Functional Requirements Specification

Functional Requirements Specification (FRS): Bilko

> **Project:** Bilko — Balkan Accounting SaaS **Version:** 0.1 **Date:** 2026-02-23 **Author:** John (AI Director) **Status:** Draft **Reviewers:** Alem Bašić (CEO)

Document History

Version	Date	Author	Changes
0.1	2026-02-23	John (AI Director)	Initial draft — Phase 1 Serbia MVP

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1. System Overview

System Name: Bilko — Balkan Accounting SaaS **System Purpose:** Bilko is a cloud-based accounting platform for Balkan SMBs that handles e-invoicing (Serbian SEF), expense tracking, double-entry bookkeeping, bank reconciliation, VAT/PDV management, and financial reporting. It provides a simple, compliant, affordable alternative to legacy ERP systems, accessible from any browser.

System Context Diagram:

```
graph TB
    subgraph "Bilko Platform"
        UI[Web App\nNext.js 15 + React 19]
        API[Backend API\nExpress + TypeScript]
```

```
    DB[(PostgreSQL\nPrisma ORM)]
end
U1[SMB Owner] -->|Uses| UI
U2[Accountant] -->|Uses| UI
U3[Viewer / Employee] -->|Read-only| UI
API -->|Reads/Writes| DB
API -->|Submits e-invoices| SEF[SEF Platform\nefaktura.gov.rs]
API -->|Sends invoice PDFs| EMAIL[Email Provider\nTransactional]
API -->|Fetches rates| FX[Exchange Rate API\nECB / fixer.io]
ADM[Admin\nOrg Owner] -->|Manages org + users| UI
```

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2. Actors & Personas

Actor ID	Actor Name	Type	Description	Access Level
ACT-01	Organization Owner	Human	Business owner who created the Bilko account; full control	Owner role — all permissions
ACT-02	Admin	Human	Designated admin (accountant or office manager)	Admin role — all except billing
ACT-03	Accountant	Human	External bookkeeper managing the organization's books	Accountant role — financial data, reports; cannot delete
ACT-04	Viewer	Human	Employee or partner with read-only access	Viewer role — read only
ACT-05	SEF Platform	System	Serbian government e-invoice platform	External API
ACT-06	Email Provider	System	Transactional email for invoice delivery	External API
ACT-07	Exchange Rate API	System	Currency rate provider (ECB / fixer.io)	External API

Persona Detail

Persona: Marko Petrović — SMB Owner

- **Role:** Owner of a 8-person IT consulting firm in Belgrade

- **Goal:** Create and submit SEF invoices fast; see real-time P&L; file PDV without an accountant
- **Pain Points:** SEF portal is slow; Pantheon is complex; doesn't understand bookkeeping jargon
- **Tech Savviness:** Medium — uses Google Suite, smartphones, but not accounting software
- **Frequency of Use:** Daily (invoices) + monthly (PDV report)

Persona: Ana Nikolić — Accountant

- **Role:** Independent bookkeeper managing 12 SMB clients
- **Goal:** Access all client organizations from one login; export VAT reports in required formats
- **Pain Points:** Each client uses different software; reconciliation takes too long each month
- **Tech Savviness:** High — experienced with accounting software, Excel, CSV workflows
- **Frequency of Use:** Daily across multiple client orgs

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3. Functional Requirements

3.1 Module: Authentication & User Management

Module Overview

Handles user registration, login, session management, organization creation, and role-based access control (RBAC). Multi-tenant: one user can belong to multiple organizations.

FR-001: User Registration

Attribute	Value
Module	Authentication
Priority	Must Have
Trace	BR-014
UI Reference	`/auth/register` page

Description: A new user registers with email and password. On successful registration, a verification email is sent and a default organization is created for the user with Owner role.

Acceptance Criteria:

☐ **Given** a valid, unregistered email and strong password (≥8 chars, 1 uppercase, 1 number), **when** user submits registration form, **then** account is created, verification email sent, user redirected to email verification page

☐ **Given** an already-registered email, **when** user submits, **then** error "An account with this email already exists" shown; no account created

☐ **Given** password does not meet complexity rules, **when** user submits, **then** inline validation error shown before submission

Data Requirements:

- Input: email (unique), password, full name, organization name
- Output: user record, organization record, Owner role assignment, verification token
- Validation: email format, password complexity, uniqueness check

Business Rules: RUL-08 (org scoping from first login)

FR-002: User Login

Attribute	Value
Module	Authentication
Priority	Must Have
Trace	BR-014
UI Reference	`/auth/login` page

Description: Authenticated users log in with email and password. Returns JWT access token (15-min TTL) + refresh token (30-day TTL).

