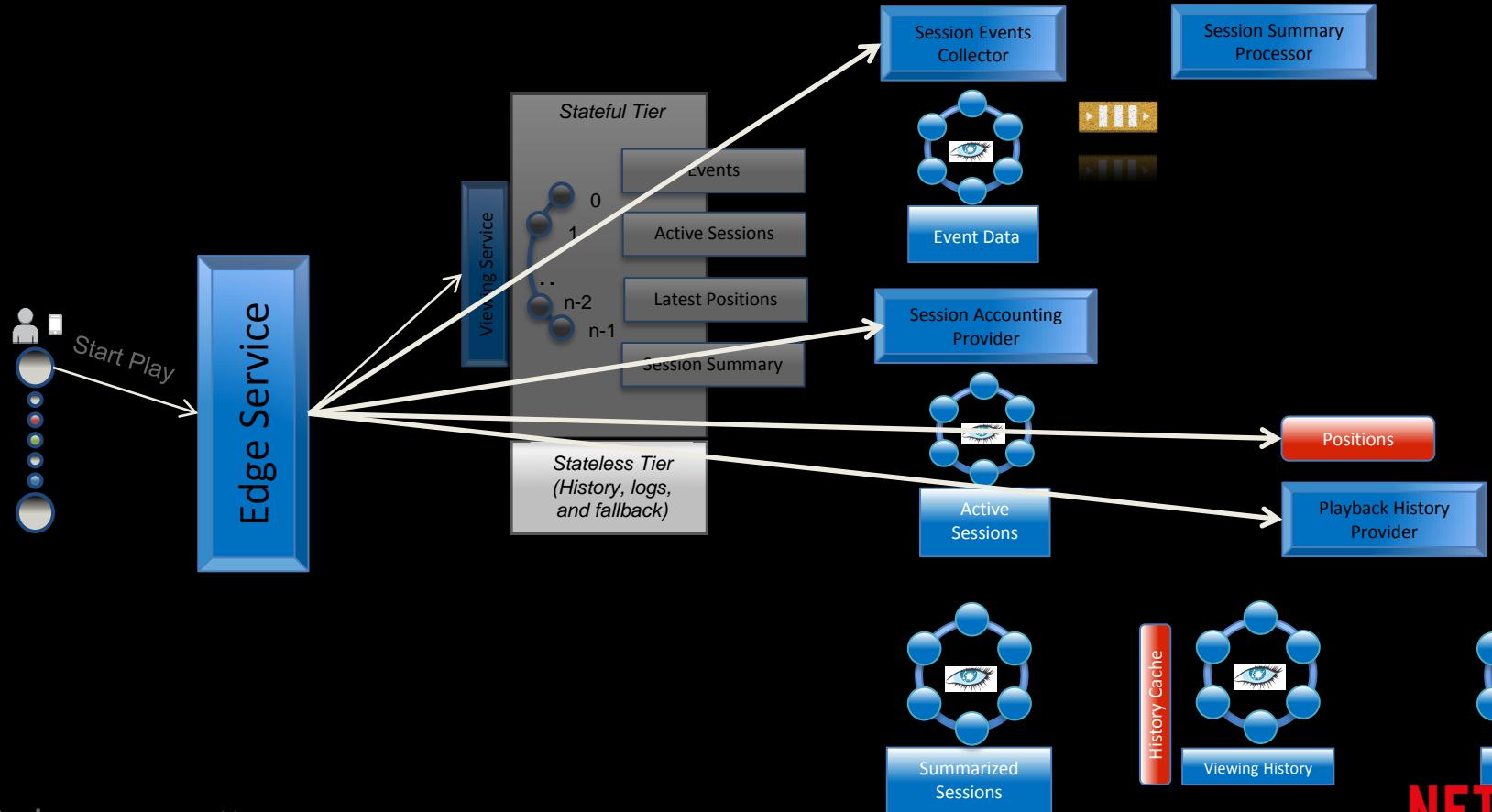
# Traffic Dial



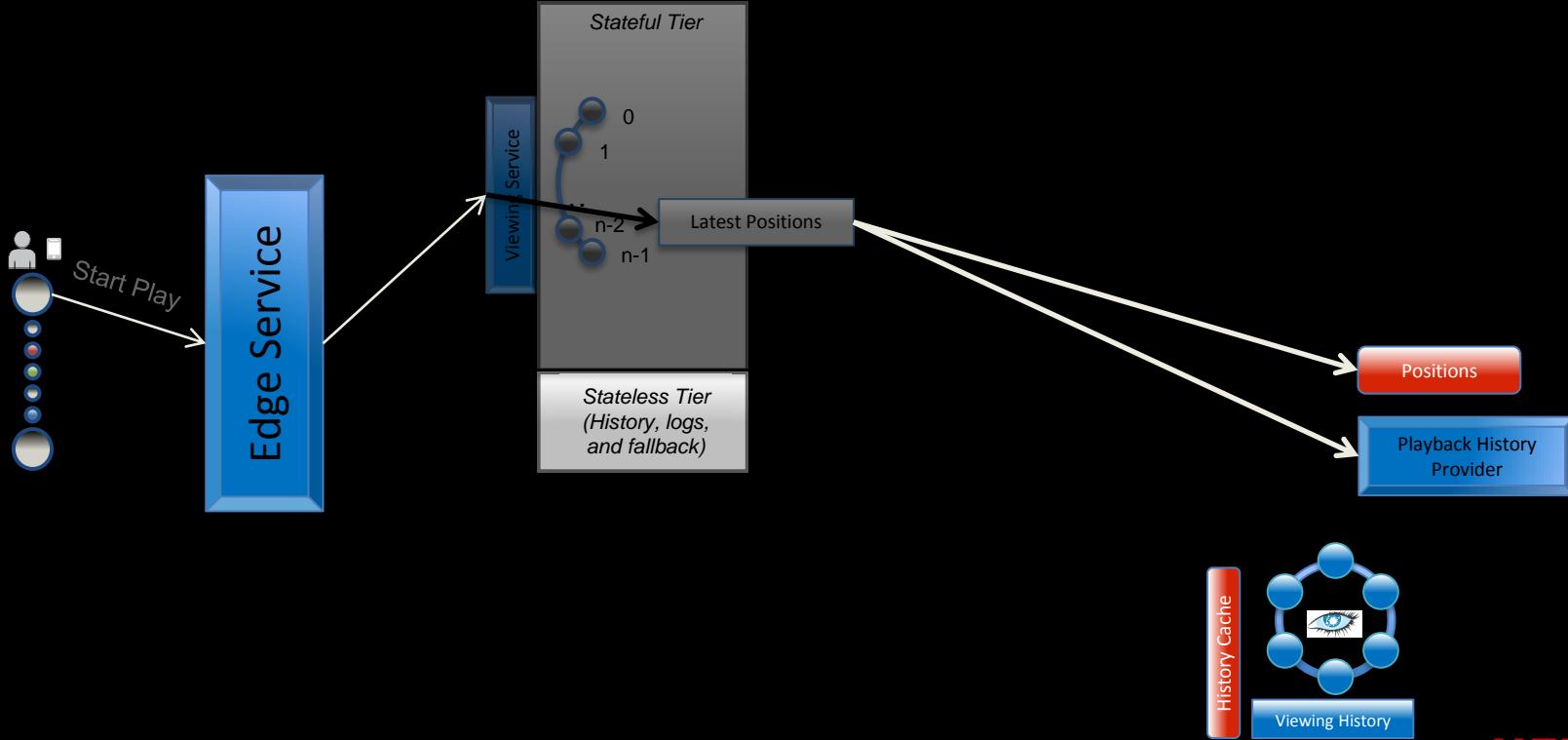
# Traffic Dial



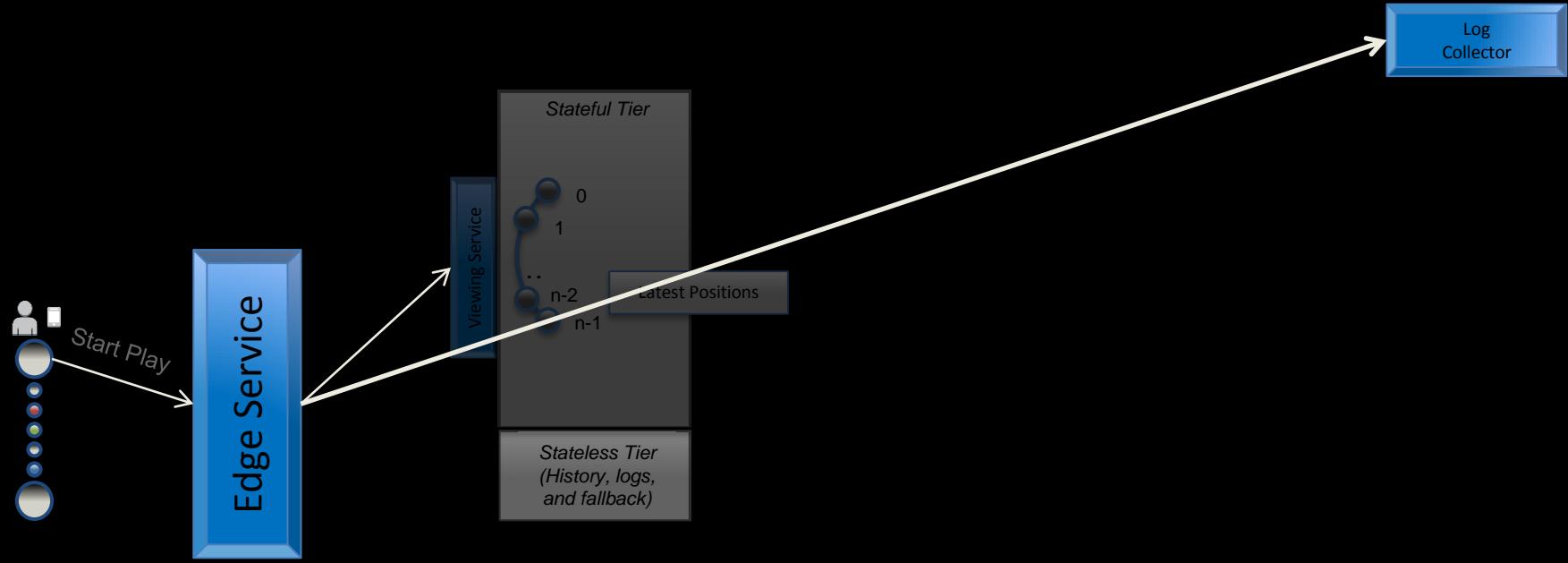
