

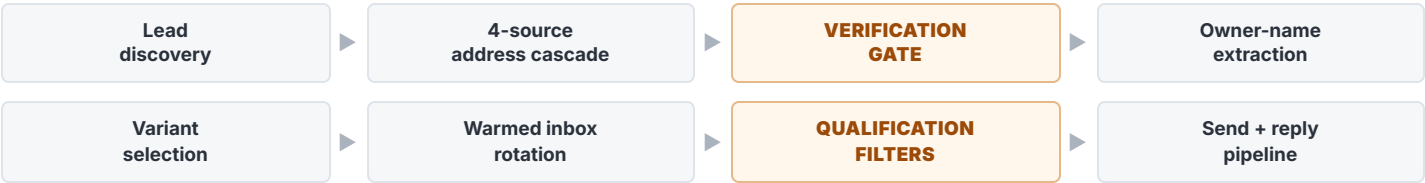
Outbound Email Pipeline & Deliverability Engineering

A six-mailbox outbound system that turns a map listing into a **verified, personally addressed email** — lead discovery, a four-source address cascade, qualification filters, and rotated copy sent from warmed inboxes.

BUILDING THE LIST

Discovery starts from map data, then every candidate goes through a **four-source address cascade**: the business's own site first (homepage, then /contact, /contact-us, /about, parsing mailto: links and inline addresses), then its Facebook page, then Yelp, then a targeted web search. Directory and platform domains are blacklisted so a listing site's address can never be mistaken for the business's own. Only a real, observed address moves forward — nothing is constructed from a domain name.

ARCHITECTURE



SENDING INFRASTRUCTURE & MESSAGE VARIANTS

Six mailboxes across seven authenticated domains, all carrying SPF, DKIM and DMARC. Delivery goes over the provider's HTTPS API rather than SMTP, because the host blocks outbound mail ports outright, so the transport was rebuilt around an API the firewall does not touch.

Inbox selection is least-used-first under a per-inbox warmup cap — five sends a day for the first week, then fifteen, twenty, and twenty-five as the mailbox ages. Volume scales by adding mailboxes, never by raising a single one's ceiling.

Copy is assembled, not repeated. Three openers rotate, and one of them is conditional: it only fires for a business above a rating and review-count threshold, because the line it opens with refers to their reviews. Below it, that line would not be true, so the renderer picks another opener.

Three trades carry their own vocabulary slots — tree service, painting and handyman — so one template renders trade-specific imagery rather than generic filler. The rest personalises from review count, star rating, season and first name.

```
# per-inbox warmup ramp
# (days, sends/inbox/day)
WARMUP_SCHEDULE = [
    (7, 5),
    (14, 15),
    (21, 20),
    (10*6, 25),
]

# opener C is gated on the
# claim it actually makes
OPENER_C_MIN_RATING = 4.5
OPENER_C_MIN_REVIEWS = 15
```

CONTROLS

Qualification filters

A single homepage fetch feeds three separate checks — whether the business already runs an online booking platform, whether it is too large to be owner-operated, and who the owner is. One request, three answers, cached for the run.

Verification gate

Every address clears third-party verification before it can enter a batch, and the cache stores the provider's raw verdict rather than a pass/fail, so tightening the standard re-judges everything already cached instead of grandfathering it.

Sequencing & compliance

A two-email sequence where the follow-up threads as a real reply against the stored provider message ID, so it lands in the existing conversation. Every message carries a postal address and opt-out line, and the renderer refuses to produce one that fails validation.

STACK

Python · OAuth REST mail API · IMAP · concurrent HTTP scraping · HTML & JSON-LD parsing · **DNS** (authoritative-nameserver queries) · ZeroBounce · Google Places · systemd timers & cron · SignalWire alerting

REPUTATION MONITORING

All sending domains carry SPF, DKIM and DMARC, and are verified in Google Postmaster Tools. A daily job checks each one against domain blocklists — querying authoritative nameservers directly, because public resolvers refuse those lookups — and runs a control query against a domain known to be listed, so a check that cannot see anything reports broken rather than clean.

A weekly job pulls DMARC aggregate reports over IMAP and parses the XML into a readable digest, so authentication results get reviewed instead of accumulating unopened.

- 6 mailboxes, chosen least-used-first under per-inbox warmup caps
- 4 independent sources in the address-discovery cascade
- 7 authenticated domains under daily blocklist monitoring