WendyOS

Swift for Embedded Linux

Joannis Orlandos

FOSDEM 2026



What is WendyOS?

Linux distro for embedded devices

Run Swift apps on Raspberry Pi / Jetson
OTA updates & Fleet management
Cloud & Local Observability

Usage

```
$ brew install wendylabsinc/tap/wendy
$ wendy os install
$ wendy run
```

Our Vision

IoT & Robotics will grow explosively

Already everywhere

Development is slow

Security issues rampant

Agenda

1. The Goals
2. Architecture
3. Filling missing pieces
4. Future directions




The Goals

Make Embedded Development easy

Fast Iteration

Quick feedback loops for development

Secure

Built-in security best practices

Scalable

From prototype to production fleet

Leverage the Swift Ecosystem

Observability

swift-otel

API Surface

grpc-swift

App Isolation

swift-container-plugin

Interactive CLI

Tuist/Noora

Remote Debugging

LLDB + VSCode

Process Mgmt

Swift Subprocess

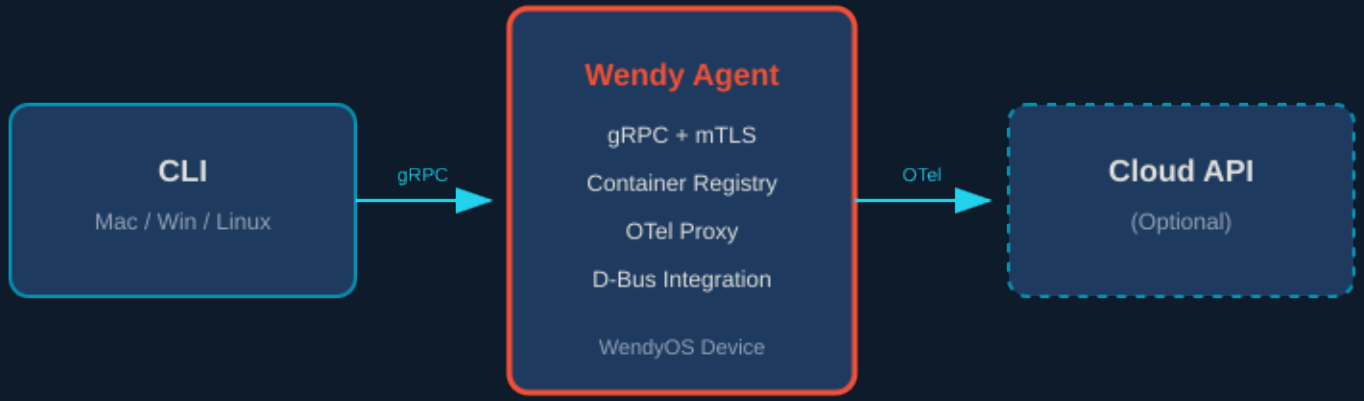
SDK Generation

Swift SDK Generator

Security

Swift-Certificates

Architecture



Wendy Agent

Centerpiece of the system

gRPC-Swift Server

mTLS secured communication

Container Registry API

Efficient image management

OTel Proxy

Broadcast to CLI & Cloud

D-Bus & Bluez

WiFi, Bluetooth config

`github.com/wendylabsinc/wendy-agent`

Wendy Agent - gRPC

Separate services for capabilities

Devices without BLE don't expose BLE APIs

Container

BLE

Network

OTel

gRPC Streams for log tailing

Real-time streaming of container logs and metrics

Container Registry

HTTP API → containerd

Registry maps cleanly to ContainerD APIs

Built with Hummingbird

Using OpenAPI generator. Had to create spec (it was missing!)

Start Container

UNIX sockets for logs → SwiftNIO → OpenTelemetry

OTel Proxy

Hummingbird & gRPC

Logs

Metrics

Traces

Distribution

CLI

During debugging

Cloud

If provisioned

CLI

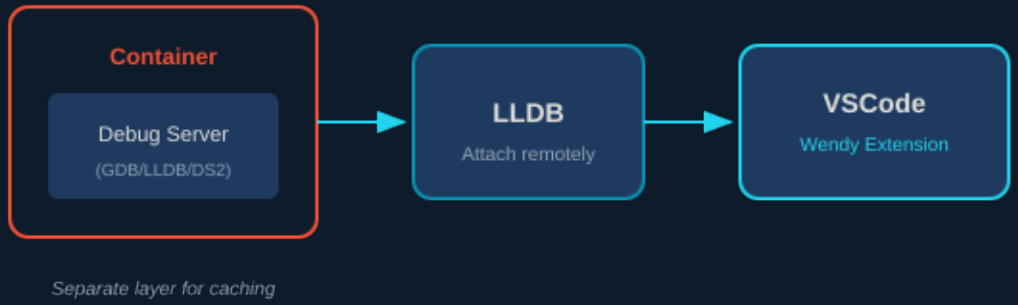
gRPC & BLE Client

Remotely control and setup your device over network or Bluetooth

Build System

swift-container-plugin for Swift, buildkit for Dockerfiles

Remote Debugging



- Installs Debug Server as separate layer (better caching)
- Wendy VSCode Extension handles setup automatically

PRs Made

Contributing back to the ecosystem

SwiftNIO Windows support

SSL, gRPC, HTTP, NIOExtras

DNSClient Windows

Cross-platform networking

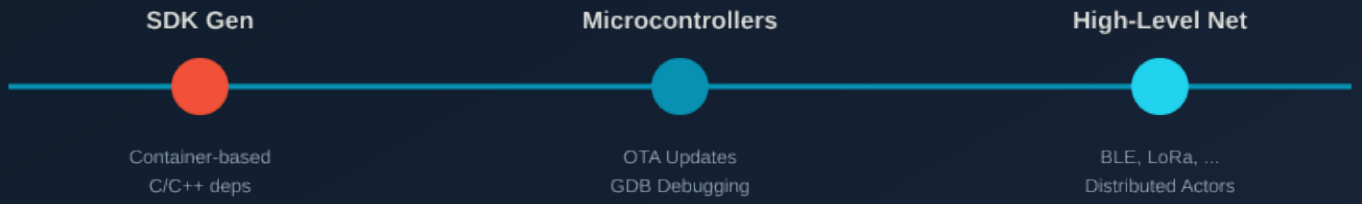
Tuist/Noora improvements

Plus Windows support

MLX-Swift on Linux

SwiftPM support

Future Directions



Swift SDK Generation

Based on container environment, build against C/C++ deps

Microcontrollers

OTA Updates, Remote GDB Debugging

High-Level Networking

BLE, LoRa, Distributed Actors, Embedded Swift

Thank you!

wendy.sh

Let's chat in the break!