

Interactive Dashboard: Superstore Case Study

Build a complete, interactive sales dashboard from the Superstore data, from business questions and KPIs to pivot charts, slicers, a timeline, KPI cards and a dynamic title. Then protect it (sheet, workbook, allowed ranges), document it with comments and notes, and audit formulas with Evaluate Formula.

● Live classes 8–9

✦ Excel for Microsoft 365, 2026

Intermediate–Advanced

🕒 150 min

By the end of this lesson you can

- Turn a business brief into KPIs and questions before building anything
- Prepare data, create one pivot per visual and connect them with slicers and a timeline
- Build KPI cards and a dynamic title with GETPIVOTDATA and TEXT
- Lay out a clean dashboard and apply design rules
- Protect sheets and workbooks, use comments and notes, and audit formulas with Evaluate Formula

Datasets used

`superstore_sales.csv`

The brief

CASE STUDY Superstore sales review

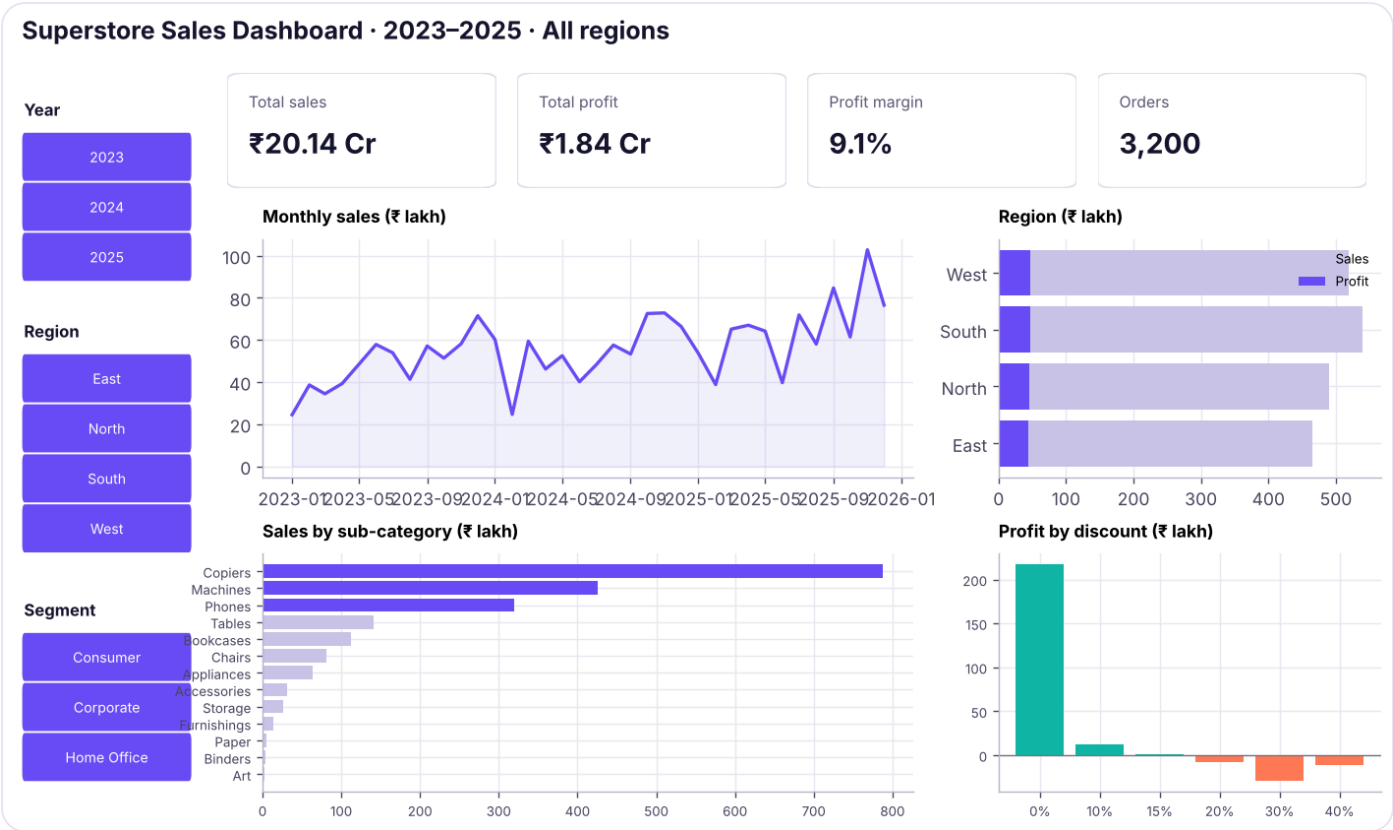
The Head of Sales wants a one-page Excel dashboard to review performance for 2023–2025. They want to see, at a glance: total sales, profit, profit margin and orders; how sales are trending; which regions, categories and sub-categories perform best and worst; and the effect of discounts on profit. They want to filter by year, region and segment. The dashboard will be emailed every month, so it must be protected against accidental changes.

