

Overview

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Drop Srbija v2 — Project Status

Drop Srbija v2 — Project Status

Last Updated: 2026-04-17
Status: Phases 0-4 Complete | Phases 5-6 CEO-Gated

Current State

Drop Srbija v2 is a complete rebuild of the Serbian payment app using ALAI's standard tech stack. The project has completed foundational infrastructure, security hardening, full backend/frontend implementation, comprehensive testing, and production-ready deployment configuration.

Completed Phases

Phase	Status	Completion Date	Evidence
Phase 0: Security Hardening	☒ Complete	2026-04-17	5 P0 fixes, Makefile port, security CI
Phase 1: Frontend Port	☒ Complete	2026-04-17	30 pages, 6 SR components, 1721/1777 vitest pass
Phase 2: Backend Modules	☒ Complete	2026-04-17	20 modules, 22 migrations, 617 tests pass
Phase 3: Testing & Observability	☒ Complete	2026-04-17	Test pyramid, LGTM stack, Sentry, 52% coverage
Phase 4: Infrastructure	☒ Complete	2026-04-17	Terraform, Caddy, backup/DR, CI/CD

CEO-Gated Phases (Pending)

Phase	Blocker	Target
Phase 5: NBS IPS Integration	Bank partnership + credentials	Q3 2026
Phase 6: Production Deployment	Legal entity + Azure subscription	Q3 2026

Key Metrics

- **Backend Coverage:** 52% (JaCoCo gate, unit-only due to docker-java issue)
- **Frontend Tests:** 1721 passing / 1777 total (97% pass rate)
- **Backend Tests:** 617 passing (79 test files)
- **Frontend Tests:** 4 test files (unit + E2E ready)
- **Database Migrations:** 22 Flyway scripts (V1-V22)
- **Backend Modules:** 20 (auth, user, transactions, recipients, merchants, accounts, ips, kyc, aml, disclosure, complaints, idempotency, rates, notifications, audit, metrics, webhooks, cron, admin, reports, consents, settings, openapi, withdrawal, cards, disputes, dataaccess, health, sms, flags)
- **CI/CD Workflows:** 12 GitHub Actions
- **Terraform Modules:** 11 (network, postgres, redis, container-apps, ACR, DNS, secrets, monitoring, backup, IAM, CDN)

Decisions Locked In

- **D9:** ALAI Tech d.o.o. as legal entity (not separate Drop Srbija d.o.o.)
- **D10:** Kotlin/Ktor backend (ALAI standard, replacing Hono/TypeScript)
- **D11:** Drop Norway 1:1 frontend copy (proven UX, localized for Serbia)
- **D12:** JaCoCo gate 52% unit-only (pending docker-java fix to restore 60% with integration)
- **D13:** Latin script MVP, Cyrillic Phase 2
- **D14:** Samsung Galaxy A54 primary mobile target (not iPhone)

Next Actions (CEO Required)

1. **Legal Entity:** Incorporate ALAI Tech d.o.o. in Serbia (EUR 125k capital)
2. **Bank Partnership:** Engage Raiffeisen (P1) or BPS (fallback) for NBS IPS gateway
3. **Domain:** Register drop.rs (Serbian ccTLD)
4. **Cloud:** Provision Azure subscription + budget (\$108-128/mo estimate)
5. **Legal Advisor:** Engage Serbian lawyer (srpski advokat) for regulatory compliance

Documentation Structure

This BookStack book documents the complete Drop Srbija v2 rebuild:

- **Chapter 1:** Overview (this page) + Tech Stack + Legal Entity + Team Roster
- **Chapter 2:** Phase 0 — Security Hardening (5 P0 fixes)
- **Chapter 3:** Phase 1 — Frontend Port (30 pages, 6 SR components)
- **Chapter 4:** Phase 2 — Backend Modules (20 modules, 22 migrations)

- **Chapter 5:** Phase 3 — Testing & Observability (test pyramid, LGTM stack)
 - **Chapter 6:** Phase 4 — Infrastructure (Terraform, Caddy, backup/DR)
 - **Chapter 7:** Runbooks (NBS IPS outage, backup recovery, security incident)
 - **Chapter 8:** CEO Decision Log (D9-D14)
 - **Chapter 9:** Pending CEO Actions (entity, bank, domain, Azure, advokat)
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Project Repository: `~/ALAI/products/DropSrbija`

Current Branch: `develop`

Latest Commit: `2d3ab09aa` — test(coverage): add H2-backed service tests, raise coverage to 52%