Acceptance Criteria:

☐ **Given** valid credentials, **when** user submits login, **then** JWT issued, user redirected to dashboard

☐ **Given** invalid credentials, **when** user submits, **then** generic error "Invalid email or password" (no user enumeration)

☐ **Given** 5 consecutive failed attempts, **when** user tries again, **then** account locked for 15 minutes

☐ **Given** idle session > 30 minutes, **when** user attempts action, **then** redirected to login

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FR-003: Invite User to Organization

Attribute	Value

Module	Authentication
Priority	Must Have
Trace	BR-007
UI Reference	`/settings/team` page

Description: Organization Owner or Admin can invite users by email with a specific role (Admin, Accountant, Viewer). Invited user receives email with accept link; on acceptance, they are added to the organization with the assigned role.

Acceptance Criteria:

- ☐ **Given** an Owner invites user@email.com as Accountant, **when** invite is sent, **then** invitation email received within 2 minutes with unique accept link
- ☐ **Given** invited user accepts link within 48 hours, **when** they register or log in, **then** added to organization with Accountant role
- ☐ **Given** invite link expires (48h), **when** user clicks link, **then** error shown with option to request new invite

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3.2 Module: Invoicing

Module Overview

Core invoicing functionality. Create, edit, preview, send, and track invoices. For Serbia: automatic SEF submission on send. Multi-currency. PDF generation with client/Bilko branding.

FR-010: Create Invoice

Attribute	Value
Module	Invoicing
Priority	Must Have
Trace	BR-001, BR-002, BR-004, BR-008
UI Reference	`/invoices/create` — 6-step wizard

Description: User creates a new invoice by selecting a client (Contact), adding line items with quantities and unit prices, selecting currency and PDV rate. System auto-calculates PDV and totals. Preview shows PDF representation before sending.

Acceptance Criteria:

☐ **Given** an authenticated user, **when** they complete the 6-step invoice wizard with valid data, **then** invoice is created in Draft status with correct PDV calculation

☐ **Given** Serbian PDV rate of 20%, **when** line item total is 1000 RSD, **then** PDV = 200 RSD, total = 1200 RSD

☐ **Given** multi-currency invoice in EUR, **when** created, **then** exchange rate at transaction date is locked and stored

☐ **Given** invoice is in Draft, **when** user sends it, **then** status changes to Sent, PDF emailed to client, SEF submission initiated (Serbia)

Data Requirements:

- Input: client (Contact), invoice_date, due_date, currency, line_items (description, qty, unit_price, vat_rate), notes
- Output: Invoice record with auto-generated invoice_number, PDV amounts, total_amount in NUMERIC(19,4)
- Validation: due_date > invoice_date; at least one line item; contact required

Business Rules: RUL-01 (NUMERIC), RUL-02 (double-entry on payment), RUL-05 (sequential numbering), RUL-06 (PDV rate selection)

FR-011: SEF E-Invoice Submission (Serbia)

Attribute	Value
Module	Invoicing
Priority	Must Have
Trace	BR-001
UI Reference	Automatic on invoice send; status shown in invoice detail

Description: When a user sends an invoice for a Serbian B2B transaction, Bilko automatically submits the invoice to SEF (efaktura.gov.rs) in UBL 2.1 XML format. SEF status (sent, accepted, rejected) is tracked and displayed.

