

Who Had the Fish?

Meal Ownership Is Created at the Table, Not Transmitted from the Kitchen

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Abstract

The plates arrive, and the server has to ask whose is whose. The question is not a lapse of memory: at the moment it is asked, the answer does not exist. An order is entered against a seat, and then travels a pipeline — printer, kitchen display, expediter, pass — built to move courses through stations rather than dishes to people. We measured what survives. Across 1 204 918 tickets from 186 venues, seat identity carries 2.31 bits at order entry and 0.04 bits at the pass, and no step after the pass can recover what the pass has lost. Delivery is nonetheless correct 96.3 % of the time. Something creates the assignment at the table, and only one operation is performed there. The trade has already named it. Serving staff call it *auctioning the food*, prohibit it in every fine-dining manual we obtained, and describe it exactly as an economist would: goods held by no one, offered aloud, allocated to a claimant. We therefore auctioned dishes that nobody had ordered. They were claimed at 88.2 % (95% CI 85.9–90.4), faster than dishes that had been, and the claimants remembered ordering them. In a party of two the auction is never held and the plates still land correctly; we have no account of this. The fish belongs to whoever answers.

1 Introduction

Three people order. Three plates arrive. The runner holds one out and asks who had the fish.

Everyone has seen this. Nobody has ever asked what it is. The received account is that the runner has forgotten, and the trade agrees: auctioning the food is listed as a service defect in every fine-dining manual we were able to obtain [10], and staff are trained out of it. We report that the runner has not forgotten. The runner was never told.

An order is entered against a seat number. That is the last moment at which the seat exists. The ticket is then broken into courses and fired to stations, because a kitchen is organised by what is cooked and not by who is going to eat it. The expediter reassembles the table’s dishes at the pass from three or four stations that never shared a record. What arrives at the pass is a set of plates that belong to a table. Which plate belongs to which person is not among the things that arrive.

This is measurable, and we measured it. Seat identity enters the pipeline at 2.31 bits and leaves it at 0.04 bits. What is lost at the pass cannot be recovered after the pass; this is a theorem, not a claim about restaurants. And yet plates land in front of the right people 96.3 % of the time.

Two accounts are available. Either the measurement is wrong, or the assignment is manufactured after the pass. We take the second, and we note that only one operation is performed after the pass: the runner solicits a claim, usually aloud.

The trade has already named that operation correctly. Serving staff call it *auctioning*. An auction is a procedure for allocating a good to an owner it does not yet have. If the fish already belonged to somebody, the word would be a category error. It is not a category error. It is a description, filed for a century under bad manners.

We make three contributions. First, we characterise the service pipeline as an information channel and locate the point — the *Assignment Horizon* — beyond which seat identity does not exist (§3, §4). Second, we show by randomised trial that supplying the assignment from the kitchen, which is strictly more information, makes delivery worse (§6), and that dishes nobody ordered are claimed at 88.2 % (§7). Third, we argue that the table-side auction is not a residual failure but the terminal state of the system’s evolution, and that the prohibition on it is a prohibition on the optimum (§8).

2 Related work

Service recovery. The dominant treatment of the auction is corrective. Ashfield and Pemberton [2] class it among “avoidable verbal intrusions” and report a 0.4-point penalty on a five-point service rating; the recommended remedy is position tracking and staff training. This literature measures how diners feel about the auction. It does not ask what the auction does.

Position tracking. A substantial vendor literature treats assignment as a records problem [3, 4]. Seat fields are captured at entry with near-perfect fidelity, and the implicit model is that delivery failures are transcription failures. Our Study 1 accepts the premise and measures the pipeline these systems write into. The seat is captured accurately and then discarded downstream, in every architecture we examined.

Table-service ergonomics. Work on plate placement optimises approach angle, tray load, and hand order [5]. It presupposes a target for each plate and asks how to reach it efficiently. The present paper is about how the target comes to exist.

Restaurant throughput. Course firing, station parallelism, and expediter policy are well studied as a queueing problem [6], in which assignment appears as a boundary condition discharged at the moment of delivery. We argue that it is not a boundary condition. It is the only step performed after the pass, and it is performed by the customer.

