

# ServicePro White-Label Super-System

## Complete Fusion & Implementation Plan

**Version:** 2.0 - Repository-Informed

**Date:** November 5, 2025

**Status:** Production-Ready Implementation Plan

**Target:** Multi-Million Dollar Multi-Tenant SaaS Platform

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## Executive Summary

This document provides a **complete, production-grade implementation plan** to fuse Clean Machine Auto Detail (CM) and ServicePro (SP) into a unified whitelabel "super-system." The plan preserves CM's battle-tested features while transforming both into a multi-tenant SaaS platform that any service business owner can deploy with **zero code**.

### Key Tech Stack (Preserved):

- **Frontend:** React + TypeScript + Vite + Tailwind CSS + shadcn/ui
- **Backend:** Express.js + TypeScript (ESM modules)
- **Database:** PostgreSQL (Neon serverless) + Drizzle ORM
- **Auth:** Session-based (express-session + passport-local) + JWT for widget
- **Storage:** Google Drive for photos

### Core Architectural Principles:

1. **Non-destructive migration:** Clean Machine continues as ROOT tenant
  2. **Additive approach:** No breaking changes to working CM features
  3. **Monorepo structure:** Core SDK + Adapters + Tenant isolation
  4. **Onboarding-first UX:** Zero-code setup for non-technical users
  5. **Feature flags:** Safe rollouts, instant rollbacks
  6. **Multi-tenant by default:** Row-level isolation, encrypted secrets vault
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# 1) Architecture & Code Organization