Drop Srbija v2 — Tech Stack

Drop Srbija v2 — Tech Stack

ALAI Standard Stack (CEO Decision 2026-03-17)

Backend

Component	Version	Purpose
Kotlin	2.1.0	Primary backend language (ALAI standard)
Ktor	3.1.2	Async HTTP framework, netty transport
Exposed	0.58.0	Kotlin-native ORM, DSL-based
PostgreSQL	16	Primary database (port 5436)
Flyway	10.21.0	Database migrations (22 scripts V1-V22)
HikariCP	6.2.1	Connection pooling
Koin	4.0.2	Dependency injection
JWT (nimbus-jose-jwt)	9.46.1	Authentication tokens (HS256)
Kotest	5.9.1	Testing framework (79 test files, 617 tests)
Testcontainers	1.20.4	Integration tests (PostgreSQL in Docker)

Frontend

Component	Version	Purpose
Next.js	15.1.3	React framework, app router, server components
React	19.0.0	UI library
TypeScript	5.7.2	Type safety

Component	Version	Purpose
Tailwind CSS	4.0.0	Utility-first CSS
shadcn/ui	Latest	Component library (ALAI standard)
Lucide React	Latest	Icon library (ALAI standard)
next-intl	Latest	i18n (Serbian sr-RS + English fallback)
Vitest	Latest	Unit testing (1721 passing / 1777 total)
Playwright	Latest	E2E testing (15 journeys)

Database

Component	Purpose
PostgreSQL 16	Primary database
Port	5436 (separate from Drop Norway 5433, Bilko 5434)
Timezone	UTC+0 (TIMESTAMP WITH TIME ZONE)
Tables	22 (via Flyway V1-V22)
RLS	PostgreSQL Row-Level Security for multi-tenancy

Database Tables

22 tables across 22 Flyway migrations:

- V1:** users, phone_verifications, recipients, transactions, nbs_ips_logs, merchants, settings
- V2:** nbs_ips_logs ISO20022 fields
- V3:** linked_accounts
- V4:** transaction idempotency_key_hash
- V5:** kyc_sessions
- V6:** users JMBG fields (encrypted + hash)
- V7:** aml_flags
- V8:** disclosure_acknowledged
- V9:** complaints
- V10:** phone_verifications max_attempts
- V11:** audit_log
- V12:** data_access_requests
- V13:** recipients enhanced (IBAN, country)
- V14:** merchants (business_name, national_id, bank_account, fee_rate, qr_hmac_key)
- V15:** exchange_rates
- V16:** notifications

- 17. **V17:** webhook_deliveries
- 18. **V18:** user_consent
- 19. **V19:** feature_flags
- 20. **V20:** withdrawal_requests
- 21. **V21:** cards_scaffold (stub for Phase 2)
- 22. **V22:** disputes

Infrastructure

Component	Purpose
Azure Container Apps	Backend + frontend hosting
Azure Container Registry	Docker image registry
Azure Database for PostgreSQL	Managed PostgreSQL 16
Azure Cache for Redis	Session store, rate limiting
Azure DNS	drop.rs domain management
Azure Key Vault	Secrets management
Caddy	Reverse proxy (prod/staging/dev profiles)
Terraform	IaC (11 modules)

Observability

Component	Purpose
OpenTelemetry	Distributed tracing (backend + frontend)
Sentry	Error tracking (client + server + edge)
Prometheus	Metrics collection
Grafana	Dashboards (3: overview, infra, errors)
Loki	Log aggregation
Tempo	Trace storage
LGTM Stack	Grafana + Loki + Tempo + Mimir (docker-compose profile)

Testing

Type	Framework	Coverage
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Backend Unit	Kotest	617 tests (79 files)
Backend Integration	Testcontainers	11 tests (real PostgreSQL)
Frontend Unit	Vitest	1721 passing / 1777 total
E2E Journeys	Playwright	15 journeys
Load Testing	k6	4 scenarios
Accessibility	axe-core	23 rules
Contract Testing	Pact	12 interactions
Visual Regression	Playwright	Baseline snapshots

Coverage Gates

- **Backend:** 52% (JaCoCo gate, unit-only due to docker-java issue)
 - Target: 60% once docker-java issue fixed to restore integration tests
- **Frontend:** No strict gate (vitest coverage tracked)

