Memfault

Managing Android Devices at Scale with Memfault AOSP SDK Bort 4.0

Heiko Behrens, Head of Product

Webinar | March 24, 2022

Heiko Behrens

Head of Product, Memfault

- Enjoys: Faster iteration
- Challenges: Status quo
- Previously: Software Engineer @ Pebble, Intel, Oculus
- Based in Memfault Berlin – we're hiring!

pebble intel oculus Memfault

Device & Fleet as key concept

Managing Android Devices at Scale with Memfault AOSP SDK Bort 4.0

What is Memfault?

What is new?

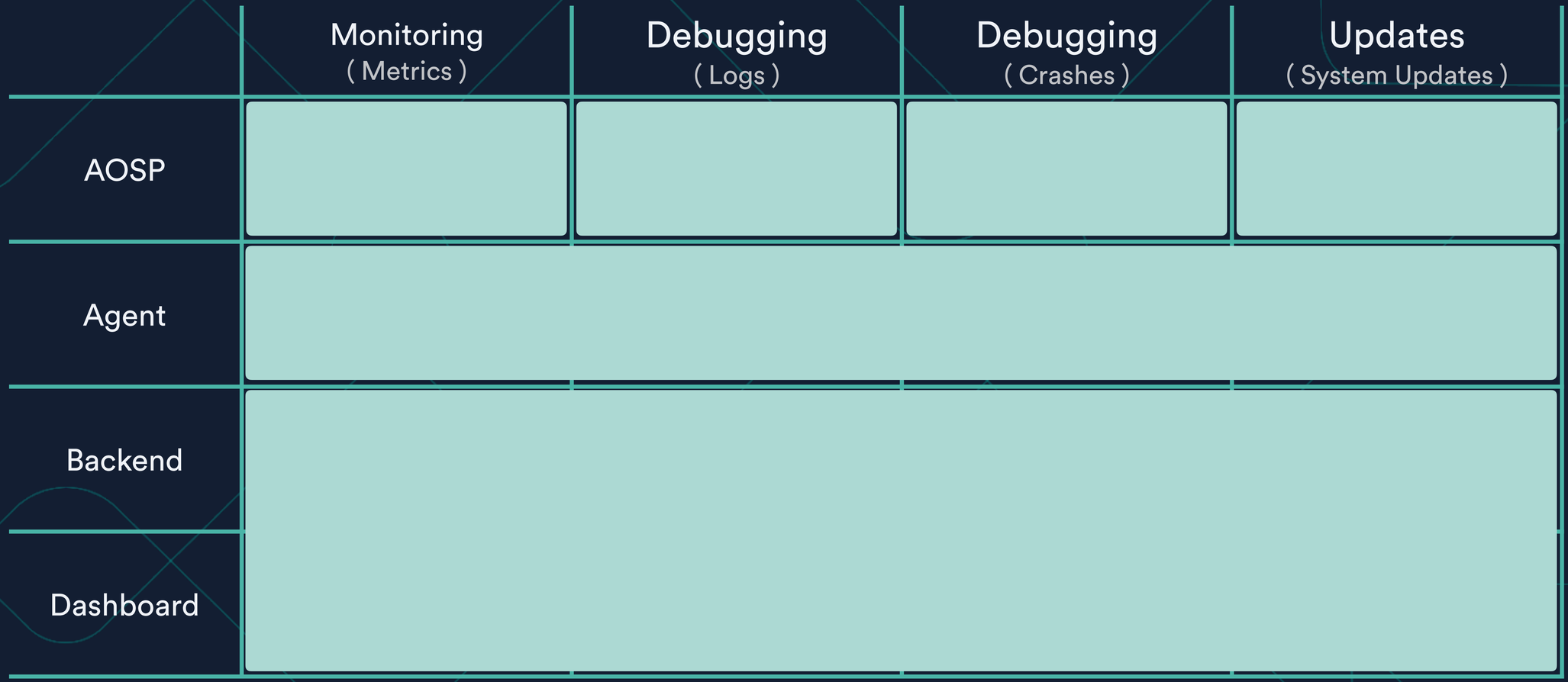
AOSP SDK Bort 4.0

AOSP
SDK
Bort
4.0

AOSP	Android Open-Source Project
SDK	Software Development Kit
Bort	Bug Report
4.0	very mature

