The Analytics Easy Button

How to Deploy ClickHouse® Services with Terraform, Helm, or Argo CD

Josh Lee - Altinity Developer Advocate
Robert Hodges - Altinity CEO

A brief message from our sponsor…

Robert Hodges

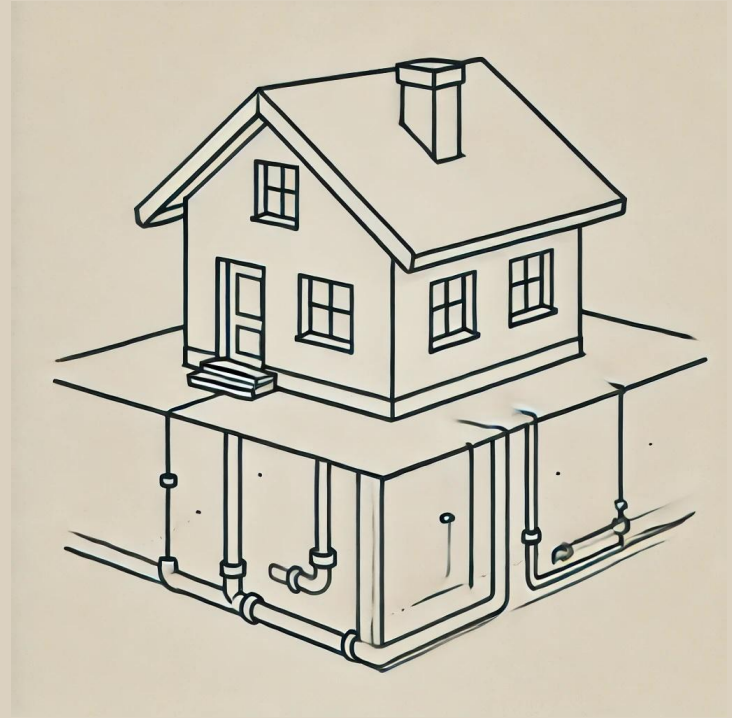Database geek with 40+ years on DBMS. Kubernaut since 2018. Day job: Altinity CEO

Josh Lee

Obsessed with Open Source & Observability. SQL was my second language.

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ClickHouse software and services: Altinity.Cloud and Altinity Stable Builds
Authors of Altinity Kubernetes Operator for ClickHouse

What's in a Platform?

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Applications

Platform

Applications

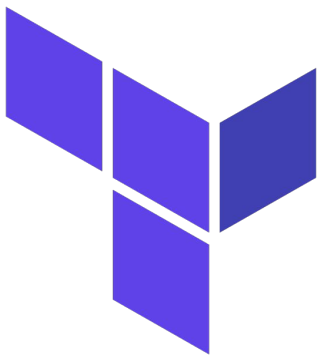Platform Applications

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Infrastructure

Applications

Platform Applications

Infrastructure

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Terraform for Infrastructure

Strict state management for semi-permanent entities: VMs, clusters, operators, managed services

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Helm for App Definitions

Combine with:
- Terraform Helm Provider
- ArgoCD

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Argo for managing apps

Easy-to-use API with CRDs and app-of-apps pattern.
Uses Helm for inflating templates only…

App Definitions (Argo CRDs) → templates / grafana.yaml

Parent Application (plain helm chart) → Chart.yaml

3rd-Party Helm Chart with custom values → lines 15–16, 19–20

```
argo-apps
  templates
    grafana.yaml
    otel-collector.yaml
  values
  Chart.yaml
  .gitignore
  .terraform.lock.hcl
  README.md
  TODO.md
  argocd.tf
  main.tf
```

Code | Blame   27 lines (26 loc) · 651 Bytes   Raw

```yaml
 1
 2  apiVersion: argoproj.io/v1alpha1
 3  kind: Application
 4  metadata:
 5    name: grafana
 6    namespace: argocd
 7    annotations:
 8      argocd.argoproj.io/sync-wave: "1"
 9  spec:
10    destination:
11      namespace: default
12      server: https://kubernetes.default.svc
13    project: default
14    sources:
15      - chart: grafana
16        repoURL: https://grafana.github.io/helm-charts
17        targetRevision: 8.3.4
18        helm:
19          valueFiles:
20            - $values/argo-apps/values/grafana.yaml
21      - repoURL: 'https://github.com/joshleecreates/clickhouse-opentelemetry-iac.git'
22        targetRevision: main
23        ref: values
24    syncPolicy:
25      automated:
26        selfHeal: true
27        prune: true
```

ClickHouse is a real-time analytic database
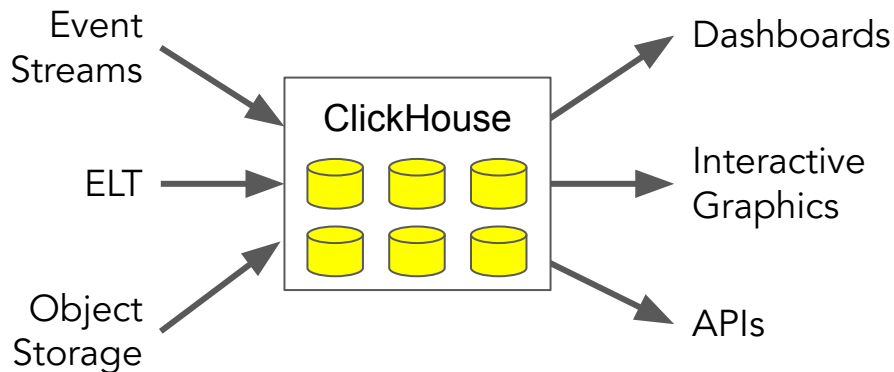
Understands SQL