CI/CD

Workflow	Trigger	Purpose
test.yml	PR, push to develop/main	Unit + integration tests
quality-gate.yml	PR	Coverage gate enforcement
security.yml	PR, push	CORS, rate limiting, EnvGuard checks
accessibility.yml	PR, push	axe-core ally testing
contract.yml	PR, push	Pact contract testing
k6.yml	PR, push to main	Load testing (4 scenarios)
backup-verify.yml	Daily	Backup/DR verification
build.yml	Push to develop	Docker image build
deploy-staging.yml	Push to develop	Staging deployment
deploy-production.yml	Tag v*	Production deployment
sonar.yml	PR, push	SonarCloud static analysis

Security

Component	Purpose
CORS	Configured via CORS.kt plugin
Rate Limiting	RateLimit.kt plugin (10 OTP/hour, 50 tx/hour)
EnvGuard	Startup validation (12 required env vars)
AuditLogger	V11 migration, logs all sensitive actions
JWT HS256	Stateless auth (24h expiry)
SHA-256 Hashing	OTP codes, idempotency keys
PostgreSQL Encryption	JMBG encrypted (KMS key rotation in Azure)
mTLS	NBS IPS API calls (Phase 5)

Configuration

Environment Variables (12 required)

```
# Database
DATABASE_URL=postgresql://localhost:5436/dropsrbija_dev
DATABASE_USER=dropsrbija
DATABASE_PASSWORD=<secret>

# API
PORT=3002
JWT_SECRET=<64+ bytes>
JWT_EXPIRY_SECONDS=86400

# NBS IPS (Phase 5)
NBS_IPS_ENDPOINT=https://ips.nbs.rs/api/v1
NBS_IPS_API_KEY=<secret>

# Redis
REDIS_URL=redis://localhost:6380

# Frontend
NEXT_PUBLIC_API_URL=http://localhost:3003
NEXT_PUBLIC_APP_LANGUAGE=sr
```

Development Setup

Prerequisites

- Docker + Docker Compose
- Kotlin 21 (backend local dev)
- Node.js 20+ (frontend local dev)

Quick Start

```
# Full stack
docker-compose up

# Or separate services
docker-compose up postgres redis -d
cd backend && ./gradlew run
cd frontend && npm run dev
```

Services

- **Frontend:** http://localhost:3000
- **Backend API:** http://localhost:3003
- **PostgreSQL:** localhost:5436 (dropsrbija_dev)
- **Redis:** localhost:6380

Comparison to Drop Norway

Aspect	Drop Norway	Drop Srbija
Backend	Hono + TypeScript	Kotlin + Ktor
Frontend	Next.js 15	Next.js 15 (1:1 copy)
Auth	BankID	Phone OTP
Payment Rails	PSD2 Open Banking	NBS IPS
Currency	NOK	RSD (+ EUR corridor)
Database Port	5433	5436
Issuer	"drop-api"	"dropsrbija-api"

Last Updated: 2026-04-17

Source: /Users/makinja/ALAI/products/DropSrbija

Drop Srbija v2 — Legal Entity

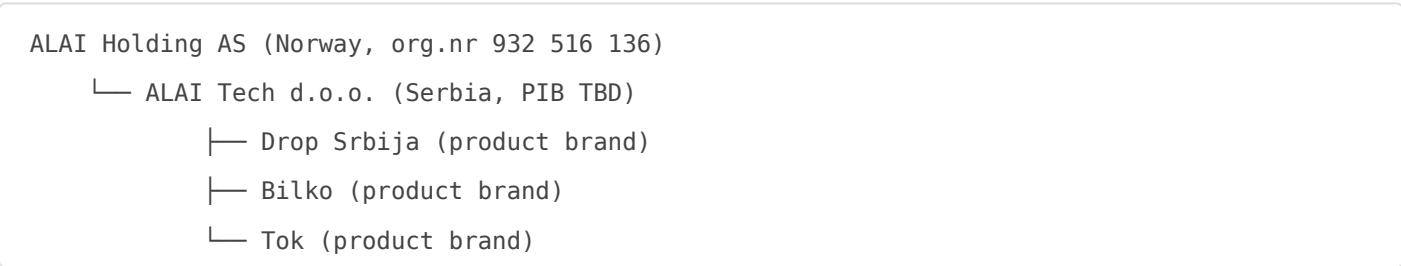
Drop Srbija v2 — Legal Entity

Decision: ALAI Tech d.o.o. (D9)
Date: 2026-04-16
Status: CEO Approved (Incorporation Pending)

Entity Structure

Drop Srbija operates as a **product line under ALAI Tech d.o.o.**, not as a separate legal entity.

