

Innovating at the tactical edge with Google Distributed Cloud

Tactical Edge Appliance

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Agenda

- 01 Use Case Overview
- 02 GDC air-gapped appliance overview
- 03 Technical solution
- 04 Q&A

01

Use Case Overview

AFA News: Air Force Developing 'Cloud in a Box' Device for Aircraft Sustainment

9/16/2024

By Josh Luckenbaugh



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Air Force photo

NATIONAL HARBOR, Maryland — The Air Force's Rapid Sustainment Office has teamed with Google to build a device that will allow forward operators to access important maintenance data even if they are disconnected from the Air Force network.



“Google Distributed Cloud air-gapped appliance will enable the Air Force Rapid Sustainment Office (RSO) to bring the maintenance digital ecosystem to Airmen in austere and forward deployed locations, supporting the Air Force's agile objectives while prioritizing security and reliability”

Col. Nathan Stuckey
Military deputy program executive officer

The Air Force's Rapid Sustainment Office



U.S. AIR FORCE

Aircraft Maintenance - Powered by Google

Digitizing Maintenance & Logistics

Increase Aircraft Readiness

Improve Maintainer Efficiency

Modernize Logistics IT



Fleet Status
Last updated: 8/23/2024 20:43

MAINTAINER: [dropdown]

17 Aircraft (94% MC)
Last updated: 8/23/2024 20:43

All MCs [dropdown]

Tail #	Status	Location	ETDC
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000/1	PMC	000/1	8/24/2023 22:15
000/2	PMC	000/2	6/10/2023 04:00
000/3	PMC	000/3	
000/4	PMC	000/4	6/15/2023 07:00
000/2	PMC	000/2	8/21/2023 02:45
000/3	PMC	000/3	7/25/2023 01:00
000/1	PMC	000/1	
000/2	PMC	000/2	6/1/2023 11:30
000/1	PMC	000/1	

1 My Tools
Last updated: 8/23/2024 20:43

0 Suspensions
Last updated: 8/23/2024 20:43

Select Dates & Times: [dropdown]

107 AIRS Jobs
Last updated: 8/23/2024 20:43

All AIRS [dropdown] | All WICs [dropdown] | All Maintainers [dropdown]

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24227000-001	13AMP	000	Out	MIG HUNG	ASBARI	
24213001-001	13000	000	Ready	MIG SHIMMY	ASBARI	

Tools Search

Search [input]

None/Close or per # [dropdown]

Navigation: DASHBOARD MAINTAINER SUPPORT UNTITLED TEST CUSTOMIZE

02

GDC air-gapped appliance Overview

The Tactical Edge Spectrum

Edge is not one size fits all

GDC air-gapped Data Center



Data Center

Cloud solutions in traditional data centers that meet regulatory and sovereignty requirements with full operations teams.

GDC air-gapped Data Center for a full private cloud with fully staffed operations

Cloud

GDC air-gapped appliance



Field Operations Centers

Environments with power, some IT staff, and sophisticated computing needs that must be handled in the field.

GDC air-gapped appliance lets you take cloud-like infrastructure to where you need it

Tactical Edge



Far Edge

Compute hardware is specialized, diverse, and operable with minimal training. Typically low power and single node.

Deploy containerized software to 3rd party platforms

GDC air-gapped appliance

Proprietary + Confidential

The GDC air-gapped appliance is an innovative, ruggedized, hardware and software bundled solution designed for tactical edge or denied, degraded, intermittent, and latent (DDIL) environments. It creates an isolated "sovereign cloud in a box" by being physically disconnected from the internet.

Portable, rugged, small form factor appliance

- 3 ruggedized server nodes (temperature, altitude, humidity)
- Xeon processors, SSD storage, NVidia A100 GPU
- Enterprise grade switch
- Single Tenant
- Core GDCH Services: Kubernetes, VMs, networking, Block and Object storage, Vertex AI, etc.
- Data transfer system to copy data to/from GDC or cloud storage
- Works on standard household power (110V/15A in US)



16.87" H x 14.69" W x 27.13" L
(428 mm H x 373 mm W x 689 mm L)
~100 lbs (~45.3 kg)

Portable

Size of a suitcase, with handles and wheels. Approximately 100 lbs.