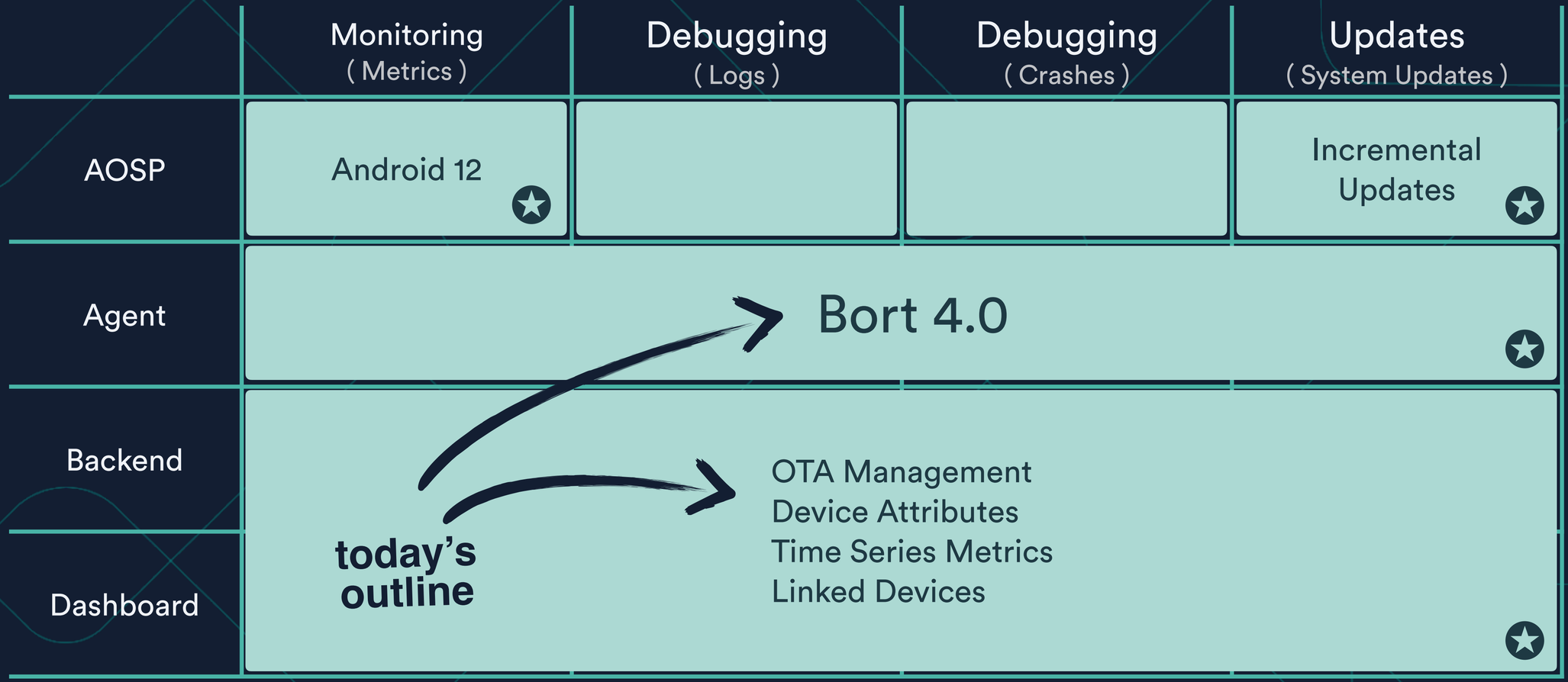
Recap: Our Recent Android Webinar

Monitoring, Debugging and Updating

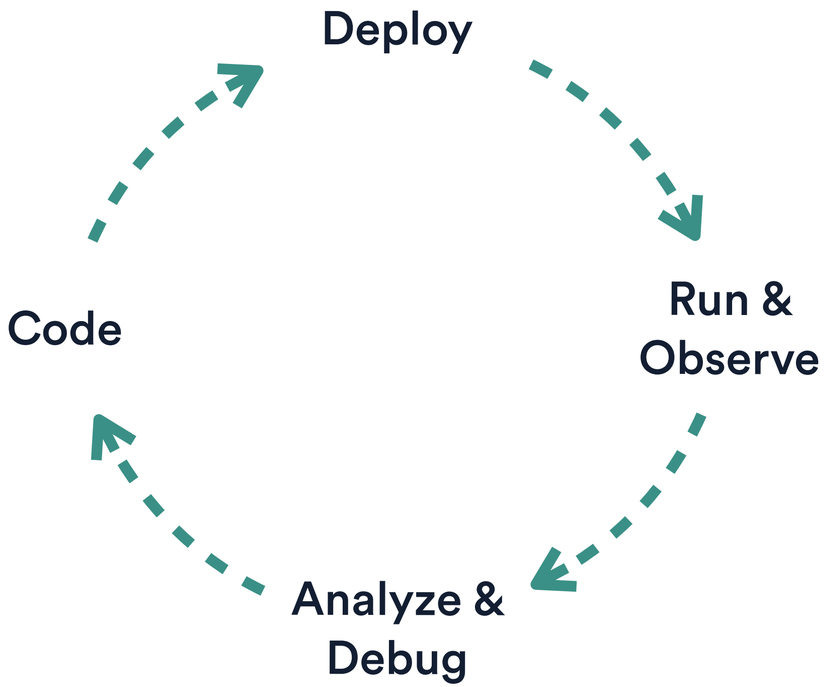


Recap: Our Recent Android Webinar

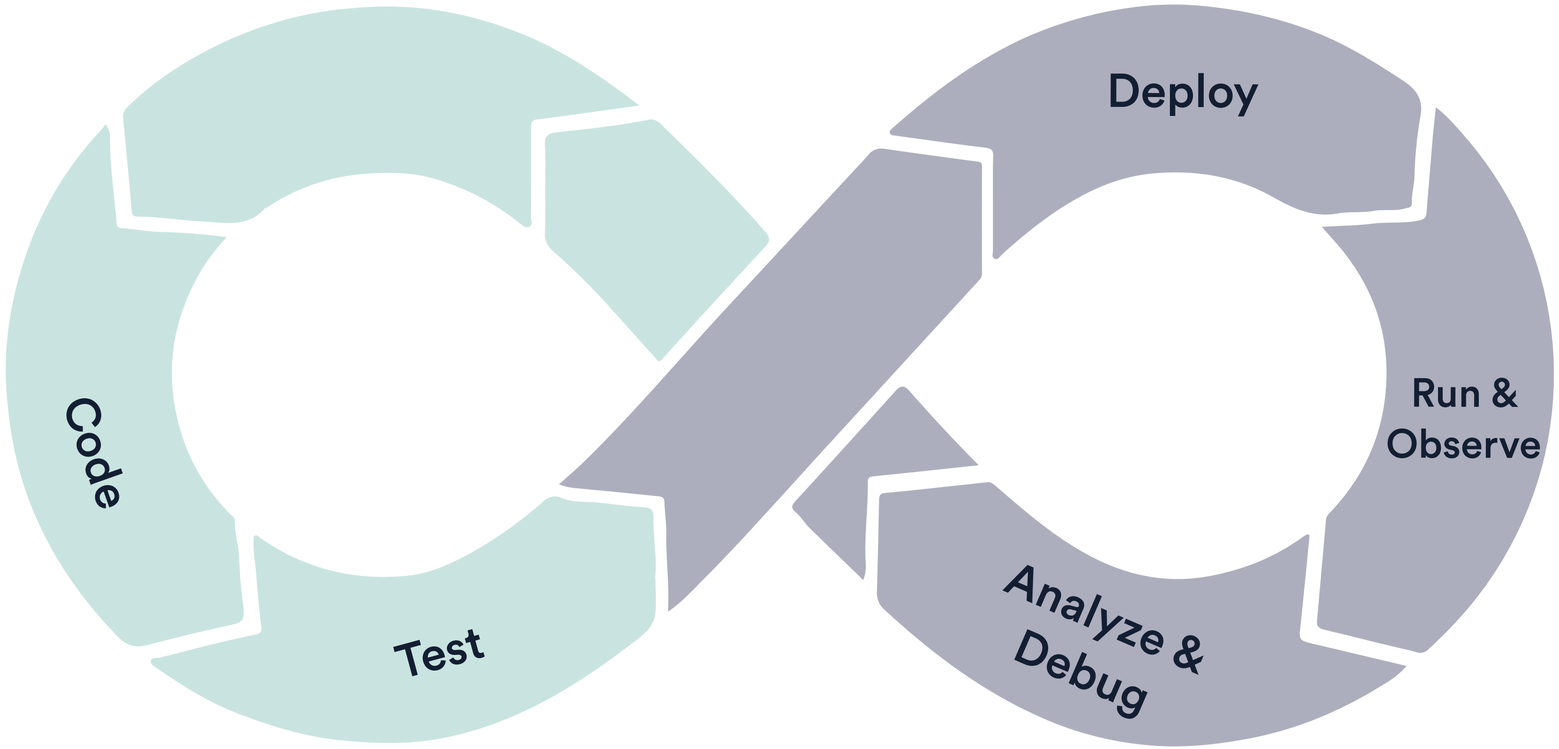
✪ ...and what is new since Bort 4.0



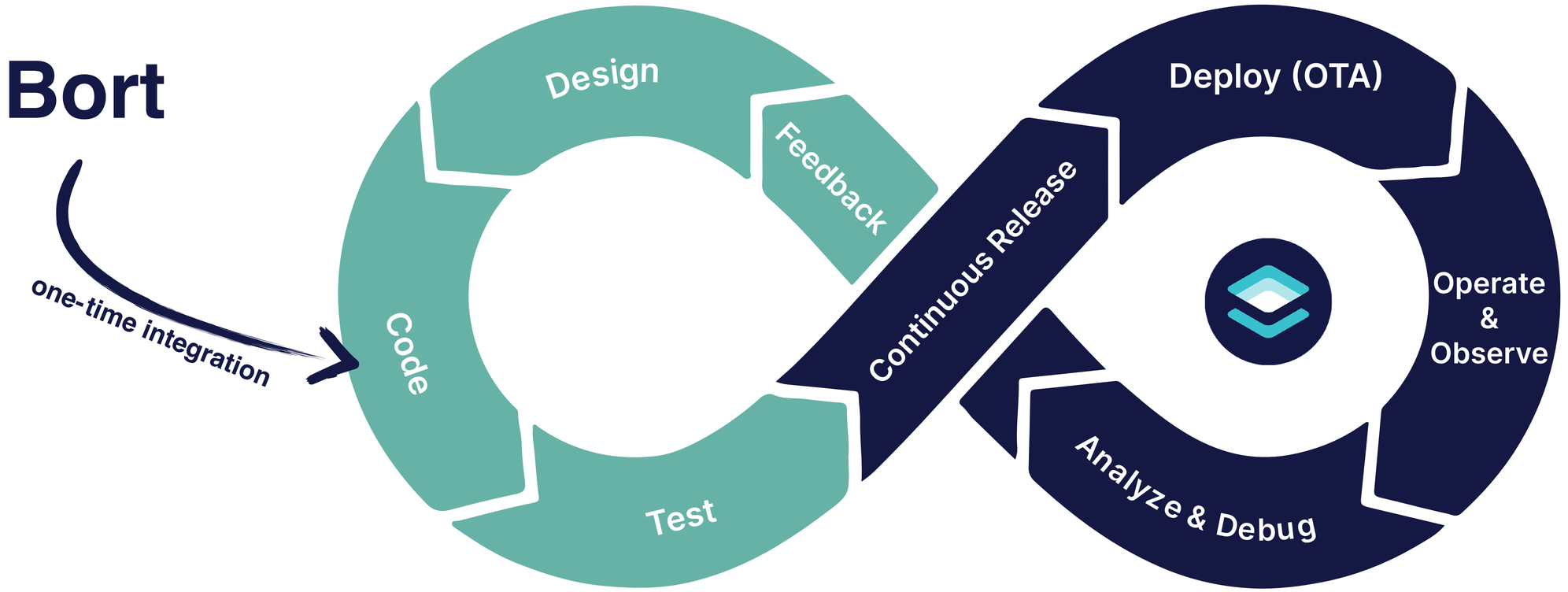