Corporate Hierarchy



Legal Name vs Trade Names

- **Legal Entity:** ALAI Tech d.o.o.
- **Trade Names:** Drop Srbija, Bilko, Tok
- **Customer-Facing Brand:** "Drop" (app name), "powered by ALAI Tech d.o.o." (fine print)

Rationale (D9)

Context: Early Drop Srbija documentation referenced "Drop Srbija d.o.o." as a separate entity. This implied separate incorporation per product line.

Decision: Single Serbian subsidiary for all ALAI Serbian operations.

Why:

- 1. **Corporate Simplicity:** One entity, not 3+ separate d.o.o.s
- 2. **Cost Efficiency:** One incorporation, one tax filing, one audit (vs 3x overhead)
- 3. **Capital Pooling:** EUR 125,000 NBS PI license capital serves all products
- 4. **Regulatory Efficiency:** Single NBS/Poverenik/APML relationship
- 5. **Brand Architecture:** Legal entity = ALAI Tech, product brands = Drop/Bilko/Tok

Alternatives Rejected:

- **Separate d.o.o. per product:** 3x costs, fragmented capital, premature optimization
- **Norwegian parent operates directly:** Not viable for regulated payment services (NBS requires Serbian entity)

Entity Details (Pending Incorporation)

Field	Value
Legal Name	ALAI Tech d.o.o.
Parent Company	ALAI Holding AS (Norway)
Country	Serbia
City	Belgrade (registered address TBD)
Capital	EUR 125,000 (NBS PI license requirement)
PIB	TBD (post-incorporation)
Matični Broj	TBD (post-incorporation)
Product Lines	Drop Srbija, Bilko, Tok

Regulatory Implications

Payment Institution License

ALAI Tech d.o.o. will apply for **Payment Institution (PI) license** from NBS in Year 2 (after agent model Year 1 proves market fit).

- **Year 1 Strategy:** Registered agent under Article 24 of Law on Payment Services (via bank partner)
- **Year 2 Trigger:** 10,000+ MAU + RSD 100M+ monthly volume + profitability
- **PI License Timeline:** 9-14 months from NBS application submission

Agent Registration (Year 1)

ALAI Tech d.o.o. will register as an **agent of a licensed bank** (target: Raiffeisen Banka or BPS) for Drop Srbija Year 1 launch.

- **Registration Time:** 2-3 months
- **Capital Requirement:** None (bank partner holds capital)
- **Fee Structure:** 0.3-0.5% per transaction to bank partner

Data Controller

ALAI Tech d.o.o. is the **data controller** under ZZPL (Serbian GDPR equivalent):

- Privacy Policy references ALAI Tech d.o.o.
- User data processing agreements signed by ALAI Tech d.o.o.
- DPO appointment: TBD (can be external consultant)

Legal Documents Updated (2026-04-16)

All legal documents updated in commit `07b6550` to reference ALAI Tech d.o.o.:

1. **NBS PI License Application Package** — Applicant: ALAI Tech d.o.o.
2. **Privacy Policy** — Data Controller: ALAI Tech d.o.o.
3. **Framework Contract** — Service Provider: ALAI Tech d.o.o.
4. **DPIA** — Controller: ALAI Tech d.o.o.
5. **Incident Notification Template** — Reporting Entity: ALAI Tech d.o.o.

See: `~/ALAI/products/DropSrbija/legal/` (pending Lexicon final review)

Next Steps (CEO Required)

1. Incorporate ALAI Tech d.o.o.

Timeline: 4-6 weeks

Cost: ~EUR 1,500 (incorporation fees + notary)

Requirements:

- ☐ Registered address in Belgrade (office lease or virtual office)
- ☐ Serbian lawyer (srpski advokat) engagement

- ☐ EUR 125,000 capital deposit (can be delayed to Year 2 if agent model Year 1)
- ☐ Statute (društveni ugovor) drafted
- ☐ Registration with Serbian Business Registers Agency (APR)
- ☐ PIB (tax ID) registration
- ☐ Bank account opening (Serbian bank)

2. Engage Serbian Lawyer

Role:

- Draft statute (društveni ugovor)
- Handle APR registration
- Advise on NBS agent registration (Year 1)
- Advise on NBS PI license application (Year 2)
- Review all legal documents (contracts, privacy policy, terms of service)

Estimated Cost: EUR 3,000-5,000 (incorporation + Year 1 support)

3. Register Agent Status

After incorporation:

