An end-to-end Spark based data stack in the hybrid cloud

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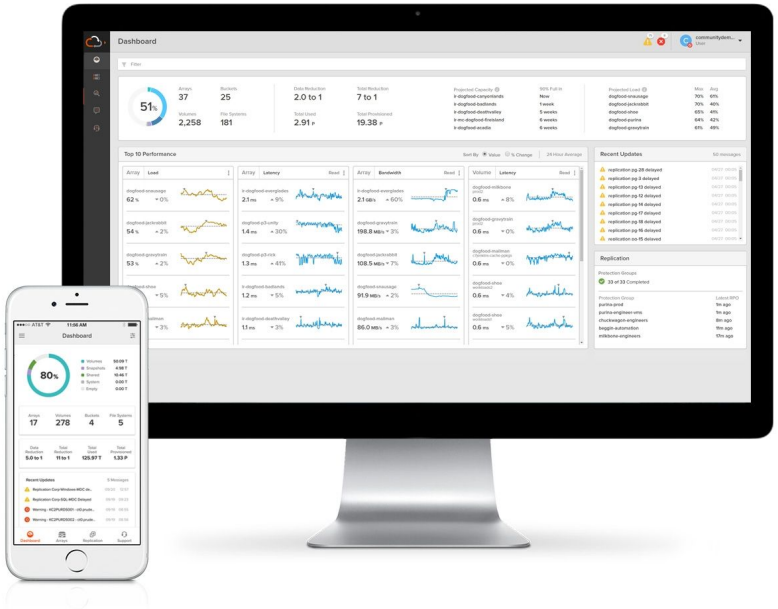
#HWCSAIS12

Outline

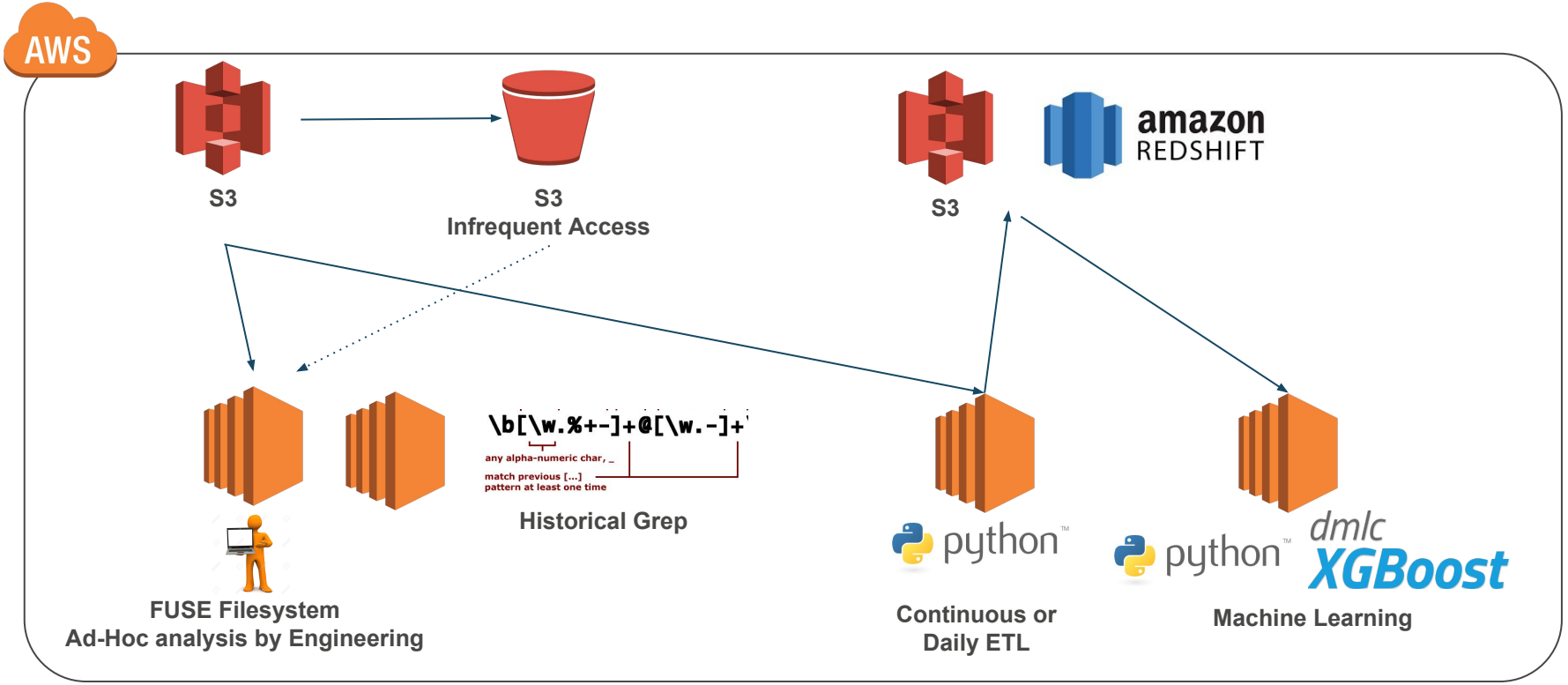
- Environment overview & problems
- Solutions - Hint : Spark
- More Spark More Problems
- Hybrid Cloud
  - Options & Performance comparison
  - Should you do it ?
  - Basics of datacenter