Step 0: questions and KPIs first

KPI / question	Calculation	Visual
Total sales	Sum of sales	KPI card
Total profit and margin	Sum of profit; profit ÷ sales	KPI cards
Number of orders	Distinct count of order_id	KPI card
Sales trend	Sales by month	Line chart
Regional performance	Sales and profit by region	Bar chart
Product mix	Sales by category and sub-category	Bar chart / treemap
Discount impact	Profit by discount level	Column chart
Filters	Year, Region, Segment	Timeline + slicers

Agreeing on this table before building saves hours of rework. It is also your "requirements document" in interviews.

Here is the finished result we are aiming for (drawn from the real data):



The finished Superstore dashboard: KPI cards on top, trend and breakdown charts below, slicers on the left.

Step 1: prepare the data

1. Import `superstore_sales.csv` with **Data → From Text/CSV** (Power Query, Lesson 12), or open it and convert the range to a Table named `tblSales` (`Ctrl + T`).
2. Add helper columns that the pivots will need:

Column	Formula (structured reference)	Why
year	=YEAR([@order_date])	Year slicer (or use a Timeline)
month	=TEXT([@order_date], "mmm")	Labels
margin	=[@profit]/[@sales]	Row-level margin for analysis
discount_band	=IFS([@discount]=0, "0%", [@discount] ≤ 0.2, "1-20%", TRUE, ">20%")	Simpler grouping
days_to_ship	=[@ship_date] - [@order_date]	Operations KPI

3. Check data quality: blanks (`COUNTBLANK`), duplicates of `row_id` , negative quantities, dates outside 2023–2025.

Python

```
s.describe(include="all").T[["count", "unique", "min", "max"]].head(12)
```

OUTPUT

	count	unique	min	max
row_id	6,323	NaN	1	6,323
order_id	6323	3200	NaN	NaN
order_date	6323	NaN	2023-01-01	2025-12-31
ship_date	6323	1040	NaN	NaN
ship_mode	6323	4	NaN	NaN
customer_id	6323	785	NaN	NaN
customer_name	6323	424	NaN	NaN
segment	6323	3	NaN	NaN
city	6323	16	NaN	NaN
state	6323	15	NaN	NaN
region	6323	4	NaN	NaN
product_id	6323	78	NaN	NaN

12 rows × 4 columns

Step 2: one pivot table per visual

Create a sheet called **Calc** (it will be hidden later). Insert one pivot table for each chart, all from `tblSales` so they share **one pivot cache**:

Pivot	Rows	Values	Notes
P1 KPIs	(none)	Sum of sales, Sum of profit, Distinct count of order_id	Tick "Add this data to the Data Model" to get Distinct Count
P2 Trend	order_date grouped by Years + Months	Sum of sales	Line chart
P3 Region	region	Sum of sales, Sum of profit	Bar chart
P4 Sub-category	sub_category	Sum of sales (sorted)	Bar chart
P5 Discount	discount	Sum of profit	Column chart

Give each pivot a meaningful name (PivotTable Analyze → PivotTable Name: ptTrend, ptRegion ...). Names make GETPIVOTDATA formulas and maintenance easier.

Step 3: pivot charts

Click each pivot → PivotTable Analyze → **PivotChart** → choose the type → cut and paste the chart onto a sheet called **Dashboard**.

Clean each chart:

- Right-click the field buttons → **Hide All Field Buttons on Chart**.
- Delete gridlines and legends that are not needed; add data labels where there are few bars.
- Apply the same font and a two-colour palette (one highlight, one neutral).
- Write insight titles, for example "Technology drives most sales" or "Discounts above 20% destroy profit".