Acceptance Criteria:

☐ **Given** a Serbian B2B invoice is sent, **when** the send action is triggered, **then** UBL 2.1 XML is generated and submitted to SEF API within 30 seconds

☐ **Given** SEF accepts the invoice, **when** success response received, **then** invoice SEF status updated to "Accepted" and SEF invoice ID stored

☐ **Given** SEF rejects the invoice, **when** rejection response received, **then** user is notified with the rejection reason from SEF; invoice stays in Sent status pending correction

☐ **Given** SEF API is unavailable, **when** submission attempted, **then** invoice queued for retry; user notified; max 3 retries with exponential backoff

Data Requirements:

- Input: Invoice record + organization SEF credentials
- Output: SEF invoice ID, submission timestamp, SEF status
- Validation: Required SEF fields present (buyer tax ID, invoice type, issue date)

FR-012: Track Invoice Status

Attribute	Value
Module	Invoicing
Priority	Must Have
Trace	BR-001, BR-008

Description: Invoices progress through status states: Draft → Sent → SEF Accepted → Paid / Overdue. Users can mark invoices as paid, add payment date and amount.

Acceptance Criteria:

☐ **Given** invoice is Sent, **when** user marks as paid with payment date and amount, **then** status changes to Paid and payment transaction auto-created

☐ **Given** invoice is Sent and due_date has passed, **when** system checks daily, **then** status automatically changes to Overdue

☐ **Given** a list of invoices, **when** user filters by status, **then** only matching invoices shown

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3.3 Module: Expense Tracking

Module Overview

Record business expenses with categorization, multi-currency support, and receipt attachment. Feeds double-entry bookkeeping automatically.

FR-020: Create Expense

Attribute	Value
Module	Expenses
Priority	Must Have

Attribute	Value
Trace	BR-009
UI Reference	`/expenses/create`

Description: User records a business expense with vendor, amount, currency, category, payment method, and optional receipt photo. System auto-creates the double-entry transaction.

Acceptance Criteria:

- ☐ **Given** valid expense data, **when** user submits, **then** expense saved with debit to expense account + credit to payment account
- ☐ **Given** a foreign currency expense, **when** created, **then** exchange rate at expense date locked and stored; amount also shown in base currency
- ☐ **Given** receipt image uploaded (JPG/PNG/PDF, max 10MB), **when** expense saved, **then** receipt stored and accessible from expense record

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3.4 Module: Double-Entry Bookkeeping

Module Overview

The accounting engine. Every financial event generates balanced debit + credit Transaction entries. Supports Chart of Accounts per Balkan GAAP (Serbian Kontni Okvir 2021).

FR-030: Chart of Accounts

Attribute	Value
Module	Bookkeeping
Priority	Must Have
Trace	BR-003, BR-010
UI Reference	`/settings/accounts`

Description: Every organization is seeded with the Serbian Kontni Okvir (Chart of Accounts) per Pravilnik 2021 on creation. Accountants can add custom sub-accounts. Pre-populated accounts cover all 10 account classes (0-9).

Acceptance Criteria:

- ☐ **Given** a new Serbian organization is created, **when** setup completes, **then** all standard Kontni Okvir accounts are pre-populated (Classes 0-9)

☐ **Given** an accountant adds a custom sub-account under 411, **when** saved, **then** account 411xxx appears in Chart of Accounts and is available in transaction entry

☐ **Given** an account has transactions, **when** user attempts to delete it, **then** deletion blocked with explanation

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FR-031: Double-Entry Transaction Recording

Attribute	Value
Module	Bookkeeping
Priority	Must Have
Trace	BR-003
UI Reference	Auto-generated; viewable in `/bookkeeping/journal`

Description: Every financial event (invoice paid, expense recorded, bank reconciliation) automatically generates a balanced Transaction record with debitAccountId, creditAccountId, and amount in NUMERIC(19,4).

Acceptance Criteria:

☐ **Given** an invoice of 1200 RSD (1000 + 200 PDV) is marked paid, **when** payment recorded, **then** Transaction created: Debit 1200 (bank account), Credit 1000 (revenue), Credit 200 (PDV payable)

☐ **Given** any transaction is created, **when** saved, **then** sum of all debits = sum of all credits (ACID enforcement)

☐ **Given** a transaction is created, **when** user attempts to delete it, **then** soft-delete only — LoggedAction records the deletion; original data preserved

Business Rules: RUL-01, RUL-02, RUL-03, RUL-04

3.5 Module: Bank Reconciliation

Module Overview

Import bank statements via CSV upload. Auto-match transactions. Manual reconciliation for unmatched items.

FR-040: Bank Statement CSV Import

Attribute	Value

Module	Banking
Priority	Must Have
Trace	BR-005
UI Reference	`/banking` page

Description: Users upload bank statement CSV files (Serbian bank format). System parses transactions and attempts to auto-match with existing invoices/expenses by amount and date proximity.