Pure1

- Fleet dashboard for IoT devices
  - Storage arrays
  - VM’s
- Real-time log/metric streaming
- 16 TB logs/metrics ingested daily
- Intelligence
  - Proactive scanning for issues
  - Predictive alerting
  - Machine learned forecasting



Logs are king



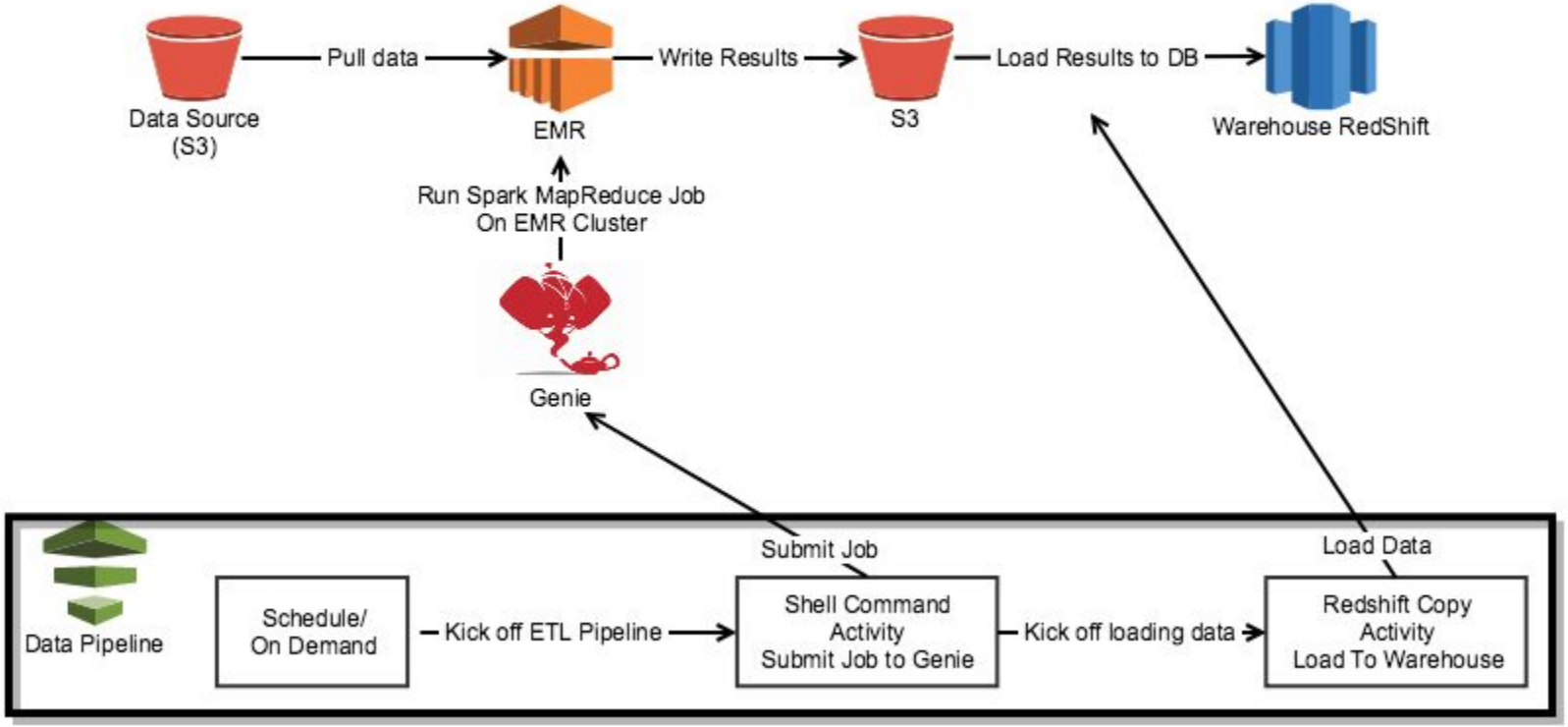