Step 4: slicers and a timeline that control everything

1. Select any pivot → PivotTable Analyze → **Insert Slicer** → tick region and segment.
2. **Insert Timeline** → order_date → switch the timeline to **YEARS**.
3. Right-click each slicer → **Report Connections** → tick **all five** pivots. Now one click filters every chart and KPI.
4. Format slicers: Slicer tab → Columns = 1 or 2, a matching style, size them to align with the grid.

WATCH OUT Report Connections are greyed out?

Slicers can only connect pivots that share the same pivot cache (or the same Data Model). If you built a pivot from a different range, rebuild it from tblSales.

Step 5: KPI cards and a dynamic title

KPI cards are simply cells or shapes linked to the KPI pivot. GETPIVOTDATA keeps returning the right number even when slicers change the pivot.

X Calc sheet: KPI formulas (values shown for the unfiltered data)

	A	B	C
1	KPI	Formula	Value
2	Total sales	=GETPIVOTDATA("Sum of sales",Calc!\$A\$3)	201,413,569
3	Total profit	=GETPIVOTDATA("Sum of profit",Calc!\$A\$3)	18,352,164
4	Profit margin	=C3/C2	9.1%
5	Orders	=GETPIVOTDATA("Distinct Count of order_id",Calc!\$A\$3)	3,200
6	Sales label	="₹"&TEXT(C2/10^7,"0.00")&" Cr"	₹20.14 Cr

C4 =C3/C2

C6 ="₹"&TEXT(C2/10^7,"0.00")&" Cr"

Let's verify these numbers with pandas:

Python

```
print(f"Sales : {s.sales.sum():,.0f}")
print(f"Profit : {s.profit.sum():,.0f}")
print(f"Margin : {s.profit.sum() / s.sales.sum():.1%}")
print(f"Orders : {s.order_id.nunique():,}")
```

OUTPUT

```
Sales : 201,413,569
Profit : 18,352,164
Margin : 9.1%
Orders : 3,200
```

To show a KPI card on the dashboard: Insert → Shapes → Rounded Rectangle, click the shape, type =Calc!C6 in the **formula bar**, and press Enter. The shape now displays the live value.

Dynamic title: build the title text in a cell and link a text box to it:

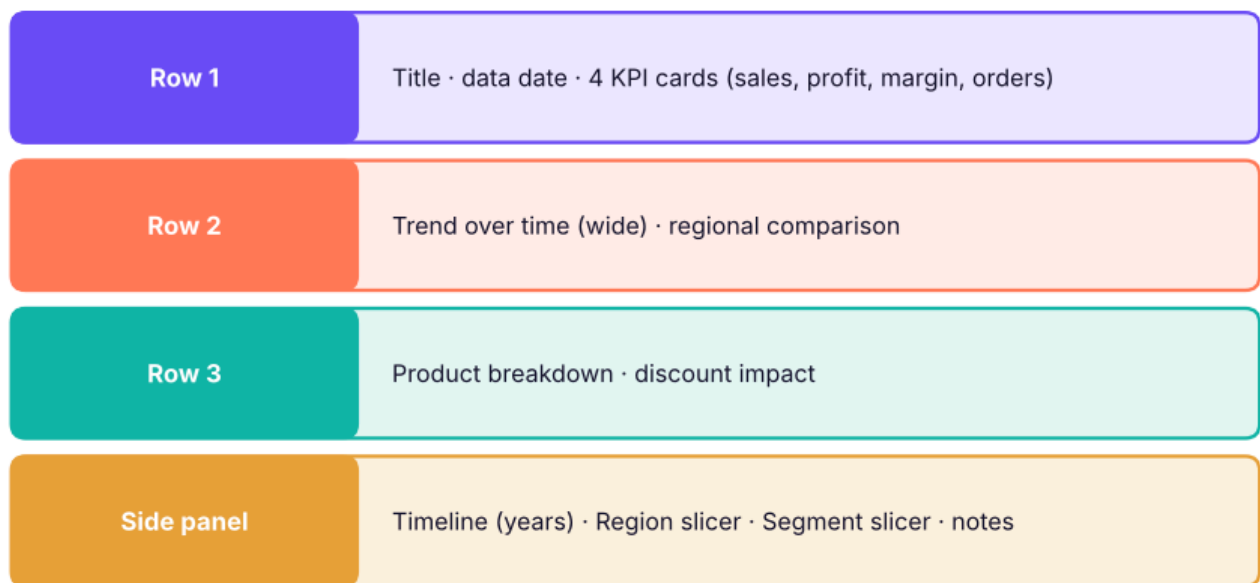
Excel formula

```
= "Superstore Sales Dashboard · " & TEXTJOIN(", ", TRUE, Calc!H2:H5)
```

where H2:H5 is a small pivot with region in Rows that is also connected to the slicers, so it lists only the selected regions.