Rugged

Rugged transit case and ruggedized servers meet MIL-STD-810H standards.

Compute Power

Three server-class nodes, data center GPU, and a network switch

GDC air-gapped appliance capabilities



Compute & Storage

Secure, scalable compute and storage, ensuring defense agencies can access mission-critical applications and data, even in disconnected environments.



Container Orchestration

Streamlined container orchestration, freeing defense developers to focus on building mission-critical applications, not managing infrastructure.

Seamlessly run applications across multiple platforms,



Data Analytics

Empowers defense agencies with secure, scalable data analytics and cutting-edge AI capabilities within a protected environment.

Gain rapid insights from your data and leverage the power of AI to enhance decision-making and mission success.



Open Technology

Leverage industry standard open-source software, to reuse, adapt, and innovate without vendor lock-in.

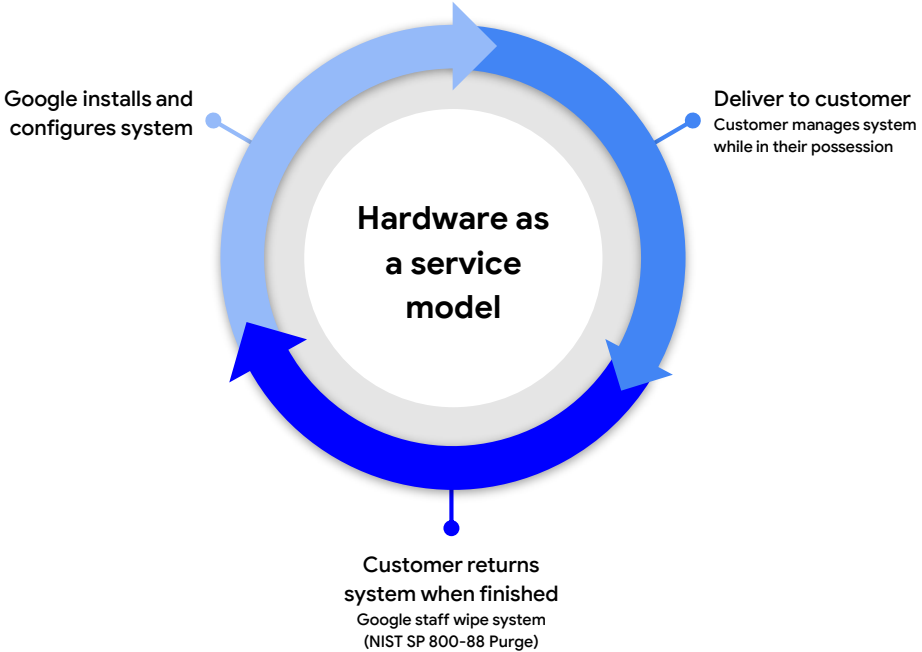
Maintain operational control over your technology stack, ensuring sovereignty and the ability to seamlessly integrate with existing systems or switch providers as needed.



Security & Policy

Fortify workloads with a purpose-built infrastructure designed for the most stringent security requirements. Our end-to-end solutions safeguard your entire environment, from the data center to the edge, ensuring unparalleled protection for sensitive data and mission-critical operations.