# Traffic Dial



# Traffic Dial

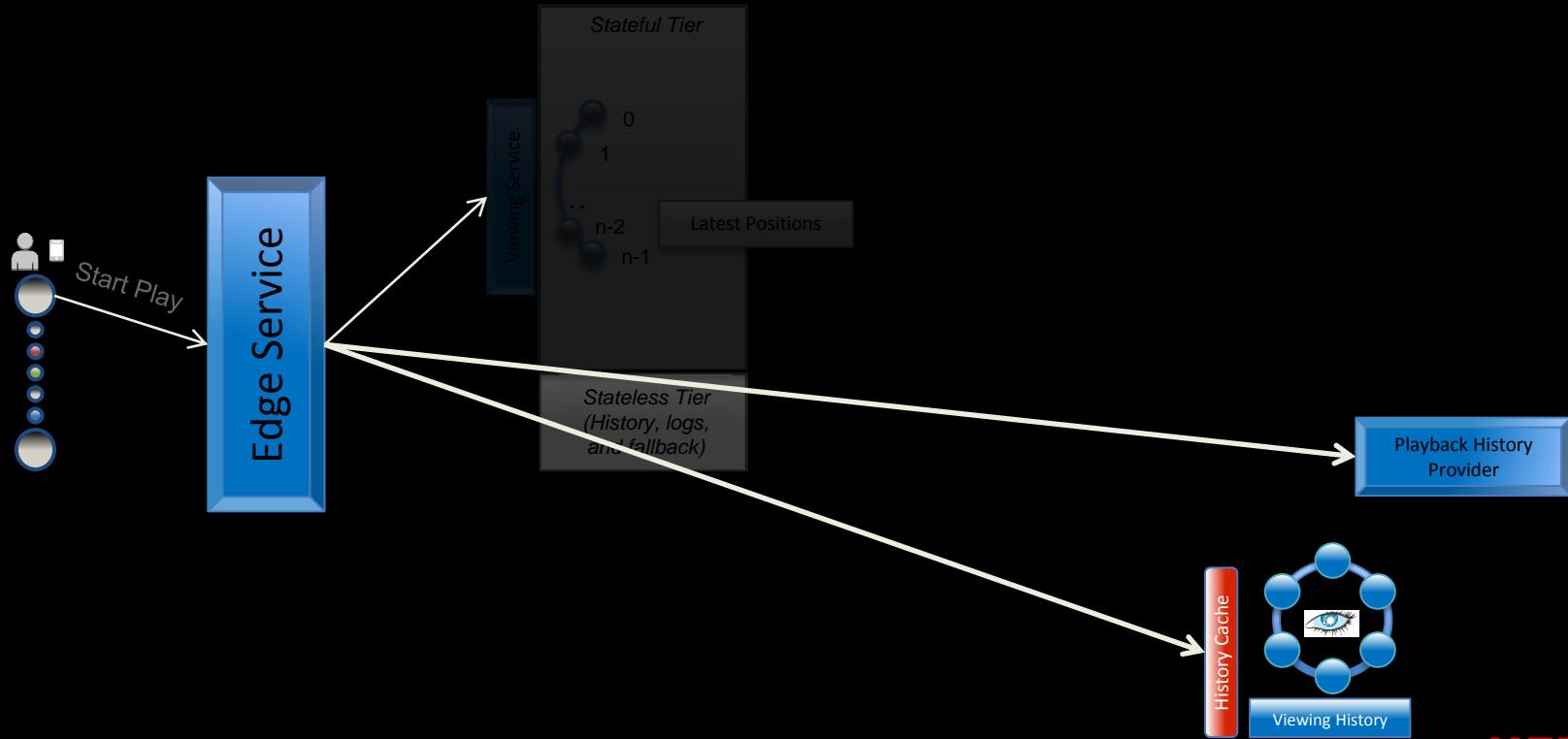


# Traffic Dial



**NETFLIX**

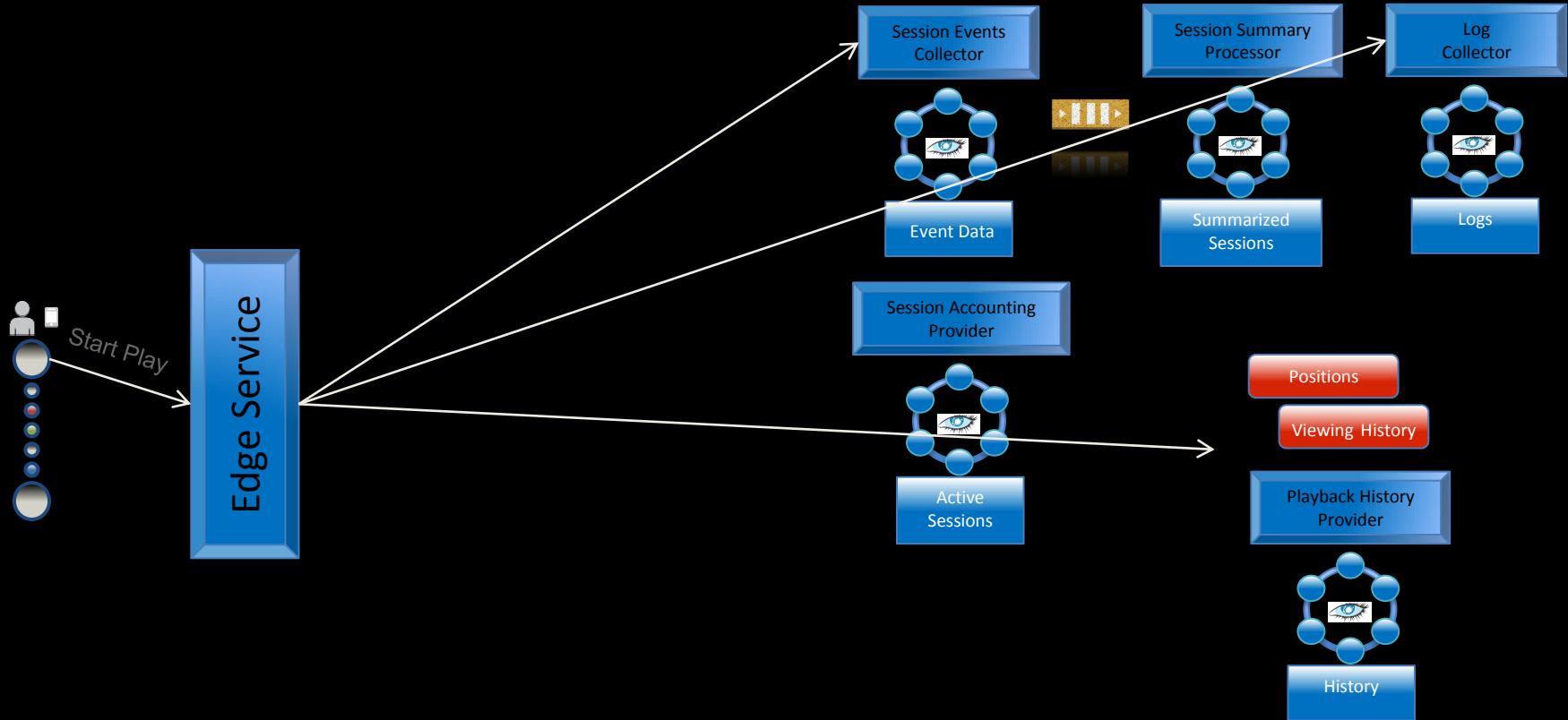
# Traffic Dial



