7x Exponential Katalyst - Tech Deck

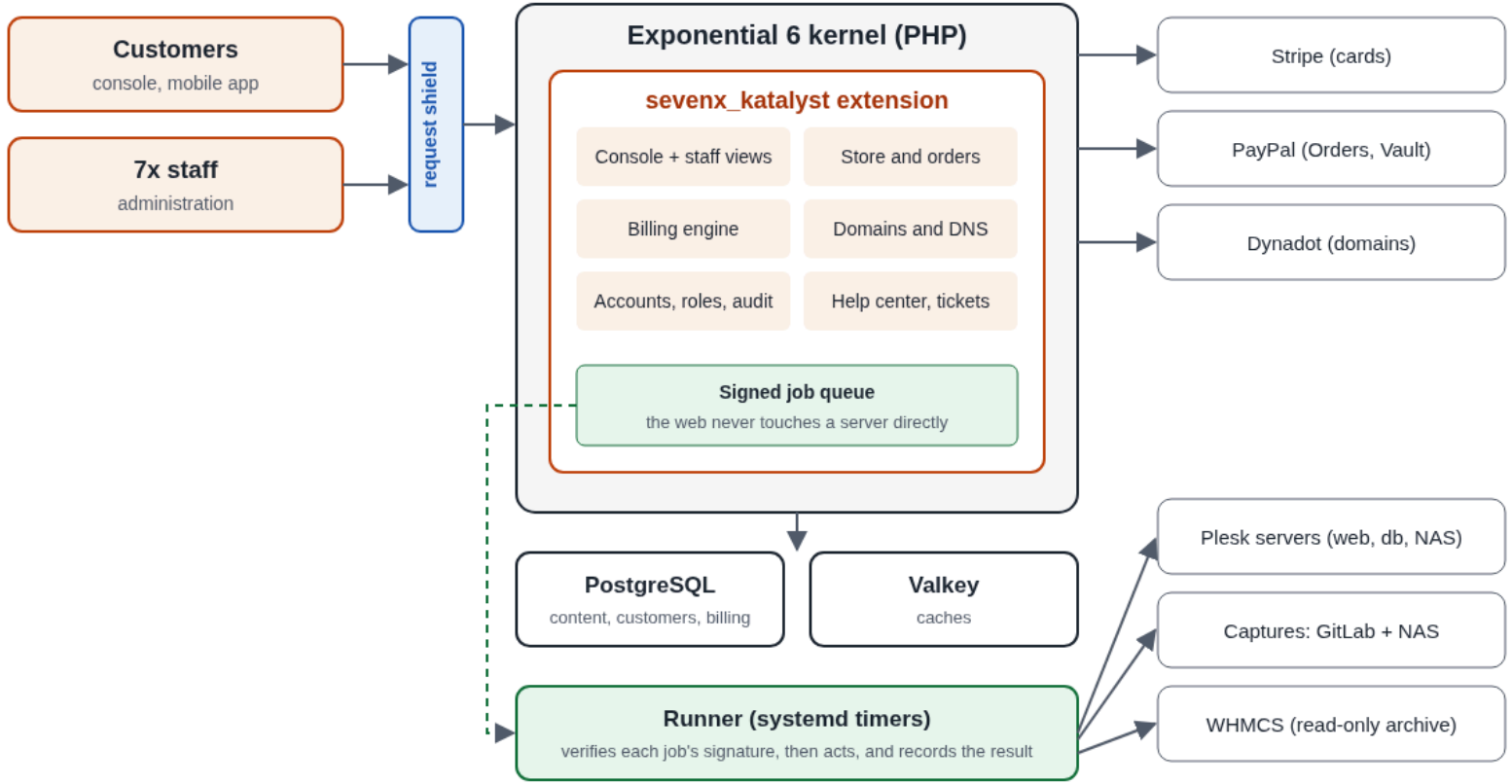
A slide deck for technical readers: developers, system administrators and anyone evaluating Katalyst. Use **Next slide** or the list of slides below, read all slides on one page, or open the PDF. For a non-technical tour, see Visual Introduction to 7x Exponential Katalyst.

