Blueprint Lengkap: SaaS Video Hosting + LMS

Versi 1.1 — Disusun: 19 Agustus 2025 (Asia/Jakarta)

Dokumen ini memuat fitur lengkap, struktur menu, role & permission, integrasi (Contabo, Tripay, Starsender), desain API, desain pricelist, laporan/analytics, serta panduan operasional.

# 0. Ringkasan & Tujuan

* Menyediakan platform Video Hosting multi-tenant yang aman dan scalable.
* Menambahkan LMS yang fleksibel: kursus, kuis, tugas, sertifikat, live class.
* Mendukung monetisasi: PPV, bundle, subscription, add-to-cart & buy-now.
* Menjaga vendor storage (Contabo) transparan, tidak terlihat user.

# 1. Arsitektur & Tech Stack

Frontend: Next.js 14 (App Router), TypeScript, Tailwind, React Query, Video.js/Shaka.

Backend: NestJS (REST+OpenAPI), Node 20, Prisma + PostgreSQL, Redis (cache/queue), BullMQ (job), FFmpeg (transcode), NGINX (origin proxy).

Storage: S3-compatible (Contabo) private; CDN: Cloudflare/Bunny; Notifikasi: Starsender; Pembayaran: Tripay; Email: SMTP.

* Keamanan: JWT, signed playback token, domain allowlist, rate limit, audit log.
* DevOps: Docker, docker-compose (dev), GitHub Actions CI, observability (Prometheus+Grafana).

# 2. Fitur Video Hosting (Detail)

* Upload & Ingest: drag-drop, resumable, size validation, pre-signed PUT URL (10 menit).
* Transcoding: HLS/DASH multi-bitrate (1080p/720p/480p/360p), keyframe aligned, 4s segments, thumbnails/storyboard.
* Player: branding per-tenant, subtitle VTT/SRT, chapter, speed, PiP, CTA/endscreen.
* Keamanan: signed URL playback (HS256, exp 1 jam), domain allowlist, geo/IP restrict, hotlink protection, HTTPS-only.
* Storage: bucket privat vod-original & vod-processed; lifecycle ke archive tier.
* CDN: domain cdn.brand.com; purge & cache-control: m3u8 (30s), segmen (7d).
* Monetisasi VOD: PPV, sewa, subscription channel; kupon; webhook payment.
* Live (opsional): RTMP → HLS low-latency, DVR, auto-record ke VOD.
* Integrasi: webhooks (upload/transcode/payment/quota), Starsender, SMTP.

# 3. Fitur LMS (Detail)

* Struktur: Program → Path → Kursus → Modul → Pelajaran (video/teks/file/kuis/tugas/live).
* Kuis: MCQ, multi-answer, true/false, matching, essay; bank soal + randomisasi; timer; passing grade; retake rules.
* Tugas/Essay: rubric, file upload, feedback; anti-plagiarisme opsional.
* Progress: prerequisite, drip (by date/offset), completion rules.
* Sertifikat: template editor, field dinamis, nomor seri, QR verifikasi publik.
* Live Class: jadwal, RSVP, pengingat WA/email, rekaman otomatis ke VOD.
* Monetisasi Kursus: course/bundle/subscription; kupon; Tripay integration.
* Komunitas: diskusi per course/lesson; moderasi; pinned answer.
* Kepatuhan: SCORM 1.2 & xAPI (opsional LRS ringan).

# 4. Struktur Menu (Per Modul & Peran)

## 4.1 Menu Tenant (Admin/Owner)

* Dashboard: ringkasan storage/bandwidth, status encoding, top video 7 hari, revenue ringkas.
* Konten → Video, Playlist, Channel, Live.
* Library → Folder & assets (watermark, logo, font).
* Player & Brand → Tema, warna, endscreen, CTA, allowlist domain.
* Monetisasi Video → Produk PPV/sewa/subscription, Kupon.
* LMS → Kursus, Bank Soal, Sertifikat, Siswa (enrolment/cohort), Live Class, Diskusi, Penilaian.
* Commerce (LMS) → Produk Kursus/Bundle/Subscription, Kupon, Pesanan/Order.
* Analytics → Video (plays/retention/QoE), LMS (progress/kelulusan/nilai), Monetisasi.
* Integrasi → API keys, Webhooks, Starsender, Pixel/GTM.
* Organisasi → Profil, Domain, Tim & Peran, Audit Log.
* Billing → Paket & Add-on, Tagihan Tripay, Penggunaan kuota, Metode pembayaran.
* Pengaturan → Privasi, Keamanan, Lifecycle, Notifikasi, Moderasi.
* Support → Ticket, Knowledge Base, Status Layanan.

