KubeCon CloudNativeCon North America 2026

#KubeCon #CloudNativeCon

AI Found a 0-Day in Metal3. What Happens Next?

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Who Am I

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Agenda

1. A Report Lands
2. Triage: What's Claimed and What's Real
3. From Valid Finding to Released Fix
4. When Your Upstream Has a Vulnerability
5. When We Release, Your Clock Starts
6. Pain Points, Roadmap, Takeaways

How a Vulnerability Disclosure Works



Report T+0	Acknowledge T+7d	Fix up to T+90d	Release and advisory	Users upgrade
Sent privately to the security list. The clock starts.	Answer the reporter, form a Fix Team. Metal3 policy: 7 days. Triage pace follows the claimed severity.	Usually under embargo. Industry norm: up to 90 days.	Patch releases on supported branches, GitHub advisory, CVE.	The release starts the users' clock.

Every step has a deadline. That is the clock.

Metal3 in 60 Seconds

Kubernetes Controllers	Packaged Upstream	Hardware
Cluster API Provider Metal3 (CAPM3)	ironic-image	BMCs: Redfish, IPMI
Bare Metal Operator (BMO)	OpenStack Ironic	Network boot: PXE, iPXE
IP Address Manager (IPAM)	Ironic Python Agent	Real servers
Ironic Standalone Operator (IrSO)		

T+0

Case: A Report Lands on the Metal3 Security List

Subject: Security issue in Cluster API Provider Metal3

Long and generic

A plausible code path, wrapped in confident prose

No reproduction, no affected versions

First impression: clearly from AI

The Clock Starts

Policy: acknowledge the reporter within 7 days.

Claims High? Triage starts now.

Is it real?

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T+0 + 1 min

The Reporter Was Me

In 2026, every Metal3 disclosure came from my own AI vulnerability discovery pipeline.

External AI reports received: zero.

Before 2026: manual reports from outside researchers.



One Pipeline, Two Roles

The pipeline scans Metal3 and the OpenStack Ironic that Metal3 ships.

AI Vulnerability Discovery Pipeline

Metal3: I Am the Receiver

Findings go to the Metal3 Security Committee: our own process and schedule

OpenStack Ironic: I Am the Reporter

Findings go to the OpenStack security team; their fixes come back as bumps

Same rigour both ways: my own reports get no free pass.

Aside

Real Hardware Is Not Ephemeral

	Ephemeral VM	Real Server
Compromised	Delete and recreate	Firmware and BMC can persist across reprovisioning
Rebuild	Seconds	Tens of minutes per host: POST, firmware, disk wipe
Out of band	Hypervisor API	BMC: own OS, admin credentials, old crypto, vendor-paced fixes
Boot	Cloud image	Network boot: DHCP and PXE, unauthenticated by design
Testing a fix	CI spins it up	Ironic-level fixes need BMC emulation; most controller fixes do not
Rolling out	Rolling update	Maintenance windows, often air-gapped

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T+0 - T+weeks

Vulnerability Disclosure Triage:
What's Claimed and What's Real?



T+days

Four Questions We Need to Ask

1

Is It Actually Real?

Does the code exist at the version named? Does it reproduce?

2

Is It in Our Repo?

Metal3, Ironic, a dependency, or BMC firmware?

3

Who Can Reach It?

Provisioning network, RBAC, credentials: who is the attacker?

4

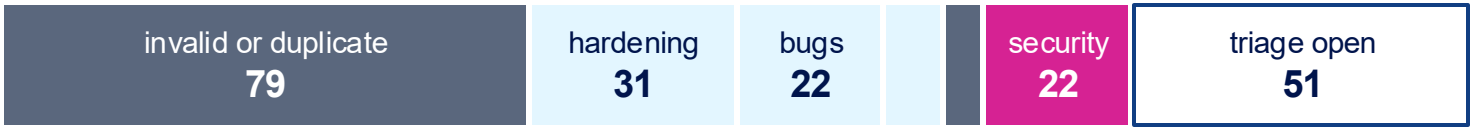
How Bad, Really?

Not the claimed score. The impact in a real deployment.

T+weeks

From Finding to Advisory

220
triaged



9 by design, 6 cancelled

22
confirmed security issues

9 released in 4 advisories

13 disclosures in progress

Discovery is fast. Fixing and coordinating is the slow part.

Metal3, 2026, from our triage tracker. Ironic findings go to the OpenStack security team.

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T+7d - T+90d

From Valid Finding to Released Fix



T+7d

Severity Decides the Path

Low

CVSS under ~4

Fixed in the open.

Ships when ready.

Medium

CVSS under ~7

Fixed in the open: public PRs, private discussion.

Coordinated to the next patch release.