## 1.1 Monorepo Structure (Replit-Compatible)



```
servicepro-monorepo/
├── .replit          # Replit configuration
├── replit.nix       # Nix dependencies
├── package.json     # Workspace root
├── tsconfig.json    # Base TypeScript config
├── turbo.json        # Turborepo for caching
├── .env.example
└── .gitignore

└── packages/
    ├── core/          # Business logic SDK (Clean Machine → ServicePro)
    │   └── src/
    │       ├── scheduling/
    │       │   └── domain/
    │       │       ├── scheduler.ts
    │       │       ├── availability-checker.ts
    │       │       ├── conflict-detector.ts
    │       │       ├── weather-aware-scheduler.ts
    │       │       ├── buffer-calculator.ts
    │       │       ├── recurring-service-engine.ts
    │       │       └── google-calendar-sync.ts
    │       ├── ports/
    │       │   ├── calendar-port.ts
    │       │   ├── weather-port.ts
    │       │   ├── notification-port.ts
    │       │   └── geocoding-port.ts
    │       └── use-cases/
    │           ├── book-appointment.ts
    │           ├── check-availability.ts
    │           ├── reschedule-for-weather.ts
    │           ├── create-recurring-service.ts
    │           ├── process-recurring-batch.ts
    │           └── sync-with-google-calendar.ts
    └── telephony/
        └── domain/
            ├── sms-template-engine.ts
            ├── voice-call-handler.ts
            ├── missed-call-auto-sms.ts
            ├── voicemail-to-sms.ts
            └── consent-tracker.ts
```

```
    ├── tcpa-compliance.ts
    ├── two-leg-calling.ts
    └── click-to-call.ts

    └── ports/
        ├── telephony-provider-port.ts
        ├── transcription-port.ts
        └── recording-storage-port.ts

    └── use-cases/
        ├── send-sms.ts
        ├── handle-incoming-call.ts
        ├── process-voicemail.ts
        ├── auto-respond-missed-call.ts
        ├── initiate-two-leg-call.ts
        ├── track-sms-consent.ts
        └── handle-stop-start-help.ts

    └── weather/
        ├── domain/
            ├── weather-analyzer.ts
            ├── reschedule-rules.ts
            ├── industry-thresholds.ts # Auto-detail vs lawn care
            └── forecast-evaluator.ts

        ├── ports/
            └── weather-provider-port.ts

        └── use-cases/
            ├── check-weather-impact.ts
            ├── auto-reschedule-appointment.ts
            └── notify-customer-of-reschedule.ts

    └── maps/
        ├── domain/
            ├── service-area-validator.ts
            ├── geocoder.ts
            ├── eta-calculator.ts
            └── route-optimizer.ts

        ├── ports/
            └── geocoding-port.ts

        └── use-cases/
            ├── validate-service-area.ts
            ├── calculate-technician-eta.ts
            └── geocode-address.ts
```

```
knowledge-base/
  domain/
    kb-matcher.ts
    response-generator.ts
    confidence-scorer.ts
    sheets-kb-sync.ts # Google Sheets integration
  ports/
    kb-store-port.ts
    ai-provider-port.ts
    sheets-port.ts
  use-cases/
    answer-customer-question.ts
    suggest-ai-response.ts
    sync-kb-from-google-sheets.ts

technicians/
  domain/
    technician-profile.ts
    bio-coach.ts # AI-powered bio improvement
    photo-validator.ts
    onboarding-checklist.ts
    pto-manager.ts
    shift-trader.ts
    applicant-pipeline.ts
    time-tracker.ts
  ports/
    ai-coach-port.ts
    storage-port.ts
    calendar-port.ts
  use-cases/
    create-technician.ts
    improve-bio-with-ai.ts
    inject-profile-in-otw-message.ts
    request-pto.ts
    trade-shift.ts
    track-applicant.ts

billing/
  domain/
    invoice.ts
```

```
    └── third-party-payer.ts # Complex multi-role billing
    └── gift-billing.ts
    └── company-po-billing.ts
    └── deposit-rules.ts
    └── payment-methods.ts
    └── role-based-notifications.ts
    └── ports/
        └── payment-provider-port.ts # Stripe + PayPal
        └── invoice-store-port.ts
        └── notification-port.ts
    └── use-cases/
        └── authorize-third-party-payer.ts
        └── collect-deposit.ts
        └── finalize-invoice.ts
        └── process-gift-payment.ts
        └── handle-company-po.ts
        └── notify-payer-recipient-separately.ts

    └── messaging/
        └── domain/
            └── multi-channel-router.ts # SMS, web, FB, IG
            └── unified-inbox.ts
            └── ai-takeover-manager.ts
            └── manual-override.ts
            └── message-rephraser.ts # GPT-4o-mini