Local AOSP Development Process



Deploying AOSP to Production Fleets



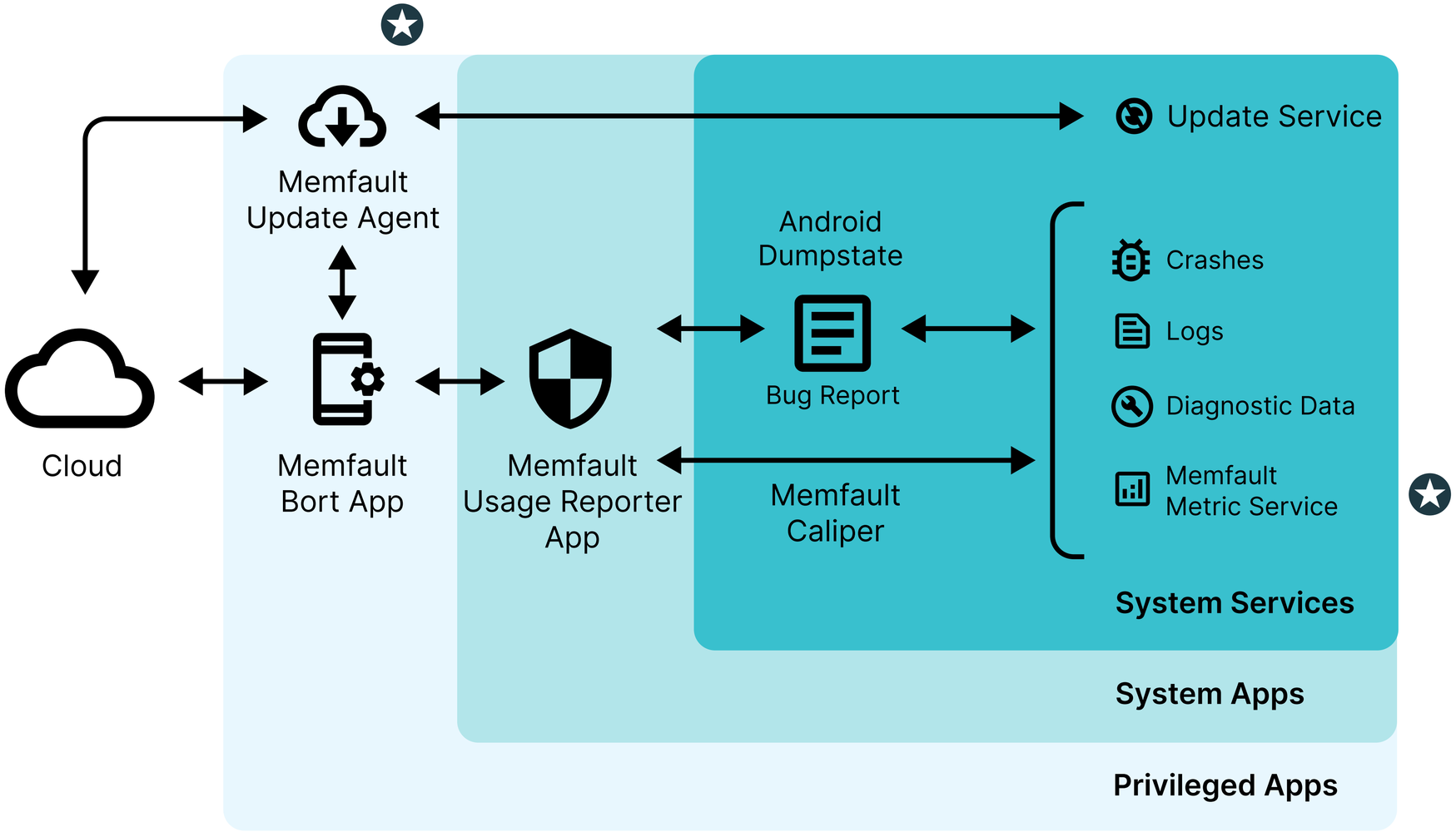
Applying DevOps Thinking



Development Process

Fleet Management & Observability

Inside Bort, the Memfault AOSP SDK?



Poll #1

Do you collect bug reports from production units?

A. Yes, via Memfault