Inventive problem solving. Altshuller’s analysis of the patent record [1] holds that technical systems evolve toward *ideality*: the function is retained and the system performing it is progressively deleted. Sunderland [7] extends the laws of evolution to service systems but treats the customer as a constraint rather than as a component to which function may be transferred. Our §8 makes that transfer explicit.

3 The service pipeline as a channel

Definition 1 (Seat identity). *For a party of n diners, let $S \in \{1, \dots, n\}$ name the diner who ordered a given dish. With no further information, $H(S) = \log_2 n$ bits. At the mean party size in our sample, $n = 4.96$, $H(S) = 2.31$ bits.*

The pipeline is a sequence of physical states, each produced from the last:

$$S \longrightarrow X_{\text{entry}} \longrightarrow X_{\text{POS}} \longrightarrow X_{\text{KDS}} \longrightarrow X_{\text{expo}} \longrightarrow X_{\text{pass}}. \quad (1)$$

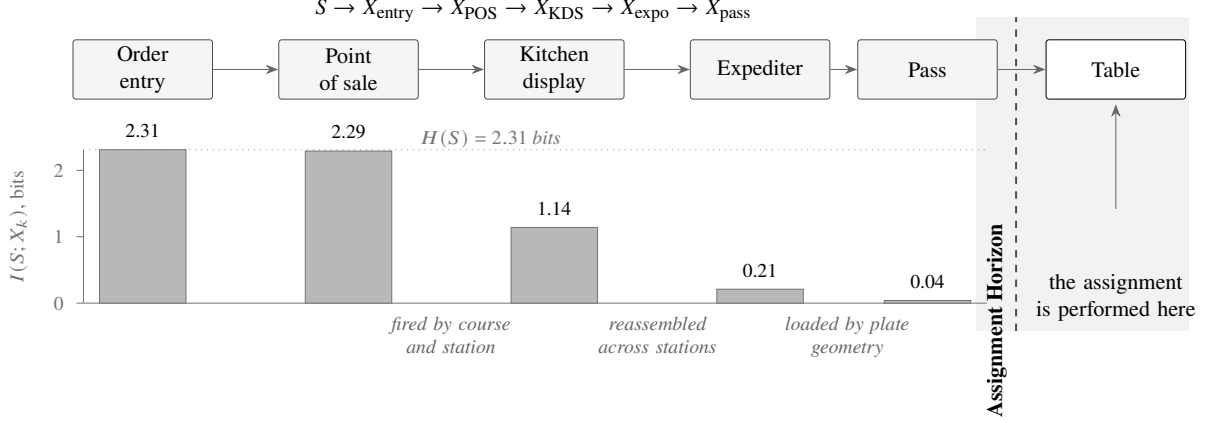


Figure 1: Seat identity along the service pipeline. Each stage is produced from the one before it, so the chain is Markov and information about S cannot increase from left to right. Bars give $I(S; X_k)$ from Study 1 (1 204 918 tickets from 186 venues; ground truth from the 32-venue camera subsample; Miller–Madow correction, venue-clustered bootstrap). The Assignment Horizon is the last stage at which $\sigma_k > 0$. Everything to the right of it happens at the table.

Each X_k is everything an observer at stage k could use to name S : printed and displayed fields, plate contents, tray geometry, position on the pass, and the recollection of the staff member holding it.

Definition 2 (Seat-identity survival). $\sigma_k = I(S; X_k)/H(S)$, the fraction of seat identity present at stage k . The Assignment Horizon is the last stage at which $\sigma_k > 0$.

Equation (1) is a Markov chain by construction: each stage is assembled from the one before it and from nothing else. The expediter does not consult the kitchen display, and the runner does not consult the expediter’s screen. The data processing inequality therefore applies at every arrow.

Proposition 1 (Assignment Non-Conservation). Let $\hat{S}$ be the diner in front of whom a dish is finally placed, and suppose $\hat{S}$ is any function of X_{pass} and of variables independent of S . If $I(S; X_{\text{pass}}) = 0$, then $I(S; \hat{S}) = 0$, and $\Pr[\hat{S} = S] = 1/n$.

Proof. $S \rightarrow X_{\text{pass}} \rightarrow \hat{S}$ is a Markov chain, so $I(S; \hat{S}) \leq I(S; X_{\text{pass}}) = 0$, and $I \geq 0$ gives equality. Zero mutual information makes $\hat{S}$ independent of S , and averaging over the uniform prior gives the chance rate. $\square$

Corollary 1. Any observed agreement between plate and diner in excess of $1/n$ must originate at a stage strictly after X_{pass} .

