Deploying Kubernetes in Classified Environments

Palantir

Speakers

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Agenda

- Palantir Overview
- Challenges
  - Security & Compliance
  - Infrastructure Constraints
  - SDLC + Incident Response
- Solutions
- Q/A

Introducing Palantir

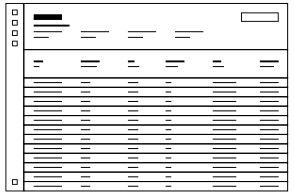
Overview

Palantir builds leading software platforms for data-driven operations and decision-making. We empower government institutions to deliver on their mission and duty for the benefit of the people they represent.

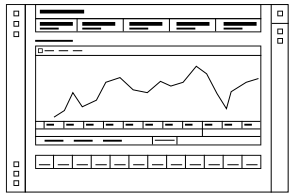
Our Mission

- → Support the world's most critical institutions — in their daily operations and in times of crisis.
- → Deploy data ecosystems that empower users, enhance collaboration, and compound value.
- → Preserve fundamental principles of privacy and civil liberties while using data.

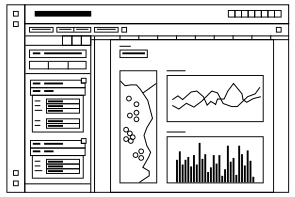
Platform capabilities



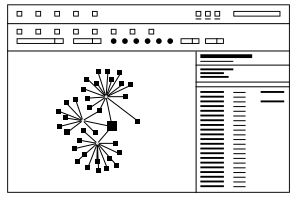
Data Integration, Management, & Security



Analytics, Modeling, & Exploration



Investigative & Case Management Applications



Operational Decision-Making Applications

Our Clients Include

ARMY	AIR FORCE	SPACE FORCE	HHS	NCATS & NC3
CDC	DHS	PEPFAR	NCI	FDA

Challenges

Terminology Overview

- Highside
- Secure Space
- ATO – Authority or Authorization to Operate
- NIST Controls – National Institute of Standards and Technology
- STIG - Security Technical Implementation Guide
- DISA - Defense Information Systems Agency
- SIPR
- JWICS
- SCIF
- CDS
- DTO
- ITAR
- NNPI
- UCNI
- CUI
- NSS
- CMMC
- RMF
- BCAP
- CC SRG
- TS/SCI
- NIPR/SIPR/JWICS

Compliance Challenges

/ 01 **STIGs –** There are many DISA STIGs required if you want to use k8s – OS, k8s, and things that run in the cluster.

/ 02 **Continuous compliance** – It's not enough to satisfy STIGs at accreditation time; STIG scans must be conducted regularly.

/ 03 **Operating System**
- Ex: Logging failed login attempts
- Major vendors have different STIGs published (Canonical / RedHat)
- Lag in STIGs for latest OS versions

/ 04 **Kubernetes**
- Ex: kube-apiserver anonymous auth disabled
- Ex: kubelet readonly port disabled
- k8s distro STIGs available with nuanced checks

Infrastructure Challenges

/ 01 **Overview**
- Hyperscalers have classified regions
- Physically in USA
- Exist for both Secret and Top Secret classifications

/ 02 **Feature Lag –** Features deployed high-side last (~24-36 months)

/ 03 **Capacity Constraints**
- HW capacity errors more frequent highside
- Specialized HW is scarce
- Longer VM lifecycle operation times

/ 04 **No SaaS**
- NO GitLab / GitHub offering
- NO centralized public container image registry
- NO observability provider available
- NO centralized Identify Provider
- Options limited to cloud provider services / DIY

/ 05 **PKI Management**
- Highside regions are air-gapped
- No public DNS registrar
- CAs not included in OS bundles
- All services need access to the CA bundle for TLS connections

COMMERCIAL

New features land in commercial cloud

Secret

New features available

Top Secret

New features available

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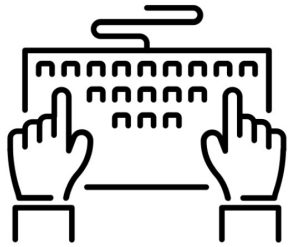
Software Development Lifecycle / Incident Response

/ 01 **SDLC**

- Vulnerability management and virus scanning
- How to transfer software to classified networks
- How to deploy, configure, upgrade software highside
- Running high-side fleet with cleared human operators



