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DESIGN STUDY

Store associate devices for 320 grocery stores: Wi-Fi 7 in every store, 3,200 shared handhelds

Complete design on current platforms

CAPABILITY	INDUSTRY	SETTING
Mobility	Retail	Grocery chain
DOCUMENT	**VERSION**	**DATE**
MOB-003	1.1	Oct 10, 2026

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Document control

Document	MOB-003	Version	1.1
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Capability	Mobility	Industry	Retail
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Approval	Approved by Edwin Ozer, Founder, Oct 10, 2026. Issued by Symbeeo, Oct 10, 2026. Design study: every figure is vendor-published, a design target or a marked assumption.		
Sign-off	"An engagement under this design is signed by the practice lead before any build proceeds."		

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CONVENTIONS

Source tags. [S] figure read from the vendor's own current page on Sep 24, 2026, or on Sep 27, 2026 where the text says so · [S*] figure from a page summary or trade press where the vendor's page could not be opened or was not read in full · [A] design assumption, to be confirmed by the signing engineer · [T] design target: the record's outcome figure and anything derived from it. No figure comes from any engagement, file or asset. A row with more than one tag is counted once: as a published figure if any tag is [S] or [S*], otherwise as an assumption if any tag is [A], otherwise as a design target.

Table 1. Revision history

Date	Version	Change
Sep 27, 2026	1.0	First issue.
Oct 10, 2026	1.1	Approval line now reads: approved by the Founder, issued by Symbeeo. Mark Winston remains the author.

1 · Scope

Who it is for. The store-operations CIO of a grocery chain whose associates share eight-year-old handhelds on eight-year-old store Wi-Fi, whose devices are re-imaged by hand at a depot when they fail, and who must replace both in one program without closing a store.

Typical buyer [A]. A grocery chain with 320 stores in one country, average sales floor 3,500 m² plus back room and loading dock. 14,000 associates; 10 shared handhelds per store for picking online orders, stock counts, price checks and receiving. Existing store Wi-Fi 5 APs on PoE+ switches; existing handhelds at end of security updates.

What is in. Store Wi-Fi 7 access points; the store SSID profile; 3,200 handhelds; enrollment, configuration and shared sign-in through one UEM; the store-by-store overnight cut-over. **What is out.** Store switches and the store WAN; point of sale; the identity provider; distribution centers.

Assumptions. Cisco supplies the APs, managed from the Meraki cloud dashboard [A]. Zebra supplies the handhelds [A]. SOTI MobiControl is the UEM, already chosen by the buyer's comparison [A]. Every store switch has free PoE+ ports and a 1G or faster uplink [A].

Related documents, read Sep 24, 2026.

- Cisco Wireless 9172 Series Access Points data sheet (updated September 15, 2026; read in full Sep 27, 2026) — https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/wireless-9172-series-access-points-ds.html
- Cisco Wireless CW9172 and CW9171 Access Point Deployment Guide (published summary) — https://www.cisco.com/c/en/us/td/docs/wireless/access_point/technical-reference/cw9172-dg.html
- Zebra TC501 specification sheet — https://www.zebra.com/us/en/products/spec-sheets/mobile-computers/handheld/tc501.html
- Zebra press release, TC501 and TC701, February 18, 2026 — https://www.zebra.com/gb/en/about-zebra/newsroom/press-releases/2026/zebra-introduces-ai-powered-tc501-and-tc7901-mobile-computers-for-logistics-frontline.html
- SOTI MobiControl help, Using the Zebra OEMConfig with Android Enterprise Devices, release 2026.0 (read in full Sep 27, 2026) — https://pulse.soti.net/support/soti-MobiControl/help/?V=2026.0&T=console/devices/managing/enrollment/androidplus/knox/tsk_using_the_zebra_plugin_with_android_enterprise_devices
- SOTI blog, SOTI MobiControl 2026.0 Update Part 1 (November 18, 2025; dates release 2026.0) — https://soti.net/resources/blog/2025/soti-mobicontrol-20260-update-part-1-streamlining-android-and-apple-device-management/

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- SRA-MOB-001, SDD-MOB-001, STP-MOB-001 (Symbeeo), v1.0 of Sep 27, 2026