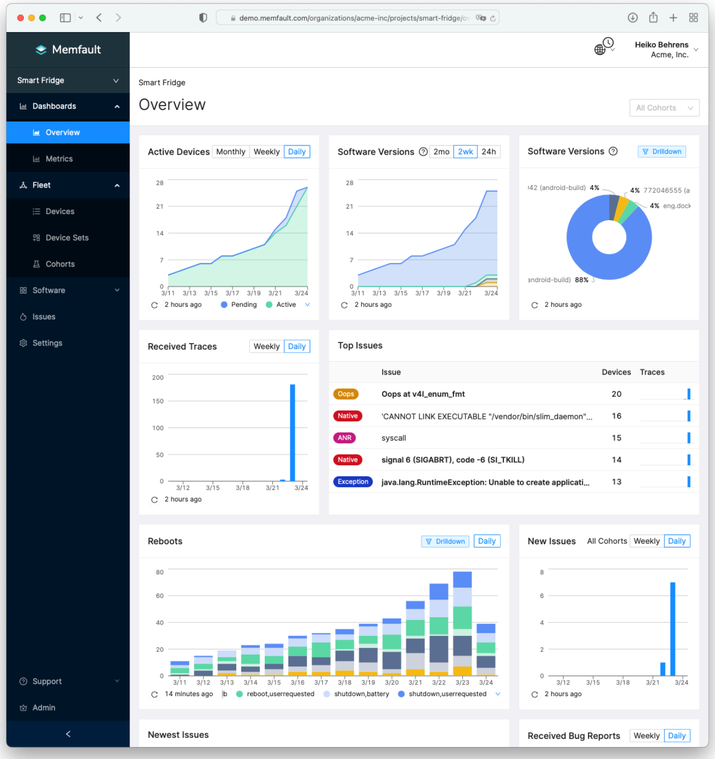
B. Yes, other solution

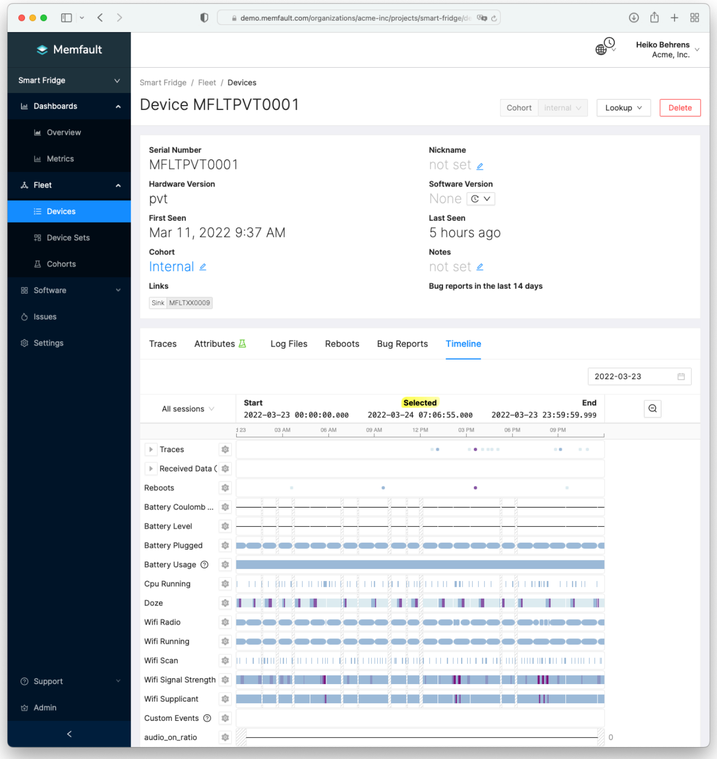
C. No

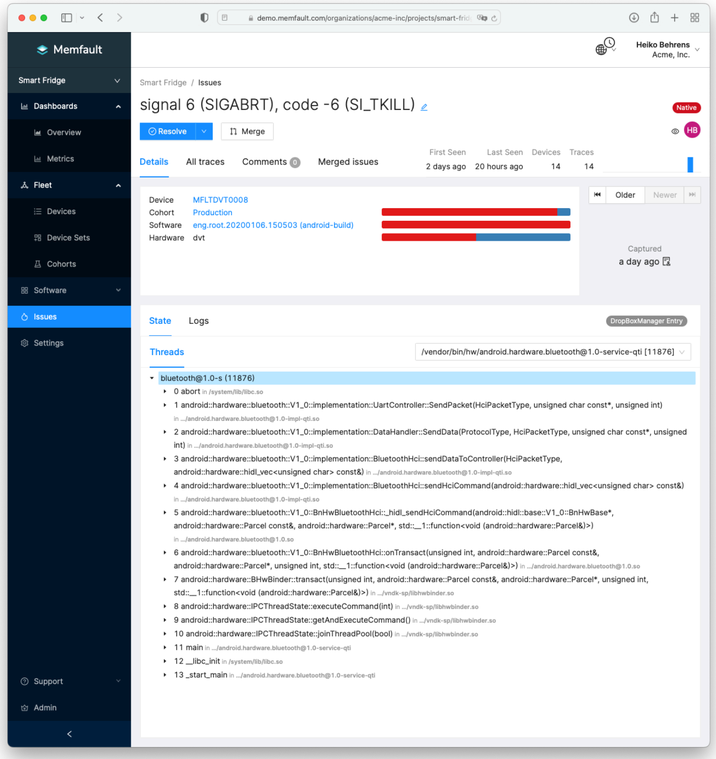
Getting Started with Memfault

As an Android engineer, how do I integrate Bort into the AOSP build? How can I use it to observe my fleet and perform post-mortem debugging?

