Pairing a Blazing Fast Database

With *THE Fastest Cloud* On The Planet

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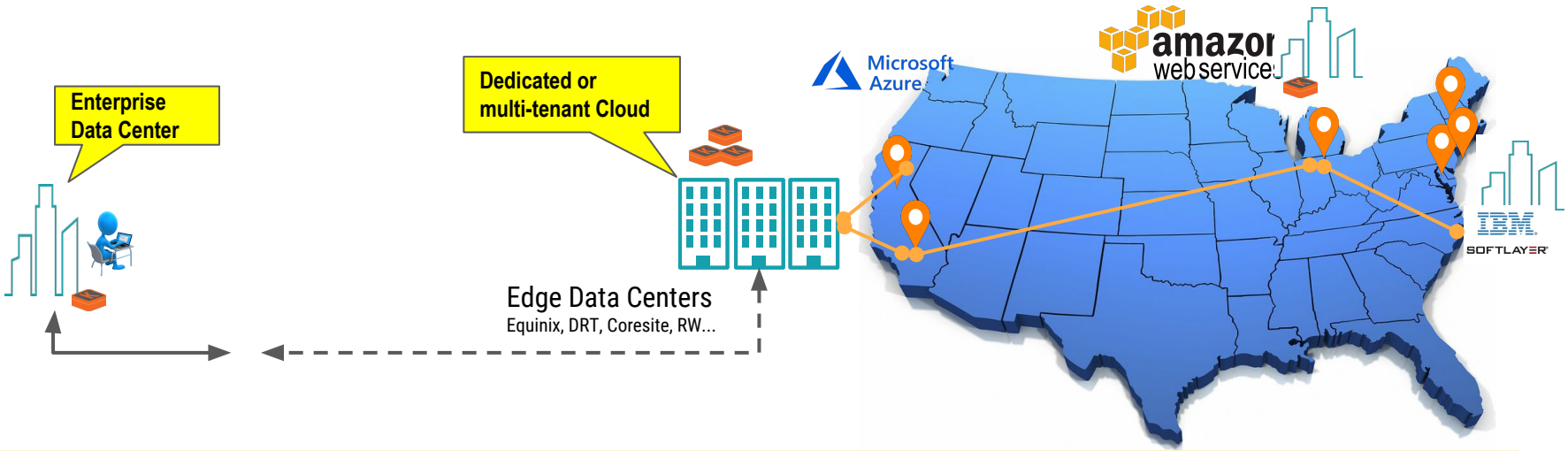
Kodiak Data Intro:

We Solve The Problem of Performance For Edge Clouds

- ➔ Cloud 1.0 started with VMware as first ‘Private Cloud’
  - VMware solved the problem of **server and OS sprawl**
  - Simplified IT infrastructure TCO by separating app SW from HW
- ➔ Cloud 2.0 Added Public Cloud to expand benefits of virtualization
  - AWS solved the problem of **data center sprawl**
  - Introduced multi-tenant infrastructure sharing for cost efficiency
- ➔ Cloud 3.0 is for analytics, big-data and AI/ML for on/offsite use
  - Most workloads are cluster-centric, long-running INSTEAD of spin-up/spin-down server-centrice loads
  - Requires high-bandwidth data sources and ability to provide data coherency between cloud locations

Kodiak: First-to-market With Onsite *and* Edge Cloud



Kodiak provides PRIVATE CLOUD for Enterprises, Managed Service Providers and Telco/Carrier Operators

- ✓ Operates down to a tiny footprint (desktop/closet/basement)
- ✓ Provides exceptional performance (up to 5X faster than AWS, even for data-heavy workloads)
- ✓ $aves thousands to millions in cloud operating cost

