SLOs for Data-Intensive Services

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• Agenda

1. SLO Refresher
2. Our reservation system
3. SLO definition journey
4. Benefits
**SLIs, SLOs**

**Service Level Indicator**
- Quantitative measure
- Availability

**Service Level Objective**
- SLI ≥ target
- Availability for 1 week over 99.99%
Scale highlights

1,500,000+ experiences booked every 24 hours
23 years since launch founded in 1996
50,000+ physical servers across 4 datacenters
Reservation system

Reservation Service

Stream

Search Service

Data nodes

Gateway

Search queries
First SLOs

- Reservation Service
  - Availability
  - Latency
  - Res. success rate

- Search Service
  - Data nodes
  - Gateway
  - Availability
  - Latency

Stream
• Stakeholders reaction
  Reservation service
Stakeholders reaction

Search service
Missing SLOs

Reservation Service

Search Service

Data nodes

Gateway

- Durability?
- Accuracy?
- Consistency?
- Freshness?
Consistency SLO

Reservation Service

Get orders id

Probe

Search Service

Search orders and compare

Data nodes

Gateway
Consistency SLO

99.99% of reservations are consistent among all data nodes
Consistency SLO (2nd attempt)
• Consistency SLO (2nd attempt)

99.99% of search results are consistent
● Freshness SLO

Reservation Service

Get recent orders

Probe

Search orders

Data nodes

Gateway
99.9% of reservations are available within xx seconds
• Accuracy/Durability SLO
• Accuracy/Durability SLO
Current data SLOs
• Reservation SLOs

- Completeness
- Latency

Reservation Service → Hadoop → Stream → Consumer

- Durability

Probe → Hadoop
● Availability / Latency SLOs

- Client Latency: 96.983% / 99.5%
- Availability: 99.031% / 99.99%
• Availability / Latency SLOs

Buckets (manual)

Query 1
Query 5

SLO latency: 50 ms
SLO availability

Query 8
Query 2

SLO latency: 100 ms
SLO availability

Query 3
Query 4
Query 6
Query 7

No objectives
● Availability / Latency SLOs

Bucket (automated)

- **Score ≤ X** AND **Timeout ≥ x**
  - SLO latency: 50 ms
  - SLO availability

- **X ≤ Score ≤ Y** AND **Timeout ≥ y**
  - SLO latency: 100 ms
  - SLO availability

- **Score ≥ Y** OR **Low timeout**
  - No objectives
Was it worth it?
Auto. Mitigation

- Reservation Service
- Stream
- Freshness Probe
- Search Service
- Data nodes
- Gateway

Stop traffic
Auto. Repair

- Hadoop
- MR
- Dump
- Data nodes
- Search Service
- Gateway
- Completeness Probe
- Re-process
- Fix
- Daily snapshot push
- Reservation Service
- Stream
• Biggest gains

Awareness

Confidence
Thank you!

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