# A great RTOS is no longer enough

## On Governance, Regulation, Ecosystem, & AI as Pillars

Tiago Manczak · Infineon Technologies

# About me

- 👷 **Tiago Manczak** — Embedded SW Engineer
- ⚡ 6 Yrs developing and integrating SCADA
- 🔐 8 Yrs building NVM solutions for Sec. MCUs
- 💡 Innovation enthusiast
- 🦀 Rust evangelist

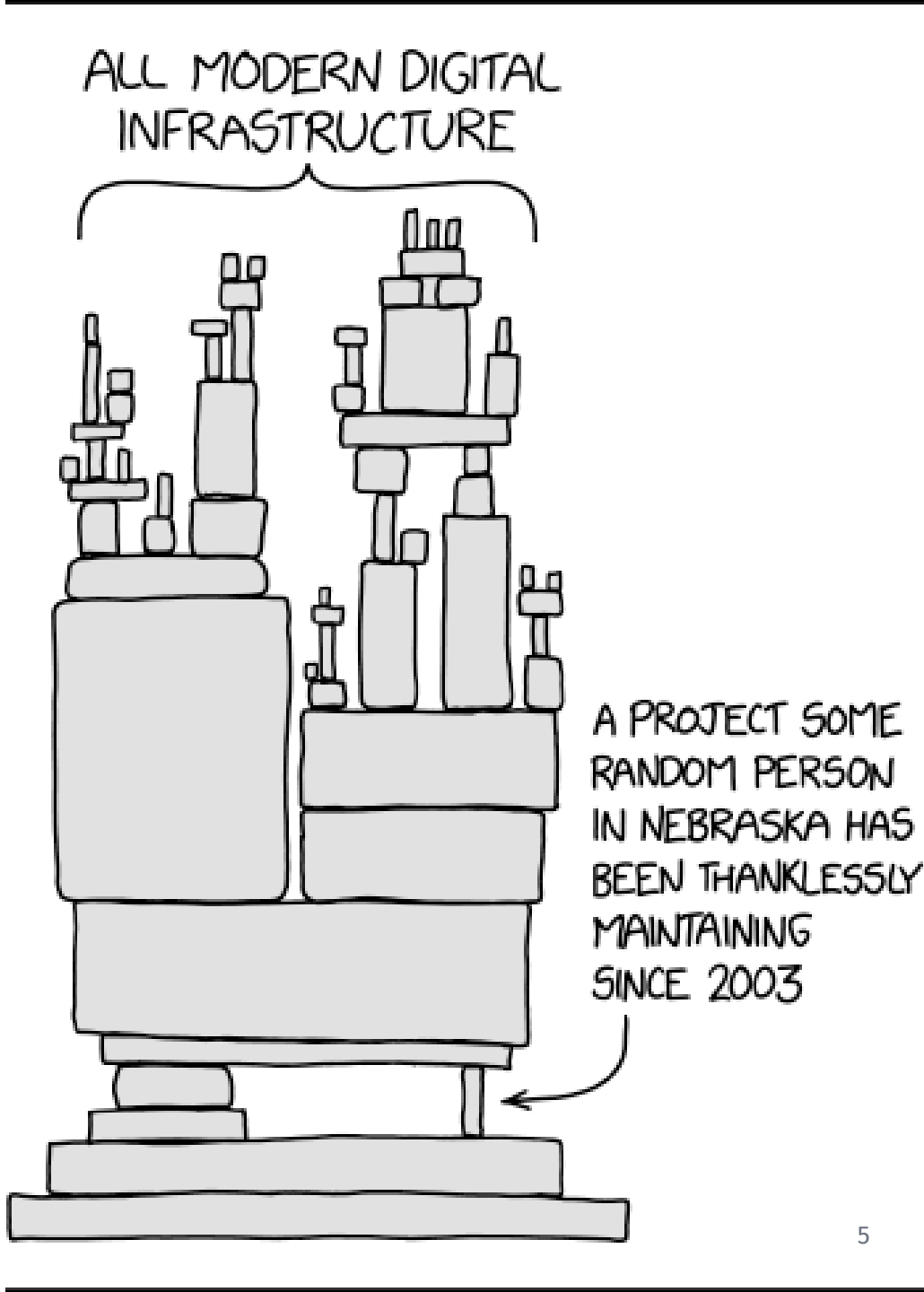

The lesson I learned the hard way !

