Item Positioning Management System

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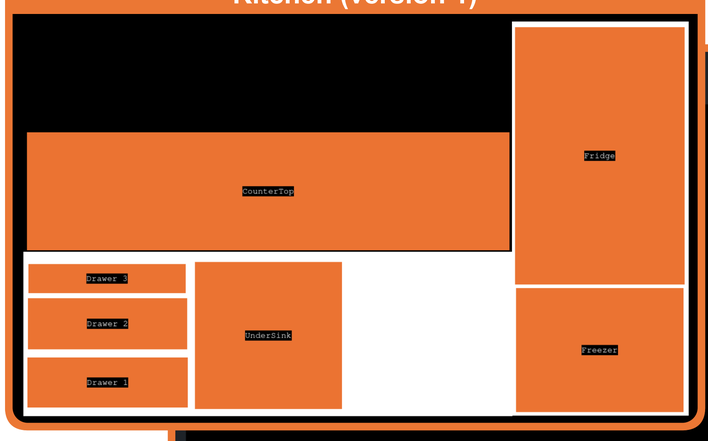
Motivation

People frequently spend unnecessary time *searching for physical items*, even in small homes or workplaces, which reduces efficiency and *causes frustration*. Most existing inventory tools provide only list-based records and offer little intuitive information about real spatial location of objects.

A visual system that *mirrors actual spaces* can make item *lookup and management* far more natural. By allowing users to recreate their floor plans and furniture, such an application could enable *fast orientation* and *easy relocation* of items without requiring intensive prior training.

Kitchen (version 1)



A4 Envelopes

	id [PK] bigint	version [PK] timestamp with time zone (6)	current boolean	deleted boolean	name character varying (255)	shape_ids bigint[]	top_down_view_id bigint
1	4	2026-02-07 03:36:19.786919+00	true	false	Palm	{23,24}	7
2	5	2026-02-07 03:42:45.390567+00	true	false	Desk With Drawers	{25,26,27}	1
3	6	2026-02-07 03:44:48.308478+00	true	false	Office Cabinet	{31}	1
4	7	2026-02-07 03:47:59.241943+00	true	false	Meeting Table	{35,36,37}	1
5	8	2026-02-07 03:56:23.130253+00	true	false	Chair	{42,43,44,45,46,47}	1
6	9	2026-02-07 04:18:31.472534+00	true	false	Circular Dining Table	{286,287,288}	2
7	10	2026-02-07 04:24:09.244117+00	true	false	4-tier Shelf	{422}	1
8	11	2026-02-07 04:35:14.165969+00	false	false	Kitchen	{501,502}	1
9	11	2026-02-07 12:27:23.811122+00	true	false	Kitchen	{659,660,661}	1

Fast Orientation

Kitchen (version 2)

Item Lookup

Item List | Search items... | 10 per page | Alphabetical (A– | Add New Item

Name ▼	ID	Category	Quantity	Description	Location	Action
A4 Envelopes	72	Office Supplies	100	Blank postal envelopes of size A4.		
A5 Envelopes	73	Office Supplies	100	Blank postal envelopes of size A5.		
Batteries	68	Electronics	20	Pack of AA and AAA batteries.		
Budget Folder	12	Documents	1	Folder with budget planning spreadsheets and pri…		
Business Cards	9	Office Supplies	1	Box of personal business cards for client meetings.		
Calculator	13	Electronics	1	Desktop calculator for quick financial estimations.		
Coffee Capsules Box	42	Consumables	1	Box containing various coffee capsules.		
Coffee Machine	43	Electronics	1	Automatic espresso machine used by employees.		
Conference Phone	1	Electronics	1	Speakerphone device used for hybrid meetings wi…		
Contract Folder	6	Documents	1	Folder containing printed contracts and confidenti…		

Previous 1 2 3 4 5 Next

Warehouse Manager

The system manages item locations through a *visual model of real spaces*. Users create floors, furniture, and reusable shapes and place items directly inside these structures. The user can subsequently *query for the location* of a selected item. The items may form a *tree hierarchy*.

The *frontend* is a browser application built with *Phaser.js* and *Bootstrap*. The *backend* consists of *Spring microservices* for shapes, furniture, floors, and items. They are accessed using an *API Gateway* with automatic service discovery. Editor functionality is implemented using *loosely coupled managers* for movement, selection, zoom, and other operations. All elements are stored as *versioned snapshots*, ensuring that edits to any element do not invalidate existing furniture or floors.

Key *implementation challenges* included the design of a *versioning schema* and extraction of editor state for persistence.

Benefits

- *Spatial representation* of inventory based on floors and furniture
- *Hierarchical modeling* of items and containers
- *Version-safe editing* without breaking existing layouts
- Support for *complex structures*
- *Realistic item movement* mirroring real-life handing

Conclusion

The system provides *visual*, *space-oriented item management*, allowing users to manage floors and furniture and organize items directly within the structures. *Hierarchical organization* enables users to locate objects without prior knowledge of the environment. The versioned data model ensures safe and *consistent evolution* of shapes and furniture.

Future work could include *multi-user collaboration*, improved item management, and alternative methods for moving items.

Image source: https://ware2go.co/articles/warehouse-management-systems/