State of 18 November 2026, from the code and documentation of the extension and the live settings of se7enx.com.

What Katalyst is

- The hosting and billing platform that runs 7x Hosting: ordering, billing, domains, hosting, backups, accounts and support in one system.
- An extension of **Exponential 6** (6.0.15), the PHP content management system 7x maintains: `sevenx_katalyst`.
- It replaces WHMCS. WHMCS is kept only as a read-only archive for staff.
- Free software under the **GNU General Public License, version 2 or later**.

Architecture



Architecture: the Exponential 6 kernel with Katalyst, PostgreSQL, Valkey, the signed job queue, the runner and outside services.

- The web application only reads and writes its database and queues **signed jobs**; it never touches a server directly.
- A runner, started by systemd timers, verifies each job and carries it out on the servers.

The extension in numbers

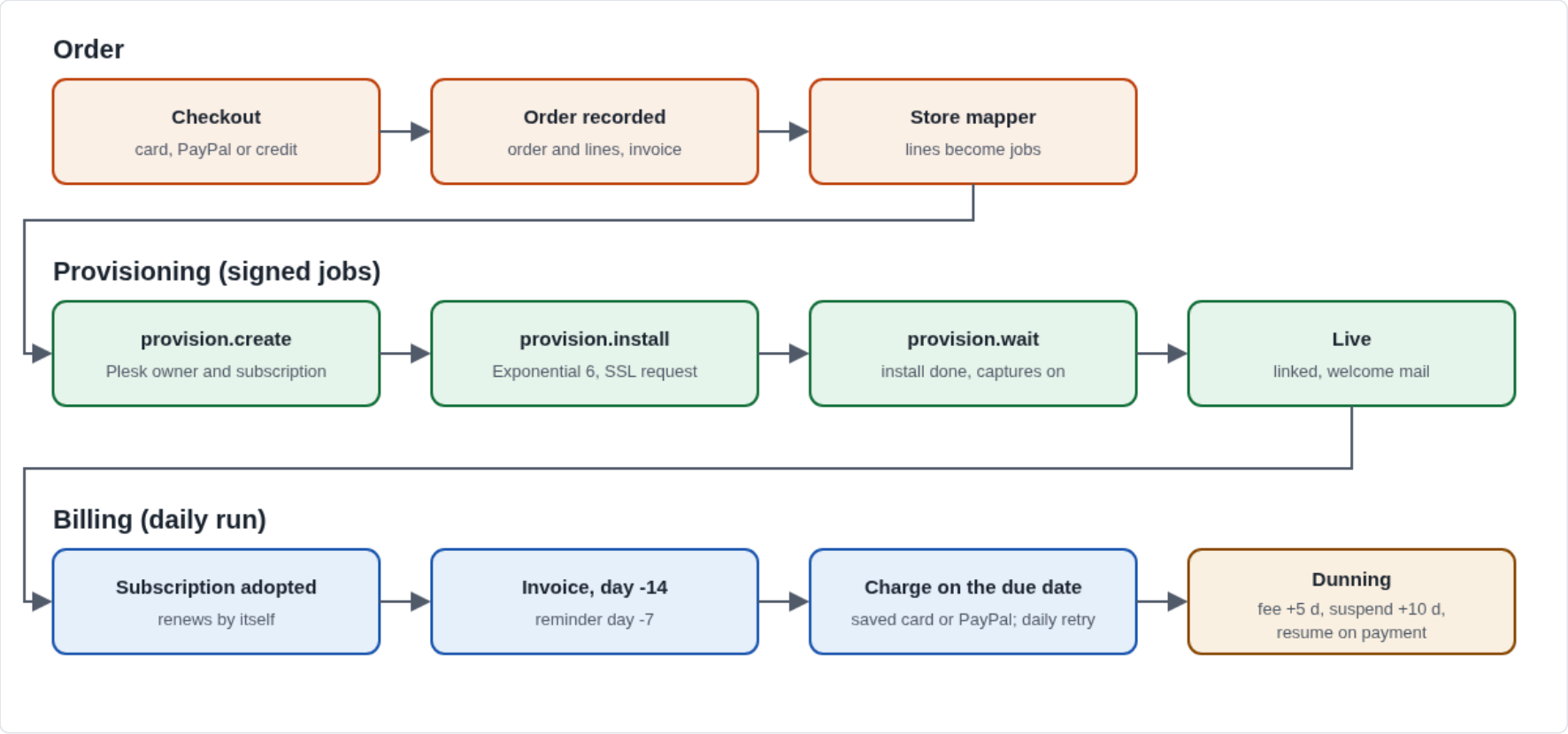
Part	Count
Modules (customer, account, staff, portal)	4
Views	98
Database tables (`katalyst_*`)	64
Job types with their own handler	about 106
PHP class files	363
Console scripts	142
Unit test methods	856
Documentation pages	37