Observing Your Fleet with Memfault







Getting Started With Memfault

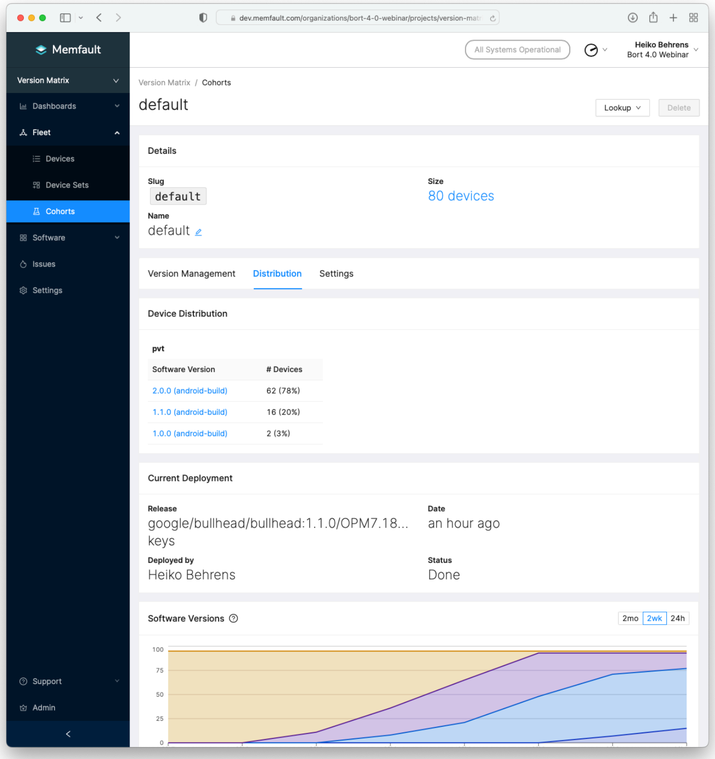
- Bort is well documented and quick to integrate
  - Highly configurable, source code available on GitHub
- Memfault offers a device-centric perspective of your fleet out of the box
  - Fleet overview dashboard
  - Post-mortem debugging and logs (similar to Android bug reports)
  - Per-device timeline (similar to Android battery stats)

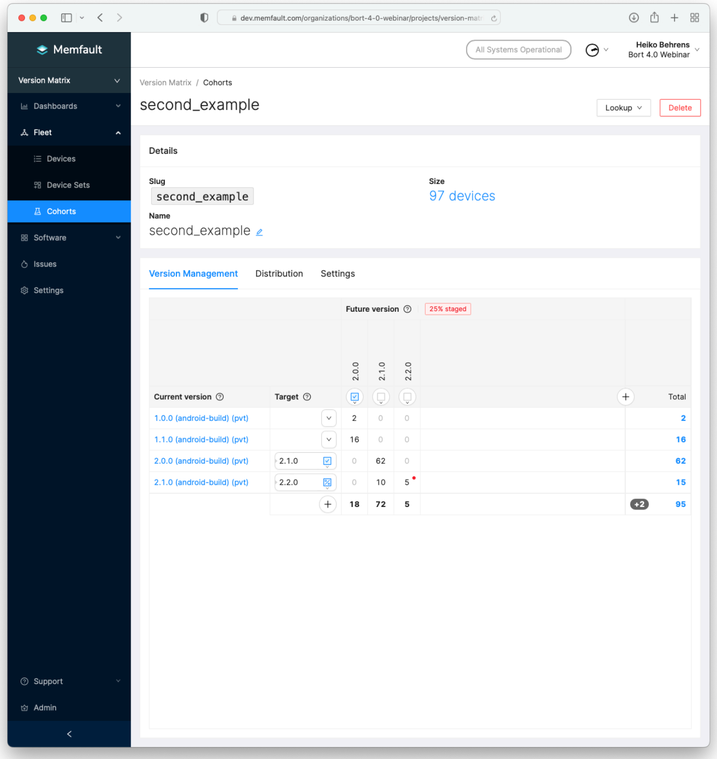
Updating via System Updates

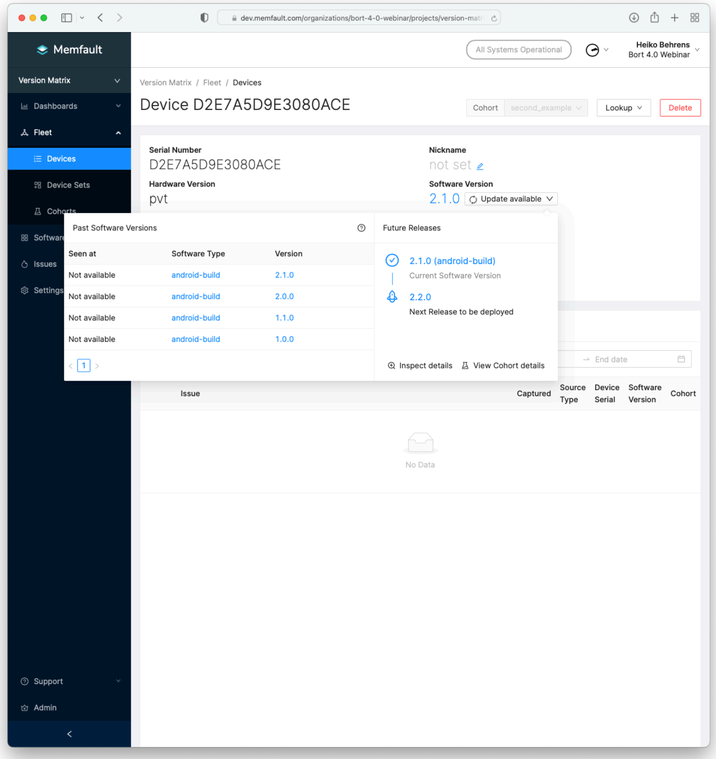
Android devices can receive and install over-the-air (OTA) updates.