Step 6: layout and design rules

Dashboard layout



A simple dashboard grid. Most important information top-left; filters on one side; consistent spacing.

1. **Z-pattern:** people read top-left first: put the headline KPIs there.
2. **Align to the grid:** hold **Alt** while dragging or resizing a chart to snap it to cell borders; set every chart to the same height.
3. **Limit colours:** one brand colour, one highlight, red only for bad news.
4. **Remove clutter:** View → untick Gridlines and Headings; hide the Calc sheet (right-click tab → Hide).
5. **Label the date and the source:** "Data: Superstore orders, Jan 2023 – Dec 2025. Refreshed 05-Jan-2026."
6. **Test it:** click every slicer combination; check that totals match the raw data.

Step 7: protect the dashboard

Protection	Where	What it does
Lock / unlock cells	Ctrl + 1 → Protection → Locked	All cells are locked by default; unlock the input cells users may change. Locking only takes effect when the sheet is protected
Hide formulas	Ctrl + 1 → Protection → Hidden	Formula bar shows nothing for those cells once the sheet is protected
Protect Sheet	Review → Protect Sheet	Prevents editing locked cells; tick what users may still do: Use PivotTable & PivotChart, Edit objects (needed for slicers), sort, filter, format
Allow Edit Ranges	Review → Allow Edit Ranges	Lets specific ranges be edited, optionally with their own password
Protect Workbook	Review → Protect Workbook	Protects the structure : no adding, deleting, renaming, moving or unhiding sheets
Encrypt with password	File → Info → Protect Workbook → Encrypt	Password needed to open the file
Mark as Final	File → Info → Protect Workbook	A read-only hint (not security)

STEP BY STEP Protect so slicers still work

1. Unlock any cells users need to type in (for example a target input).
2. Review → **Protect Sheet** → tick "Select unlocked cells", "Use PivotTable & PivotChart" and "Edit objects" → set a password.
3. Review → **Protect Workbook** (structure) so the hidden Calc sheet cannot be unhidden.
4. Test with a colleague before emailing.

WATCH OUT Sheet protection is not strong security

Sheet and structure passwords stop accidents, not determined users. Never rely on them to protect confidential data: use file encryption, SharePoint permissions or share only what is needed (for example a PDF export).