1c · Public implementations this design follows

Table 2. Public implementations this design follows

Implementation	Who published it · date	What it settles for this design	URL
A New Zealand grocery group replaces its store associates' aging handhelds with Zebra mobile computers chosen with store staff; associates look up product information on the shop floor instead of at the manager's office computer	Zebra blog (success story) · September 19, 2023 · public deployment	the design's shape — a grocer replacing shared store handhelds chain-wide — runs at a named grocer; it names no models and does not settle R2–R13	https://www.zebra.com/us/en/blog/posts/2023/foodstuffs-retail-success-story.html
Cisco 9172 Series positioned for environments such as "retail stores" and distributed business locations, with cloud, on-premises or hybrid management	Cisco data sheet · updated September 15, 2026 · vendor documentation, used to build our own design	R3 and §4.1: an entry tri-radio Wi-Fi 7 AP made for low-to-moderate density sites such as stores	https://www.cisco.com/c/en/us/products/collateral/wireless/catalyst-9100ax-access-points/wireless-9172-series-access-points-ds.html
TC501 and TC701 announced with Wi-Fi 7 and 5G, dual-carrier connectivity, "a 10-year lifecycle" and LifeGuard for Android	Zebra press release · February 18, 2026 · vendor documentation, used to build our own design	R11: the handheld class is current and its lifecycle is published by the maker	https://www.zebra.com/gb/en/about-zebra/newsroom/press-releases/2026/zebra-introduces-ai-powered-tc501-and-tc7901-mobile-computers-for-logistics-frontline.html
SOTI MobiControl administering Zebra devices under Android Enterprise through a Zebra OEMConfig profile	SOTI help for release 2026.0 · release announced November 18, 2025 · vendor documentation, used to build our own design	§4.4: maker settings pushed from the UEM, no depot re-imaging	https://pulse.soti.net/support/soti-MobiControl/help/?V=2026.0&T=console/devices/managing/enrollment/androidplus/knox/tsk_using_the_zebra_plugin_with_android_enterprise_devices

Every row was read in full on Sep 27, 2026. The SOTI help page carries no date of its own; its date is the 2026.0 release date from SOTI's blog of November 18, 2025 (Related documents).

2 · Requirements register

Table 3. Requirements register

#	Requirement	Value	Source
R1	Stores and devices	320 stores · 3,200 handhelds · 10 per store	[A]

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#	Requirement	Value	Source
R2	Store coverage	≥ −67 dBm, SNR ≥ 25 dB, 5 and 6 GHz, 95 % of sales floor, back room, dock and cold rooms	[A]; SRA-MOB-001 R2
R3	AP generation	Wi-Fi 7, concurrent 2.4/5/6 GHz	[S] CW9172I tri-radio; SRA-MOB-001 R3
R4	AP power	within PoE+ on the existing switch	[S] CW9172I 802.3at 25.5 W max
R5	AP uplink	2.5G mGig or 1G on existing ports	[S] CW9172I 1 × 100M/1G/2.5G
R6	APs per store	12	[T]
R7	SSID security	WPA3-Enterprise with PMF on store; no WPA2 SSID after cut-over	[S] CW9172I WPA3; SRA-MOB-001 R4–R5
R8	Handheld durability	IP65 or better; 2.4 m drop to concrete	[S] TC501 IP68/IP65, 2.44 m
R9	Handheld Wi-Fi	Wi-Fi 7 with multi-link	[S] TC501 MLMR tri-band and dual-band
R10	Enrollment	out of the box, no depot step	[T]; SRA-MOB-001 R10
R11	Handheld life	maker-published lifecycle and security-update program	[S] Zebra 10-year lifecycle; LifeGuard
R12	Device swap at store	failed unit replaced and working in ≤ 30 min by store staff	[T]
R13	Cut-over	store by store, overnight, trading hours untouched	[T]
R14	Lost or stolen handheld	locked and wiped ≤ 15 min after report	SRA-MOB-001 R18

Fourteen rows; seven carry a vendor figure, two are design assumptions, four are design targets, and one restates an SRA-MOB-001 requirement for this design.

3 · Architecture overview

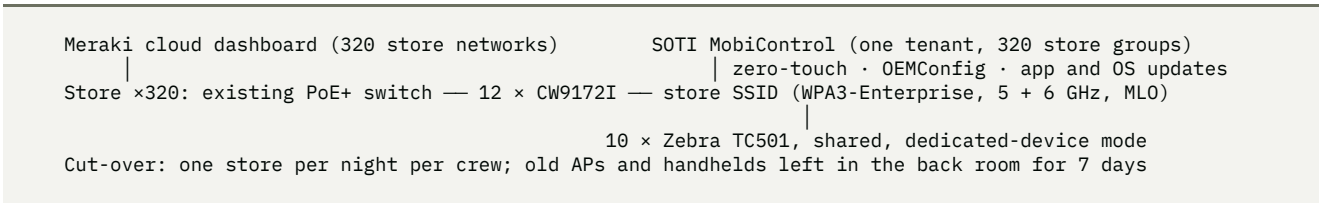


Figure 1. Store Wi-Fi 7 and shared handhelds

One AP model, one handheld model and one console per layer, identical in every store. A store is a template: the dashboard network and the UEM group are cloned, not built. Cisco's 9172 Series is the class it sells for stores [S]; the TC501 is the handheld class Zebra launched in February 2026 [S].