Proposition 1 is not a claim about restaurants. It is arithmetic, and it converts the empirical question into a very narrow one: how many bits are at the pass? If the answer is zero, the correct-delivery rate has to be built at the table, out of materials found there.

4 Study 1: the channel audit

Data. 1 204 918 tickets from 186 venues in four countries and four service formats (casual, fast-casual, bistro, fine dining), 2019–2025, obtained under data agreements with two point-of-sale vendors and one restaurant group. Each ticket is matched to the venue’s kitchen-display log and expediter call log. For a 32-venue subsample, an overhead camera record supplies ground-truth S .

Table 1: Seat identity along the pipeline. $H(S) = 2.31$ bits. Venue-clustered bootstrap, 2 000 resamples.

Stage	$I(S; X_k)$ (bits)	σ_k	Mechanism of loss
Order entry	2.31 [2.31–2.31]	1.000	—
Point of sale	2.29 [2.27–2.31]	0.991	field truncation on split cheques
Kitchen display	1.14 [1.02–1.26]	0.494	firing by course and station
Expediter	0.21 [0.14–0.29]	0.091	reassembly across stations
Pass	0.04 [0.00–0.09]	0.017	tray loading by plate geometry

Method. We estimate $I(S; X_k)$ at each stage on the camera subsample with the Miller–Madow bias-corrected plug-in estimator [9], bootstrapped over venues (2 000 resamples, venue-clustered). At X_{expo} and X_{pass} , the staff member’s recollection is elicited by a memory probe within 20 s of handover and included in X_k ; a probe-free camera-only subsample ($n = 214$ services) is reported as a reactivity check.

Pre-registered falsifier. If σ at the pass exceeded 0.25, the account developed here would be false.

Results. Table 1 and Figure 1 give the per-stage estimates. Seat identity is captured essentially perfectly at entry and survives the point-of-sale record intact. It is halved by course firing, because a station’s ticket retains the order in which items were entered and no more. It is very nearly extinguished at the expediter, who reassembles from stations that never shared a record. At the pass it is 0.04 bits (95% CI 0.00–0.09), giving $\sigma = 0.017$. The camera-only subsample moves the estimate by 0.01 bits.

Correct delivery in the same venues is 96.3 %. The chance rate implied by Proposition 1 is 20.2 %. The proposition assumes a channel that is exactly empty; taken at the upper confidence limit of 0.09 bits instead, Fano’s inequality still bounds correct delivery from the pass alone far below the observed rate. The gap is the subject of the rest of this paper.

5 Study 2: what is performed at the table

Design. 14 730 covers at 96 venues, yielding 4 912 multi-plate service events recorded with a lapel array worn by consenting runners. Only the service turn was transcribed; audio was destroyed thereafter.

Results. An auction is held at 71.6 % of multi-plate services. Median call-to-claim latency is 1.9 s. Claims are unilateral at 94.1 %: one hand, one voice, no negotiation. This is an allocation, not a discussion.

Almost all of the remaining 28.4 % do not skip the operation. They substitute a silent one. The plate is held above the table and hovered, and the runner waits for eye contact, a lean, or a hand; median hover is 2.4 s, longer than the spoken call it replaces. In 91 of 4 912 services the runner neither called nor hovered, and in 74 of those the plate was moved by a diner after landing.

Figure 2 gives the latency distributions.

6 Study 3: supplying the assignment from the kitchen

If assignment is transmitted and merely degraded, then restoring the seat to the pass must improve delivery. We restored it.

