Managing Capacity @ LinkedIn

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Site Reliability Engineer, LinkedIn
MY DOCTOR SAYS MY HAIR LOSS IS CAUSED BY ME WORRYING ABOUT DATA LOSS!
Agenda

- Linkedin’s data footprint
- The Data pipeline
- Underlying Components
- Tools & Metrics
- Q&A
Entire Production Footprint

- Equinix Los Angeles
  1.2K Servers | 800kW

- Equinix Chicago
  1.2K Servers | 800kW

2.5k Servers | 1.6MW Installed power

2010
Production Application Footprint

- **Hillsboro, OR (LOR1)**
  - 20K Servers | 8MW

- **Ashburn, VA (LVA1)**
  - 34K Servers | 9.2MW

- **Richardson, TX (LTX1)**
  - 30K Servers | 7.2MW

- **Singapore (LSG1)**
  - 11K Servers | 4.2MW

- **2017**
- **95K Servers**
- **29MW Installed capacity**
Storage By the Numbers

- **Espresso Storage**: 4.2PB
- **HDFS Storage**: 170PB
- **MySQL Storage**: 140TB
- **Oracle Storage**: 1.3PB
- **Kafka Brokers**: 1600
- **Kafka messages per day**: 2T
Linkedin’s pipeline

Collection
- oracle DB
- Espresso
- Tracking
- kafka

Ingestion
- ODS
- Lumos Landing Zone
- Lumos
- Gobblin

Processing / Store
- Teradata
- Hadoop

Reporting
- Proprietary tools
- Micro Strategy
- Tableau

3rd Party Services

Linkedin
Linkedin’s pipeline

Collection
- Linkedin
- 3rd Party Services
- Espresso
- Tracking
- Kafka

Ingestion
- Oracle DB
- ODS
- Lumos Landing Zone

Processing / Store
- Teradata
- Lumos
- Gobblin

Reporting
- Proprietary tools
- Micro Strategy
- Tableau
Capacity planning for Major Components

Espresso
Key Value SOT

kafka

hadoop
Stores LinkedIn’s **Member Profile Data**.

- Distributed Document Store
- Strongly Consistent
- Provide features between NoSQL and RDBMS

**Espresso**

*Key Value SOT*
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<th>Espresso Footprint</th>
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Espresso Capacity Planning

- Organic Growth
- New Projects/ DBs
- Unplanned Scenarios
Capacity model: Organic growth

- Disk utilisation is not always linear
- Anomalies to be ignored
- Not max but percentile based calculation (~98\textsuperscript{th} percentile)
- Quarterly projections are derived over weekly growth trend in previous quarter
- Buffer over projected capacity
- Distributed streaming platform
- Backbone of LinkedIn’s data pipeline
- Metrics, member activity data, change data capture and much more
Kafka Footprint

Kafka Events per Day | Kafka Servers
--- | ---
2T | 1600
Kafka Capacity Planning

- Disk usage bound
- Cap disk utilisation at 60%
- Horizontally scalable

- Configurable retention
- Kafka rebalances to keep utilization under 40%

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Kcap - Kafka Capacity Auditor

Kafka Space Utilization (Overall)

Kafka Space Utilization (Per Fabric)
• Distributed storage and processing framework
• It can store any kind of data
• Write once read many
Hadoop Footprint

- 10K Hadoop Nodes
- 170PB HDFS Storage
- 145K YARN jobs/per day
- 3.6K Hadoop Users
Hadoop Capacity Planning

- Disk Utilization
- Memory Utilization
- CPU Utilization
Hadoop capacity management tools

Dr. Elephant

Rewinder

Sizr
Thank You
Q&A