
Celona EdgeOS

The network operating system that integrates the wireless fabric into the enterprise IP network.

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The wireless edge wasn't built for this

For thirty years, enterprise wireless was sized for people: a person with a device, moving through a building on business hours. That era is ending. Factories, warehouses, ports, and energy sites are moving critical operations onto wireless – robots, autonomous vehicles, vision systems, and sensor fleets working alongside the people who run them. These machine workloads don't tolerate a dropped packet, and they don't stay on one radio.

The network edge underneath them hasn't kept up. Each wireless technology arrives as its own island, with its own identity and management, bolted to the enterprise LAN through gateways that hide devices behind NAT. Quality of service is coarse and best-effort, spectrum is planned by hand, and a one-size-fits-all architecture can't scale down to smaller sites.

As enterprises design the next generation of wireless – private 5G and Wi-Fi together – the edge is the layer to redesign, not patch: **a network operating system that runs every radio as one deterministic fabric, integrated into the enterprise IP network.**

The legacy wireless edge – the challenges

- One rigid deployment model can't fit both a dense campus and a remote site.
- Carrier-style cores hide devices behind NAT, invisible to enterprise security tools.
- Best-effort delivery can't carry machine traffic that tolerates no dropped packets.
- Each radio is an island: separate identity, management, and policy per network.
- Spectrum planning is manual, RF-expert work that doesn't scale across sites.

Key considerations for a converged network edge

01 Part of the enterprise network, not beside it

The wireless edge joins a network that already exists – IP subnets, VLANs, QoS domains, firewalls, zero-trust frameworks, operational tools. A network operating system must route wirelessly connected devices into that fabric as first-class citizens – full IP visibility instead of a hidden NAT boundary, policy that survives the handoff from air to wire – and deploy in whatever form each site needs, cloud, appliance, or virtualized, with one operating model everywhere.

02 Convergence engineered into the network, not stitched on top

If private 5G and Wi-Fi are to behave as one network, the edge must own what they share: one core, one identity, one session. Overlay controllers and device-side agents can only react after a link degrades. A network that terminates both access layers itself can see both radios at once, steer a device before its connection drops, and hold the session as it moves – with nothing to install on the device.

03 Deterministic by design, enforced at the edge

Machine workloads need guarantees, not averages. The edge must let operators declare per-application service levels – priority, latency, loss – and enforce them where traffic enters the network, then carry the same intent into the enterprise LAN. The same discipline applies below the traffic layer: spectrum itself must be planned, monitored, and re-optimized continuously, not tuned by hand.



Introducing Celona EdgeOS

Celona EdgeOS is the network operating system of Celona Orion – cloud-native, microservices-based software that runs private 5G and Wi-Fi as one secure, deterministic fabric, integrated into the enterprise IP network. It delivers converged 4G/5G core services, wireless-aware routing, intelligent spectrum management (ISM), and per-device, per-application QoS – deployed cloud-delivered with AerFlex, as an on-premises appliance, or virtualized on VMware ESXi. One software platform, one operating model everywhere.

[THE NETWORK OPERATING SYSTEM OF CELONA ORION]



Celona Orion · EdgeOS – private 5G and Wi-Fi terminate in one network operating system managed by Celona Orchestrator AI: one SIM identity, deterministic QoS, IT/OT separation.