Comments and notes

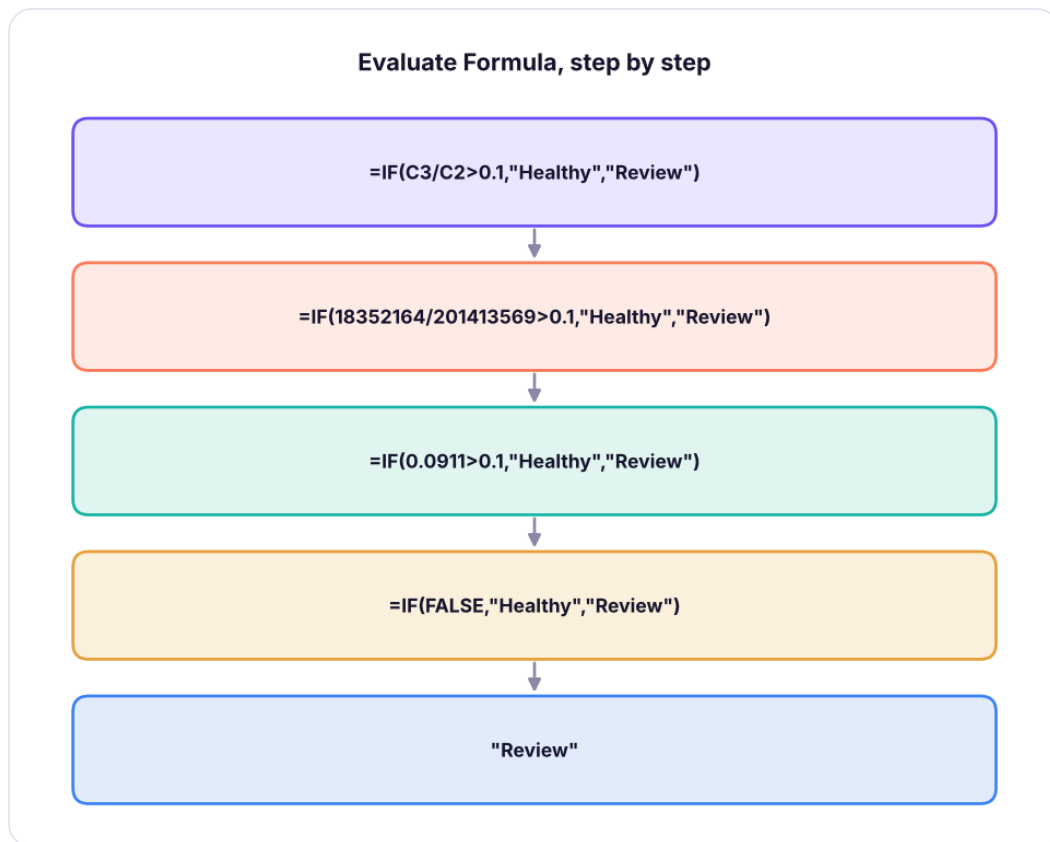
Feature	Insert	Use
Note (old "comment")	Review → Notes → New Note (Shift + F2)	A sticky note explaining a cell: "Target approved by CFO on 12-Jan"
Comment (threaded)	Review → New Comment (Ctrl + Alt + M)	A conversation: @mention a colleague, reply, resolve

Notes are best for permanent documentation; comments for review discussions. Add a small **"How to use"** note on the dashboard explaining the slicers and data date.

Auditing formulas: Evaluate Formula and friends

When a KPI looks wrong, use **Formulas → Formula Auditing**:

Tool	What it shows
Evaluate Formula	Steps through a formula one calculation at a time: press Evaluate to see each part replaced by its value
Trace Precedents / Dependents	Arrows to the cells a formula uses, or that use it
Show Formulas (Ctrl + `)	Every formula instead of its result
Error Checking	Walks through cells with errors and suggests fixes
Watch Window	Keeps an eye on key cells while you work elsewhere
F9 inside the formula bar	Select part of a formula and press F9 to see its value (press Esc to undo)



Evaluate Formula replaces one part at a time until only the result remains.

Delivering the dashboard

- **Refresh:** Data → Refresh All before sending.
- **Export:** File → Export → PDF (select the Dashboard sheet, landscape, fit to one page) for people who only need to read it.
- **Share live:** save to OneDrive/SharePoint and share a link; viewers can use slicers in Excel for the web.
- **Automate:** Power Query + Refresh All, or Office Scripts / Power Automate to refresh and email on a schedule.

DO IT WITH AI Do it with AI

Copilot in Excel can draft the analysis: *"Summarise sales and profit by region and category, identify the three biggest loss-making sub-categories, and suggest charts for a dashboard."* Use its suggestions as a starting point, then build the final dashboard deliberately: you are responsible for every number on it.

Insights from the case

Python

```
sub = s.groupby("sub_category")[["sales", "profit"]].sum()
sub["margin"] = (sub.profit / sub.sales * 100).round(1)
print("Loss-making sub-categories:\n", sub[sub.profit < 0].round(0).to_string())
disc = s.groupby(pd.cut(s.discount, [-0.01, 0, 0.2, 1], labels=["0%", "1-20%", ">20%"]),
observed=False)[["sales", "profit"]].sum()
disc["margin %"] = (disc.profit / disc.sales * 100).round(1)
print("\nMargin by discount band:\n", disc.round(0).to_string())
```

OUTPUT

Loss-making sub-categories:

	sales	profit	margin
sub_category			
Bookcases	11274848.0	-422786.0	-4.0
Tables	14046224.0	-816042.0	-6.0

Margin by discount band:

	sales	profit	margin %
discount			
0%	123936290.0	21718963.0	18.0
1-20%	57729097.0	697141.0	1.0
>20%	19748182.0	-4063940.0	-21.0

A good dashboard closes with 3–4 written insights, for example:

1. Technology generates about three quarters of sales and most of the profit; furniture is unprofitable overall.
2. Tables and Bookcases lose money; both are heavily discounted.
3. Order lines with discounts above 20% lose money almost every time: review the discount policy.
4. Sales peak every October–December (festive season); plan stock and staffing accordingly.