Problems

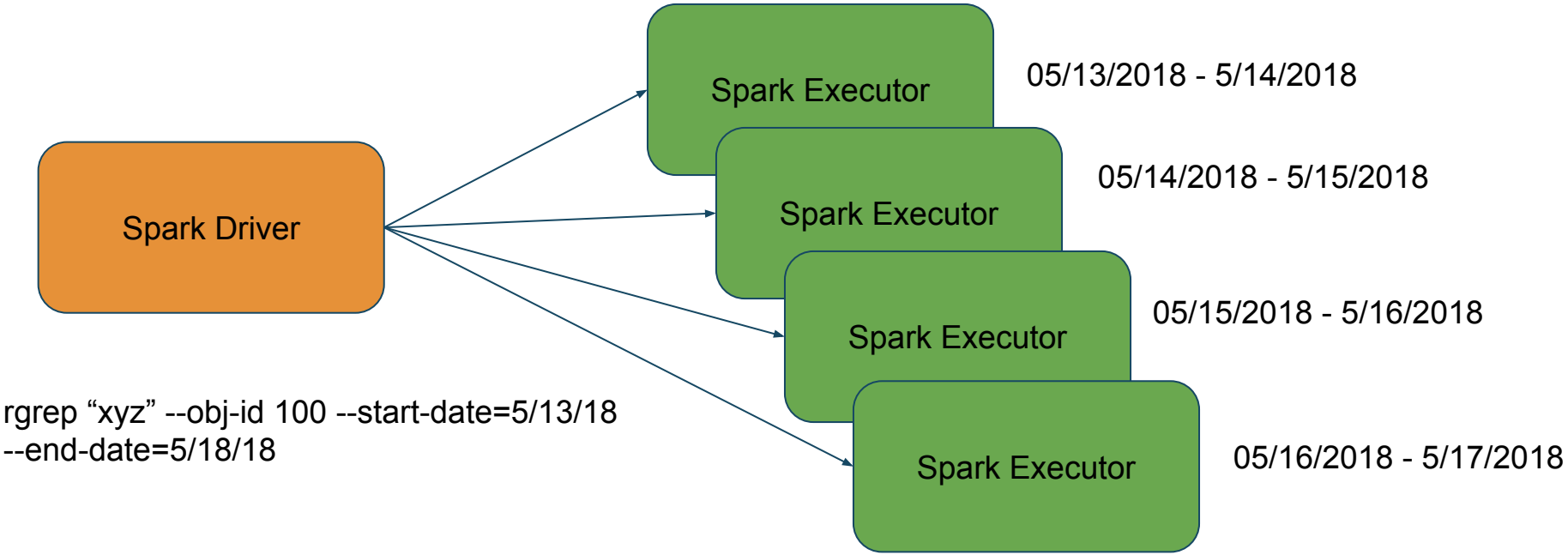
- Speed of running historical greps
  - Bottlenecked on single machine throughput
- Resource wastage for ETL machines
- Code/maintenance for new ETL jobs
  - Becoming a monolith
- ML training time
  - As data grows, taking 8-12 hours

all the things !