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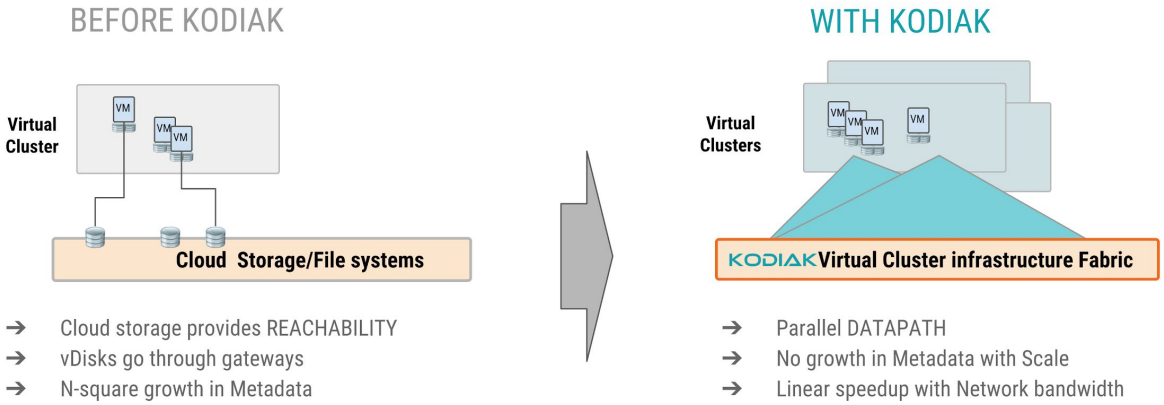
Kodiak: First in Benchmarks for Infrastructure



- HDFS Big Data benchmarks - 5X faster than AWS @ ½ the cost for similar configuration
- Data-store performance for Cassandra - 4X faster than bare metal
- Clickhouse columnar data warehouse - 3X faster than AWS at half the cost
- Big-data on VMware-hosted Kodiak - 6X faster Horton Data Platform with Kodiak-on-VMW vs native VMW
- MySQL to Vertica Replication benchmark - 8X to 10X faster

All tests are independently run. Details on website.

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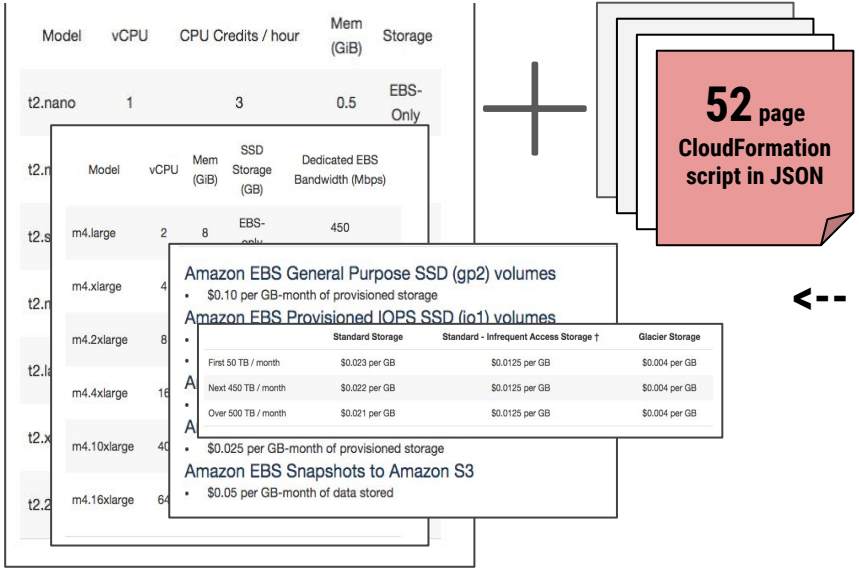
Kodiak: First To Cut Cloud-deployment Steps by 99%

EC2 CPU: 12 Categories / 52 Options



52 page CloudFormation script in JSON

<-- OR -->

1 Sheet - vCPU, RAM, SSD

Name	Description	Hosts	vCPU	RAM	SSD	OS	BootA	BootB	Data1	Data2	Data3
CEPH1	Custom Ceph Cluster	Number		GB	GB		GB	GB	GB	GB	GB
RGW1	Read GW	1	4	8	50	Centos7.3	50				
RGW2	Read GW	1	4	8	50	Centos7.3	50				
RGW3	Read GW	1	4	8	50	Centos7.3	50				
MON1	Monitor	1	4	8	50	Centos7.3	50				
MON2	Monitor	1	4	8	50	Centos7.3	50				
MON3	Monitor	1	4	8	50	Centos7.3	50				
OSD1	OSD	1	4	24	250	Centos7.3	50		100	100	
OSD2	OSD	1	4	24	250	Centos7.3	50		100	100	
OSD3	OSD	1	4	24	250	Centos7.3	50		100	100	
OSD4	OSD	1	4	24	250	Centos7.3	50		100	100	
OSD5	OSD	1	4	24	250	Centos7.3	50		100	100	
OSD6	OSD	1	4	24	250	Centos7.3	50		100	100	
TELE	Telemetry	1	4	16	200	Centos7.3	200				
LB	Load balancer	1	4	8	50	Centos7.3	50				
Total	**MemCloud - 4X**	**14**	**56**	**216**	**2,050**						