## 4.2 Menu Portal Siswa

* Beranda → Kursus terdaftar, progres, jadwal live.
* Katalog → Cari & filter; detail kursus; instruktur; rating; Buy Now/Add to Cart.
* Belajar → Player, materi, kuis, tugas, diskusi.
* Akun → Profil, sertifikat, riwayat pembayaran, preferensi notifikasi.

## 4.3 Menu Admin Super

* Tenant → daftar, aktivasi/suspensi, limit kuota.
* Operasional → antrian transcode, job failure, health check.
* Komersial → paket/pricebook, promo, pajak.
* Konfigurasi Global → storage/CDN, email/WA, template.
* Laporan Agregat → keuangan, performa platform, biaya resource.
* Log Sistem & Audit.

# 5. Role & Permission Matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Role | Video: Upload/Edit/Delete | Video: Publish/Embed | Player & Brand Config | Analytics Video View | Monetisasi Video (PPV/Subscription) | LMS: Create/Publish Course | LMS: Grade (Quiz/Essay) | LMS: Live Class Manage | LMS: View Student Data | Commerce: Orders/Refunds | Billing & Invoices | API Keys/Webhooks | Audit Log View | Tenant Settings |
| Owner | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Admin | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Editor | Y | Y | N | Y | N | N | N | N | N | N | N | N | N | N |
| Instructor | N | N | N | Y | N | Y | Y | Y | Y | N | N | N | N | N |
| Reviewer | N | N | N | N | N | N | Y | N | Y | N | N | N | N | N |
| Learner | N | N | N | N | N | N | N | N | Own only | N | N | N | N | N |
| Finance | N | N | N | Y | Y | N | N | N | N | Y | Y | N | N | N |
| Support | N | N | N | Y | N | N | N | N | N | N | N | N | Y | N |

# 6. Desain API (Autentikasi, Endpoints, Error)

* Auth: API Key via Authorization: Bearer <API\_KEY>; header X-Tenant-ID.
* Idempotency-Key untuk POST create; Rate limit default 600 req/menit.
* Error JSON: {error, message, request\_id, hint}.

Endpoint inti Video Hosting: /videos (list/detail/update/delete), /videos/upload-url, /videos/ingest-complete, /embeds, /analytics/events.

Endpoint inti LMS: /lms/courses, /lms/modules, /lms/lessons, /lms/quizzes, /lms/assignments, /lms/enrollments, /lms/certificates, /lms/analytics.

Commerce LMS: /lms/commerce/cart, /lms/commerce/checkout, /lms/commerce/checkout/buy-now, /lms/commerce/orders, /lms/commerce/access.

Webhooks: upload.completed, transcode.completed/failed, playback.denied, payment.succeeded/failed, quota.threshold, enrollment.created.

# 7. Integrasi Object Storage Contabo (S3-Compatible)

* Semua objek privat; publik hanya via CDN & token playback.
* Pre-signed PUT untuk upload; masa berlaku 600 detik.
* NGINX origin proxy → S3 Contabo; header x-amz-\* dihapus; error generik.
* Token playback HS256 (fields: tid, vid, exp).
* Lifecycle policy: pindah ke archive tier setelah 60 hari idle (disarankan).

**Contoh ENV (ringkas):**

STORAGE\_ENDPOINT=https://s3.contabo.io

STORAGE\_REGION=eu2

STORAGE\_ACCESS\_KEY=...

STORAGE\_SECRET\_KEY=...

STORAGE\_BUCKET\_ORIGINAL=vod-original

STORAGE\_BUCKET\_PROCESSED=vod-processed

CDN\_BASE\_URL=https://cdn.videosaas.com

PLAYBACK\_SIGNING\_KEY=...

# 8. Checkout LMS: Add-to-Cart & Buy-Now

* Add-to-Cart: user menambah course/bundle → apply kupon → Checkout → Tripay.
* Buy-Now: dari halaman course langsung buat order dan redirect ke Tripay.
* Webhook Tripay (HMAC) → set paid → auto-enroll → kirim WA & email.
* Guest checkout (opsional): akun otomatis dibuat setelah pembayaran berhasil.