- Faster*
- Better resource utilization
- Uniform language and tooling
- Streaming / batch jobs
- One infra to maintain

Automated ETL Workflow with AWS DATA Pipeline

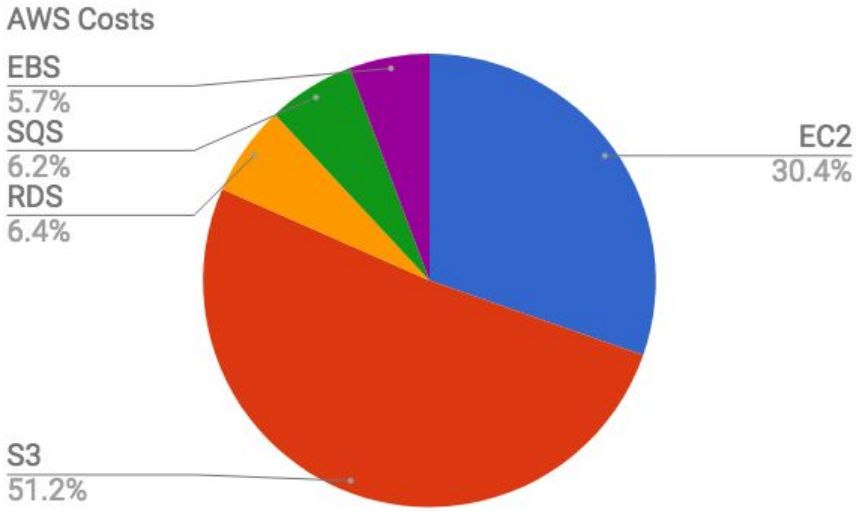


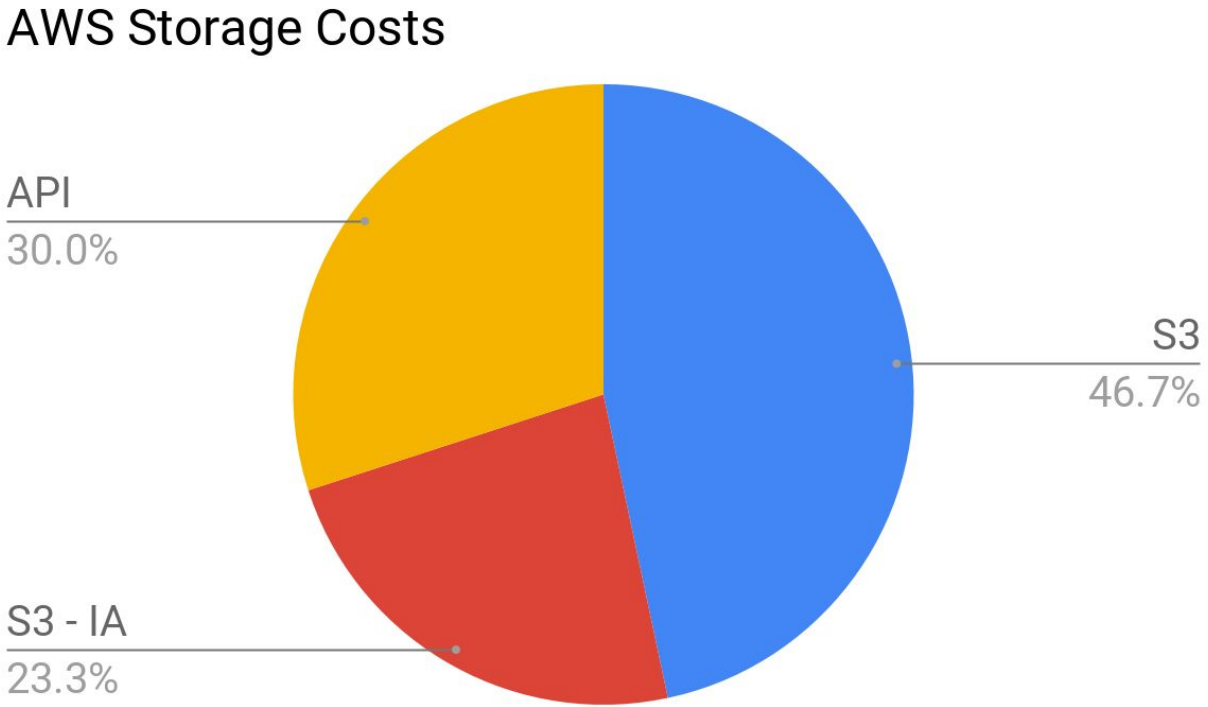


Grep -> Distributed grep on Spark

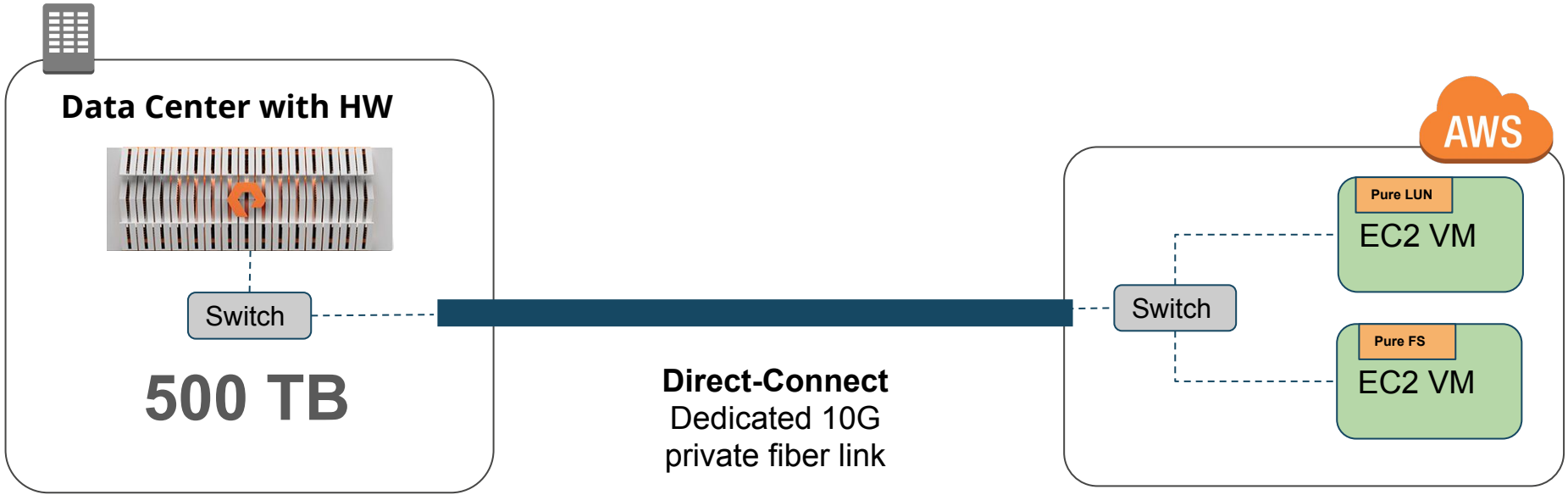
Done !