✪ New: Incremental Updates

Managing System Updates in Memfault







Over-The-Air System Updates

- Supports updates via RecoverySystem and Update Engine (A/B or Seamless)
- Downloads can be resumed and are backed by global CDN
- UI notifications of available updates, and download progress

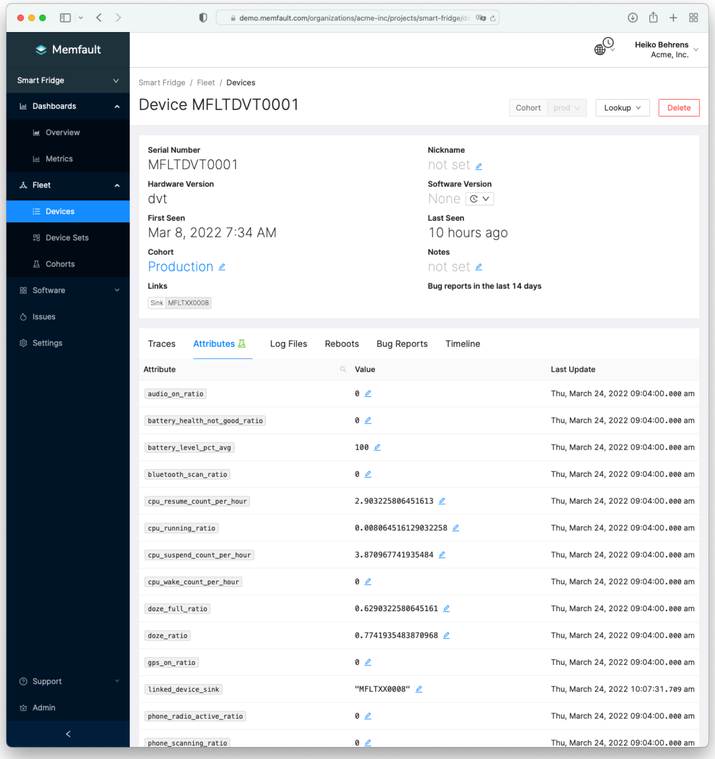
- Memfault supports mix of full updates and incremental updates
- Beta cohorts, staged rollouts
- Visibility of current version distribution and ongoing rollout

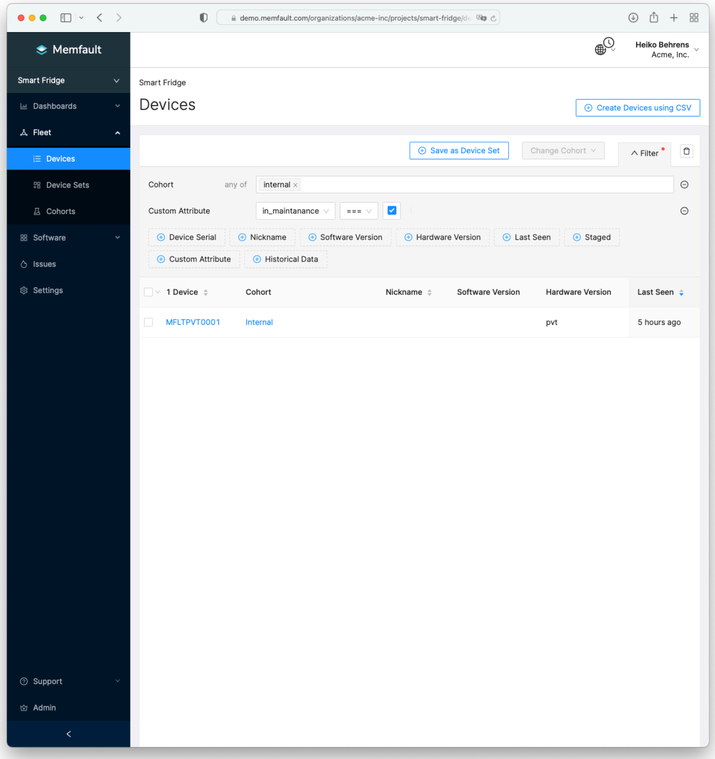
Fleet Management via Device Attributes

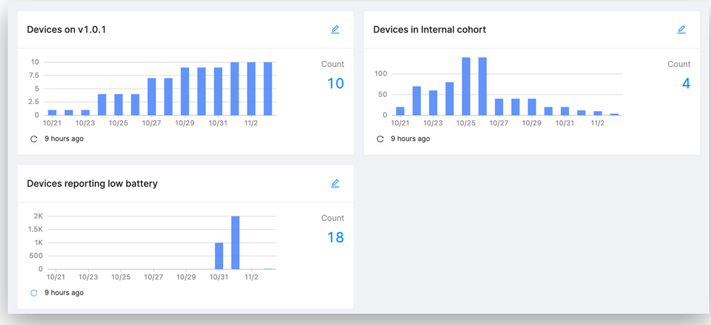
Define and populate custom device attributes to segment your fleet according to product-specific needs.

✪ New: Bort Custom Metric Reports

Device Attributes in Memfault







Device Attributes

- **On-Device Metrics Service** (receive + spool metrics)
  - Collects default built-in metrics (battery stats + system properties)
  - Support for custom metrics (from apps and services)
- **Fleet Segmentation** (populated via most-recent metric reading, API, or manual)
  - “Are the battery issues related to a particular batch?”
  - “What’s the version distribution in Europe vs. North America?”
- **Inventory Management**: “Which devices are currently in repair?”

Poll #2

Do you collect metrics today?