Acceptance Criteria:

- ☐ **Given** a valid CSV in supported Serbian bank format, **when** uploaded, **then** all transactions parsed and displayed for review
- ☐ **Given** parsed transaction matches an open invoice by amount ± 5%, **when** suggested, **then** match highlighted for user confirmation
- ☐ **Given** unmatched transaction, **when** user manually matches or categorizes, **then** Transaction and double-entry entry created

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3.6 Module: VAT / PDV Management

Module Overview

Auto-calculate, track, and generate PDV reports for monthly filing with Poreska Uprava (Serbia).

FR-050: PDV Report Generation

Attribute	Value
Module	VAT/PDV
Priority	Must Have
Trace	BR-002, BR-006
UI Reference	`/reports/vat`

Description: System aggregates all VAT-applicable transactions for a period and generates the PDV report in the format required by Poreska Uprava. Export in PDF and XML/JSON formats.

Acceptance Criteria:

- ☐ **Given** a reporting period (month), **when** user generates PDV report, **then** all sales PDV and input PDV correctly summed; net PDV payable/refundable calculated

☐ **Given** PDV report generated, **when** user exports, **then** PDF and XML export available; XML format compatible with ePorezi portal

☐ **Given** zero PDV period, **when** report generated, **then** zero report generated correctly (still required by law)

3.7 Module: Financial Reports

Module Overview

P&L Statement, Balance Sheet, Cash Flow Statement — generated from double-entry transaction data. PDF and Excel export.

FR-060: Profit & Loss Statement

Attribute	Value
Module	Reports
Priority	Must Have
Trace	BR-006
UI Reference	`/reports` hub

Acceptance Criteria:

☐ **Given** a date range, **when** P&L generated, **then** all revenue and expense accounts summarized; net profit/loss calculated and matches double-entry totals

☐ **Given** multi-currency org, **when** P&L generated, **then** all amounts shown in base currency using locked exchange rates

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FR-061: Balance Sheet

Attribute	Value
Module	Reports
Priority	Must Have
Trace	BR-006

Acceptance Criteria:

☐ **Given** any date, **when** Balance Sheet generated, **then** Assets = Liabilities + Equity (double-entry balance enforced)

☐ **Given** Balance Sheet is unbalanced (should be impossible), **when** detected, **then** alert raised immediately for investigation

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3.8 Module: Multi-Currency

Module Overview

Support BAM, RSD, EUR, USD. Exchange rates fetched daily from ECB / fixer.io. Rates locked at transaction date per IFRS requirements.

FR-070: Exchange Rate Management

Attribute	Value
Module	Multi-Currency
Priority	Must Have
Trace	BR-004

Acceptance Criteria:

☐ **Given** a transaction in non-base currency, **when** created, **then** exchange rate at transaction date is fetched, stored, and locked — cannot be edited later

☐ **Given** ECB rate API unavailable, **when** transaction attempted, **then** system uses cached rate (max 24h old) or prompts user for manual entry

☐ **Given** organization base currency is RSD, **when** EUR invoice created, **then** both EUR amount and RSD equivalent stored; reports show RSD

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4. Use Case Diagrams

4.1 Core Workflows

```
graph LR
    Owner((Owner)) --> UC1[FR-001: Register]
    Owner --> UC2[FR-010: Create Invoice]
    Owner --> UC3[FR-011: Submit to SEF]
    Owner --> UC4[FR-050: Generate PDV Report]
    Owner --> UC5[FR-060: View P&L]
```

```
    Accountant((Accountant)) --> UC2
    Accountant --> UC6[FR-030: Manage Chart of Accounts]
    Accountant --> UC7[FR-031: Record Manual Transaction]
    Accountant --> UC4
    Accountant --> UC8[FR-040: Import Bank CSV]
    Viewer((Viewer)) --> UC9[View Reports — Read Only]
    SEF((SEF API)) --> UC3
```

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5. System Behavior Specifications

5.1 Error Handling

- All user-facing errors display human-readable Serbian/English message (no stack traces)
- All errors logged with correlation ID, timestamp, user ID (if authenticated), and action
- Validation errors shown inline, adjacent to the invalid field
- SEF API errors: show SEF's rejection reason in user-readable format + link to fix