Problem - AWS Cost trend

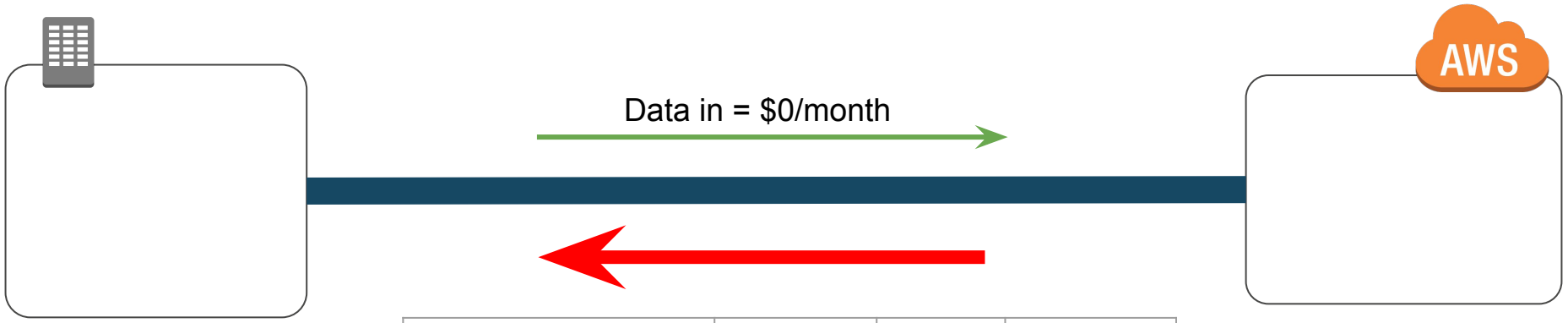



AWS Storage Costs
API
30.0%
S3
46.7%
S3 - IA
23.3%

Hybrid Cloud

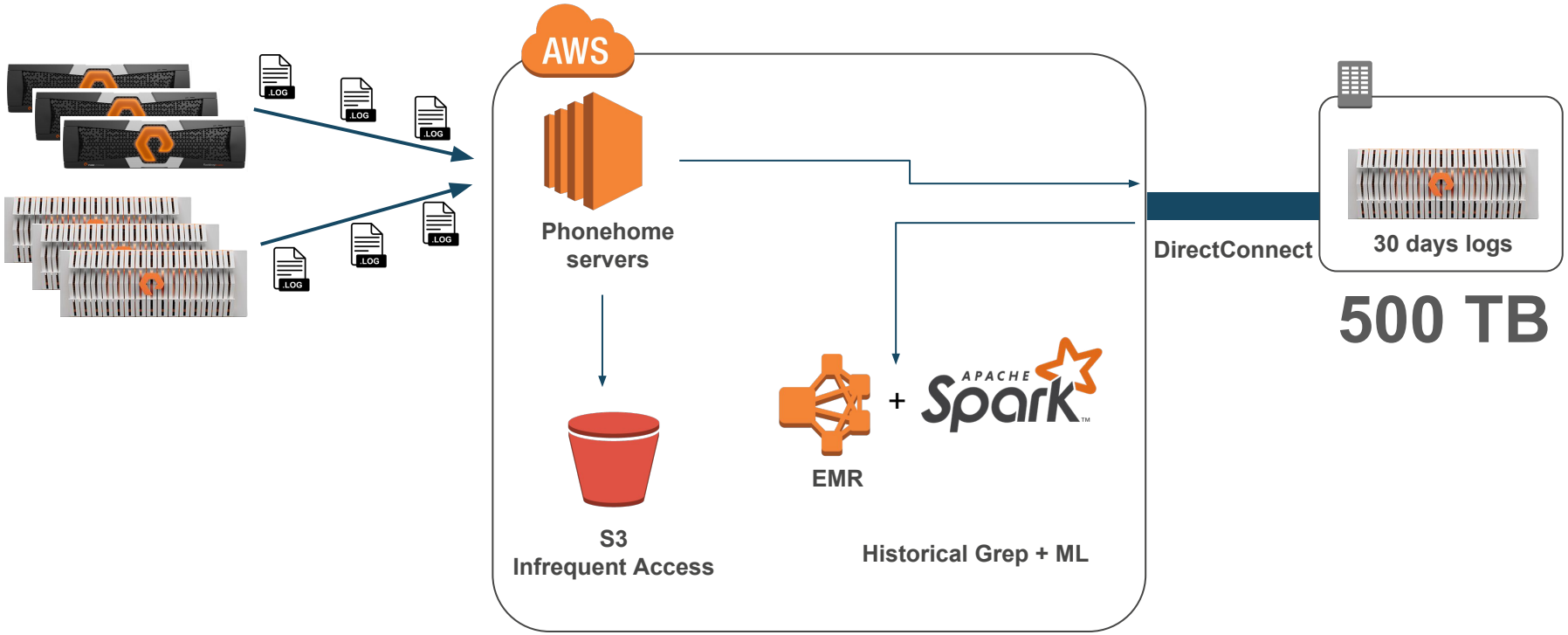


Hybrid Cloud - Pricing



Utility	Price	Usage	Total per month
10G port	$2.25/hr	720 hr	$1620
Data transfer out of AWS	$0.020/GB	500 TB	$10000
AWS Cost			$11620