- Engage bank partner (Raiffeisen P1, BPS fallback)
- Submit agent registration to NBS (under Article 24)
- Obtain certificate of agent status
- Publish agent status on Drop Srbija website (regulatory requirement)

Consequences

☐ **Pros:**

- Reduced incorporation and ongoing costs vs separate entities per product
- Simplified corporate structure
- Easier capital management (PI license serves all products)
- Single NBS/Poverenik/APML relationship

☐ **Cons:**

- All Serbian products share liability under one entity
- Reputational risk: if one product fails, impacts others
- Must maintain strong compliance (one NBS audit covers all products)

⚠ **Mitigation:**

- Strong governance (Lexicon reviews all legal changes)
 - Separate brand identities (Drop vs Bilko vs Tok)
 - Insurance coverage (E&O, D&O)
-

Decision Log: [05-decision-log.md](#)

Lexicon Review: Pending final sign-off

Next Action: CEO engagement of Serbian lawyer (srpski advokat)

Drop Srbija v2 — Team Roster

Drop Srbija v2 — Team Roster

Last Updated: 2026-04-17

Core Team

Role	Agent/Company	Contribution
Product Owner	Alem Basic (CEO)	Vision, funding decisions, bank partnership
Chief Architect	Petter Graff (CodeCraft)	Backend architecture, Kotlin/Ktor implementation
Frontend Lead	Brad Frost (Vizu)	Drop Norway 1:1 port, Serbian localization
QA Lead	Angie Jones (Proveo)	Test pyramid, E2E journeys, validation evidence
Security Lead	Parisa Tabriz (Securion)	Phase 0 security hardening, CORS, rate limiting
DevOps Lead	Kelsey Hightower (FlowForge)	Terraform, Caddy, Azure Container Apps, backup/DR
Fintech Advisor	Markos Zachariadis (Finverge)	NBS IPS integration, bank partnership strategy
Legal Compliance	Thaer (Lexicon)	ZZPL compliance, NBS PI license application
Documentation	Skillforge	BookStack docs, runbooks, decision log
Orchestrator	John (ALAI Director)	Task routing, progress tracking, evidence collection

Specialist Agents by Phase

Phase 0: Security Hardening (Securion)

- **Parisa Tabriz** — Security architect
- **sentinel-architect** — Threat modeling

Deliverables:

- 5 P0 fixes (CORS, EnvGuard, rate limiting, AuditLogger, security CI)
- Security.yml workflow
- EnvGuard validation (12 required env vars)

Phase 1: Frontend Port (Vizu)

- **Brad Frost** — Atomic Design, component library
- **Lea Verou** — CSS architecture, Tailwind optimization

Deliverables:

- 30 pages adapted (NOK→RSD, BankID→OTP, Vipps→NBS IPS)
- 6 Serbian components (JMBGInput, PhoneSRInput, IBANSRInput, PIBInput, NBSIPSTButton, OTPVerifyForm)
- 145 i18n keys (sr + en)
- 2 new pages (onboarding/jmbg, onboarding/nbs-ips)
- 1721/1777 vitest pass (97%)

Phase 2: Backend Modules (CodeCraft)

- **Petter Graff** — Kotlin/Ktor architecture
- **Martin Kleppmann** — Database schema design
- **Bruce Momjian** — PostgreSQL optimization

Deliverables:

- 20 modules ported (auth, user, transactions, recipients, merchants, accounts, ips, kyc, aml, disclosure, complaints, idempotency, rates, notifications, audit, metrics, webhooks, cron, admin, reports, consents, settings, openapi, withdrawal, cards, disputes, dataaccess, health, sms, flags)
- 22 Flyway migrations (V1-V22)
- 617 tests passing (79 test files)
- Koin DI pattern
- Exposed ORM integration

Phase 3: Testing & Observability (Proveo + AgentForge)

- **Angie Jones** — Test pyramid strategy
- **James Bach** — Exploratory testing
- **Lisa Crispin** — Integration test design
- **Dorota Huizinga** — Accessibility testing (axe-core)

Deliverables:

- Test pyramid: 617 unit, 11 integration, 15 E2E, 4 k6 scenarios, 23 axe-core rules, 12 Pact interactions
- Visual regression baseline (Playwright)
- OpenTelemetry (backend + frontend OTLP)
- Sentry (client + server + edge)
- LGTM stack (Prometheus + Grafana + Loki + Tempo)
- 3 Grafana dashboards (overview, infra, errors)
- JaCoCo 52% coverage gate

Phase 4: Infrastructure (FlowForge)