The tables are described once and generated for PostgreSQL, MySQL and SQLite.

Data and caches

- **PostgreSQL** holds the site's content and every Katalyst table: customers, subscriptions, orders, invoices, jobs, audit.
- **Valkey** holds the kernel's caches.
- The Exponential kernel provides content, users, roles and policies, sessions, the shop and the administration; Katalyst adds its modules, services and models on top.
- The billing layer has one interface with two providers: the built-in engine (Katalyst's own tables plus Stripe and PayPal) and the WHMCS provider, now in archive mode.

From order to provisioning to billing



From order to provisioning to billing: checkout, the order, the signed provisioning jobs, then renewals and dunning.

- The shop's checkout records the order; a mapper turns its lines into jobs.
- `provision.create` makes the Plesk customer and subscription; `provision.install` installs Exponential 6 and queues the SSL certificate; `provision.wait` waits for the install and the first backups, then links the site.
- The daily billing run adopts the new subscription and renews it from then on.

Payments

- **Stripe**: the Payment Element, PaymentIntents charged off-session on the due date with idempotency keys, SetupIntents to save cards, refunds, and signed webhooks, each event stored once and applied by a job.
- **PayPal** (through the `sevenx_paypal` extension): Orders v2, Payments v2 and webhooks for payments; Vault v3 for saved PayPal accounts that pay renewals.
- Invoices are proforma until paid, then take the next number of a gapless series; refunds get credit notes.
- Account credit is applied before any charge.

Domains

- **Dynadot** is the registrar in use: search, registration, renewal, transfer, lock, name servers, over its REST API.
- A **GoDaddy** adapter is implemented and its reads are live; no extension is routed to it yet.
- The customer's payment is only held until the registry confirms, and released on any failure.
- DNS can live with the customer (or Cloudflare), at the registrar, or on 7x DNS (Plesk zones on 7x name servers).

Hosting on Plesk

- Plesk is driven through its command line (`plesk bin`, `plesk db`), locally or over SSH, as root, by the runner only; the XML API is not used for provisioning.
- Commands are built as argument lists, never as a shell line.
- Customers add, disable, enable and remove domains, aliases and subdomains on their hosts within the plan's limits; each change is a job.
- One-click control panel sign-in creates a Plesk login link through one narrow sudo rule.
- SSL: Let's Encrypt certificates issued and renewed automatically once a name resolves to its server.
- Site settings, self-service: PHP version (front page and editor checked before and after, automatic rollback), maintenance mode (503 page with Retry-After, editor untouched, 12-hour preview link) and redirects (exact paths, 301/302, at most 50, whole-domain www and https through Plesk); one change at a time, each a job.