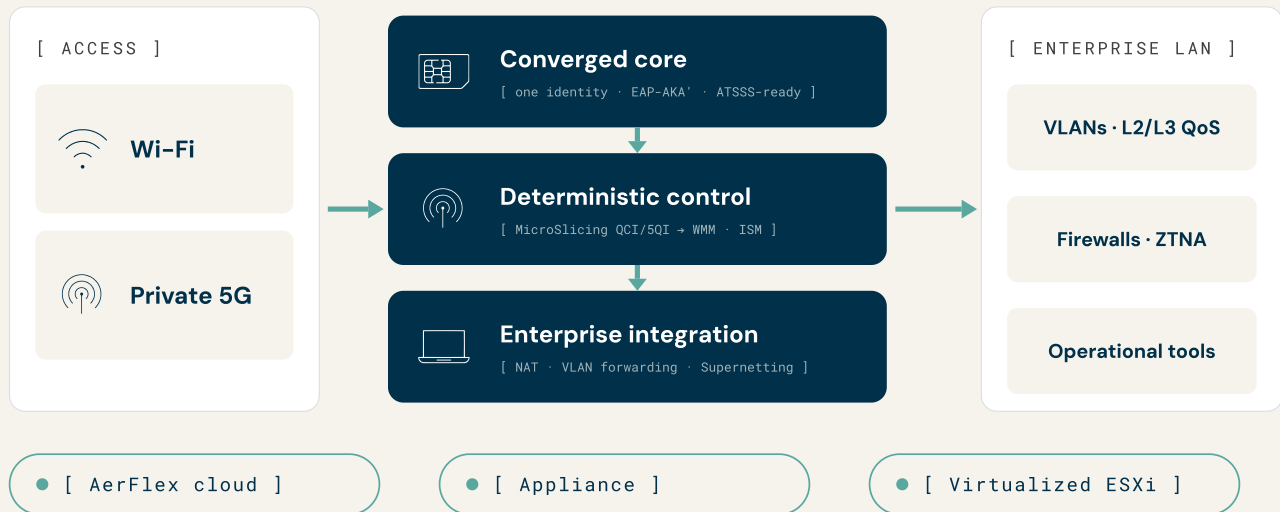
One stack, one supply chain

EdgeOS carries the trust model of the platform it powers. Celona writes the entire software stack in-house – the core, both wireless access layers, the SIM, routing, and security engineered together. That means one supply chain, one security model, and one accountable vendor for the fabric carrying your most operationally critical traffic – managed end to end by Celona Orchestrator AI.

How EdgeOS runs the converged fabric

EdgeOS runs the fabric through three layers – a converged core, deterministic control, and enterprise integration – so every device gets one identity, a guaranteed experience, and full visibility on the enterprise network.

[EDGEOS – THREE LAYERS, ONE FABRIC]



EdgeOS: the converged core terminates private 5G and Wi-Fi on one identity; deterministic control enforces MicroSlicing QoS from QCI/5QI to WMM plus ISM spectrum optimization; enterprise integration routes into the LAN, firewalls, and zero-trust systems.

Converged core

A cloud-native, standards-compliant 4G/5G packet core – EPC and 5G Standalone with a unified data plane – with Wi-Fi integrated as trusted access to the same core. One SIM or eSIM authenticates on both radios using EAP-AKA'. The network sees both radios, steers before a link degrades, and holds the connection as a device moves. On phones it deploys as an MDM profile – no app – and the ATSSS-ready core deepens convergence as devices add support.

Deterministic control

Celona MicroSlicing enforces QoS per application: critical traffic flows are detected and prioritized in real time and assigned QCI/5QI classes that map to Wi-Fi WMM access categories – one QoS policy, unified across devices and applications on both radios. Beneath the traffic layer, ISM fuses real-time telemetry and SAS feedback into closed-loop, zero-touch planning and self-optimization across shared, unlicensed, and licensed bands, with Domain Proxy support for CBRS at scale.

Enterprise integration

A full IP stack at the network edge routes between the wireless fabric and the enterprise LAN – NAT, VLAN forwarding, and Supernetting – with device-level visibility and policy enforcement instead of a hidden cellular subnet. MicroSlicing QoS maps to enterprise L2/L3 QoS settings, and the fabric integrates with existing firewalls and zero-trust (ZTNA) systems, with micro-segmentation for OT and IT/OT separation built in.

Because all three layers deploy as one software platform – cloud, appliance, or virtualized – the same fabric and operating model reach every site, from a dense manufacturing campus to a remote AP-only depot.

Benefits

- 01 **Deploy anywhere** — AerFlex in the cloud, appliance, or virtualized – one software platform, one operating model everywhere.
- 02 **Part of your network** — full IP routing and device-level visibility into the LAN, firewalls, and zero-trust systems.
- 03 **Deterministic performance** — per-application QoS enforced at the edge and unified across radios, from QCI/5QI to WMM.
- 04 **Connection follows the device** — one identity and one session across private 5G and Wi-Fi, steered before a link degrades.
- 05 **Zero-touch spectrum** — closed-loop ISM planning and self-optimization across shared and licensed bands.



Additional EdgeOS capabilities

Because Celona builds the core, both wireless access layers, and the SIM, capabilities that elsewhere require integration projects are properties of the fabric itself.

SIM-based identity and security

One SIM or eSIM authenticates on both radios via EAP-AKA'. Each SIM can be tied to specific device hardware for granular control, and identity extends into existing firewall and zero-trust (ZTNA) policy.

Wireless-aware IP routing

A full IP stack at the edge supports NAT, VLAN forwarding, and Supernetting, giving IT direct visibility of wirelessly connected devices – including endpoints behind gateways – from existing operational tools.