## The pressure is growing

- Faster development cycles
- Cost reduction
- More features
- New regulations

## Open source might help!?

- Open source = free stuff
- Unclear ownership
- Supply chain risks



## Forget FOSS we have AI instead! 🤦

> *Yes I've heard that.*

from **Zephyr "Turns 10"** Report:

- **54%** AI helps write code faster 🥳
- **78% don't trust** generated code without heavy review 😭

**CHALLENGE:**

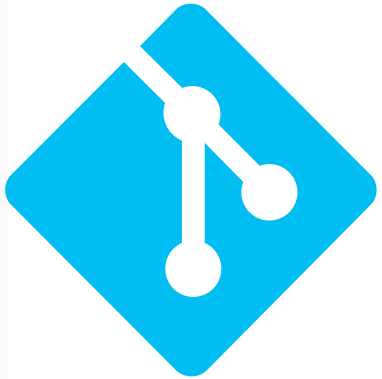
**Leverage from the productivity without losing control.**

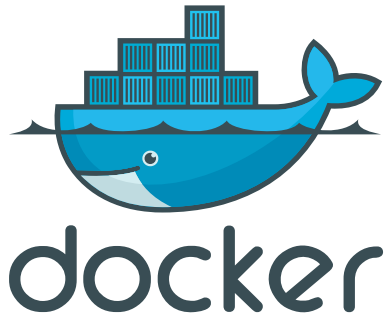
Source: Linux Foundation — Zephyr Turns 10 report

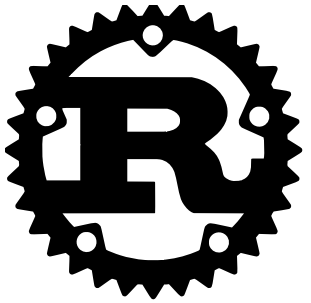
# The open source value has changed

- ~~Free stuff~~ => Stablish ecosystems
- Clear Governance
- Sustainable Funding

> *Open processes let standards become **visible, testable, and adopted**.*





# Ariel, I choose you!

- Open source ✅
- Strongly featured ✅
- Rust ✅
- Funding ✅😉
- Governance 🚧

> *And yet **it is no longer enough.***
> *Competition is there and Ariel needs to stand out!*