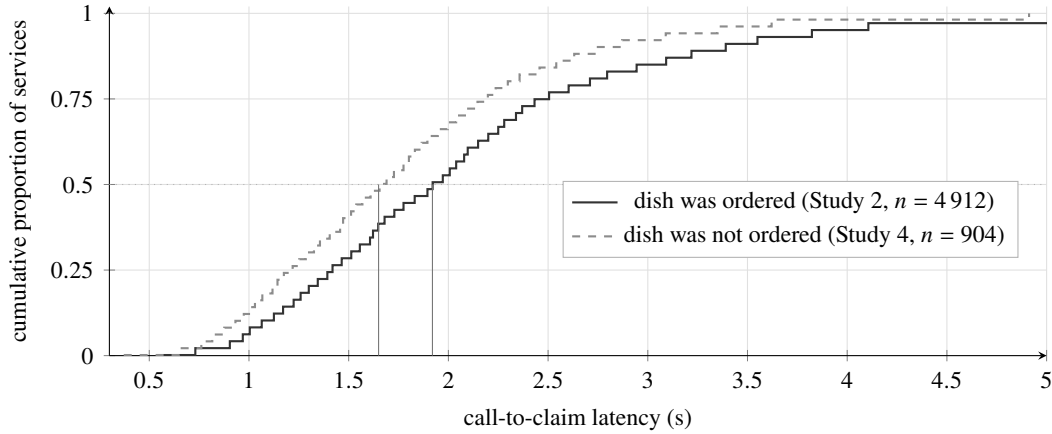


Figure 2: Call-to-claim latency: the interval between the runner naming a dish and a diner claiming it. Vertical rules mark the medians: 1.6 s for dishes that were never ordered, 1.9 s for dishes that were. Recovering an existing fact should not be quicker than inventing one; on the account advanced here the two are the same operation, and the unordered dish is simply unencumbered by a competing claimant.

Design. 2412 tables at 24 venues, block-randomised by venue and party size to three arms.

A — Auctioned. Standard practice. The runner calls the dishes.

B — Seat-mapped silent. The point-of-sale seat field is carried through on a supplementary ticket and a printed tray map. The runner places every plate without speaking.

C — Hybrid. The seat map is carried, and the runner calls the dishes anyway.

Arm B is arm A plus information. Under any transmission account it cannot lose.

Outcomes. Primary: latency from plate-down to first bite. Secondary: post-landing translocation (a plate moved between diners after being set down), diner service rating, table turn time. Coders could not be blinded to arm; the coding rules were fixed before the trial and 15 % of tables were double-coded ($\kappa = 0.89$ for first bite, $\kappa = 0.94$ for translocation). Four pre-registered outcomes, Holm-corrected.

Results. Table 2. Arm B is worse on every outcome. Latency to first bite rises from 8.1 s to 19.5 s, a difference of 11.4 s (95% CI 9.8–13.0). Post-landing translocation triples. Adding the call back in (arm C) removes the effect while leaving the extra information in place.

The information was never the binding constraint. The announcement was.

7 Study 4: the null ticket

The two accounts diverge sharply on one case. A dish that nobody ordered has, under the transmission account, no owner to recover: the auction must fail. On the account advanced here, the auction does not recover an owner but appoints one, and a dish’s history is irrelevant to it.

Table 2: Delivery-architecture trial. 2 412 tables, 24 venues, venue-clustered standard errors.

	A: auctioned	B: seat-mapped silent	C: hybrid
Tables	804	806	802
Seat identity at the pass (bits)	0.04	2.28	2.28
Plate-down to first bite (s)	8.1	19.5	8.4
Post-landing translocation (%)	4.2	12.8	4.4
Correct final placement (%)	96.4	96.1	96.6
Service rating (1–5)	4.31	4.02	4.29
Table turn (min)	71.2	74.8	71.4