        └── ports/
            └── sms-port.ts
            └── facebook-port.ts
            └── instagram-port.ts
            └── webchat-port.ts
        └── use-cases/
            └── route-inbound-message.ts
            └── send-multi-channel-message.ts
            └── takeover-from-ai.ts
            └── handoff-to-ai.ts
            └── rephrase-message-for-tone.ts

    └── quotes/
        └── domain/
            └── quote-request.ts
            └── photo-analyzer.ts # AI vision for damage assessment
```

```
    |   |   |   |   |   |   damage-assessor.ts
    |   |   |   |   |   |   custom-pricing-engine.ts
    |   |   |   |   |   |   specialty-job-workflow.ts
    |   |   |   |   ports/
    |   |   |   |   |   storage-port.ts # Google Drive
    |   |   |   |   |   ai-vision-port.ts
    |   |   |   |   |   notification-port.ts
    |   |   |   |   use-cases/
    |   |   |   |   |   create-quote-request.ts
    |   |   |   |   |   analyze-damage-photos.ts
    |   |   |   |   |   generate-custom-quote.ts
    |   |   |   |   |   approve-and-book-quote.ts

    |   loyalty/
    |   |   domain/
    |   |   |   points-engine.ts
    |   |   |   tier-manager.ts # Bronze/Silver/Gold/Platinum
    |   |   |   achievement-tracker.ts
    |   |   |   reward-redeemer.ts
    |   |   ports/
    |   |   |   points-store-port.ts
    |   |   |   notification-port.ts
    |   |   use-cases/
    |   |   |   award-points.ts
    |   |   |   check-tier-upgrade.ts
    |   |   |   unlock-achievement.ts
    |   |   |   redeem-reward.ts

    |   ai-chatbot/
    |   |   domain/
    |   |   |   conversation-manager.ts
    |   |   |   intent-classifier.ts
    |   |   |   context-builder.ts
    |   |   |   gpt4o-orchestrator.ts
    |   |   |   booking-assistant.ts
    |   |   |   damage-assessment-assistant.ts
    |   |   |   service-recommender.ts
    |   |   |   |   upsell-detector.ts # Detect selling/lease-return
    |   |   ports/
    |   |   |   ai-provider-port.ts
    |   |   |   kb-port.ts
```

```
    |   |   |   |   |   |   calendar-port.ts
    |   |   |   |   |   |   customer-store-port.ts
    |   |   |   |   |   |   use-cases/
    |   |   |   |   |   |       handle-customer-message.ts
    |   |   |   |   |   |       book-appointment-via-ai.ts
    |   |   |   |   |   |       assess-vehicle-damage.ts
    |   |   |   |   |   |       recommend-service.ts
    |   |   |   |   |   |       suggest-upsell.ts
    |
    |   |   |   |   |   templates/
    |   |   |   |   |       domain/
    |   |   |   |   |           template-engine.ts
    |   |   |   |   |           variable-injector.ts
    |   |   |   |   |           industry-defaults.ts
    |   |   |   |   |           personalization.ts
    |   |   |   |   |           rich-sms-templates.ts # Technician bio + ETA
    |   |   |   |   |   use-cases/
    |   |   |   |   |       render-template.ts
    |   |   |   |   |       validate-template.ts
    |   |   |   |   |       inject-technician-profile.ts
    |   |   |   |   |       generate-otw-message.ts
    |
    |   |   |   notifications/
    |   |   |       domain/
    |   |   |           notification-router.ts
    |   |   |           push-manager.ts # VAPID PWA push
    |   |   |           slack-notifier.ts
    |   |   |           email-notifier.ts
    |   |   |       ports/
    |   |   |           push-port.ts
    |   |   |           slack-port.ts
    |   |   |           email-port.ts
    |   |   |       use-cases/
    |   |   |           send-push-notification.ts
    |   |   |           send-slack-alert.ts
    |   |   |           send-email-campaign.ts
    |
    |   |   shared/
    |   |       errors/
    |   |           domain-error.ts
    |   |           validation-error.ts
```

```
    ├── not-found-error.ts
    └── consent-violation-error.ts
    ├── types/
        ├── common.ts
        ├── value-objects.ts
        └── tenant-context.ts
    ├── validation/
        ├── phone-validator.ts
        ├── email-validator.ts
        ├── address-validator.ts
        └── consent-validator.ts
    └── utils/
        ├── date-time.ts
        ├── formatters.ts
        └── rate-limiter.ts
└── tests/
├── package.json
└── tsconfig.json
```

```
adapters/          # Infrastructure implementations
  src/
    twilio/
      twilio-telephony-adapter.ts
      twilio-webhook-handler.ts
      a2p-registration-service.ts
      messaging-service-manager.ts
      signature-validator.ts
      transcription-adapter.ts
      campaign-helper.ts
    google/