A. No

B. Only some generic system-wide values

C. < 20 custom metrics

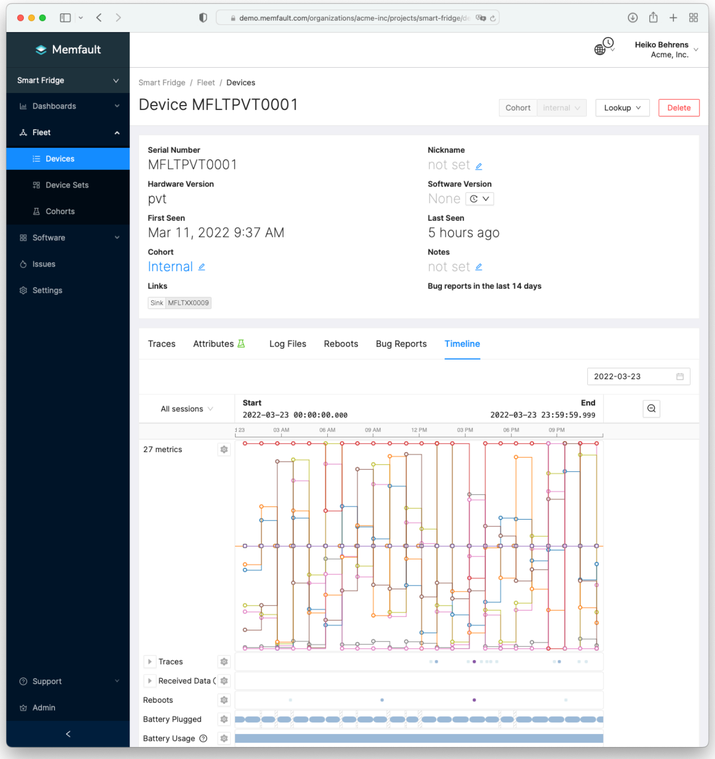
D. Everything collects telemetry everywhere

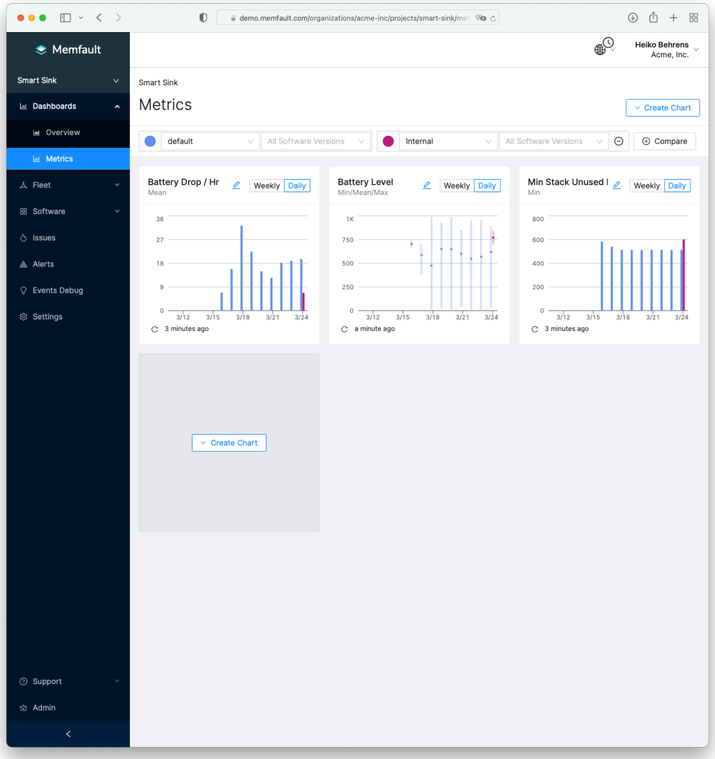
Fleet Monitoring via Time Series Metrics

A metric is a measurement captured at runtime. Combing large numbers of metrics and calculating statistics is called an aggregation.

✪ New: Bort Custom Metrics

Fleet-Wide Charts via Time Series Metrics





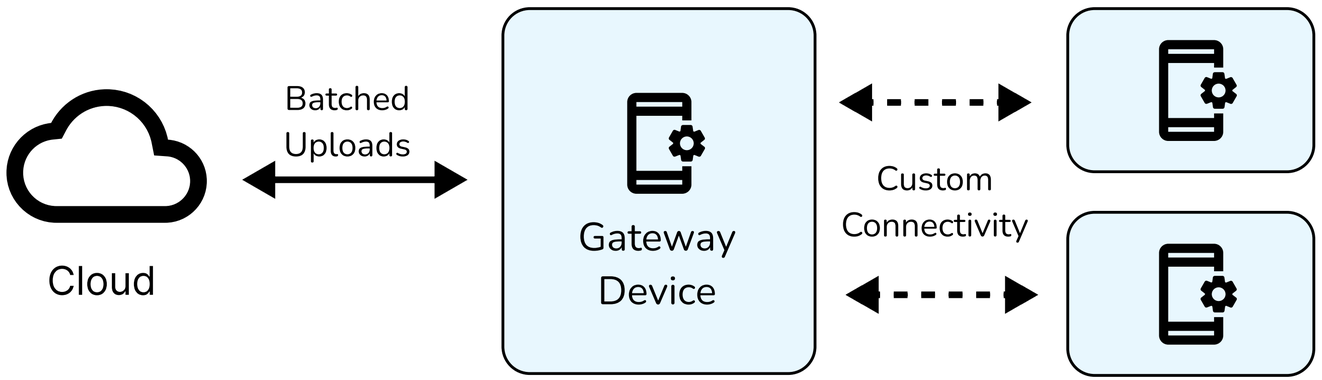
Time Series Metrics

- Proactive fleet monitoring via **charts and alerts**
- Describing device populations via **historical data**
  - “Devices on 0.2-beta that were charged >90% this week but are below 10% now”
  - “Did the frequency of disconnects decrease since 2.1-fix4321?”
- Even more powerful when combined with **Device Attributes**, some customer voices
  - “What impact does the latest driver or BSP update have on performance?”
  - “How do KPIs vary from factory to factory? (Different builds due to chip shortage)”
  - “What devices did not update, and why? (Devices were low battery)”