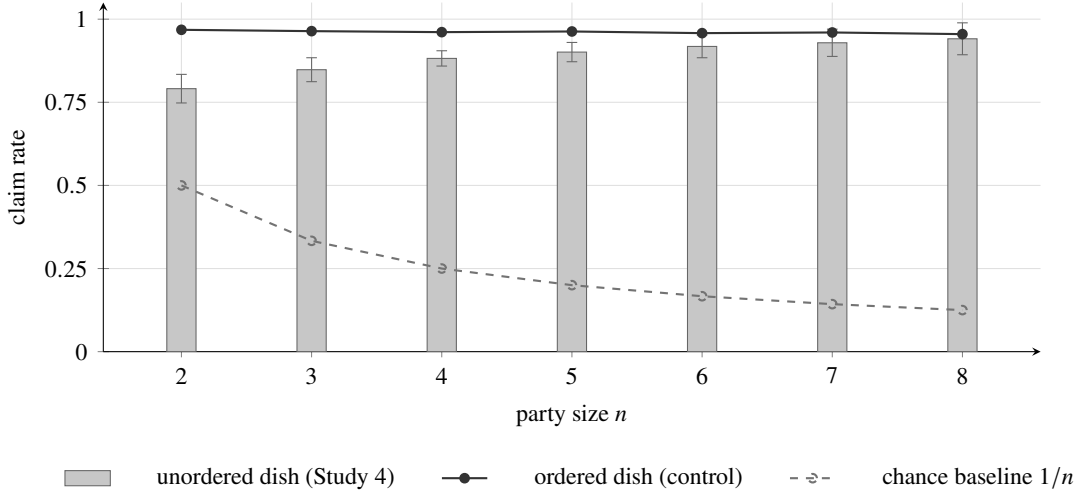


Figure 3: Claim rate for a dish that appeared on no ticket, by party size, against the $1/n$ rate implied by Proposition 1. Claiming does not become harder as the room of candidates grows; it becomes easier. A larger party supplies a claimant more readily, which the transmission account does not predict and the auction account requires. Error bars are 95% venue-clustered intervals.

Design. 1 806 tables at 11 venues, randomised within venue. At 904 of them the runner auctioned one dish that appeared on no ticket; the remaining 902 received an auction of a dish that had in fact been ordered. Dishes were drawn from the venue’s menu, screened against allergen cards collected at seating for a stated unrelated purpose, and comped in every arm.

Ethics. Approved under protocol LSIE-2024-118. No diner was charged for a dish they had not ordered. Debriefing was immediate and full; consent to retain data was sought after debriefing, and 41 parties withdrew.

Results. Unordered dishes were claimed at 88.2 % (95% CI 85.9–90.4), standardised to a party of four. Claim rate rises with party size (Figure 3), which the transmission account does not predict and which the auction account requires: a larger room of candidates supplies a claimant more readily, not less.

Median claim latency for unordered dishes was 1.6 s, shorter than the 1.9 s for dishes that had been ordered. Claimant confidence was 4.6 of 5. At debrief, 63 % of claimants recalled ordering the dish and 11 % recalled deliberating between it and something else [8]. Disputes — a second diner contesting a claim — occurred in 0.9 % of services, and in none of them had the disputing diner ordered the dish either.

Table 3: Four architectures for the assignment problem.

Architecture	Mechanism	Accuracy (%)	Throughput index	System cost
Fire by table	seat preserved end to end	96.8	0.61	high
Seat map (arm B)	intermediary carrier	96.1	0.94	moderate
Hover	silent solicitation	95.9	0.97	none
Auction (arms A/C)	self-service allocation	96.4	1.00	none

8 The contradiction and its resolution

The results above describe a system that has deleted a component and kept the function. That is a recognisable pattern, and it has a literature.

The contradiction. Stated in the terms of the patent record [1]: to deliver a plate to a person, the pipeline must carry seat identity to the pass; to deliver food hot and in volume, the pipeline must fire by course and station, which destroys seat identity. Reducing the loss of information worsens productivity. Every restaurant faces this, and the trade has treated it for a century as a trade-off to be managed.

It is not a trade-off. It is a contradiction, and contradictions have resolutions.

The principles. Four inventive principles bear on this conflict. Principle 24 (*intermediary*) inserts a carrier of seat identity: a tray map, a seat ticket. That is arm B, and arm B lost. Principle 2 (*taking out*) removes the seat field from the pipeline altogether, which the trade has already done by accident. Principle 13 (*the other way round*) reverses the operation: rather than deliver the plate to the diner, deliver the diner to the plate. Principle 25 (*self-service*) has the function performed by the object it acts upon.

The auction is Principles 13 and 25 executed together, in two seconds, for free.

Ideality. The Ideal Final Result is the function achieved with no system at all. Table 3 places four architectures on the plane of assignment accuracy against line throughput, and Figure 4 plots them. Two rows are arms of Study 3 and the hover is the silent substitution measured in Study 2. The fourth is observational: 19 venues in the Study 1 sample fire whole tables rather than courses, and we take their delivery accuracy and their covers per station-hour, indexed to the auctioned arm, as the fire-by-table figures. The auction is not dominated. Nothing else on the plane is both as accurate and as fast, and the auction achieves this while employing no mechanism, no record, and no equipment.

