

System Overview

Shelfbot is a Goods-to-Person warehouse automation system that uses autonomous robots to retrieve storage bins from standard racking and deliver them to operators at stations. The system retrofits into existing AS4084-compliant steel storage racking and integrates with your WMS via REST API.

Key principle: We built Shelfbot to be simple to understand, simple to operate, and simple to maintain—without sacrificing performance.

What Shelfbot Is

Shelfbot delivers the storage density and throughput of enterprise ASRS without the proprietary grids, 12-month implementations, or multi-million dollar commitments. It's designed for warehouses that need automation but can't afford the complexity or capital of traditional systems.

Core capabilities:

- Goods-to-Person picking (bins delivered to operators, not vice versa)
- 4× storage density improvement vs. manual operations
- 5× faster order picking vs. manual
- 4–8 week deployment (not 6–18 months)
- Robots as a Service (RaaS) model from \$10,000/month

System Components

1. Robots

- **Autonomous navigation** – Robots travel horizontally on rails and move vertically within racking aisles
- **No batteries** – Powered via 240V mains supply from outlets on the racking front frame (no downtime for charging)
- **Payload** – 20 kg max bin weight
- **Speed** – Up to 2,500 mm/s horizontal; vertical lift speeds optimized for safety and throughput
- **Per-robot throughput** – 60 bin presentations per hour

2. Bins

- **Standard dimensions** – 820 × 420 × 285 mm (L × W × H)
- **Material** – Plastic bins (standard); steel fire-rated bins available
- **Items per bin** – Depends on SKU dimensions; typically 5–50 items depending on product size
- **Bins per level** – 5 bins per shelf level (typical configuration)

3. Racking

- **Standard steel racking** – AS4084:2023 compliant storage racking (not proprietary grids)

- **Aisle width** – 1200 mm
- **Height range** – 4–10 m (up to ~21 levels at 10 m height)
- **Aisle length** – Up to 48 m (18 bays)
- **Key advantage** – Uses existing racking or standard racking suppliers; no proprietary infrastructure

4. Stations

- **One per robot** – At the end of each robot aisle, where the robot presents bins for picking and putaway
- **Integrated weight verification** – Platform scales confirm pick accuracy and catch overweight items
- **Zones** – A block of three or four robot aisles is served by one operator with one put-to-light trolley; the operator moves between the zone's stations as bins arrive
- **Throughput per operator** – Up to 300 bin presentations per hour with batch picking

5. Put-to-Light Trolley

- **Batch picking** – A 3 m put-to-light trolley behind the operator holds the zone's open orders, one shipper per position, so one presented bin serves several orders at once
- **Put to light** – The app shows the quantity to pick; one position lights at a time to show where to put it, eliminating picking errors
- **Scan to bind** – The runner scans each fresh shipper into a freed position; the system binds it to the next order and tracks completion
- **Batch optimization** – System optimizes order assignment and robot dispatch to keep all robots continuously working
- **Completed order swap** – When a position shows complete, the runner lifts the shipper onto the takeaway and places a fresh shipper of the size called; the operator keeps picking throughout

6. Server & Software

- **On-premises server** – Manages robot orchestration, bin locations, and WMS integration
- **REST API** – Secure API connects to your existing WMS, ERP, or e-commerce platform
- **Real-time inventory sync** – Product data, inventory levels, and order transactions synchronized via documented endpoints
- **Cloud redundancy** – System state backed up for disaster recovery

How It Works

1. Inventory Storage

- Products are stored in bins on standard steel racking
- Each bin is assigned a unique ID and tracked by the system
- Multiple SKUs can share a bin, or SKUs can span multiple bins
- Bins are stored at high density across multiple aisle levels

2. Order Processing Flow

1. **Orders received** – WMS sends orders to Shelfbot via API
2. **Batch optimization** – System assigns orders to the open positions on each zone's trolley and optimizes robot dispatch
3. **Shipper induction** – Runner places a fresh shipper of the size called in a freed position and scans it; the system binds it to the order
4. **Station direction** – System directs operator to next ready station
5. **Source bin delivery** – Robot delivers source bin containing required SKUs to station
6. **Sequential putting** – Put-to-light lights one shipper position at a time with the quantity needed
7. **Pick confirmation** – Operator scans the item and places it in the lit shipper position; weight verification confirms accuracy
8. **Source bin return** – Operator initiates robot return when source bin complete
9. **Order completion** – When the order is fully picked the position lights complete; the runner swaps the shipper onto the takeaway for packing and dispatch
10. **Inventory update** – System updates inventory levels and notifies WMS

3. Putaway

- **Manual putaway** – Operator scans items into bins at the station
- **Auto empty-bin flow** – System detects empty bins and routes them for putaway
- **FIFO support** – System can prioritize older inventory for picking (first-in, first-out)

4. Scaling

- **Add robots** – Increase throughput by adding more robots to existing aisles (the put-to-light trolley keeps all robots continuously working)
- **Add aisles** – Expand storage capacity by adding more racking aisles
- **Add operators** – Each operator with a put-to-light trolley can handle up to 300 bin presentations per hour
- **No system redesign required** – Scale incrementally without rebuilding infrastructure

Who These Docs Are For

Operations Managers

- Evaluating whether Shelfbot fits your operation
- Understanding throughput, storage density, and ROI
- Planning deployment timelines and operational changes

Engineers & Technical Teams

- Designing installations and integration points
- Reviewing electrical, racking, and environmental requirements
- Understanding API integration and data exchange

Electricians & Fire Consultants

- Planning electrical supply and circuit protection
- Reviewing fire safety compliance and sprinkler requirements
- Understanding safety interlocks and guarding

Procurement & Finance Teams

- Understanding capital vs. operational costs (RaaS model)
- Reviewing commercial terms and service agreements
- Planning budget allocation and payback timelines

Documentation Structure

This page and its companions ([Technical Data Sheet](#), [Safety & Compliance](#), [Integration](#), [Example Configurations](#)) are conceptual introductions. The engineering source of truth is the **published documentation** - the racking, electrical, data drive and other specifications - which is versioned and always current. Where a number here and a number in a published specification disagree, the specification wins.

What's Not Covered Here

These docs are **not** operational manuals. For day-to-day operation, training, and troubleshooting:

- **User Manual** – Operator workflows, pick/putaway procedures, and troubleshooting
- **Commissioning Manual** – Installation and commissioning procedures (provided to installers)
- **API Documentation** – Endpoint specifications, authentication, and integration guide

Next Steps

If you're evaluating Shelfbot:

- Read [Technical Data Sheet](#) to understand planning ranges
- Send us your SKU master + order history for a custom sizing ([contact us](#))
- Book a site check to verify racking, electrical, and access requirements

If you're planning an installation:

- Review [Racking Specification](#) and [Electrical Specification](#)
- Share site plans with us for validation
- Engage a fire consultant for sprinkler and compliance review

If you're integrating with your WMS:

- Review [Integration](#) for API requirements
- Confirm your WMS has documented APIs for products, inventory, and orders
- Schedule a technical integration workshop with our team

[Specs & site requirements →](#) | [Get a site check](#) | [Integration overview →](#)