Cluster design Before Kodiak

… and with Kodiak

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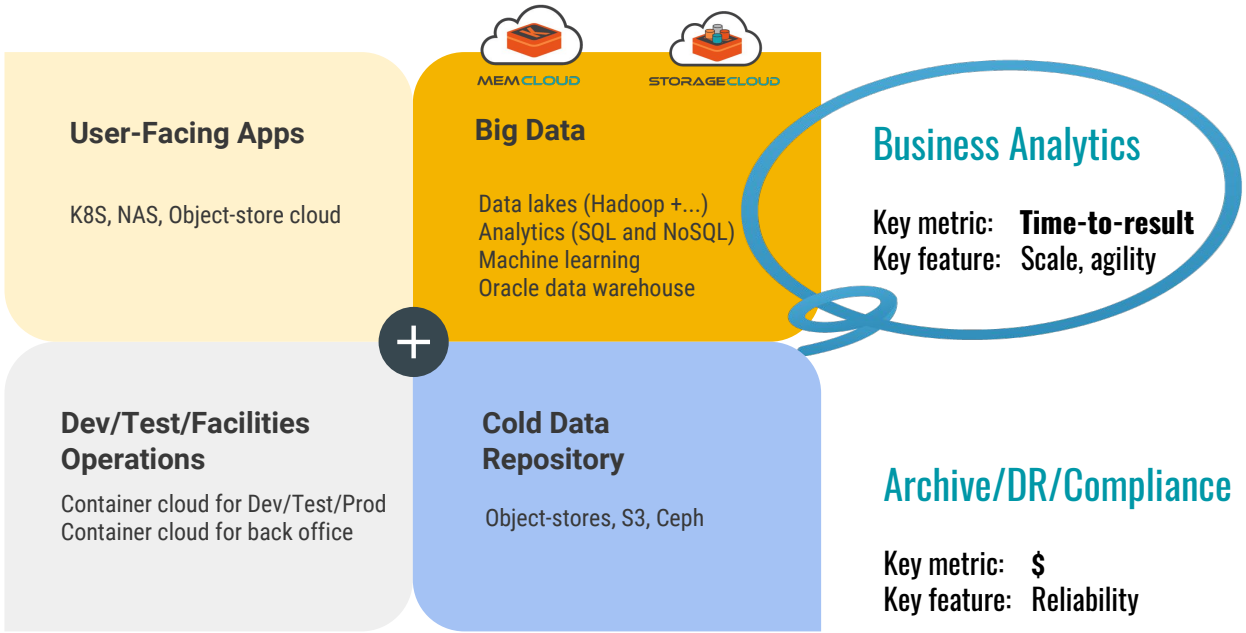
Our Focus: Big Data and Analytics

Web Apps

Key metric: **Response time**
Key feature: Elastic resource



Business Analytics

Key metric: **Time-to-result**
Key feature: Scale, agility

R&D / Back-Office Apps

Key metric: **Cost per head**
Key feature: Cost efficiency

Archive/DR/Compliance

Key metric: **$**
Key feature: Reliability

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MemCloud:
Great Savings for Analytics, Big-data and AI/ML Users

Customer Example	Why Kodiak Data?	Cloud	Performance Increase	Cost Savings
Digital Advertising ● Real-time analytics ● Continuous bid updates	● No IT/DevOps ● Better performance ● Cost savings	AWS to Hosted MemCloud	5X	50% From $ 40K /year to $ 20K /year
BI Users (HDFS/Kafka) ● 72 TB Analytics Cluster	● Faster performance ● Cost savings	AWS to Private MemCloud	3X (estimated)	50% From $ 65K per month to $ 33K/mo
ML GPU Cluster User ● 50 TB GPU data farm	● High-BW data cloud ● Private data center	Bare-metal	2X - 10X	75% savings over All-flash-array