Runs on bare metal to cloud

Shared nothing architecture

Stores data in columns

Parallel and vectorized execution
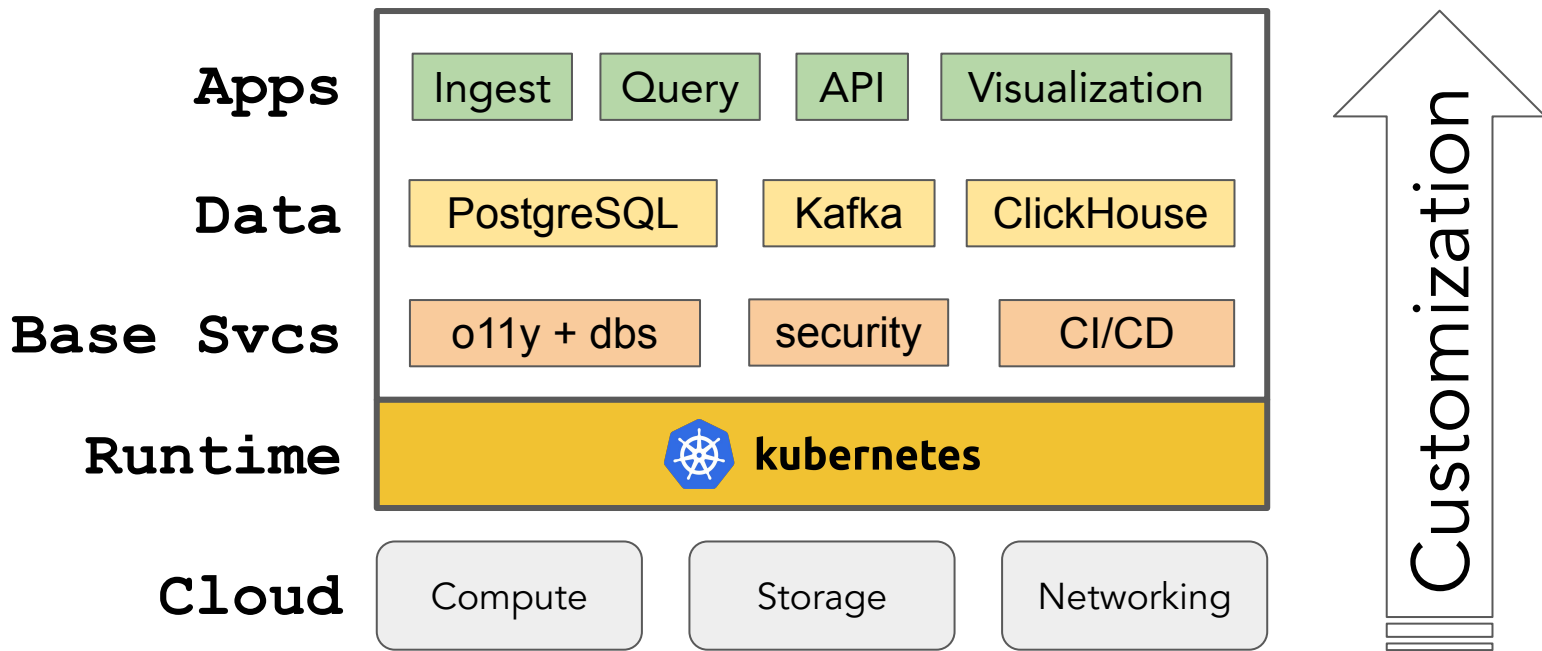
Scales to many petabytes
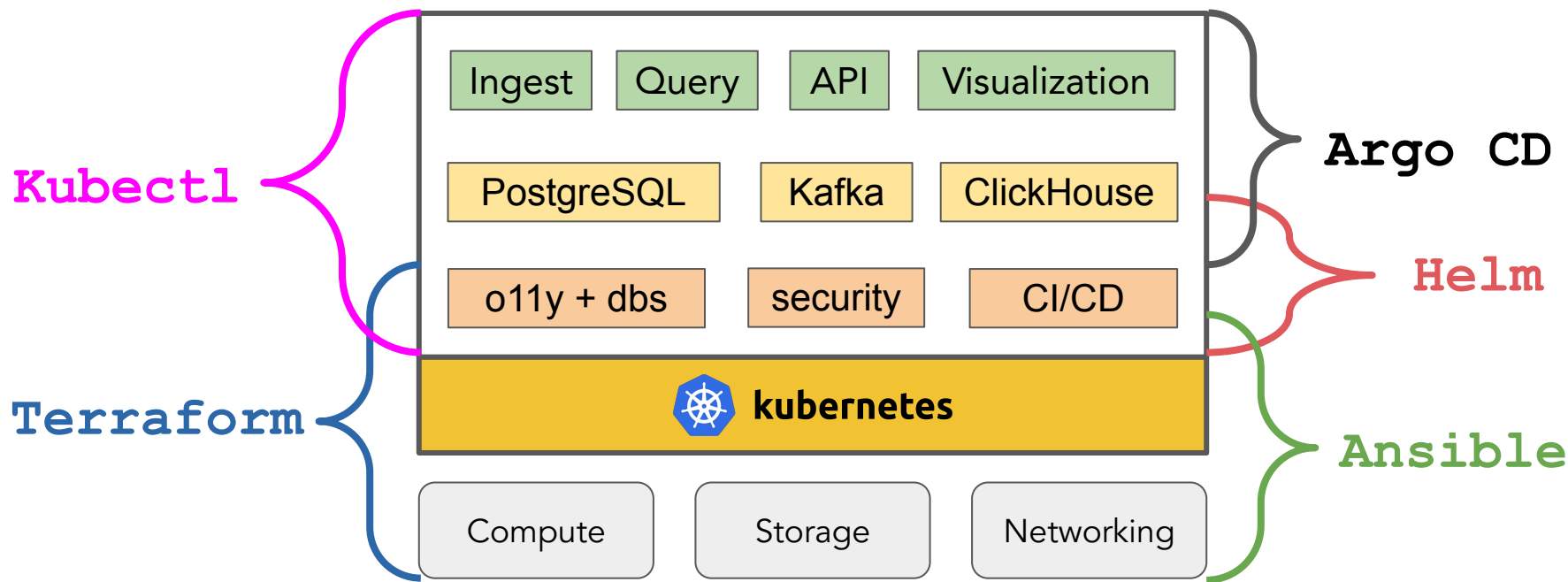
Is open source (Apache 2.0)