GDC air-gapped appliance Lifecycle

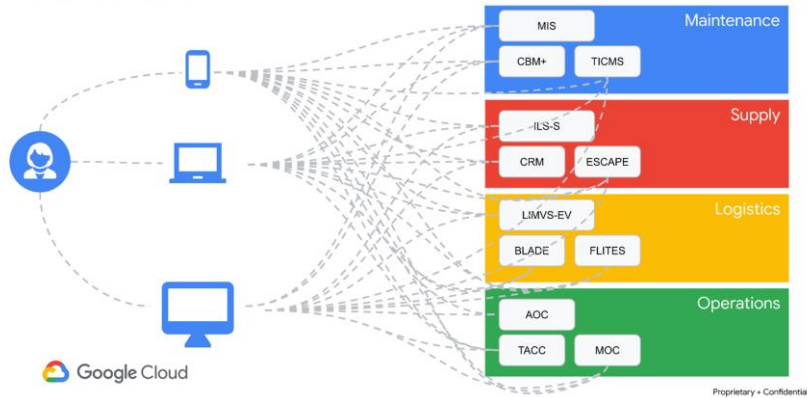


03

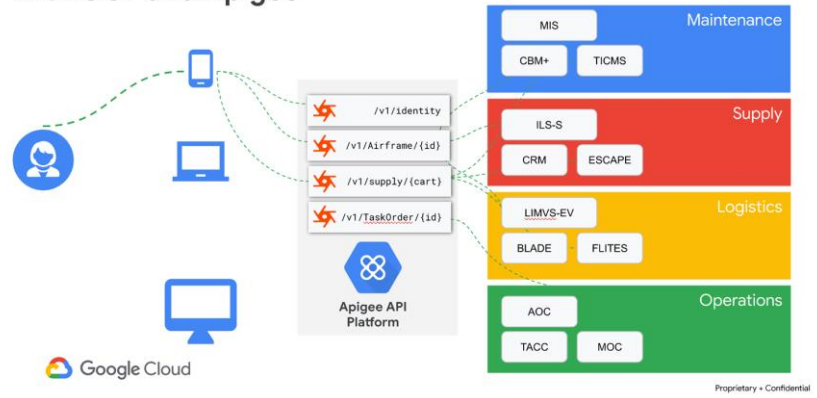
Technical Solution

Apigee enables smart data management

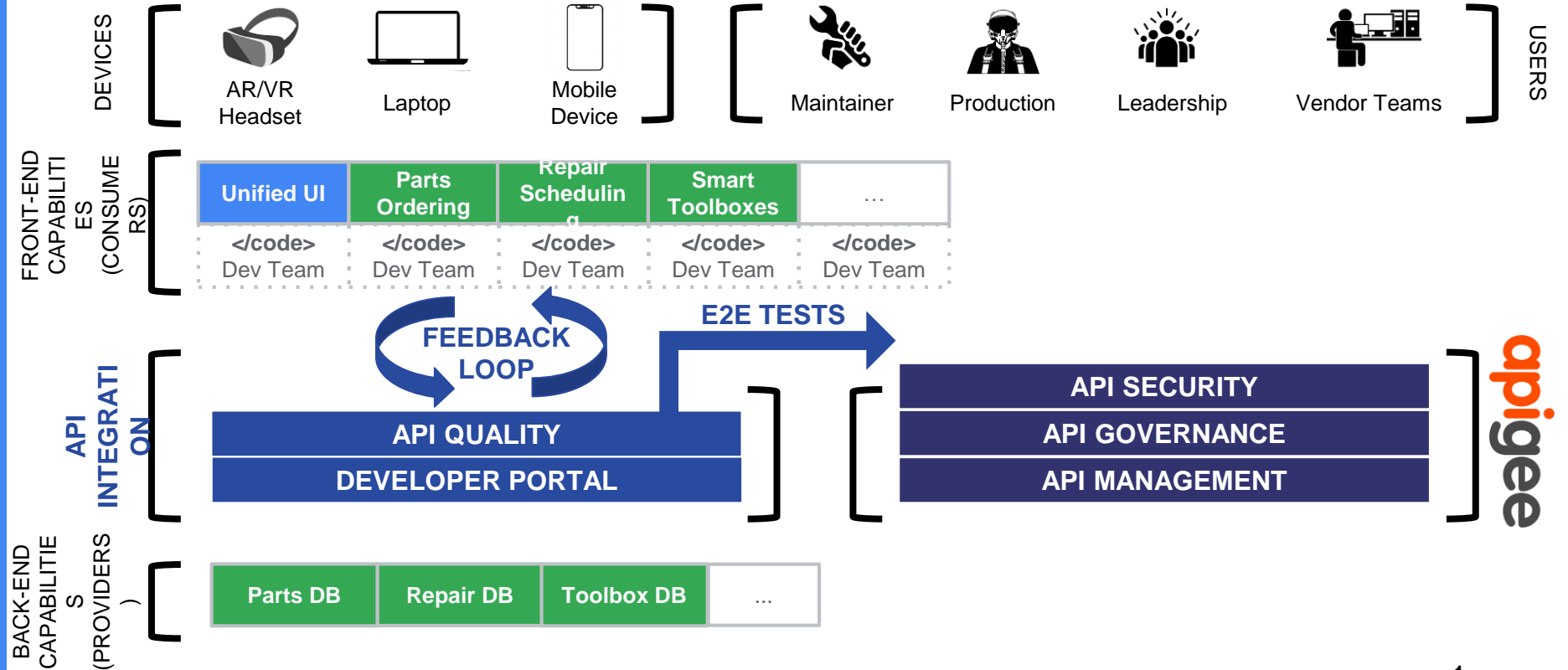
Current State



With GCP and Apigee



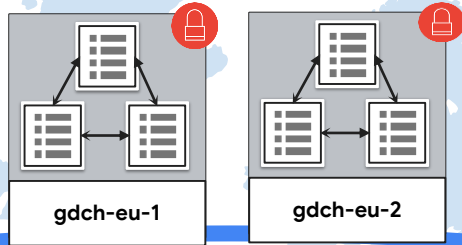
API Integration Architecture



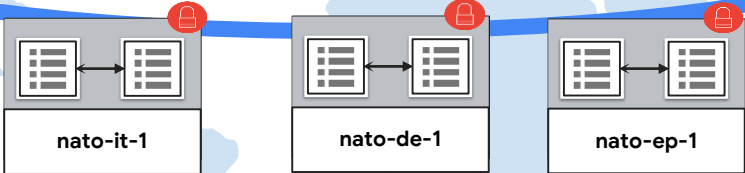
Vision for Google Disconnected Cloud

Hierarchical Private Cloud for highest level of sovereignty and survivability

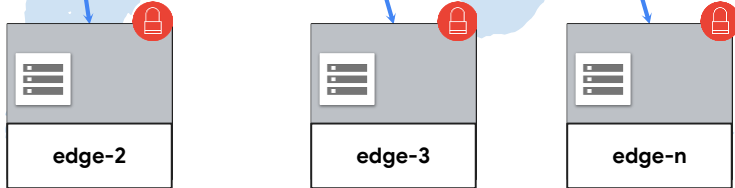
GDC air-gapped Large Regions



GDC air-gapped Operational Regions



GDC air-gapped Edge Locations



Multi-Tb/s Google Secure Backbone

FORM FACTOR	Racks
DR	Zonal DR (3 Zones)
OPERATED BY	Google

FORM FACTOR	Racks
DR	Zonal DR (2 Zones)
OPERATED BY	Partner

FORM FACTOR	Edge (Appliance)
DR	None
OPERATED BY	Partner or Customer

04

Q & A

Detailed Specification

Component	Details
Networking	HPE SN2010M TOR Switch (1U)
Servers	2x HPE ProLiant e920 1U <ul style="list-style-type: none"> - CPU: Intel Xeon Gold 6312U @ 2.40GHz (24 pCPU) - RAM: 755 GiB - SSD (OS): Two 1TiB m.2 - SSD (App): Four 3.5TiB m.2 - NIC: Four 10Gbps, one 1Gbps across three backplane L2 switches
	1x HPE ProLiant e920 2U <ul style="list-style-type: none"> - CPU: Intel Xeon Gold 6312U @ 2.40GHz (24 pCPU) - GPU: Nvidia A100 80GB - RAM: 755 GiB - SSD (OS): Two 1TiB m.2 - SSD (App): Four 3.5TiB m.2 - NIC: Four 10Gbps, one 1Gbps across three backplane L2 switches
Storage	Local Software Defined Storage <ul style="list-style-type: none"> - Capacity (Raw): 42 TiB
Blade Chassis	HPE EL8000 (5U) <ul style="list-style-type: none"> - Power: Smart auto-switching PSUs, Won't pop a 10A/110V breaker. - Backplane, Fans, integrated layer 2 switch (used for iLO and mgmt VLAN)
Rugged Case	EL8000_MCS (6U)



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