      google-calendar-adapter.ts
      google-maps-adapter.ts
      google-sheets-adapter.ts
      google-drive-adapter.ts
      service-account-manager.ts
    stripe/
      stripe-payment-adapter.ts
      stripe-webhook-handler.ts
      idempotency-manager.ts
      payment-intent-handler.ts
    paypal/
```

```
    ├── paypal-payment-adapter.ts
    └── paypal-webhook-handler.ts
    └── openai/
        ├── openai-adapter.ts
        ├── gpt4o-chatbot.ts
        ├── gpt4o-mini-rephraser.ts
        ├── bio-coach-impl.ts
        ├── vision-analyzer.ts
        └── kb-assistant.ts
    └── email/
        ├── sendgrid-adapter.ts
        └── email-template-renderer.ts
    └── social/
        ├── facebook-messenger-adapter.ts
        ├── instagram-dm-adapter.ts
        └── social-webhook-handler.ts
    └── weather/
        └── open-meteo-adapter.ts
    └── storage/
        ├── google-drive-storage.ts
        └── s3-storage-fallback.ts
    └── notifications/
        ├── slack-adapter.ts
        └── vapid-push-adapter.ts
    └── tests/
    └── package.json
    └── tsconfig.json

    └── database/          # Data layer with Drizzle ORM
        └── src/
            └── schema/
                ├── tenants.ts
                ├── tenant-settings.ts
                ├── tenant-integrations.ts
                ├── users.ts
                ├── customers.ts
                ├── appointments.ts
                ├── services.ts
                ├── recurring-services.ts
                ├── messages.ts
                └── quote-requests.ts
```

```
    └── employee-profiles.ts
    └── loyalty-points.ts
    └── loyalty-tiers.ts
    └── achievements.ts
    └── third-party-contacts.ts
    └── push-subscriptions.ts
    └── call-logs.ts
    └── industry-packs.ts
    └── feature-flags.ts
    └── docs.ts
    └── widget-tokens.ts
    └── audit-logs.ts
    └── consent-logs.ts
    └── index.ts
    └── repositories/
        └── base-repository.ts
        └── tenant-repository.ts
        └── user-repository.ts
        └── customer-repository.ts
        └── appointment-repository.ts
        └── service-repository.ts
        └── recurring-service-repository.ts
        └── message-repository.ts
        └── quote-repository.ts
        └── technician-repository.ts
        └── loyalty-repository.ts
        └── third-party-contact-repository.ts
        └── call-log-repository.ts
        └── industry-pack-repository.ts
        └── feature-flag-repository.ts
        └── docs-repository.ts
        └── consent-log-repository.ts
    └── migrations/
        └── 0001_baseline_clean_machine.sql
        └── 0002_add_tenants_table.sql
        └── 0003_add_tenant_id_to_users.sql
        └── 0004_add_tenant_id_to_customers.sql
        └── 0005_add_tenant_id_to_appointments.sql
        └── 0006_add_tenant_id_to_all_tables.sql
        └── 0007_backfill_root_tenant.sql
        └── 0008_create_secrets_vault_table.sql
```

```
    ├── 0009_create_industry_packs.sql
    ├── 0010_seed_industry_packs.sql
    ├── 0011_create_feature_flags.sql
    ├── 0012_create_docs_table.sql
    ├── 0013_create_widget_tokens.sql
    ├── 0014_create_audit_logs.sql
    ├── 0015_create_consent_logs.sql
    ├── 0016_add_composite_indexes.sql
    └── rollback/
        └── [reverse migrations]
    └── seeds/
        ├── 0001_root_tenant_clean_machine.ts
        ├── 0002_industry_packs.ts
        ├── 0003_demo_tenant.ts
        ├── 0004_docs_content.ts
        └── 0005_default_feature_flags.ts
    └── db.ts
    └── migrate.ts
    └── drizzle.config.ts
    └── tests/
    └── package.json
    └── tsconfig.json

    └── shared          # Shared utilities
        └── src/
            ├── tenant-context/
            │   ├── tenant-context.ts
            │   ├── tenant-resolver.ts # Subdomain + custom domain
            │   └── tenant-middleware.ts
            ├── secrets-vault/
            │   ├── vault-client.ts
            │   ├── encryption-service.ts # AES-256-GCM
            │   ├── key-rotation-service.ts
            │   └── secrets-cache.ts
            ├── feature-flags/
            │   ├── flag-service.ts
            │   ├── flag-evaluator.ts
            │   └── flag-middleware.ts
            └── auth/
                ├── session-service.ts # express-session
                └── passport-local-strategy.ts
```

```
    |   |   ├── password-hasher.ts # bcrypt
    |   |   ├── jwt-service.ts # For widget tokens
    |   |   └── widget-token-service.ts
    |   └── logging/
```