Event
Streams

ELT

Object
Storage

ClickHouse

Dashboards

Interactive
Graphics

APIs

It's the core engine for
low-latency analytics

A platform is like a parfait…

Data platform == custom stack to solve business problem

Apps

| Ingest | Query | API | Visualization |

Data

| PostgreSQL | Kafka | ClickHouse |

Base Svcs

| o11y + dbs | security | CI/CD |

Runtime

kubernetes

Cloud

| Compute | Storage | Networking |

Customization

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Different knowledge/tools for different parts of the stack

Kubectl

Terraform

| Ingest | Query | API | Visualization |

| PostgreSQL | Kafka | ClickHouse |

| o11y + dbs | security | CI/CD |

kubernetes

| Compute | Storage | Networking |

Argo CD

Helm

Ansible

Kubernetes encourages app vs. platform "functions"

Apps Team

Ingest	Query	API	Visualization

PostgreSQL	Kafka	ClickHouse

o11y + dbs	security	CI/CD

⎈ kubernetes

Compute	Storage	Networking

Platform Team
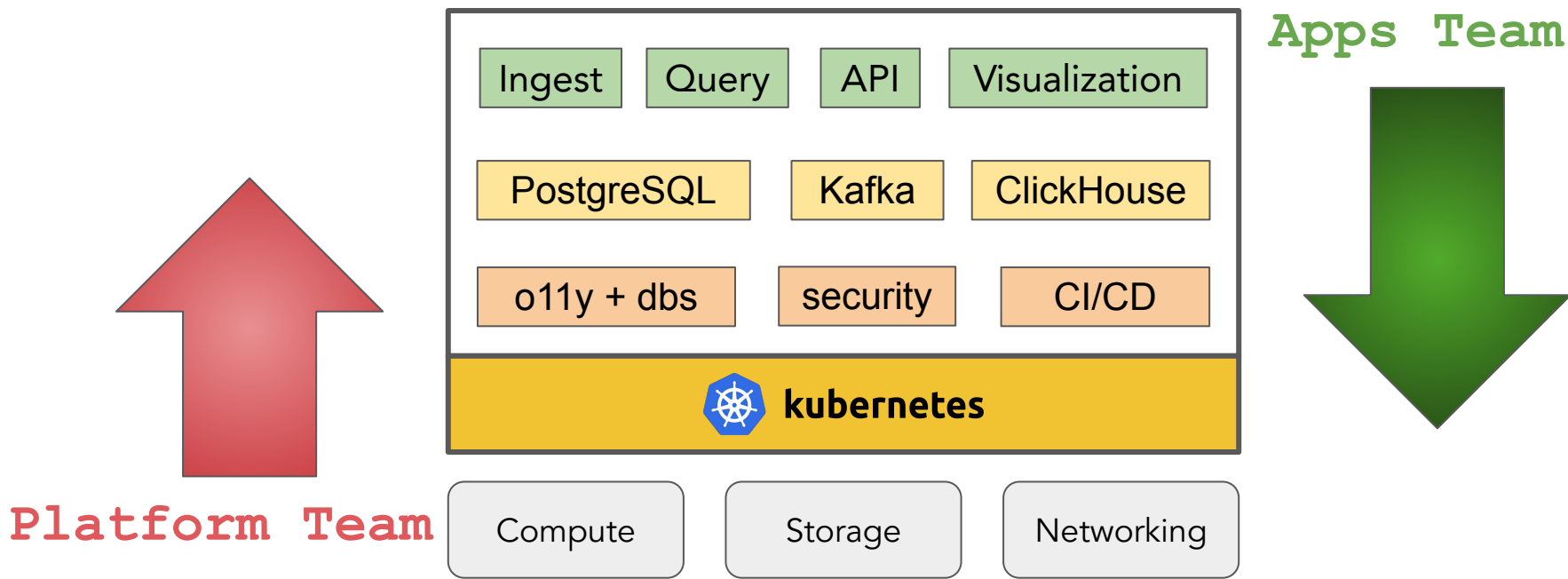
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Altinity EKS Terraform Module for ClickHouse