/ 02 **Highside Incident Response**

- Operators must share debug info with lowside developers
- No automated mechanism for bringing info lowside
- No SaaS offering highside for observability workflows → bring your own

Solutions

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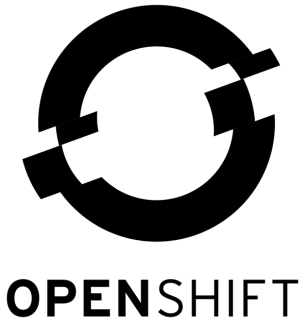
Compliance Solutions

OpenShift Platform

- Multi-node cluster deployments
- RHCOS (Red Hat Enterprise Linux CoreOS)
- compliance-operator



RKE 2 (Rancher Government)

- Edge / single-node clusters deployments
- RHEL 8

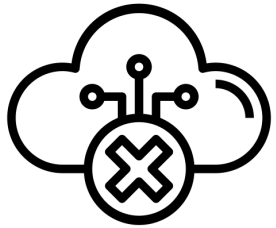
Infrastructure Solutions

PKI management

- Pre k8s we configured the OS CA bundle on every machine
- Built an API that allows pods to request CA material
- Mutate pods during admissions with initContainer + emptyDir
- Solutions like cert-manager can be also used

No reliance on SaaS

- No git / CI system highside -> strongly believe in not developing highside
- Became good at deploying OSS for SaaS highside
- OSS Prometheus
- OSS Keycloak as IdP
- Minimize components needed highside



Software Development Lifecycle Solutions

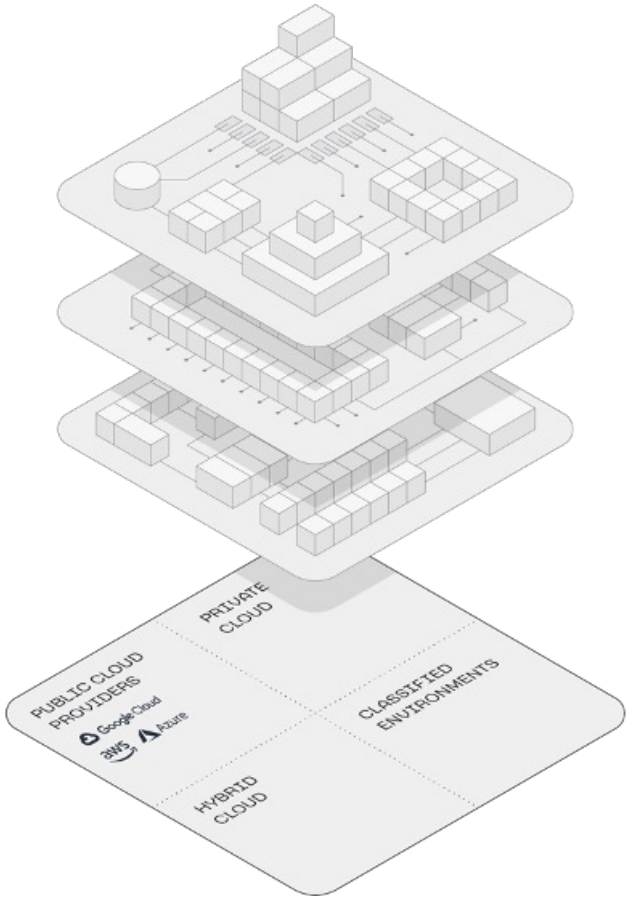
Security & Compliance

- Build software that continuously passes security & compliance requirements
- A strong vulnerability management story is critical
- Maintain internally a golden container image that all software uses
- OCI Artifacts

Cross Domain Solution

- Automated one way data transfer
- Hyperscalers offer CDS as a managed service
- Can be included in ATOs with caveats (e.g., integrity of the data in traffic)
- Reduced transfer times from multiple hours to multiple minutes
- Managing the end-to-end process highly challenging

End-to-End Management and Automation



Apollo

- Configure the environment lowside, mirror it highside
- Intelligent change management controls
- Integration with vulnerability management and scanning infrastructure
- Highside-specific overrides
- Fleet-wide changes, even highside
- Standardized monitoring and alerting

Q&A