Log analysis pipeline - Smoke test

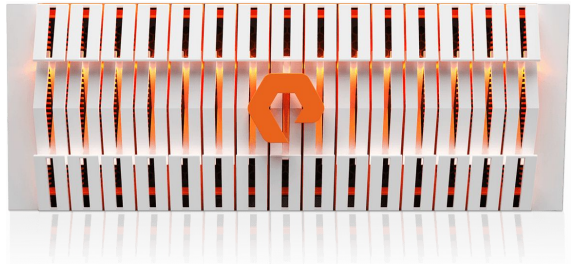


Aside
Storage Protocols

Storage system

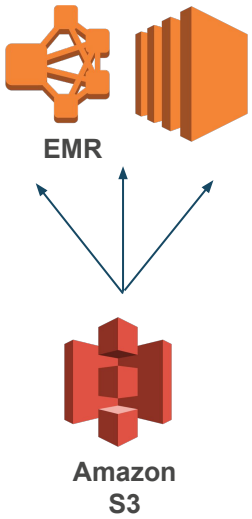
Generic

Optimized

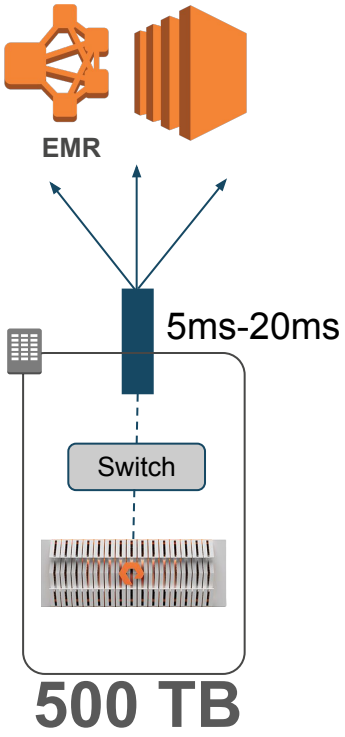


Flashblade

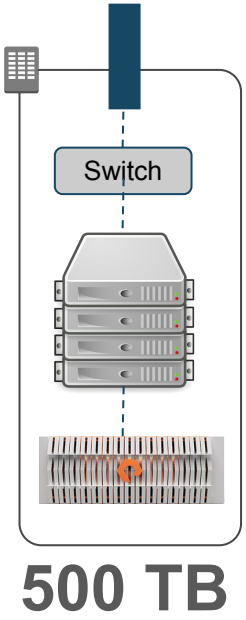
AWS Only



Hybrid with EC2

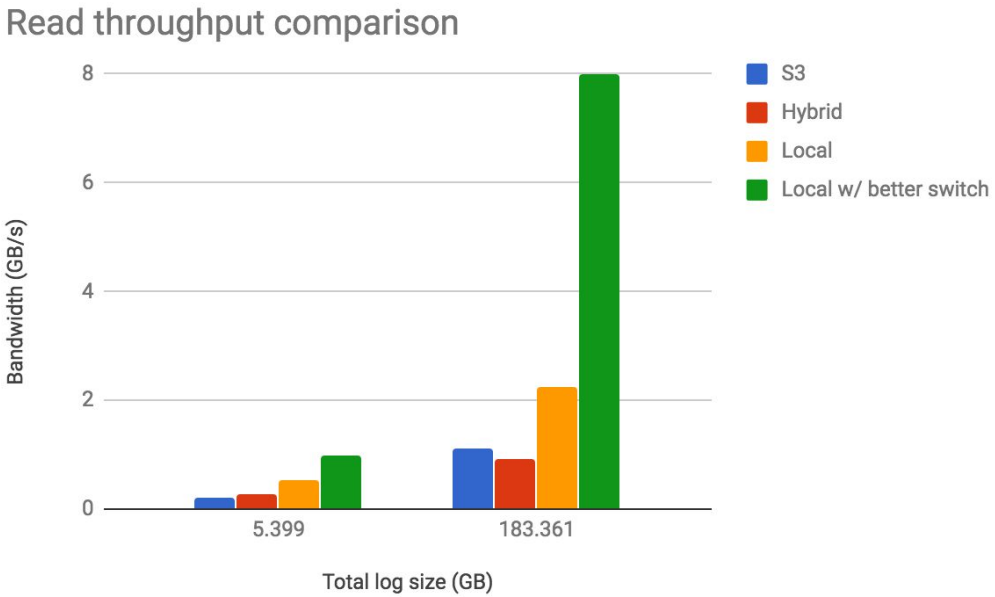


Hybrid with Local Compute

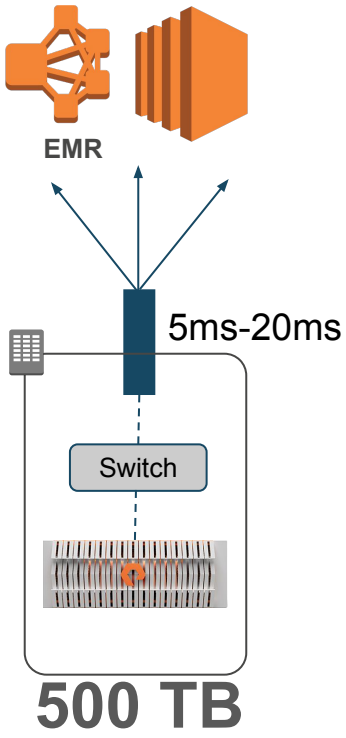


144 node spark cluster
Workload - Distributed grep

~3x-10x better throughput



Hybrid with EC2



Performance

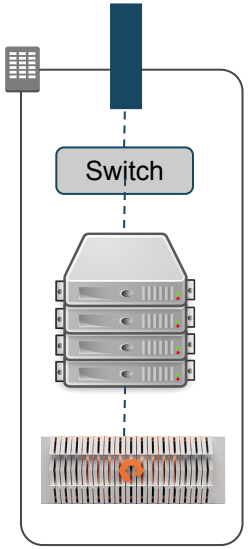
- Link latency
- Cloud networking stack

Costs

Good for

- Read heavy workloads
- Latency insensitive workloads
- Low Bandwidth workloads