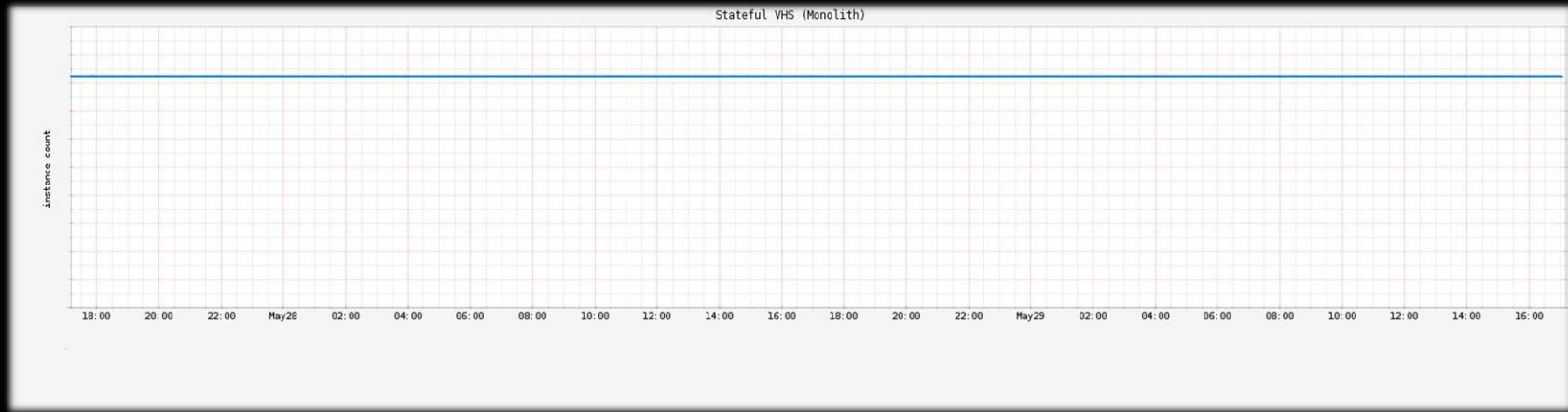
15



# Migration Status



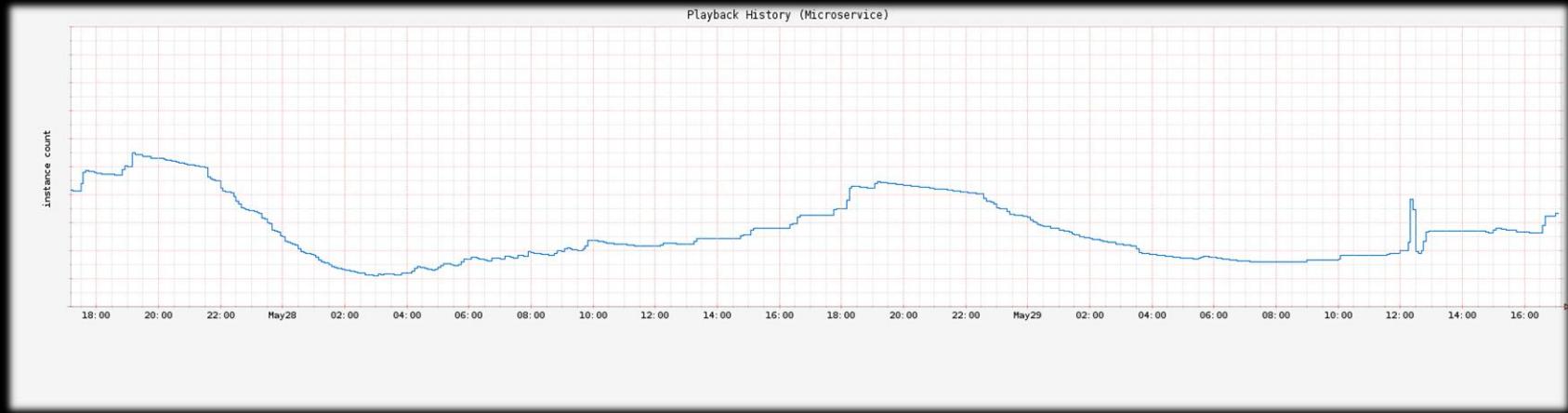
# Remember this?



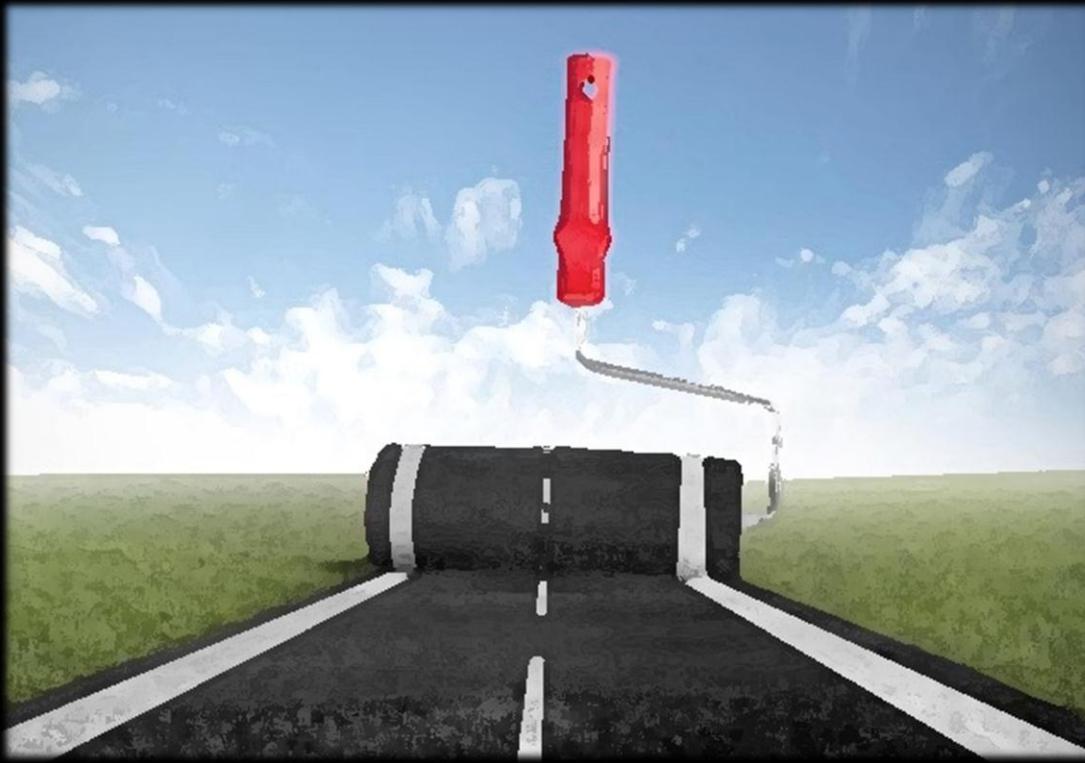
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# This is a typical graph now...



# The Road Ahead



@zimmermatt

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# Key Points

- Devour the whale a bite at a time.
- Use CQRS / Event Sourcing. Backup the raw event data. Design for idempotency so it can be replayed.
- System architectures are throw-away artifacts, useful for only a limited time.



**“If you don’t like how the table is set, turn over the table.”**

*Frank Underwood*

49m  49m