# 9. Model Data Inti (Ringkas)

* Video: videos, video\_versions, thumbnails, subtitles, embeds, analytics\_events, usage\_storage\_daily, usage\_bandwidth\_daily.
* LMS: courses, course\_modules, lessons, quizzes, questions, attempts, assignments, submissions, enrollments, certificates, cohorts, live\_sessions, discussions.
* Commerce: products, prices, carts, cart\_items, orders, order\_items, coupons, coupon\_redemptions.
* Billing: plans, subscriptions, invoices, payments.
* System: tenants, users, api\_keys, webhooks, audit\_logs.

# 10. Analytics & Report (Definisi KPI)

* Video KPIs: plays, unique viewers, watch\_time, avg\_watch\_time, retention curve, rebuffer ratio, startup time, average bitrate, error rate.
* LMS KPIs: enrolment, completion rate, median learning time, quiz avg score, discrimination index (butir soal), retake count.
* Monetisasi: revenue per video/course, ARPU, MRR, churn, LTV, kupon performance.
* Export: CSV/PDF; Scheduling: kirim otomatis via email/WhatsApp.

# 11. Desain Pricelist & Packaging

Tabel berikut mendefinisikan paket, limit, dan SLA. Semua harga IDR/bulan, billing bulanan; diskon tahunan 15%.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Plan | Harga | Storage (GB) | Bandwidth (TB) | Video Monetisasi | LMS | Integrasi/API | Support | SLA |
| Starter | 199.000 | 50 | 0.5 | — | — | API Basic | Email (48 jam) | N/A |
| Growth | 499.000 | 200 | 2 | Basic | 3 modul/kuis | API + Webhooks | Email+WA (24 jam) | 99.5% |
| Pro | 999.000 | 500 | 5 | Advanced | Tugas, Live, Sertifikat serial | Full API | Prioritas (8 jam) | 99.9% |
| Enterprise | 2.499.000 | 2000 | 20 | Enterprise | SCORM/xAPI, SSO, White-label | Premium API + SLA | Dedicated | 99.95% |

## 11.1 Add-on & Overage

|  |  |
| --- | --- |
| Add-on | Harga |
| Storage tambahan 100GB | 100.000 |
| Bandwidth tambahan 1TB | 150.000 |
| Whitelabel domain tambahan | 50.000 |
| Transcription AI per jam video | 25.000 |
| Live streaming per jam | 35.000 |

Overage: storage Rp1.500/GB; bandwidth Rp200/GB. Proration untuk upgrade mid-cycle, downgrade efektif periode berikutnya. Kupon diskon persen/nominal; pajak mengikuti regulasi.

# 12. SLA, Keamanan & Kepatuhan

* SLA sesuai paket; pemantauan uptime; notifikasi insiden via email/WA.
* Backup: snapshot DB harian; replikasi storage lintas region (opsional).
* Keamanan: rotasi API key, rate limit, audit log, enkripsi at rest & in transit.
* Privasi & Retensi data: penghapusan permanen 30 hari setelah delete (soft → hard).

# 13. Onboarding, Support, & Roadmap

* Onboarding: wizard setup tenant (brand, domain, notifikasi, payment).
* Support: tiket, SLA sesuai paket, knowledge base, changelog.
* Roadmap: MVP (upload→transcode→playback), Fase 2 (AI, Live), Fase 3 (SCORM/xAPI, SSO).

# Lampiran: Snippet Teknis

**Contoh NGINX Origin Proxy (ringkas):**

location /hls/ {

auth\_request /\_auth;

proxy\_hide\_header x-amz-id-2;

proxy\_hide\_header x-amz-request-id;

proxy\_set\_header Host s3.contabo.io;

proxy\_pass https://s3.contabo.io/vod-processed/;

}

**Contoh Endpoint Signed Upload:**

POST /videos/upload-url

{ "filename":"video.mov","size\_bytes":2105382934,"mime":"video/quicktime" }

→ Respon: { "video\_id":"vid\_..","storage\_key":"...","upload\_url":"...","expires\_at":"..." }

**Contoh Webhook Tripay (verifikasi HMAC):**

X-Signature: sha256=<hexdigest>

{ "reference":"TRX123","status":"PAID", "amount":99000, ... }

**Contoh Notifikasi Starsender:**

POST /notify/whatsapp

{ "to":"+62812...","template\_key":"payment\_success","vars":{"amount":"Rp99.000","product":"Kursus A"}}