Hybrid with Local Compute



500 TB

Performance 

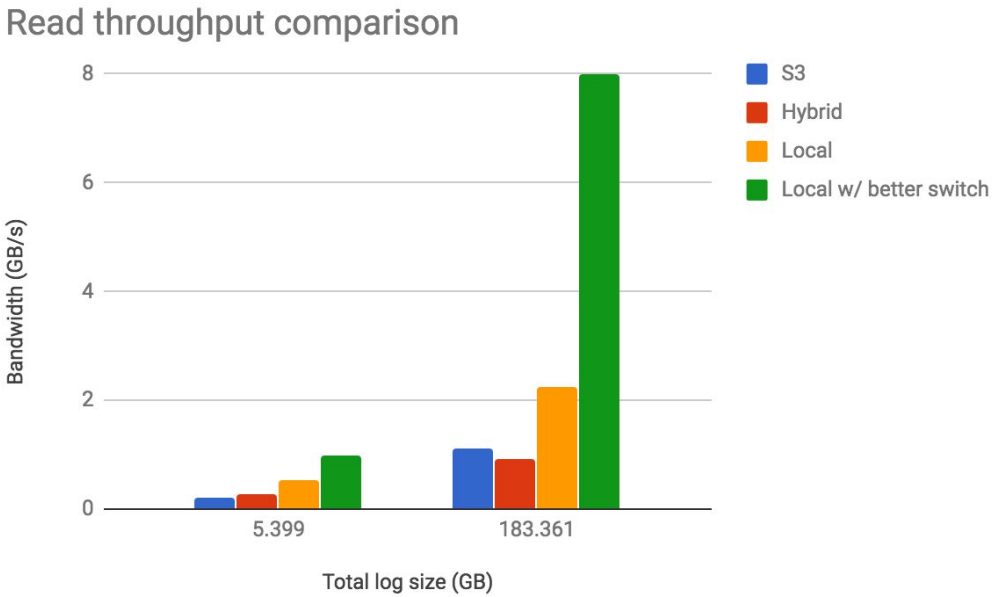
Costs  

Good for

- Read heavy workloads
- Latency sensitive workloads
- High bandwidth workloads

144 node spark cluster
Workload - Distributed grep

~3x-10x better throughput



Datacenter setup

Conclusion

- Best use cases: Workloads with **higher read, lower write** requirements
- When write portion of read/write ratio increases, be cognizant of cumulative **AWS transfer costs**
- **High performance cloud services** can be expensive, on-prem can alleviate this cost
- Unique capabilities of on-prem storage & compute:
  - **Instant snapshots**
  - **All kind of workloads on one platform**
  - **Resilience**