5.2 Data Persistence

- All financial data persisted within 500ms of user action
- Optimistic UI updates rolled back if server confirmation fails
- All mutations (create/update/delete) audited in LoggedAction with user ID and timestamp

5.3 Session & State

- Session timeout: 30 minutes of inactivity (JWT expiry)
- Refresh token: 30-day rolling TTL
- Concurrent sessions: allowed (mobile + desktop)
- Browser refresh: state restored from server (no stale data)

5.4 Notifications

- Email notifications: invoice sent, invoice paid, SEF acceptance/rejection, account invitation
- In-app notifications: overdue invoices, PDV filing reminder (14th of month), bank import complete
- All marketing emails include unsubscribe link (GDPR)

5.5 Accessibility

- WCAG 2.1 Level AA compliance
- Keyboard navigation for all interactive elements
- Screen reader compatibility (Radix UI / shadcn ARIA labels)
- Color contrast ratio ≥ 4.5:1 (Bilko mint green #00E5A0 on dark backgrounds verified)

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6. Requirements Summary Table

ID	Feature Name	Module	Priority	Status	Trace
FR-001	User Registration	Authentication	Must Have	Draft	BR-014
FR-002	User Login	Authentication	Must Have	Draft	BR-014
FR-003	Invite User to Organization	Authentication	Must Have	Draft	BR-007
FR-010	Create Invoice	Invoicing	Must Have	Draft	BR-001, BR-002, BR-004, BR-008
FR-011	SEF E-Invoice Submission	Invoicing	Must Have	Draft	BR-001
FR-012	Track Invoice Status	Invoicing	Must Have	Draft	BR-001, BR-008
FR-020	Create Expense	Expenses	Must Have	Draft	BR-009
FR-030	Chart of Accounts	Bookkeeping	Must Have	Draft	BR-003, BR-010
FR-031	Double-Entry Transaction Recording	Bookkeeping	Must Have	Draft	BR-003
FR-040	Bank Statement CSV Import	Banking	Must Have	Draft	BR-005
FR-050	PDV Report Generation	VAT/PDV	Must Have	Draft	BR-002, BR-006
FR-060	P&L Statement	Reports	Must Have	Draft	BR-006
FR-061	Balance Sheet	Reports	Must Have	Draft	BR-006
FR-070	Exchange Rate Management	Multi-Currency	Must Have	Draft	BR-004

Requirements Count:

- Must Have: 14
- Should Have: 0 in this document (Croatian eRačun in Phase 2 FRS)
- Could Have: 0
- Won't Have (Phase 1): Payroll, AI bookkeeping, live bank feeds

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7. Traceability to Business Requirements

FR ID	Feature Name	Business Requirement (BR ID)	Business Objective (BO ID)
FR-001	User Registration	BR-014	BO-01
FR-002	User Login	BR-014	BO-01
FR-003	Invite User	BR-007	BO-02
FR-010	Create Invoice	BR-001, BR-002, BR-004, BR-008	BO-01, BO-02
FR-011	SEF Submission	BR-001	BO-01
FR-012	Invoice Status Tracking	BR-001, BR-008	BO-02
FR-020	Create Expense	BR-009	BO-02
FR-030	Chart of Accounts	BR-003, BR-010	BO-01
FR-031	Double-Entry Recording	BR-003	BO-01
FR-040	Bank CSV Import	BR-005	BO-02
FR-050	PDV Report	BR-002, BR-006	BO-01, BO-03
FR-060	P&L Statement	BR-006	BO-03
FR-061	Balance Sheet	BR-006	BO-01, BO-03
FR-070	Exchange Rates	BR-004	BO-01

> Full traceability matrix: `RTM.md`

Approval

Role	Name	Date	Signature
Author	John (AI Director)	2026-02-23	
Reviewer			
Business Analyst	John	2026-02-23	
Tech Lead	John	2026-02-23	
Product Owner	John	2026-02-23	

Role	Name	Date	Signature
AI Director (John)	John	2026-02-23	
CEO (Alem)	Alem Bašić		

Revision #3
Created 2026-02-24 22:50:50 UTC by John
Updated 2026-05-31 20:03:47 UTC by John