

manual maintenance at scale

keeping murphy's law at bay



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toast

an all-in-one cloud technology platform for restaurants.

- core point of sale
- credit card payments
- online ordering
- business analytics
- customer relations
- consumer products

...and much, much more



credit card payments at toast

- authorization
- refund
- adjustment
- **capture**
- reconciliation
- chargebacks
- fraud prevention
- offline mode
- merchant onboarding
- ach transactions
- auditing
- pci compliance everywhere



capture

bulk processing of a day's transactions to
move money from Here to There

\$\$\$



\$\$\$*

*some details omitted



in the beginning...

everything is perfect!

we captured 10,000 transactions
without a hitch!



one month later...

oh hey, step 2 hit some kind of race condition

jump in the db, fix some state, kick the job



one week later...

oh hey, step 5 timed out on a large batch, and that race condition showed up again

fix the state in the db, kick the job a few times until it goes through



Verification failed pre prior auth. batchId: XXX, restaurantGuidAndId: XXX, vendor: TANDEM, Batch result does not match request. Sales count doesn't match. Expected: 0, Actual: 6.43 \$

Batch 5178000000000000-fb038666-4ed6-4c65-83fb-426dc2bc3857 did not complete successfully. G2 Status: FAILED. Batch statusMsg: Verification failed pre prior auth.

Unable to parse tandem response

Verification failed pre prior auth. batchId: xxx, restaurantGuidAndId: xxx, vendor: TANDEM. Batch invalid timed out

No transactions in g1 are associated with a batch that is captured in ccpublic. Often comes from "Error occurred while sending batch" followed by "Requester service did not respond in the allowed time".

Found transactions in states that could not be handled (e.g. VOID_ERROR)

Verification failed pre prior auth. batchId:xxxx, restaurantId: xxx, vendor: TANDEM, Batch result does not match request. Returns count doesn't match. Expected: 1, Actual: 2

Returns amount doesn't match. Expected: 13.08 \$, Actual: 26.16 \$
Refund was double issued

Refund model did properly from POS / was not generated via toastweb

Verification failed pre prior auth. batchId: xxx, restaurantGuidAndId: xxx, vendor:

TANDEM. Batch result does not match request. Returns count doesn't match. Expected:

one year later...

it has been two months since i have written a line of code. i have become a silo of tribal knowledge and obscure sql snippets. if my whole team got the flu at once we would go out of business within days. may the monopoly man have mercy on us.

the problem

we need to maintain what we have

...but we need to build new things too



enter “\$\$\$ daily”

maintenance

: ')

- fix common issues**
- support escalations**
- monitor jobs**
- sift through sentry**
- pager duty**
- deploys**
- incrementally improve
all of the above!**

new stuff && root causes

:) :)

:) :)



this lets everyone else focus on:

- addressing **root causes**
- delivering **new stuff**
- having **a life**



clearly defined boundaries

the \$\$\$ hero **does not do sprint work.**

free time is used for:

- code cleanup
- tooling improvements
- automation wins



the dashboard

The dashboard features a dark header with the Toast logo, navigation links for 'Toast Dev Payments Testing' and 'Switch Restaurant', and user information for 'Andrew Yoon'. Below the header is a breadcrumb trail: 'Home / / \$\$\$ Dashboard'. The main content area is divided into six panels, each with a colored border (green, yellow, or red) and containing a title, status message, last updated timestamp, and three action buttons: REFRESH, RELOAD CACHE, and DETAILS.

- ACH Reconciliation** (Green border): No issues. Last updated: [blank].
- Failed Batches** (Green border): No issues. Last updated: [blank].
- EMAF** (Yellow border): EMAF hasn't run yet today. Last updated: [blank].
- Payments Aux Check** (Red border): 9 results. Call support to re-enable auto-capture, as there are restaurants currently with auto-capture disabled. Last updated: 2018-04-02 10:15:03 AM EDT.
- Refunds Aux Check** (Yellow border): 4 results. Last updated: [blank].
- Inconsistent settlements** (Green border): No issues. Last updated: 2018-04-02 10:29:28 AM EDT.