High

CVSS over ~7

Private fork until disclosure.

Out-of-band release.

Fixes go to every supported branch. The Security Lead has the final say on severity. Source: Metal3 security policy.

T+N

Case: CAPM3 Medium, Fixed in the Open

Found	Triaged	First fix	Last variant	Backports	Released
03-09	03-18	04-16	04-23	04-29	05-18

Four Cross-Namespace Issues, CVSS 5.5

Secret refs in Metal3Machine

BareMetalHost lookups via host annotation

ConsumerRef check used && instead of ||

Metal3DataTemplate refs from other namespaces

v1.13.0
all four fixes

v1.12.5
all four backported

v1.11.8
three of four: no v1beta2 webhook

Why in the open: an embargo means private forks, private review and coordinated dates for every fix. At today's report volume that does not scale for medium and low.

T+N

Four Advisories, One Release Day

Advisory	Component	CVSS	What	Fix on Main
GHSA-rf84-wr5g-m3rp	CAPM3	5.5	Cross-namespace access, four fixes	04-20 - 04-28
GHSA-49pm-43hf-6xfq	IPAM	4.4	Full CRUD on Secrets it never uses	03-25
GHSA-hfc8-w5f4-3x6m	IrSO	4.3	Labels user-owned Secrets	04-08
GHSA-7cwm-fpfh-rrch	IrSO	4.3	Metrics exporter on 0.0.0.0	04-17

The same rule, four times: medium and low, fixed in the open, advisories released together on 2026-05-18.

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Upstream clock

When Your Upstream Has a Vulnerability

Metal3 ships OpenStack Ironic.

The Metal3 security team reported many of Ironic's 2026 advisories.

Every fix flows back to Metal3.





Upstream

The Bump That Came Back



A Security Fix in Disguise

ironic-image pins Ironic by git SHA digest per release branch.

The fix arrives looking like a routine Renovate bump.

Ironic, the Kubernetes Way

Standalone in containers, no Keystone, limited drivers.

Some advisories do not apply. Some depend on config, and Metal3's default config differs from upstream defaults.

Upstream

Reading an Ironic Advisory as a Metal3 User

Ironic Advisory

does not mean your Metal3 is vulnerable

No Metal3 Advisory

does not mean you are safe

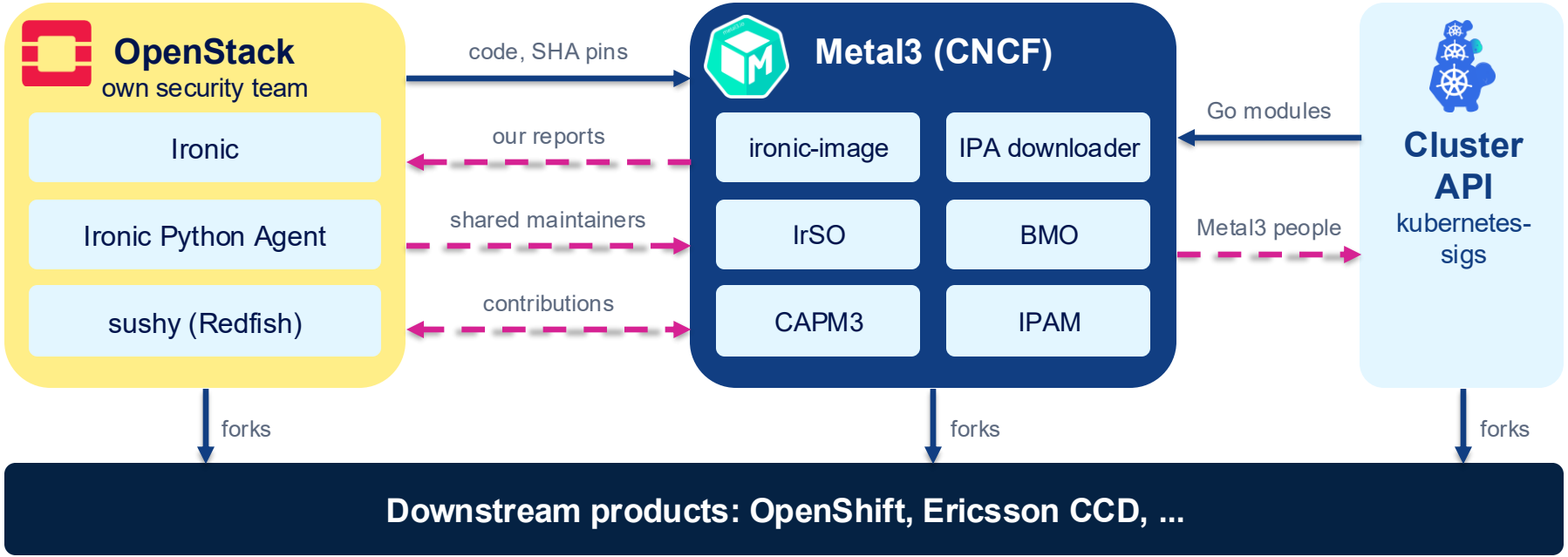
Of the Ironic issues we disclosed, about 1 in 4 also affected Metal3.