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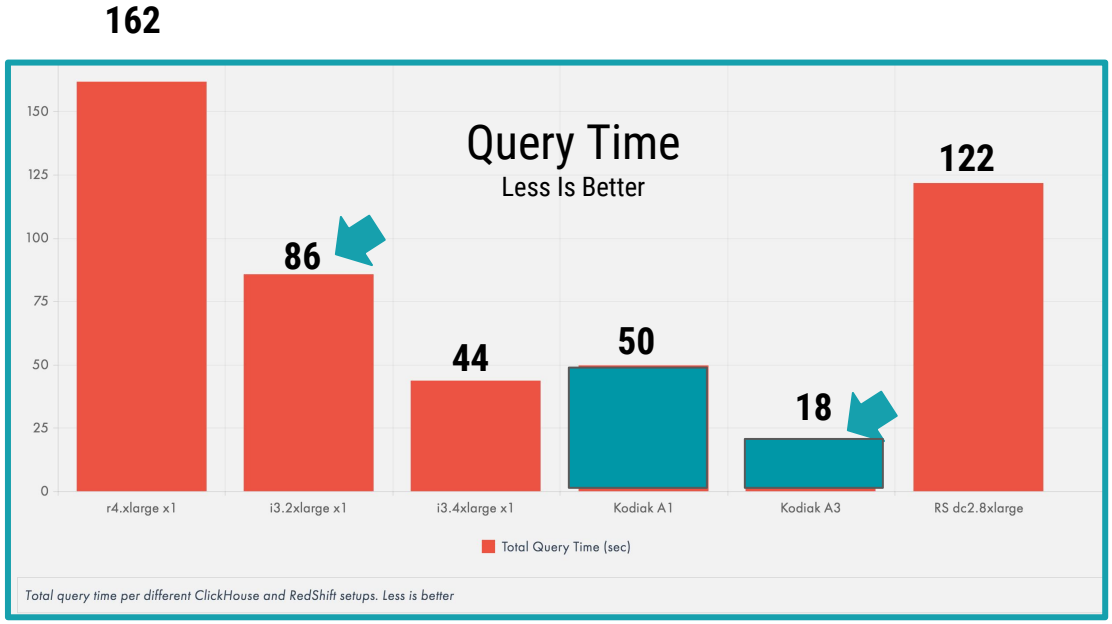
ClickHouse on MemCloud: Let's Talk Price, Performance