# You need an ecosystem!

**FIGURE 3**

## What are the most important factors when selecting an RTOS?

Zephyr Turns 10 Survey, Q15, Sample Size = 413, Total Mentions = 1,122

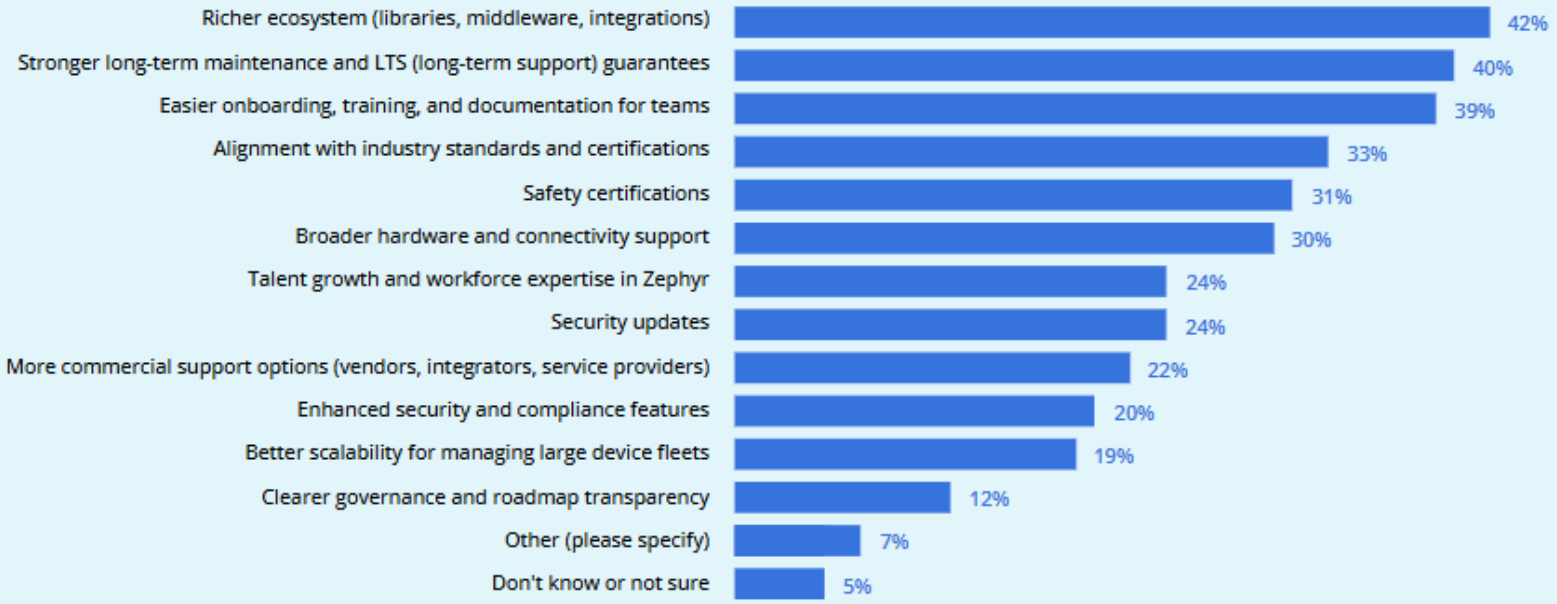

Source: Linux Foundation — Zephyr Turns 10 report

# The ecosystem needs to keep growing!

**FIGURE 24**

## What do you hope to see from the Zephyr project in the next 10 years?

Zephyr Turns 10 Survey, Q40, Sample Size = 153, Total Mentions = 560



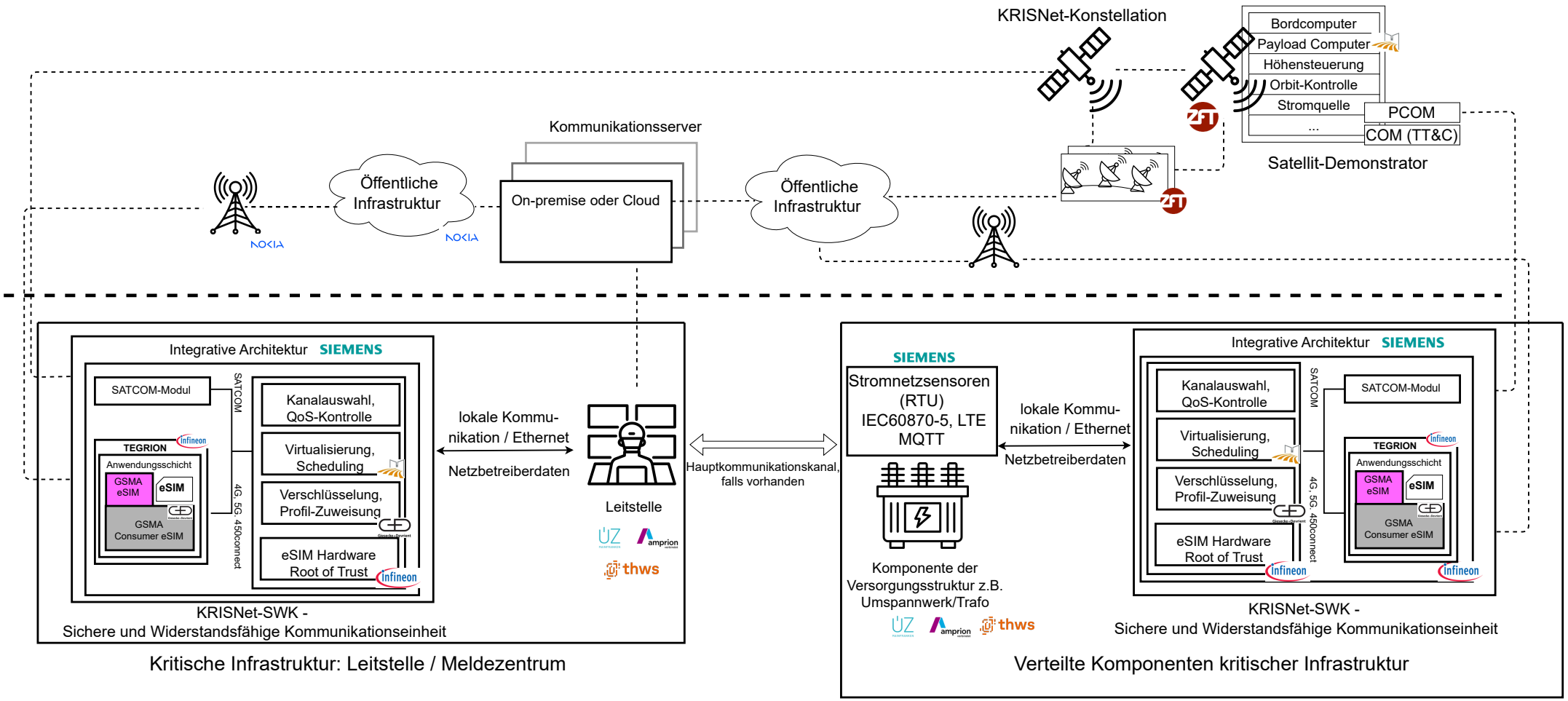

Source: Linux Foundation — Zephyr Turns 10 report

# Tools every RTOS ecosystem needs

- **Build & configuration**
  reproducible builds, board profiles, dependencies
- **Hardware support**
  HALs, drivers, and BSPs
- **Testing & validation**
  unit tests, integration tests, HIL, **fuzzing**
- **Debug & observability**
  logs, tracing, probes
- **AI-assisted engineering**
  MCP servers, reusable skills, and agentic AI support tools
- **CI & release**
  multi-target builds and signed artifacts
- **Documentation & support**
  examples, API references, porting guides, and issue triage
- **Security operations**
  **SBOMs**, **vulnerability handling**, secure boot, and **secure updates**

# The partnership for the ecosystem!

# Krisnet: How satcom can ensure the energy supply during crisis events



# Hybrid post-quantum — guidance, not slogans

Classical public-key isn't quantum-resistant; PQC is newer with new trade-offs → you need a **transition strategy**.

| Source | What it says |
|---|---|
| **BSI** | **Recommends** PQC **together with** classical where possible — *guidance*, not a universal "shall" |
| **ANSSI** | More explicit: a proper **hybrid** avoids regression by combining both KEM results via a **KDF** |

**Protection is conditional:** it holds **only** if the combiner + implementations are secure and **at least one** algorithm stays secure.

**Caution: Rainbow** (Round-3 finalist) and **SIKE** (Round-4) were **broken in 2022** — agility must include the power to **replace** an algorithm.

BSI [bsi_pqc] · ANSSI [anssi2022pqc]

# The secure update — SUIT + NIST standards

The update follows the **IETF SUIT** architecture & manifest information model.