Honest gap

We do not yet alert Metal3 users to what an Ironic advisory means for them. That one is on us.

Upstream

Upstream and Downstream at the Same Time



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Solid: code. Dashed: reports and people.

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T+release

When We Release, Your Clock Starts

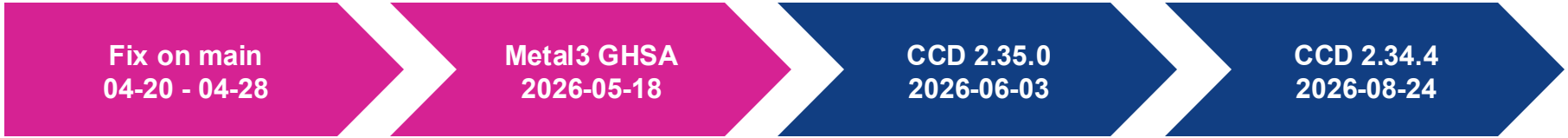
For everyone running Metal3



T+release

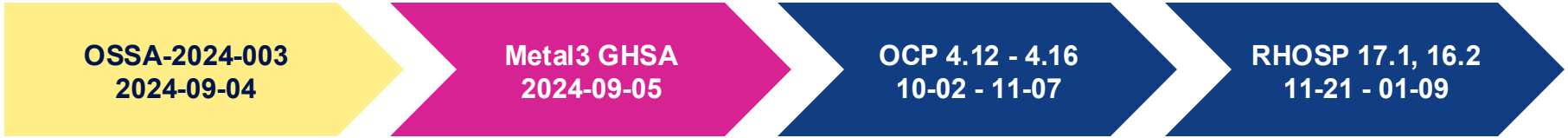
One Fix, Many Clocks

Metal3 to Ericsson CCD: GHSA-rf84-wr5g-m3rp (CAPM3, CVSS 5.5)



Both CCD releases ship CAPM3 v1.12.5, the backport.

Ironic to Metal3 to Red Hat: CVE-2024-44082 (qemu-img image data, CVSS 5.7)



2026: CVE-2026-47190 (IPAM) is fix deferred in OpenShift 4. Each hop runs its own clock.

T+release

Metal3 Guidance: How to Stay Safe

Run a Supported Release

The two latest stable releases get fixes.

One older release stays CI enabled, no patches except emergencies.

Main branch is under development.

Take the Latest Patch

Monthly patch releases for all controllers.

The latest patch of a supported branch carries every fix.

Follow GHSA and CVE feeds, release notes.

Know Your Configuration

Every knob changes exposure. Combinations multiply it.

Stay close to defaults. Check non-default settings against each advisory.

Fixed versions and workarounds for the 2026 advisories are in each GHSA.

T+release

Does It Affect You?

What we find most: multi-tenancy and role isolation, operator-wide Secret access, broad RBAC, configuration combinations, CI workflows.

One Team per Cluster

CAPM3 is designed single-tenant: namespaces organise work, they do not isolate.

Most 2026 Metal3 findings: defence in depth.

Shared Cluster or BMaaS

BMO can be run multi-tenant, with per-namespace hosts and role isolation.

Several roles with different permissions raise the risk. Access is no longer all or nothing.

New features such as HostClaim get a multi-tenancy review from the design stage.

Our Pain Points and Roadmap

Pain Points

Versatile deployments, little visibility into how users run Metal3

Little hardening documentation

Upstream advisories are hard to translate for Metal3 users

Security fixes arrive as plain digest bumps

Backports to every supported branch; one fix could not reach 1.11

Roadmap

Hardening guide: in progress now

Streamline the internal report process

Streamline releases, including packaged upstream components

Analyse upstream advisories for Metal3 users: Ironic and every dependency

Help us: tell us how you run Metal3.

Three Things to Take Home

1. Run a supported, patched release. Follow GHSA and CVE feeds.
2. Shared cluster or BMaaS? Treat multi-tenancy advisories as urgent.
3. Tell us how you run Metal3.

Metal3 booth P-13B: Tue 10:30 AM-2:30 PM, Wed 10:15 AM-1:25 PM, Thu 10:15-11:55 AM



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Session feedback

Thank you. Questions?

Found something? metal3-security@googlegroups.com

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