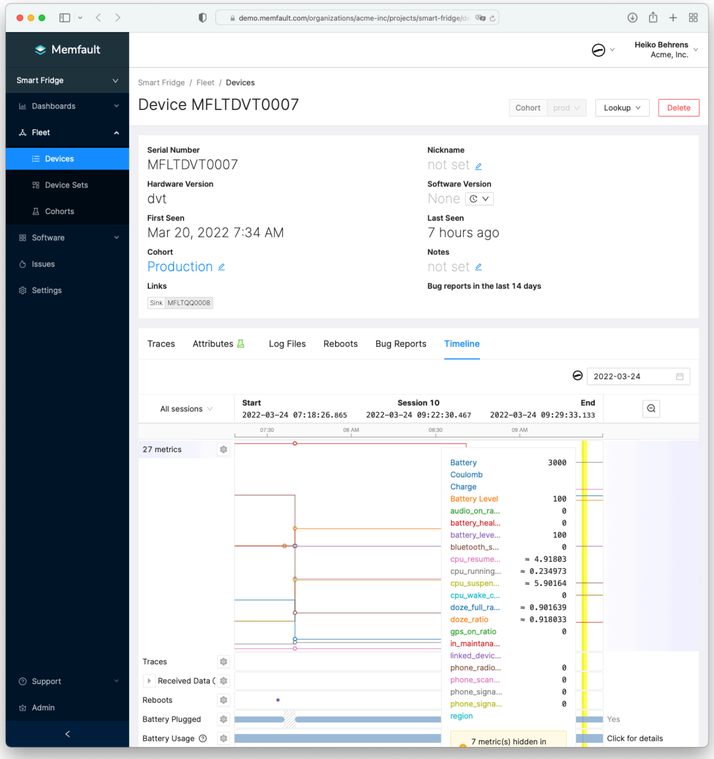
Advanced Topologies via Linked Devices

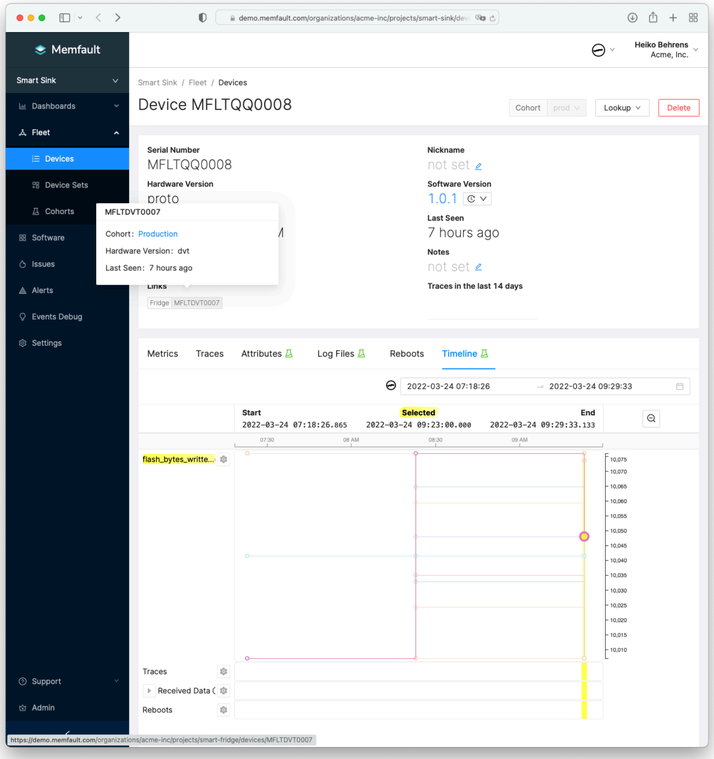
- New: Device Links
- New: Custom Data Connection

API connectivity for Offline Devices



Linked Devices





Memfault supports Advanced Device Topologies

- Represent products that consist of multiple devices
  - Simplified navigation when investigating connectivity issues
  - Visualizing time-related data side-by-side
- Support of scenarios with strict security requirements (no direct connectivity)

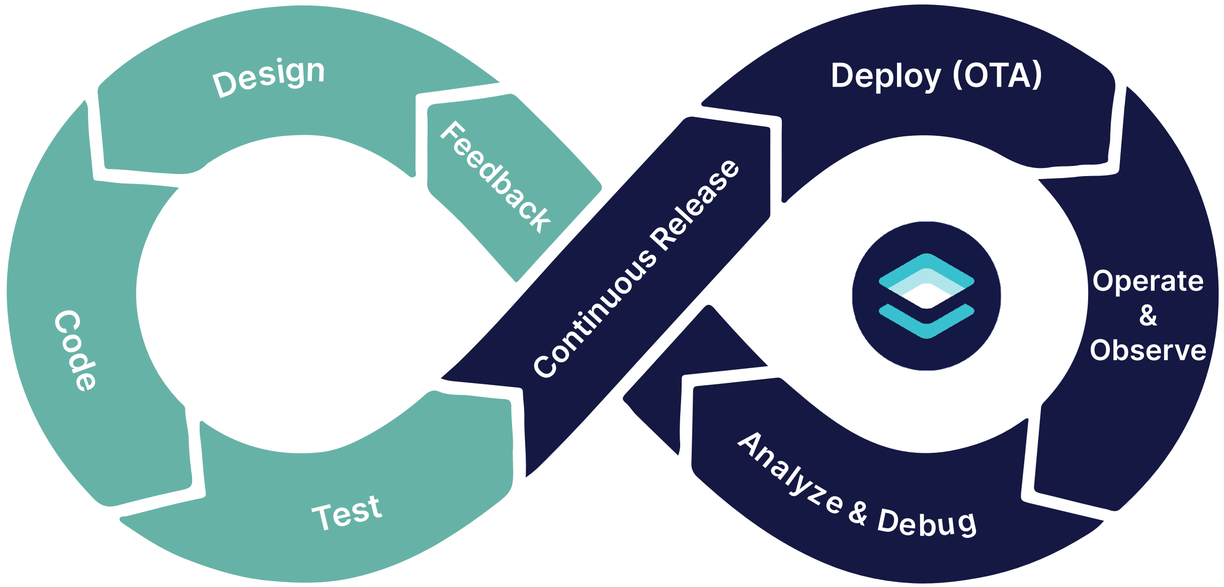
The Big Picture

✪ ... and what is new since Bort 4.0

Fleet Management & Observability with Memfault

...and what is new since Bort 4.0

Android 12



Incremental Updates

Device Attributes

Time Series Metrics

Linked Devices

What does Memfault offer?

	Monitoring (Metrics)	Debugging (Logs)	Debugging (Crashes)	Updates (System Updates)
AOSP				
Agent				
Backend				
Dashboard				

What does Memfault offer?

	Monitoring (Metrics)	Debugging (Logs)	Debugging (Crashes)	Updates (System Updates)
Android (AOSP)				
Dashboard				

Memfault offers **Cloud Debugging and Observability for Any Embedded Device!**

	Monitoring (Metrics)	Debugging (Logs)	Debugging (Crashes)	Updates (System Updates)
 Microcontrollers				
 Android (AOSP)				
 Embedded Linux	Initial Support	Coming Soon	Coming Soon	Initial Support
Dashboard	Common UI across your entire fleet of embedded devices			

Bis zum nächsten Mal!

- memfault.com/android
- twitter.com/memfault
- linkedin.com/company/memfault
  we're hiring!

Memfault

Heiko Behrens

Head of Product, Memfault