https://github.com/Altinity/terraform-aws-eks-clickhouse
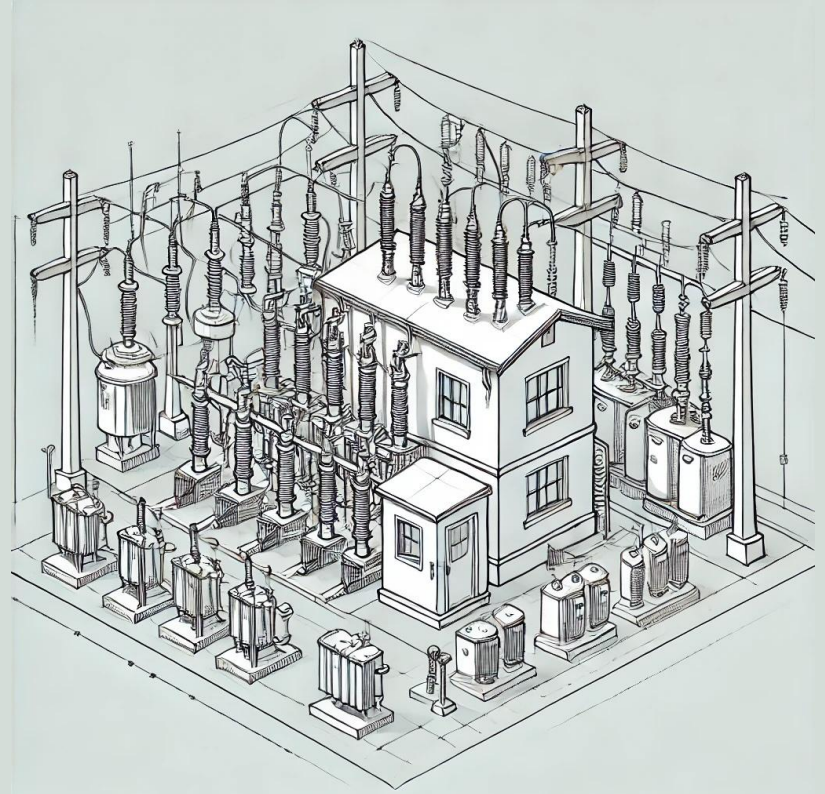
Managed Services

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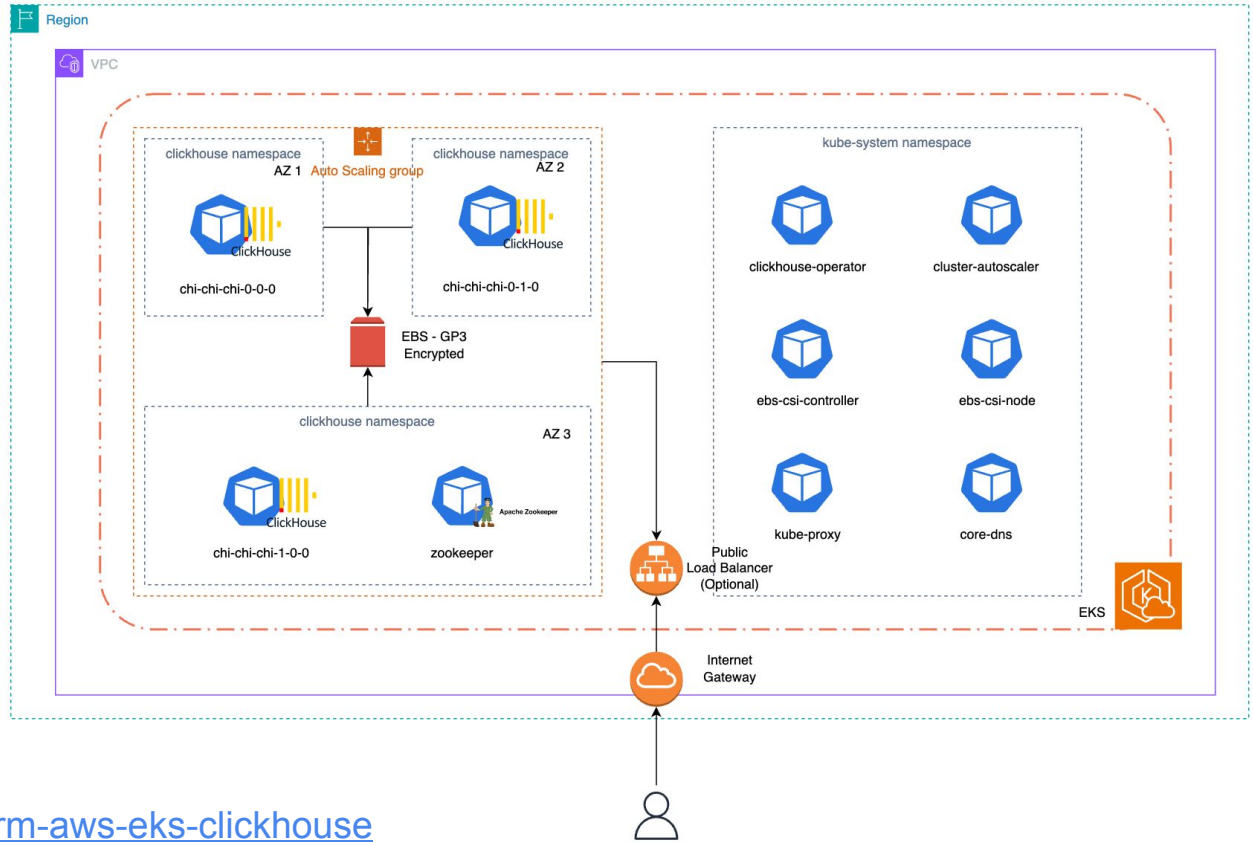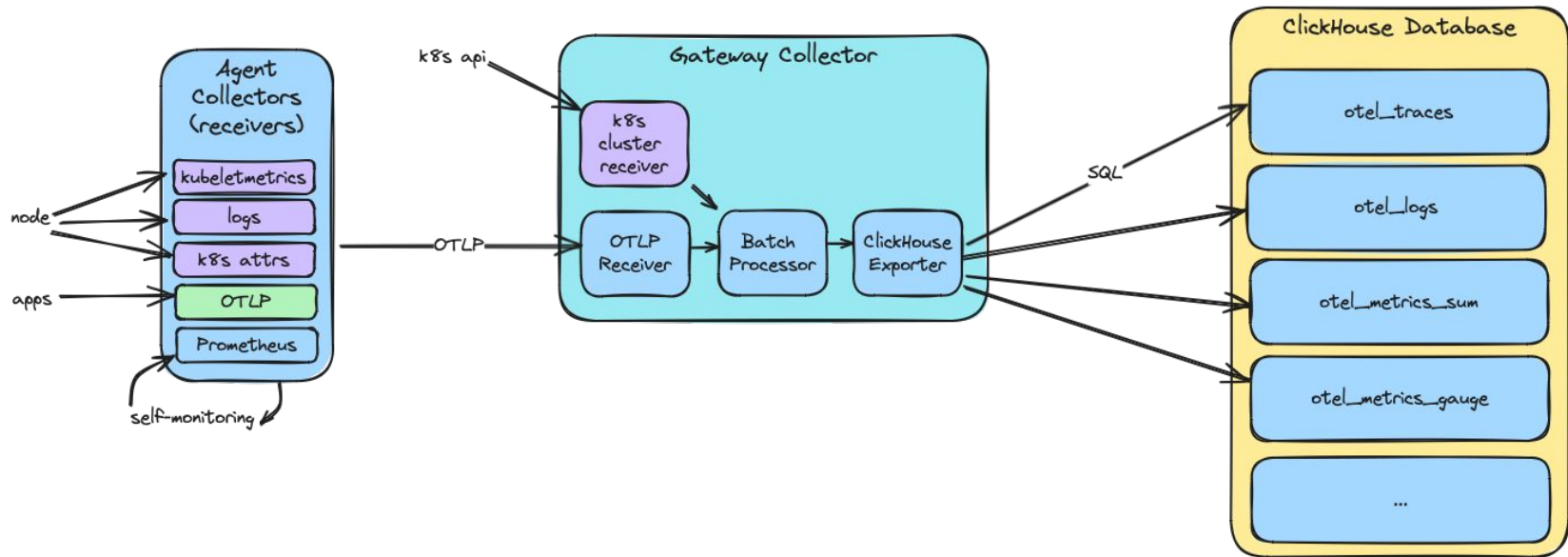
Why introduce a managed service for ClickHouse?