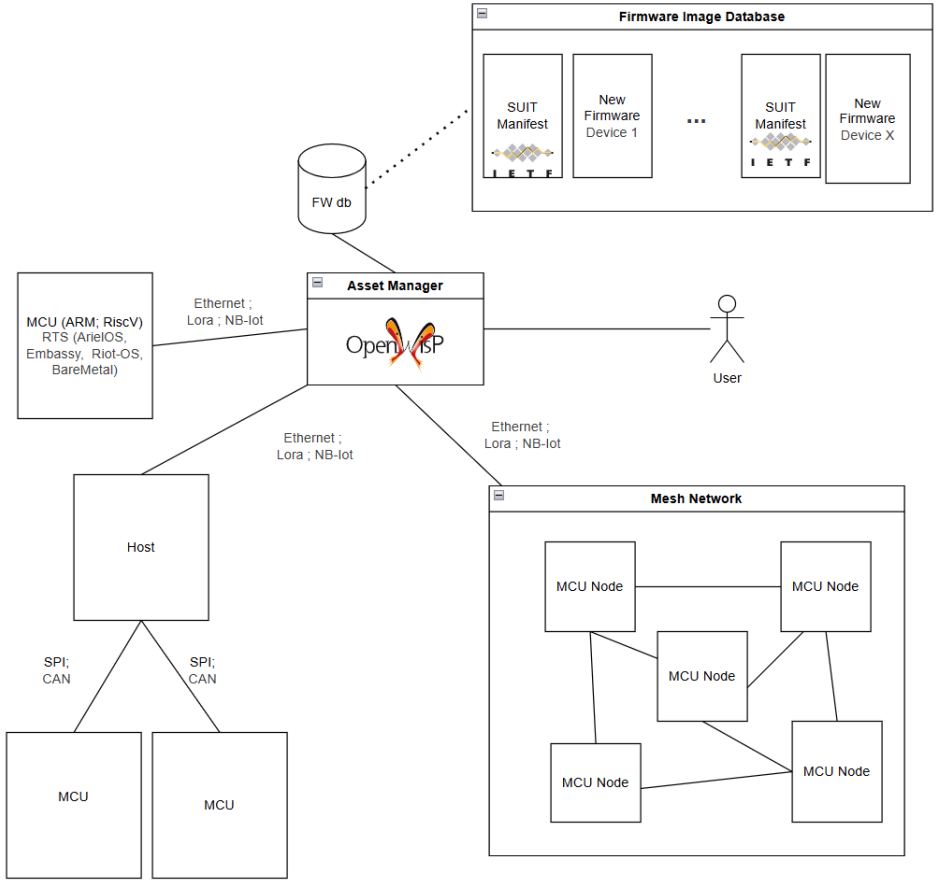
- **RFC 9019** — SUIT architecture
- **RFC-draft** — CBOR Serialization Format for SUIT Manifest
- Crypto that plugs in: **ML-KEM · ML-DSA · SLH-DSA** (**FIPS 203 / 204 / 205**)

SUIT [rfc9019] · [rfc9124] · FIPS 203 [nist_fips203] · 204 [nist_fips204] · 205 [nist_fips205]

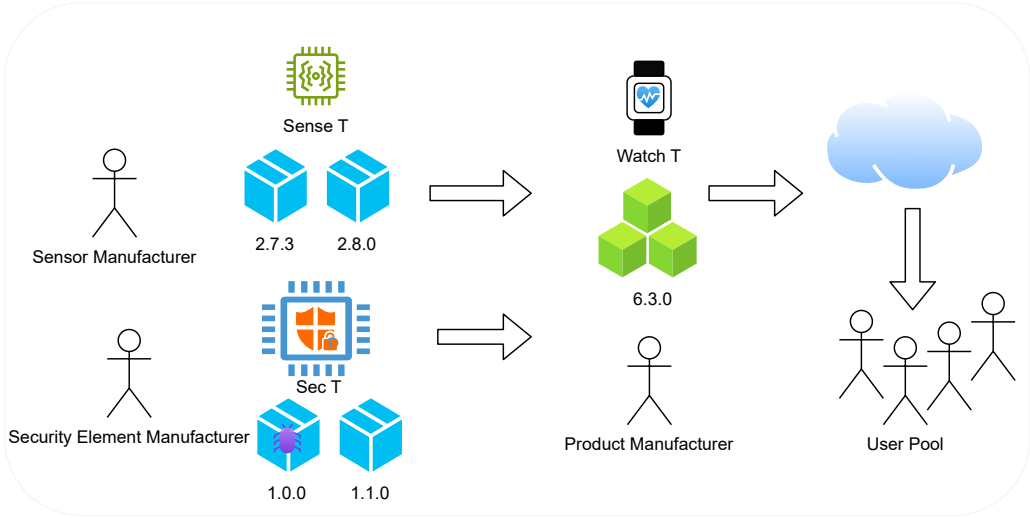
# SuperStack - SuperAPPS + SuperFOSS + SuperSAFE