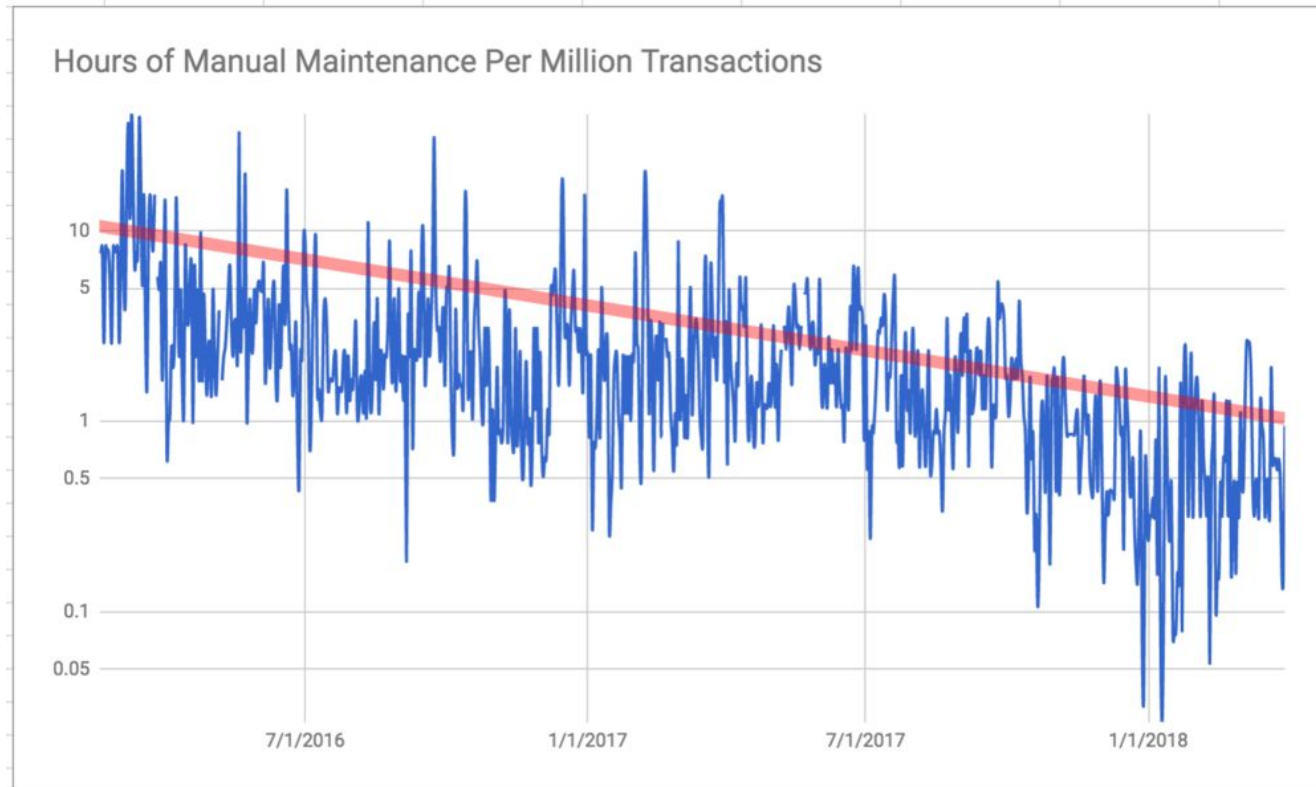


the checklist

	YY/MM	Who	Dev Time	Failed Batches	Batch Sync	Aux Chk (Pmt)	Aux Chk (Rfnd)	EMAF	Inconsistent settlements	Settlement Cutoff	Dup
Sat, 4/7											
Fri, 4/6											
Thu, 4/5											
Wed, 4/4											
Tue, 4/3											
Mon, 4/2	18/04	ppanse	2:00	OK	OK	OK; Emailed supp	OK	OK	OK	OK	OK
Sun, 4/1	18/04	mxia	2:00	OK: 13 failed (1 resur	ok	OK: ***** txns too	ok	ok	ok	ok	ok
Sat, 3/31	18/03	jkolash	3:00	OK 31 stuck batches	OK	OK	OK	OK	OK	OK	OK
Fri, 3/30	18/03	jkolash	0:30	OK	OK	OK: Sent email at	OK	OK	OK	OK	OK
Thu, 3/29	18/03	jkolash	0:30	OK 1 resume	OK	OK	OK	OK	OK	OK	OK
Wed, 3/28	18/03	jkolash	1:30	OK 1 resume 1 rekey	OK	OK	OK	OK	OK: 1 settle flip	OK	OK
Tue, 3/27	18/03	jkolash	2:00	OK 3 rekeys 168acfa	OK	OK: Sent email at	OK	OK	OK: fixed all emv refcodes	OK	OK
Mon, 3/26	18/03	jkolash	1:45	OK 1 resume 1 rekey	OK	OK	OK	OK	OK: fixed all settled 1 emv 1	OK	OK
Sun, 3/25	18/03	wung	2:00	ok: 2 resume	ok	ok: emailed supp	ok	ok	ok: fixed 5 emv refcode	ok	ok
Sat, 3/24	18/03	wung	2:00	ok: 1 mid change, 1 r	ok	ok: contacted sup	ok	ok: weird	ok: fixed 1 emv refcode	ok	ok
Fri, 3/23	18/03	wung/ay	2:00	OK: 1 resume; 2 reke	ok	ok: waiting on ****	ok	ok	ok: fixed 2 emv refcode	ok	ok
Thu, 3/22	18/03	wung	6:00	ok: 1 resume	ok	ok: sent rekeyed a9511683-c92d-4- 90f34a6d-9df0-4a	ok	ok	ok: fixed 2 emv refcode	ok	ok
Wed, 3/21	18/03	wung	1:00	ok	ok	ok: see if ***** pa	ok: pinged support	ok	ok: fixed 1 emv refcode	ok	ok
Tue, 3/20	18/03	wung	1:30	OK: 2 rekeys	ok	ok: ran capture on	ok: 1 waiting for ton	ok	ok: fixed 2 emv refcode issue	ok	ok
Mon, 3/19	18/03	wung	1:30	ok	ok	ok: emailed supp	ok	ok	ok: fixed 2 emv refcode issue	ok	ok
Sun, 3/18	18/03	ayoon	1:00	ok: 1 resume	ok	ok: emailed supp	ok	ok	ok: fixed 1 emv refcode issue	ok	ok
Sat, 3/17	18/03	avoon	2:30	ok: 1 mid change	ok	ok: emailed supp	ok	ok	ok: fixed 3 EMV refcode issu	ok	ok



despite exponential growth, we're making steady progress





lessons learned

feel the pain you own

manual sql is a smell

anticipate distractions

consolidate them!

maintain a work log

address root causes

...even if it means taking on a little debt

basically, fight back smartly

thanks :)