Going it alone

Databases have a steep
learning curve

Database automation is
time-consuming to develop

Failures can bring down
your business

Using a Service

Spend less time learning
tech and fewer mistakes

Spend more time on
application features

Make them somebody
else's problem

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Altinity.Cloud is a zero-maintenance SaaS for ClickHouse
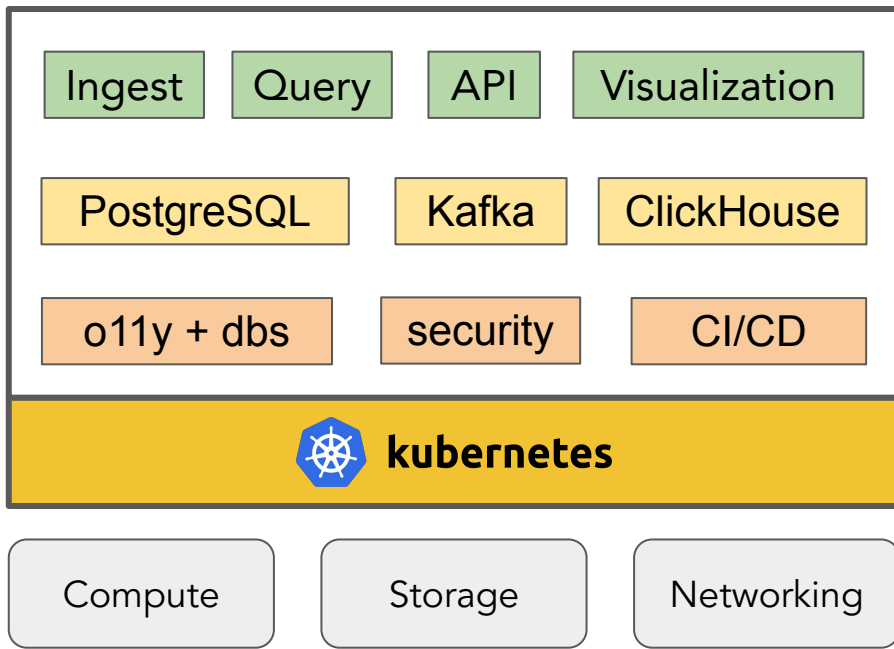
Full automation of operations with baked in DBA support

Supports **all** versions and features of ClickHouse (also experimental ones!)

Cost and performance optimized for real-time analytics

Run in AWS/GCP/Azure region **or** your own Kubernetes clusters

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How can we add managed services in *your* stack?

