

Edge vs Cloud

Executive tradeoffs in self-service infrastructure: uptime, compliance, and resilience.

Vendor-neutral executive brief | Reliability lens | Regulated environments and network uncertainty

Key takeaways

- Cloud improves agility, but cloud-only architectures increase downtime exposure.
- Edge processing is a resilience strategy, not a technology preference.
- Design for degraded mode: transactions and workflows must continue during outages.
- Regulated deployments should assume audits, logs, and deterministic behavior.

The most common failure pattern in modern self-service is not performance - it is connectivity dependency. When core workflows require a live cloud connection, a minor outage becomes a revenue and throughput event. Executives should treat 'edge vs cloud' as a governance decision: which functions must operate locally, and which can depend on the network.

"A kiosk that cannot function during an outage is not self-service - it is self-sabotage."

What belongs at the edge

Keep these functions local to protect uptime and customer flow:

- Core UI workflows and session logic (no 'blank screen' dependency).
- Device health monitoring and self-healing routines.
- Peripheral control (printers, scanners) and graceful error handling.
- Local caching of menus, forms, wayfinding, and multilingual content.
- Audit logs and event journaling with later sync.

What belongs in the cloud

Use the cloud for what it is best at: aggregation and coordination.

- Fleet-wide analytics and reporting.
- Central content management and scheduled updates.
- Model training, recommendations, and personalization (where appropriate).
- Cross-site configuration policy and compliance reporting.

Executive decision matrix

Decision area	Prefer edge when...	Prefer cloud when...
Uptime criticality	Downtime is unacceptable	Brief downtime is tolerable
Compliance & audit	Deterministic logs required	Light audit needs
Network reliability	Locations have poor/variable connectivity	Connectivity is stable
Operational scale	You need local autonomy + centralized governance	Centralize most control

Practical rule: if a function is required to complete a customer journey, design it to work offline or in degraded mode.

Executive sign-off questions

- Which kiosk functions must keep working during a network or cloud outage?
- What is the operational cost of one hour of outage per location?
- How are logs captured, retained, and audited when connectivity fails?
- What is the fallback workflow for payments, identity, or check-in when cloud services are unavailable?
- Who owns monitoring: internal teams or a managed service provider?

Treat edge as insurance. Cloud is leverage. Mature self-service uses both - intentionally.