Big Data Example: Altinity Independent ClickHouse Benchmark



1x AWS r4.xlarge - $45/week

1x AWS i3.2xlarge - $104/week

1x AWS i3.4xlarge - $208/week

1x AWS dc2.xlarge - $950/week

1x Kodiak A.1 - $40/week

1x Kodiak A.3 - $100/week

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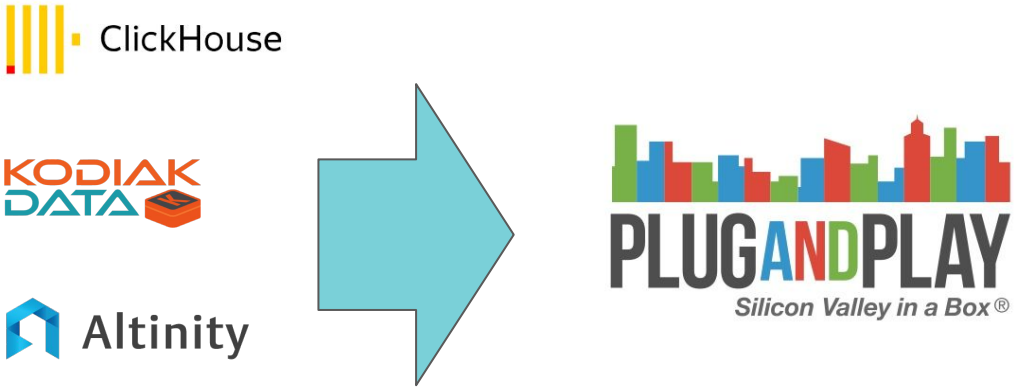
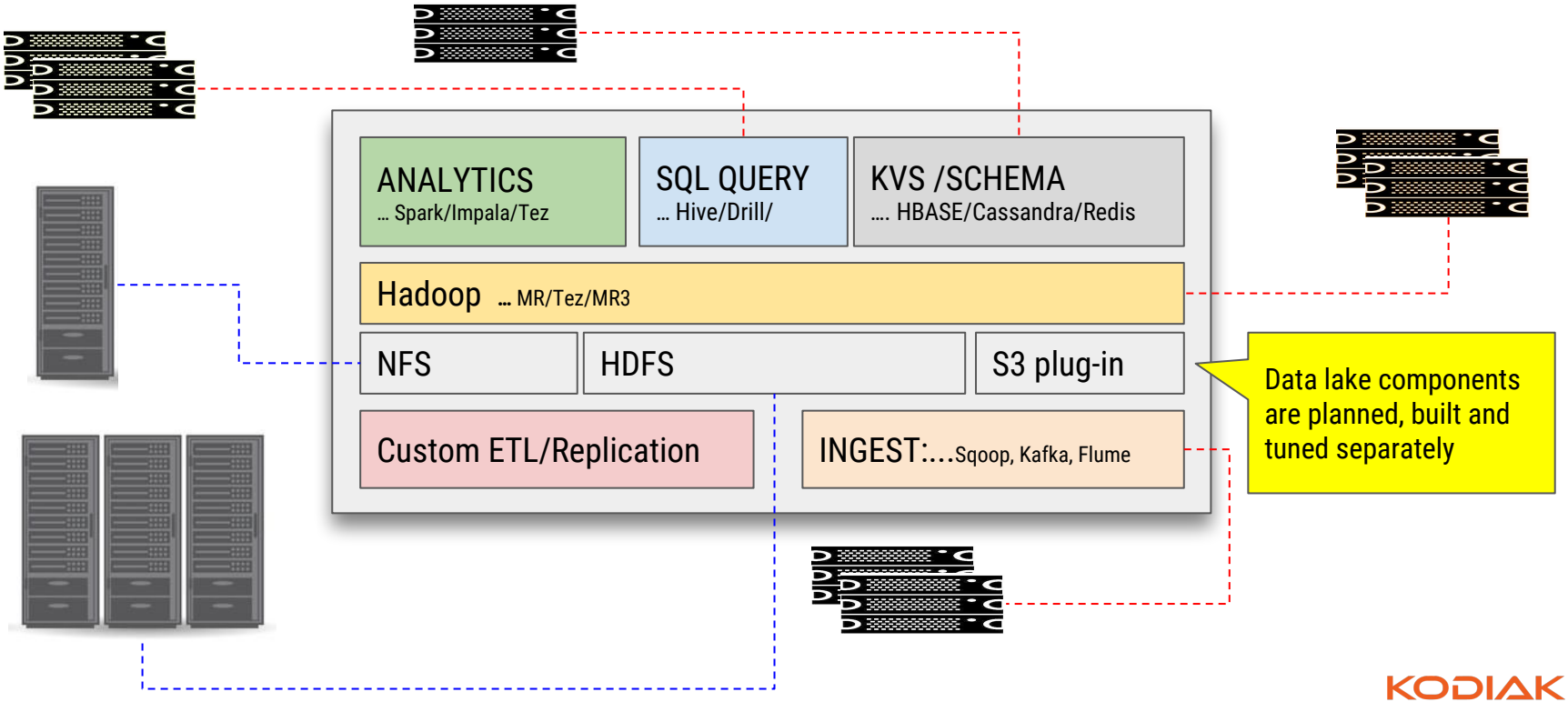
Kodiak MemCloud Technology In PlugandPlay Cloud



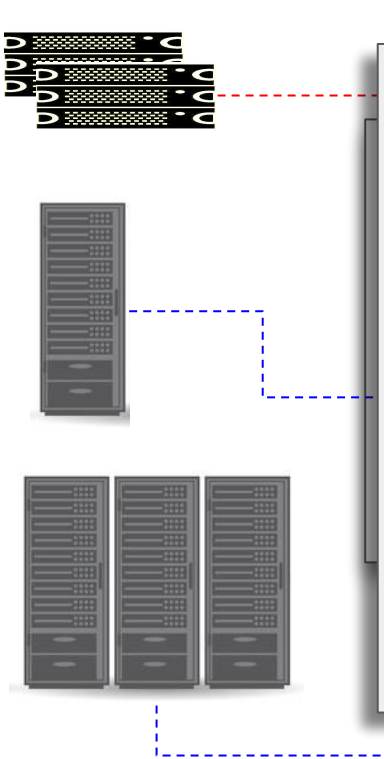
- Dedicated and unique Silicon Valley Data Center
- Fastest cloud on the planet - services at 40GE and 100GE
- 1.6 Tbits/sec connectivity options to Equinix SV-1
- Kodiak partner since Q4-2017 and offers ALL Kodiak Services

A Preview of What's Coming....

