Future Storage Layer

Roman Chyla and the ADS Team

ADS Users Group Meeting, 15-16 Nov. 2021
The retreat of Russia. Swebach Bernard Edouard (1800-1870)
The retreat of Russia in 1812 (oil on canvas 1; 26 x 1; 93) 1838
Museum of Fine Arts Besancon.
March of Suvorov through the Alps by Vasily Surikov.
The problem

● Technologically newer parts of ADS
  ○ lots of attention, gradual improvements
  ○ steady and stable

● Content curated by ADS
  ○ linear growth
    ■ 2M docs/5 yrs
    ■ doubled in 8(?) years

● Possible expansion
  ○ At least 10x more of everything
    ■ will also accentuate deficiencies
      • however: speed alone is not what informs the design
  ○ Massive change in quantity is change in quality
The problem exciting opportunity

- Connect all separate data
  - One road connecting two cities, that's something
  - But network of roads: that changes how people think

- Remove (mental) roadblocks
  - Access to computation/data via API
  - First internally, in next phase to end-users
    - Researchers will be able to run experiments on data ADS curates

- Possibly redesign API
  - Pipe dream for quite some time
Reqs

- Access to **all** data ADS curates
- Via unified interface (API)
  - internally, not exposed to public
- Highly available + scalable + failure tolerant
  - 144TB (for data - not counting logs, telemetry)
How?

- Exploration ongoing
  - number of unknowns decreasing
  - evaluated multiple distributed storage technologies
    - Cassandra
    - Hadoop/HBase
    - Yugabyte (and Postgres)
  - need to 'marry' storage and computation
    - Hadoop vs Spark vs Kafka streaming…
    - schema vs schemaless
    - thrift/protocol buffers and polyglot bindings (unified access)
  - need to assemble cost projections
    - bare metal
    - cloud and vendor products
And then put it together...