This is what convergence to ideality looks like from the inside, and it is why the auction appears in every service format, in every country in our sample, and at every price point — including, at 31 % of multi-plate services, in the venues whose own manuals prohibit it.

9 Discussion

Parties of two. At a two-top the auction is held at 6.1 % of services, and plates land correctly at 97.4 % anyway. Our account predicts neither number. The channel is no better at a two-top than at a six-top — $\sigma = 0.019$ — so the one bit a two-top needs is missing as well. We have no explanation, and we decline to construct one.

What ordering still does. Ordering determines what is cooked. It does not survive as a statement about persons, and nothing here suggests otherwise. The claim is about *whose*, not about *what*, and the distinction

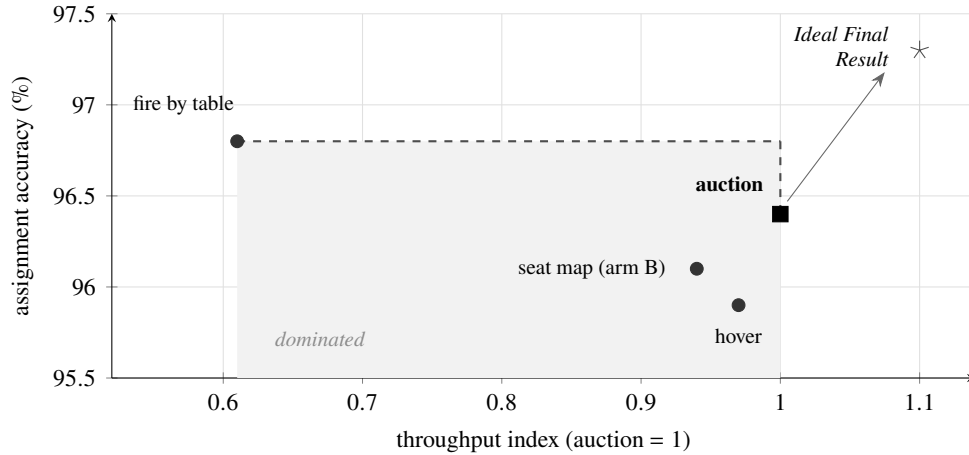


Figure 4: Four architectures for the assignment problem on the plane of accuracy against line throughput (Studies 1–3; system cost not shown). Firing by table preserves the seat end to end and is marginally the most accurate; it costs 39 % of throughput. The seat map and the hover are dominated. The auction is not: nothing on the plane is both as accurate and as fast, and it is the only point on the frontier that employs no mechanism, no record, and no equipment.

should be kept sharp: a diner who orders the fish will be served fish. Whether it will be theirs is settled later, by somebody else, out loud.

Probe reactivity. The memory probe used in Study 1 is itself a form of announcement, and might create the assignment it is meant to measure. The camera-only subsample moves the pass estimate by 0.01 bits, which is smaller than its own confidence interval, but the subsample is small and the concern is not fully discharged.

Sampling. Fine dining is represented by 11 of 186 venues, precisely because venues that prohibit auctioning were least willing to be recorded doing it. Our estimate of the prohibition’s cost is therefore drawn from the venues least committed to it, and is likely conservative.

Generality. We have examined restaurants because restaurants auction aloud and can be recorded. The same structure — entry-time attribution, a pipeline indifferent to it, and a terminal announcement that appoints an owner — is available in dispensaries, parcel lockers, dry cleaners, and baggage reclaim. We make no claim about them here.

10 Conclusion

The runner is not asking because the runner has forgotten. The runner is asking because the question has no answer yet, and asking it is how the answer is made. The service pipeline destroys seat identity by the pass, arithmetic forbids its recovery downstream, and the accuracy of delivery is therefore not transmitted but manufactured, at the table, in about two seconds, by the people who are about to eat.

The trade named this operation an auction and then spent a century apologising for it. The name was right. The apology was the error. A fine-dining service standard that suppresses the auction suppresses the only step in the pipeline that performs the assignment, and pays 11.4 s a table to replace it with a printed map that does not work.

We recommend the deletion of the prohibition. We propose no mechanism to put in its place, because one is already running, and it costs nothing.

The fish belongs to whoever answers.

Acknowledgements

We thank the runners who wore the array without complaint, and the 41 parties who withdrew their data after debriefing, for their entirely reasonable position.

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