Table 4. Architecture overview

Role	Product (exact model)	Qty	Capacity used	Why this unit
Access point	Cisco CW9172I	3,840	12 per store [T]	tri-radio Wi-Fi 7, up to 9 Gbps, 2.5G uplink, PoE+ [S]

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Role	Product (exact model)	Qty	Capacity used	Why this unit
AP management	Meraki cloud dashboard	1 org	320 networks	cloud management listed for the 9172 [S]
Handheld	Zebra TC501, WLAN model	3,200	10 per store [A]	Wi-Fi 7 MLMR, IP68/IP65, 2.44 m drop, FIPS 140-3 [S]
Store spares	Zebra TC501	320	1 per store [A]	R12 swap from stock, not from a depot
UEM	SOTI MobiControl	1 tenant	3,520 devices	zero-touch [A]; OEMConfig for Zebra [S]

4 · Design by subsystem

4.1 Access points.

CW9172I: 2.4, 5 and 6 GHz each 2x2:2, or 2.4 GHz plus 4x4:4 on 5 GHz; up to 9 Gbps aggregate with 320 MHz on 6 GHz; 20- to 320-MHz channels on 6 GHz; one 100M/1G/2.5G uplink; 25.5 W maximum on 802.3at, 32 W on 802.3bt Class 5 [S]. A fourth radio does WIDS/WIPS and RF optimization, a fifth handles Bluetooth [S*]. Twelve APs in a 3,500 m² store is ten on the floor, one per about 350 m², plus one each for the back room and dock [A]; the design uses 80 MHz on 6 GHz and 40 MHz on 5 GHz because the store has few clients and many shelves [A]. Rejected: 4x4 high-density APs — the store's load is ten handhelds and the staff phones, not a crowd.

4.2 Store SSID.

store: WPA3-Enterprise, EAP-TLS on the device certificate, PMF required, 5 and 6 GHz, MLO on [A] under SRA-MOB-001 §4.2. guest: Enhanced Open on 5 GHz, rate limited [A]. No WPA2 SSID survives the store's cut-over night (R7), because the old handhelds leave the same night.

4.3 Handhelds.

TC501: Qualcomm Dragonwing Q-6690; IP68 and IP65 per IEC 60529; 2.44 m to concrete at room temperature, 2.74 m with the rugged boot; 2,000 tumbles at 0.5 m; −20 °C to +50 °C operating [S] — the walk-in freezer visit is short, the cold room is within range [A]. Wi-Fi 7 multi-link in tri-band and dual-band modes, up to 5,764 Mbps on 6 GHz [S]. Short-range RFID reads 200 tags per second up to about 2 m [S], used for stock counts [A]. FIPS 140-3 validated and Common Criteria certified through a Secure Element [S]. Rejected: consumer phones in cases — no multi-link-certified rugged option at 2.4 m and no maker lifecycle program (R11).

4.4 Enrollment and shared use.

Each TC501 is registered for zero-touch by the reseller; first power-on enrolls it into its store's MobiControl group as an Android Enterprise dedicated device with shared sign-in [A]. Zebra scanner, RFID and battery settings are pushed through Zebra OEMConfig from MobiControl [S]. An associate signs in at the start of a shift with the identity provider; the device clears the session at sign-out [A]. A failed unit is swapped from the store spare: the associate powers it on and it enrolls itself (R12).

4.5 Updates and lifecycle.

Security patches through LifeGuard for Android, which Zebra ties to a valid support contract [S]; the UEM stages each patch to 5 % of stores for seven days, then the rest overnight [A]. Each handheld's LifeGuard end date is recorded in the as-built (SRA-MOB-001 R17).

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4.6 Store-by-store cut-over.

Per store, one night: mount 12 new APs beside the old ones; bring up the cloned dashboard network; enroll ten TC501s from the box; the store manager checks one pick, one count and one receipt at opening [A]. Old APs powered off, left cabled for seven days as the rollback path [A]. Six crews at four stores a week each is about 13 weeks for 320 stores [A].

5 · Failure behavior

Table 5. Failure behavior

Failure	Behavior	Source
One AP down	handhelds roam to neighbors; coverage holds at reduced rate	[A] 12 APs per store
Store WAN down	APs keep serving the store SSID; cloud-dependent apps stop; handhelds keep last policy	[A]; SRA-MOB-001 F2, F7
Meraki dashboard unreachable	APs keep forwarding; changes wait	[A]
UEM unreachable	devices keep last policy; spares cannot enroll until it returns	SRA-MOB-001 F7
One handheld fails	swapped from the store spare, enrolled by power-on	[T] R12
Handheld lost or stolen	locked and wiped from the UEM; certificate revoked	SRA-MOB-001 F10

6 · Limits

- Twelve APs per store is a design target from an average store; the count per store is set by a predictive design of that store's floor plan and shelving.
- The CW9172I is a 2x2 tri-radio AP (4x4 only on 5 GHz in dual-radio mode); stores with dense customer Wi-Fi use would need a larger AP class.
- Shared sign-in at AAL2 phishing-resistant (SRA-MOB-001 R12) on a shared handheld depends on the identity provider's shared-device support; where it falls short the security team signs a written exception.
- SOTI's help page, read in full on Sep 27, 2026, confirms a Zebra OEMConfig profile under Android Enterprise; zero-touch enrollment into MobiControl remains [A] until SOTI's enrollment help is read. The fourth- and fifth-radio functions of the CW9172I are [S*] from a deployment-guide summary.
- LifeGuard updates require a valid support contract; the program cost includes it for the device life.

7 · Lessons learned

None yet — this is a design study; populated after the first build against it.

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8 · The author

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Signed off by Edwin Ozer, Founder.

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Figures are as published by their sources on the dates given in this document; figures marked [A] are assumptions.

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