Summary

KEY TAKEAWAYS

- Start with the brief, KPIs and questions; then data prep; then one pivot per visual.
- Build all pivots from one Table so they share a cache and can be connected to slicers and a timeline (Report Connections).
- KPI cards use GETPIVOTDATA; shapes can display a cell's value by typing =Cell in the formula bar.
- Design: top-left headline KPIs, aligned grid, few colours, insight titles, data date and source.
- Protect: unlock inputs, Protect Sheet (allow PivotTables and objects), Protect Workbook structure; use encryption for real security.
- Audit with Evaluate Formula, Trace Precedents/Dependents, Show Formulas and the Watch Window.

Quick quiz

6 questions · tap an answer to check it

1. Why should all dashboard pivots be built from the same Table?

- A** It makes the file smaller only
- B** So they share one pivot cache and can all be connected to the same slicers
- C** Pivot charts require it
- D** It is needed for conditional formatting

Answer: B. Slicers can only control pivots that share a cache (or data model).

2. After protecting the sheet, slicers stop working. What did you forget?

- A To unlock the slicer cells
- B To allow "Use PivotTable & PivotChart" and "Edit objects" in Protect Sheet**
- C To protect the workbook structure
- D To refresh the pivots

Answer: B. Slicers are objects that change pivots, so both permissions must be allowed.

3. Which tool lets you see each step of a complex formula's calculation?

- A Trace Dependents
- B Evaluate Formula**
- C Watch Window
- D Name Manager

Answer: B. Evaluate Formula replaces one part at a time with its value.

4. What does Protect Workbook (structure) prevent?

- A Opening the file without a password
- B Editing any cell
- C Adding, deleting, renaming, moving, hiding or unhiding sheets**
- D Using slicers

Answer: C. Structure protection guards the sheets, not the cells.

5. How do you count distinct orders in a pivot table?

- A** Count of order_id
- B** Add the data to the Data Model and use Distinct Count
- C** Sum of order_id
- D** Use a calculated field

Answer: B. Distinct Count is available only for Data Model pivots.

6. What is the difference between a note and a comment in Microsoft 365?

- A** Notes are simple sticky notes; comments are threaded conversations with replies and mentions
- B** They are identical
- C** Comments cannot be printed
- D** Notes can only be added to formulas

Answer: A. Use notes for documentation and comments for review discussions.

EXERCISE Build it yourself

Build the dashboard in this lesson from `superstore_sales.csv`. Then add: (1) a **Ship mode** slicer; (2) a KPI card for **average days to ship**; (3) a chart of the top 10 customers by sales that responds to all slicers; (4) sheet protection that still allows slicers.

Show solution (worked answer)

(1) Insert Slicer → ship_mode → Report Connections → all pivots. (2) Add days_to_ship to tblSales; add Average of days_to_ship to the KPI pivot; link a shape to its GETPIVOTDATA cell. (3) New pivot from tblSales: Rows customer_name, Values Sum of sales, Value Filter Top 10; PivotChart (bar); connect to the slicers. (4) Review → Protect Sheet with "Use PivotTable & PivotChart" and "Edit objects" ticked; protect workbook structure.

INTERVIEW CORNER Questions you may be asked

Q: Walk me through how you would build an Excel dashboard. Clarify the audience and questions; define KPIs; clean and structure the data as a Table; create one pivot per visual; build pivot charts; connect slicers and a timeline; add KPI cards with GETPIVOTDATA; design the layout; validate numbers against the source; protect and share.

Q: How do you make sure dashboard numbers are correct? Reconcile totals with the raw data (SUM vs pivot), test filters, check distinct counts, use Evaluate Formula and trace precedents for KPI formulas, and have a second person review.

Q: Excel dashboard or Power BI? Excel for small data, quick turnaround and audiences who live in Excel; Power BI for larger data, many users, scheduled refresh, row-level security and richer interactivity.

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