# SuperSAFE - ASFALIA

## Automated Sovereign Fleet Assets LIfecycle mAnagement



# Comercial use case

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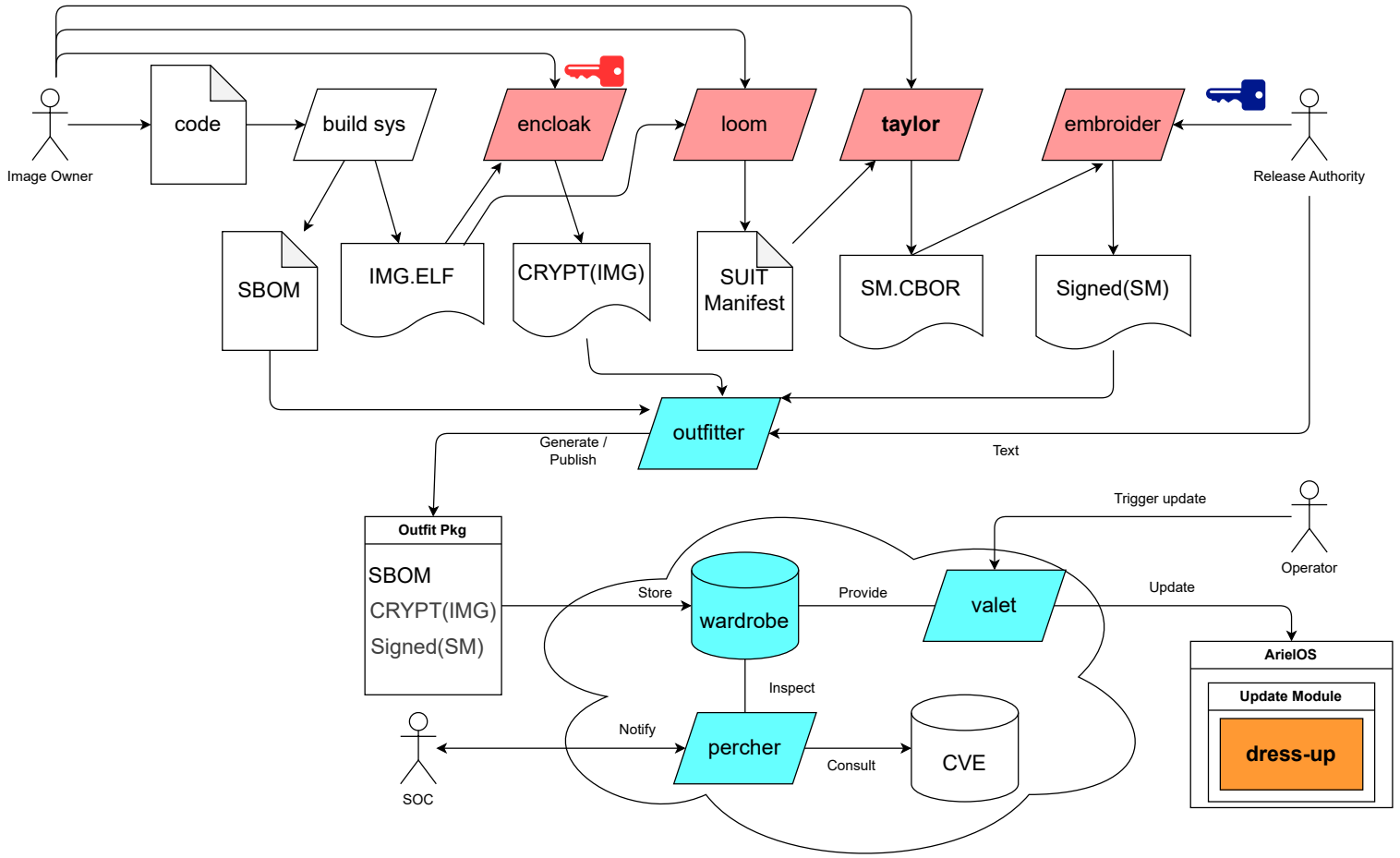
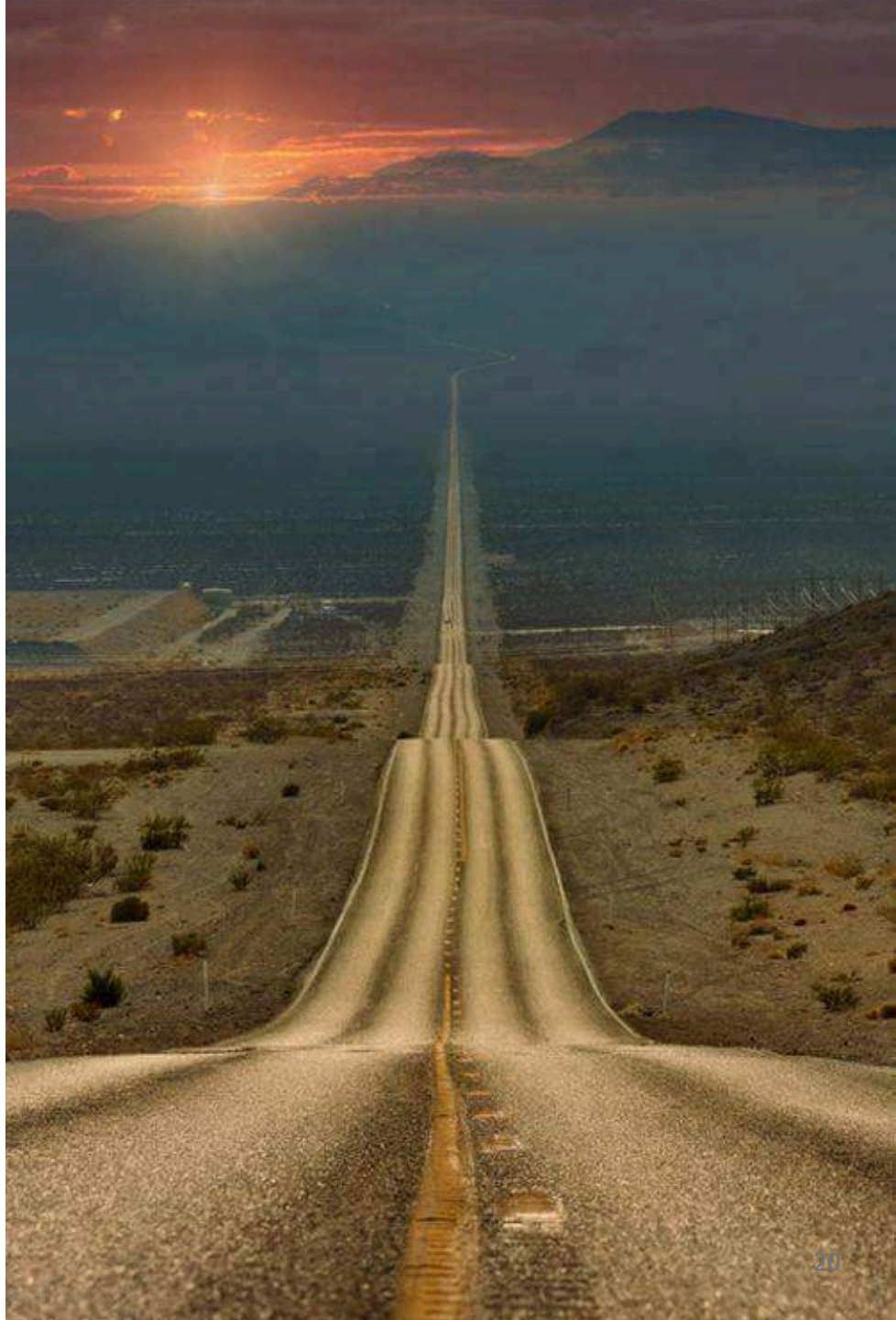
# Vision - SUIT update ecosystem



# Long road ahead

- Update orchestration
- EdgeAI for security
- Remote attestation
- Automated Cryptographic Validation Protocol
- Global Platform APIs
- Embedded WASM
- Agentic development tools



# The kernel gets you into the conversation.

Your ecosystem decides adoption, funding — and relevance years to come.

# Thank you

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