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Bring your own cloud vs. Bring your own Kubernetes

Apps Team

"BYOC"
Manage database, K8s, cloud

Ingest | Query | API | Visualization

PostgreSQL | Kafka | ClickHouse

o11y + dbs | security | CI/CD

kubernetes

Compute | Storage | Networking

Apps Team

"BYOK"
Manage database

Platform Team
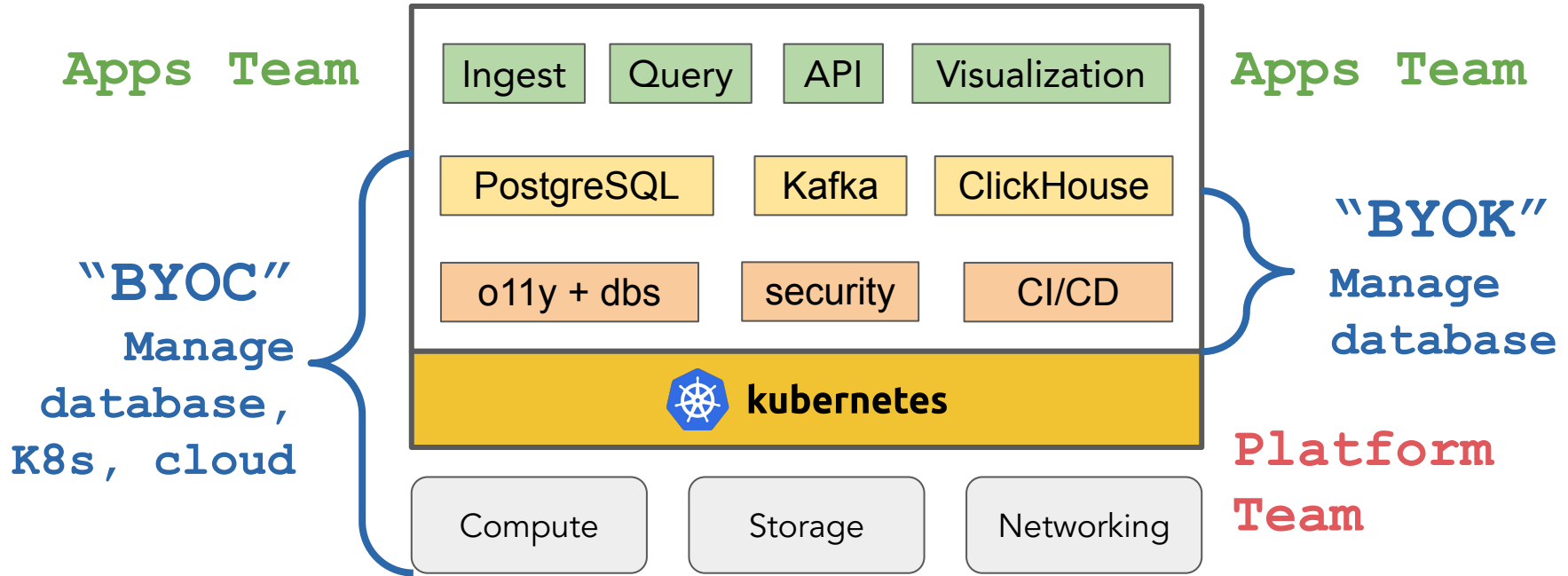
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Altinity.Cloud "Anywhere" can run in _your_ Kubernetes