- **Kelsey Hightower** — Kubernetes/container orchestration
- **Hadi Hariri** — Kotlin backend deployment optimization

Deliverables:

- 11 Terraform modules (network, postgres, redis, container-apps, ACR, DNS, secrets, monitoring, backup, IAM, CDN)
- Caddy reverse proxy (prod/staging/dev profiles)
- Backup/DR (RPO 1h, RTO 4h)
- 16 Prometheus alerting rules
- semantic-release + commitlint
- deploy-production.yml workflow
- Vaultwarden secrets (16 secrets + rotation schedule)
- 12 CI/CD workflows

Domain Experts (Advisory)

Expert	Company	Domain	Consulted On
Markos Zachariadis	Finverge	Fintech regulation	NBS IPS integration, bank partnership strategy
Thaer	Lexicon	Legal compliance	ZZPL, ZPNFTM, NBS PI license
Parisa Tabriz	Securion	Security	Phase 0 hardening, security CI

Expert	Company	Domain	Consulted On
Angie Jones	Proveo	QA	Test pyramid, validation evidence

Supporting Teams

Company	Role	Deliverables
CodeCraft	Backend development	Kotlin/Ktor modules, database schema, tests
Vizu	Frontend development	Next.js 15 port, Serbian localization, components
Proveo	Quality assurance	Test pyramid, E2E journeys, validation matrix
Securion	Security	Phase 0 hardening, CORS, rate limiting, audit logging
FlowForge	DevOps	Terraform, Caddy, Azure deployment, backup/DR
Finverge	Fintech advisory	Bank partnership pitch, regulatory strategy
Lexicon	Legal compliance	ZZPL, ZPNFTM, NBS PI license application
Skillforge	Documentation	BookStack pages, runbooks, decision log
AgentForge	AI/ML (future)	Fraud detection (Phase 7), credit scoring (Phase 8)

Communication Channels

- **Task Management:** MC CLI (`node ~/system/tools/mc.js`)
- **Documentation:** BookStack (<https://docs.basicconsulting.no/books/drop-srbija>)
- **Code Repository:** GitHub (`~/ALAI/products/DropSrbija`)
- **Decision Log:** `docs/05-decision-log.md` (synced to BookStack)
- **Slack:** #drop-srbija (agent notifications)

Escalation Path

1. **Tactical Issues (bugs, test failures):** → John → Specialist agent

- 2. **Architectural Decisions (D10-D14):** → Petter Graff → Alem (CEO approval)
- 3. **Legal/Compliance:** → Thaer (Lexicon) → Alem (final sign-off)
- 4. **Regulatory Strategy:** → Markos (Finverge) → Alem
- 5. **Security Incidents:** → Parisa (Securion) → John → Alem (within 4h)

Agent Autonomy Levels

Level	Description	Examples
L0: Query	Answer questions, no code changes	Documentation lookup, status check
L1: Execute	Run commands, tests, builds	<code>./gradlew test</code> , <code>npm run build</code>
L2: Edit	Modify code, commit changes	Bug fixes, test additions
L3: Design	Propose architecture, review PRs	New module design, tech stack choice
L4: Decide	Make binding decisions (CEO-gated)	Legal entity, bank partnership, budget

Drop Srbija Agent Levels:

- **Petter Graff:** L3 (architecture decisions within ALAI standard)
- **Brad Frost:** L3 (frontend architecture, component design)
- **Angie Jones:** L2 (test design, no architecture changes)
- **Parisa Tabriz:** L3 (security architecture)
- **Kelsey Hightower:** L3 (infra architecture)
- **Markos Zachariadis:** L3 (fintech strategy, no binding commitments)
- **Thaer (Lexicon):** L3 (legal advice, CEO final sign-off)
- **John:** L2 (orchestration, no architecture decisions)

Team Principles

- 1. **Evidence Over Claims:** All "done" reports include L2+ machine-verified evidence
- 2. **Specialist Routing:** John routes tasks to company/agent with domain expertise
- 3. **No Generic Builders:** Every task goes to named specialist agent, not "builder" or "minion"
- 4. **Documentation Required:** Skillforge creates BookStack page for every system built
- 5. **Validation Required:** Proveo validates every "done" claim with real evidence
- 6. **CEO Gates Major Decisions:** D10+ architectural decisions require Alem approval

Org Chart: `~/ALAI/org/ORGCHART.md`
Specialist Mapping: `~/system/agents/specialist-mapping.json`
Agent Permissions: `~/claude/projects/-Users-makinja/memory/project_agent_permission_system.md`