Backups and version control

- **Captures**: every site has three Git repositories (code, files, database) on its server, on GitLab and on the NAS, updated hourly and nightly.
- **Verified backups**: after each run the heads of the three copies are compared; the site shows when they last matched.
- **Daily backups**: rsync snapshots with hard links, with a weekly test restore; customers restore and download them themselves.
- **The capture gate**: nothing is removed without a passing capture younger than 24 hours on all three copies and a final capture.

The API for the mobile app

- Under `katalyst/api/v1`, for the 7x mobile app.
- Sign-in with the kernel's OAuth2 password grant: access tokens for 1 hour, refresh tokens for 30 days (sliding); the tokens are opaque and checked on the server.
- Each route needs a permission (public, signed-in, buyer, products, invoices, orders, tickets) instead of OAuth scopes.
- Checkout in the app uses Stripe's Payment Sheet; test payments never activate an order.

Security model



The security layers: the request shield, sign-in, permissions, signed jobs, the servers, and the audit trail.

Signed jobs and Live switches

- Every job is signed with HMAC-SHA256 over canonical JSON, with a nonce, a maximum age and a constant-time check.
- Every job type is off until its `Live[]` switch is on; until then it runs as a dry run that only plans.
- Protected accounts (7x's own) are checked on every suspend, removal and dunning path; a refusal is audited.
- `katalyst_audit` is append-only and holds ids, never personal data.

Secrets

- Secrets live in the kernel's secret store and are managed under Setup, Secrets; settings name a secret, never hold its value.
- The job signing key is a root-only key file.
- Control panel passwords stay on each server, root-only.
- Saved payment tokens are sealed with libsodium.

Operations: the timers

Timer	When	What it does
runner	every minute	carries out the signed jobs
domain-sales-process, watchdog	every minute, 15 min	domain orders and their money
sync, billing-sync, capture-import	hourly	Plesk, billing and backup state
trials	hourly	free trials
disk-servers	every 3 hours	disk usage
caption, caption-test-restore	daily, weekly	daily backups, test restore
domain-check, domain-sales-prices, preflight, reminders	daily	DNS and SSL checks, prices, renewals
billing-run, dunning, billing-deadline	daily	invoices, charges, dunning, deadlines

A failing unit mails an alert once an hour until it recovers; failed jobs and backups also open tickets.

Operations: deploying

- The extension is a Git checkout, fast-forwarded to the reviewed main branch.
- After a change: the autoloads are regenerated, the caches cleared (Valkey included) and PHP-FPM reloaded gracefully.
- Schema changes are applied before the code that uses them.
- Every script reports PASS or FAIL, and a change is checked in a browser before it counts as done.

Moving from WHMCS

- A move tool takes customers from WHMCS to the engine cohort by cohort: recurring services become subscriptions, open invoices are carried over, saved Stripe cards are reused, and each move can be rolled back.
- Each customer's billing provider is chosen per customer, per cohort, or by default.
- In **archive mode** every WHMCS job is refused and the syncs stop reading it; staff still open its history read-only.
- Old client-area and knowledgebase addresses answer with permanent redirects to their new pages.

License and source

- Katalyst is licensed under the **GNU General Public License, version 2 or later** (GPL-2.0-or-later), as its license file, `composer.json` and `extension.xml` state.
- Its source is kept by 7x on GitLab and GitHub (se7enxweb/sevenx_katalyst); ask us in a ticket for access.
- It builds on Exponential 6, also free software under the GPL.

Planned, as documented

Only what the repository's documentation names as planned:

- More for resellers: their own store with payments through Stripe Connect, their own portal address and invoices.
- International tax, possibly through Stripe Tax.
- An SSL API with scoped, expiring tokens.
- Switching off the control panel's own backups once the daily backups have run side by side long enough.

Learn more

- Visual Introduction to 7x Exponential Katalyst
- Customer views in detail
- Staff views in detail
- Questions? Open a ticket.