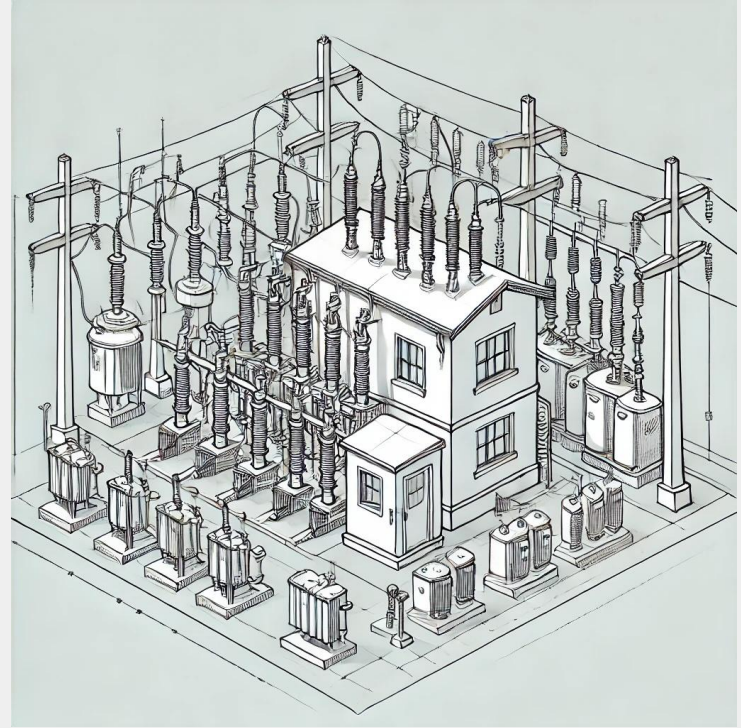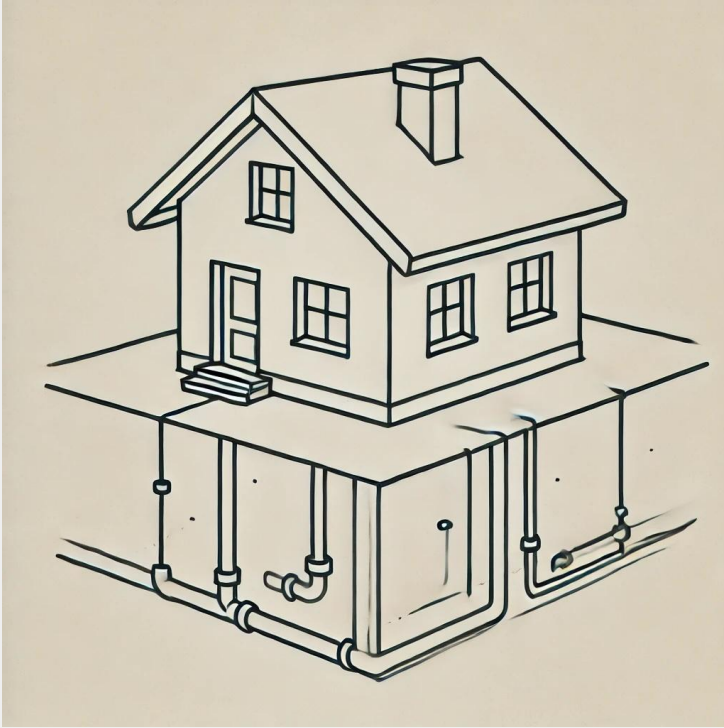
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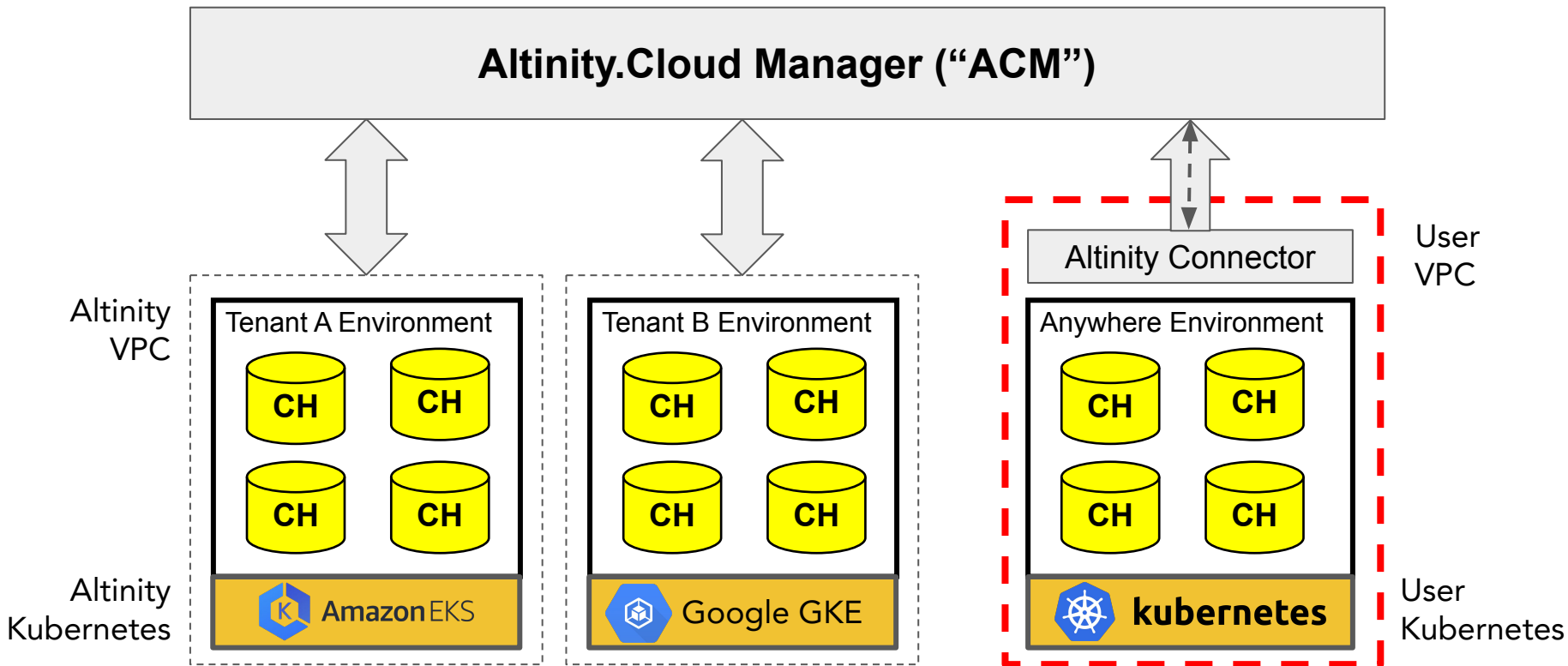
How does Altinity.Cloud work internally?
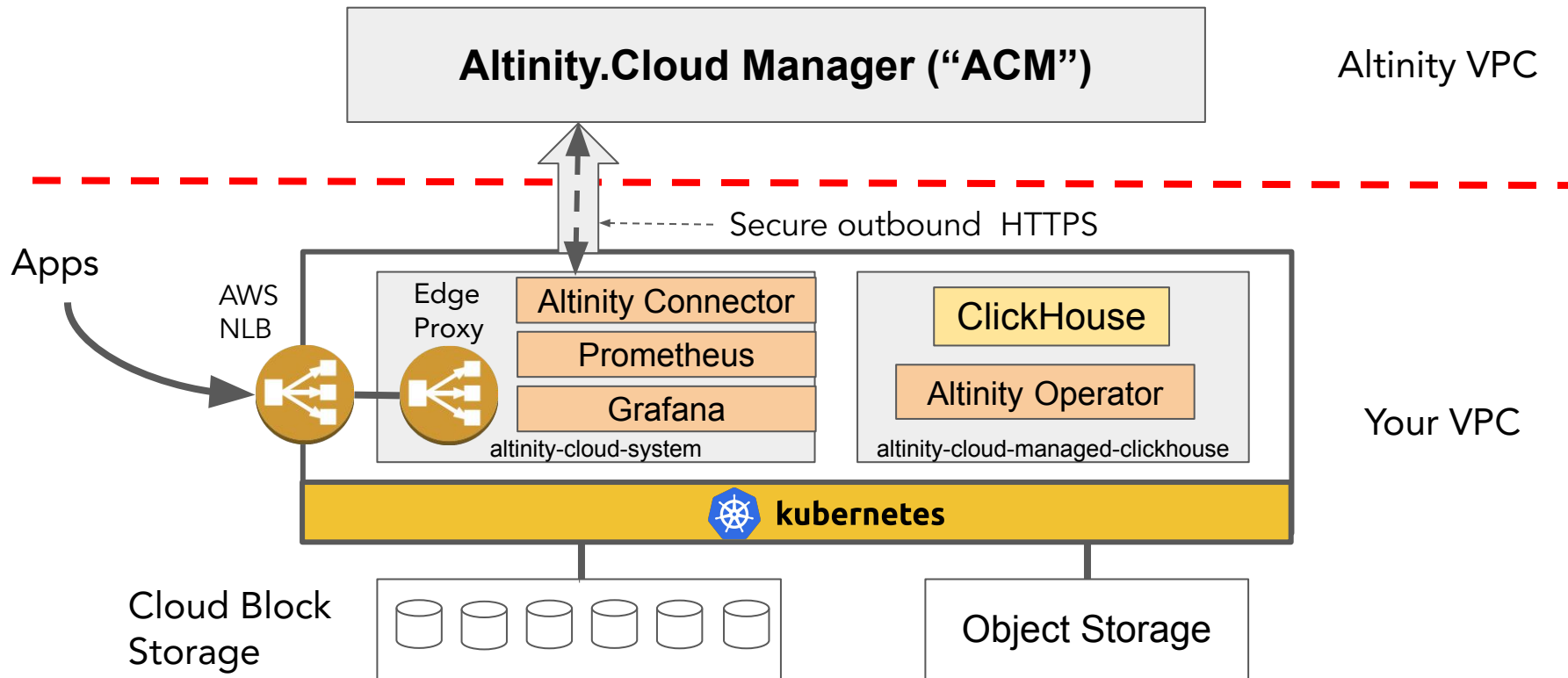
How Altinity.Cloud fits into your data platform
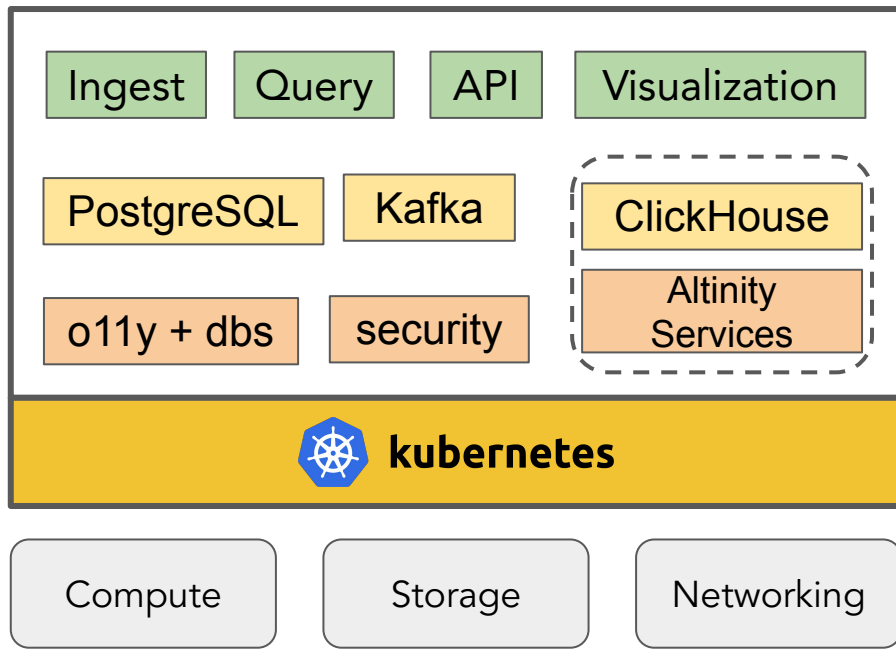
Wrapping up

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Building a Kubernetes platform for data using ClickHouse

- Use Terraform to set up cloud infrastructure and Kubernetes
- Use Helm or Argo CD to deploy platform and user applications
- Altinity.Cloud can manage ClickHouse inside your Kubernetes

More information:

- Altinity.Cloud Docs: https://docs.altinity.com/altinitycloud/
- Altinity GitHub: https://github.com/Altinity
- Altinity blog: https://altinity.com/blog
- Altinity YouTube: https://www.youtube.com/c/altinityltd

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Thank you!

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We're
hiring →