Todays Data Lake: Separate Physical Clusters For SW



Complex and Expensive to Tune and Maintain



A. Complex and Inefficient Cluster Design: Isolated Physical Server Clusters

- No simple way to evaluate, benchmark and spec clusters today
- Separate CPU/RAM/server configs (HDFS servers are different than Cassandra)
- Cluster disks/SSDs are isolated (local hot-spot, no way to balance cluster-wide)

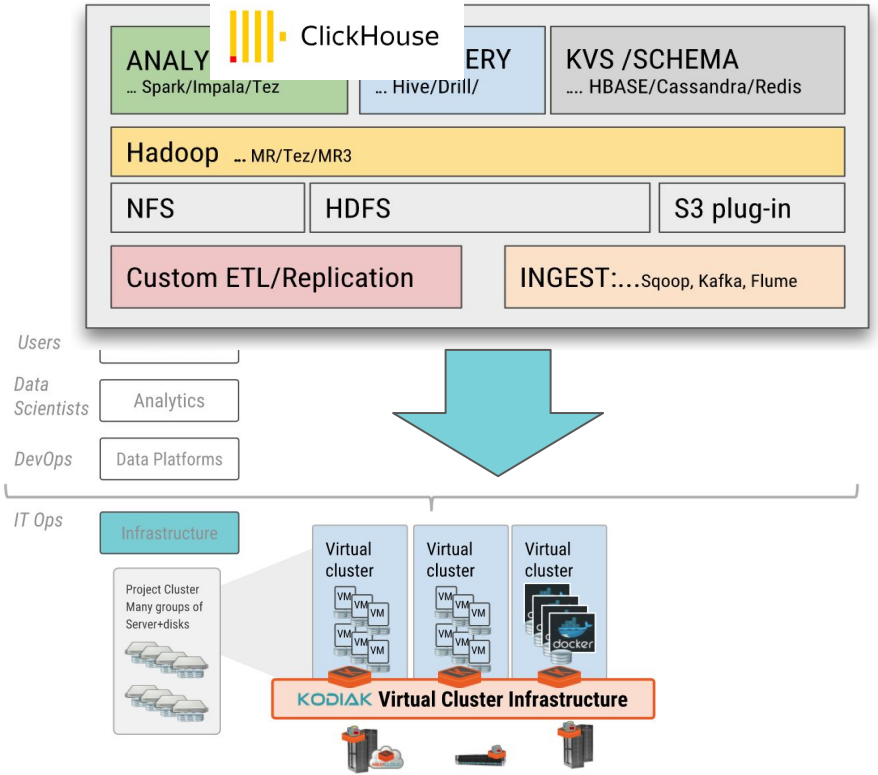
B. Difficult to Tune, Maintain and Service

- Lack of cluster-level virtualization makes it very complex to maintain
- Each section needs to be tuned separately
- 90% reduction in outage and service time

C. Changing Software Mix Drive Up HW Expenses

- Changes to SW mix and usage patterns ripple through HW configuration
- Ingest/Analytic/Schema/Storage interactions are impossible to optimize
- Adding new SW becomes lengthy process due to HW changes

Plugandplay/Kodiak/Altinity/Clickhouse for Data lakes



DESIGN logical cluster in hosted/private MemCloud

PROTOTYPE with instant what-if-analysis

DEPLOY any mix of SW on mix-and-match servers

TUNE performance without rip and redo of HW

HANDLE usage and SW changes w/o HW change

$AVE SSD costs with cluster-level thin-provisioning

SERVICE with 99% less downtime

DIRECT BACKUP to S3/Azure w/ Apache Tiering

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First Mile Cloud. Last Mile Edge.

Kodiak Clouds provide cloud economics at smaller, personal scale.

First Mile (MemCloud, SaaS)

Workspace. Building. Campus.
Broadband/Mobile/Telco.

Last Mile (MemCloud, StorageCloud, SaaS)

Enterprises. Metro Co-location. Internet Exchanges.
Public Cloud Edge.

We bring the Cloud to you!