Intelligent spectrum management (ISM)

ISM fuses real-time telemetry and SAS feedback into closed-loop optimization: zero-touch planning, self-optimization, and Domain Proxy support for enterprise-grade CBRS at scale – across shared, unlicensed, and privately licensed bands.

An entire stack written in-house

Core, both radios, SIM, routing, and security engineered together – one supply chain, one security model, one accountable vendor, built for machines and people, not just users.

Deterministic QoS with MicroSlicing

Critical flows are detected and prioritized in real time at per-device, per-application granularity – assigned QCI/5QI classes, mapped to Wi-Fi WMM and enterprise L2/L3 QoS, and enforced at the edge.

Micro-segmentation for OT

Segmentation and IT/OT separation are built into the fabric: operational traffic is isolated from general enterprise traffic end to end, down to the individual device and traffic flow.

High availability by design

A multi-node EdgeOS cluster eliminates single points of failure, load-balancing services across nodes with automated failure detection and recovery. In AerFlex deployments, cloud-based control pairs with local traffic breakout on each AP for resilient service continuity.



How EdgeOS compares

The real question isn't which box runs the network edge – it's whether the wireless fabric is part of your enterprise IP network. With EdgeOS, it is.

LEGACY ASSEMBLED WIRELESS EDGE		EDGEOS - THE CONVERGED NETWORK EDGE
DEPLOYMENT	One-size-fits-all architecture with no flexibility to scale down to smaller sites.	AerFlex cloud, appliance, or virtualized – one software platform, one operating model.
INTEGRATION	A parallel network behind NAT, opaque to enterprise security and operational tools.	Device-level visibility and routing into the LAN, firewalls, and ZTNA systems.
DETERMINISM	Best-effort delivery with coarse, network-wide QoS; intent is lost at the wireless boundary.	Per-device, per-application QoS enforced at the edge – QCI/5QI mapped to WMM and enterprise L2/L3.
CONVERGENCE	Each radio is its own network, bridged by overlay controllers.	One core terminates both radios; one identity and session follow the device.
SPECTRUM	Manual RF planning and tuning by specialists, site by site.	ISM: zero-touch, closed-loop spectrum optimization with SAS and Domain Proxy support.



Deployment use cases

One software platform reaches every kind of site – matched to the deployment model each environment needs, with the same fabric and operating model everywhere.

Manufacturing campuses — appliance-based EdgeOS for dense, mobility-heavy plants running AMRs and vision systems. · [MANUFACTURING](#)

Warehousing and logistics — deterministic QoS for scanners, AGVs, and automation across high-bay sites. · [DISTRIBUTION AND LOGISTICS](#)

Distributed enterprises — AerFlex cloud-delivered edge for remote offices, construction, and industrial retail sites.

Existing server estates — virtualized EdgeOS on VMware ESXi for big-box retail and education campuses. · [EDUCATION](#)

IT/OT convergence — micro-segmentation and built-in IT/OT separation on one converged fabric. · [OIL AND GAS](#)



EdgeOS makes wireless part of the network

EdgeOS marks a shift in how enterprise wireless is built: a network operating system that integrates the wireless fabric into the enterprise IP network, rather than bolting another island onto it. One converged core gives every device one identity and one session across private 5G and Wi-Fi; deterministic control holds critical traffic to per-device, per-application service levels, from QCI/5QI to WMM to the enterprise L2/L3 network; and enterprise integration routes the whole fabric into the LAN, firewalls, and zero-trust systems the enterprise already runs. Because it is software – AerFlex in the cloud, appliance, or virtualized – the same fabric reaches every site with one operating model, managed end to end by Celona Orchestrator AI on a stack Celona writes in-house.

The real question isn't which box runs the network edge – it's whether the wireless fabric is part of your enterprise IP network. With EdgeOS, it is – ready for the machine workloads moving onto wireless next.

/ REFERENCES

01 [AerFlex product brief](#)

02 [AerFlex configuration](#)

03 [Edge appliance data sheet](#)

04 [Virtualized EdgeOS configuration](#)

/ ABOUT CELONA

Celona is the company behind Celona Orion, the industry's first Agentic Converged Wireless Platform. Enterprises in manufacturing, logistics, mining, energy, and healthcare use Celona to connect the machines, sensors, autonomous systems, and people running their physical operations — with the deterministic performance, security, and enterprise control that off-the-shelf wireless can't deliver. For more information visit celona.io.

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