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Checkmate Technologies, LDA
NUIT: 402181389
Mozambique, Cidade de Maputo, Mavalane - B
+258846248072
info@checkmate.co.mz
https://checkmate.co.mz

USSD Architecture — Checkmate Technologies — November 2026

This document describes the **USSD architecture** (*123#) used by **Checkmate Technologies, LDA** for enterprise clients in Mozambique. It shows how the **end user**, the **Mobile Network Operator (MNO)**, **Checkmate** and the **client business systems** interact.

1. What is USSD in this context?

USSD (Unstructured Supplementary Service Data) allows interactive menus on any mobile phone (including feature phones), without internet data. The user dials a short code (e.g. ***123#**), navigates menus and receives responses within a short session managed by the mobile network.

2. Actors in the architecture

A — End user (MSISDN)

Customer / citizen / employee who dials the short code on a Movitel, Vodacom, Tmcel or other network handset.

B — Mobile Network Operator (MNO)

Owns the radio network and the **USSD gateway**. Routes USSD sessions for the short code to the application endpoint. Examples in Mozambique: **Movitel**, **Vodacom**, **Tmcel** (as applicable). Commercial activation of the short code and gateway access are agreed between the **client** and the MNO.

C — Checkmate Technologies, LDA (USSD platform)

Operates menus, session state, business rules orchestration, logging and integration with the client API. Handles technical integration with the MNO gateway (sandbox and production) when in the recommended hosting model.

D — Client enterprise systems

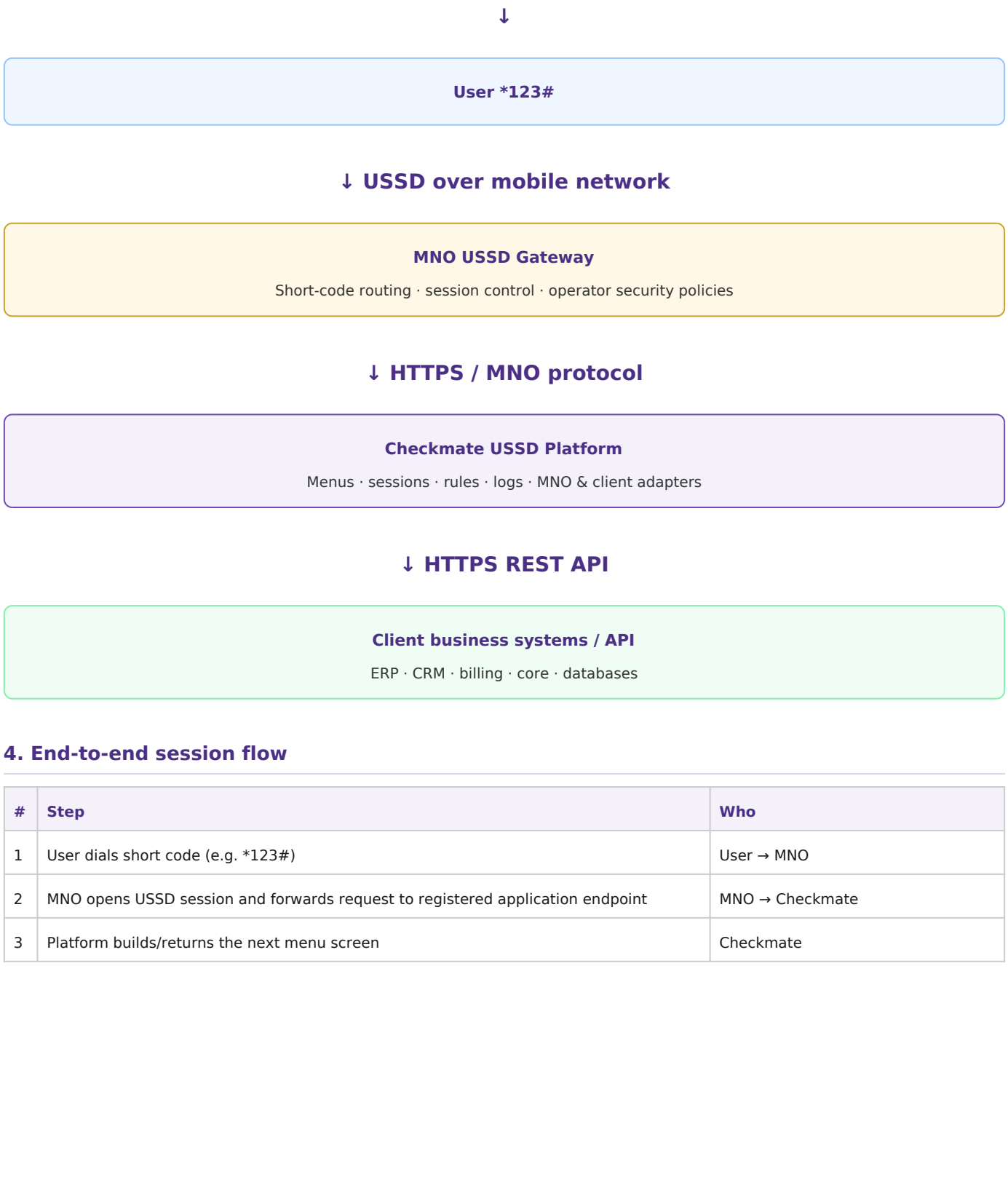
ERP, CRM, billing, core banking, web portal or custom APIs that hold the business data and final decisions (balance, registration, approval, etc.).

3. Logical architecture (recommended model)

Recommended model: Checkmate hosts the USSD application layer; the client exposes a secure business API. The client does **not** need a dedicated USSD server or a direct VPN to the MNO for USSD in this model.

Layer	Component	Responsibility

Access	Handset + MNO radio	User dials short code; MNO authenticates and opens USSD session
Network	MNO USSD Gateway	Maps short code → application URL/callback; enforces session timeout
Application	Checkmate USSD platform	Menus, session, validation, orchestration, audit logs
Integration	HTTPS REST (JSON)	Checkmate ↔ client API (token / API key / mTLS as agreed)
Business	Client systems	Authoritative data and business logic



4. End-to-end session flow

#	Step	Who
1	User dials short code (e.g. *123#)	User → MNO
2	MNO opens USSD session and forwards request to registered application endpoint	MNO → Checkmate
3	Platform builds/returns the next menu screen	Checkmate

4	When business data is required, platform calls client API	Checkmate → Client
5	Client returns result (JSON); platform formats USSD response	Client → Checkmate → MNO → User
6	Session continues until completion, cancel or timeout (typically 60–180 s, per MNO)	All

5. Role of the MNO (important for clients)

- **Short-code ownership / commercial relationship** with the MNO is the **client's responsibility** (activation, tariffs, SLA with the operator).
- The MNO provides the **USSD gateway**, sandbox and production credentials/URLs as per its specification.
- Delivery timelines for USSD projects often depend partially on **MNO cooperation** (gateway access, whitelist, short-code provisioning).
- Checkmate integrates technically with the gateway once access is granted; Checkmate does **not** replace the client in negotiating the MNO partnership for the client's short code.

6. Alternative model (client self-hosted USSD)

If the client hosts the USSD application itself, the MNO gateway points to the client infrastructure. Connectivity may require a public IP and/or **IPsec VPN** with the MNO, plus local servers, Redis/sessions and databases. This model is optional and sized per project (see technical requirements document).

7. Security & compliance (summary)

- HTTPS/TLS on external interfaces; secrets outside source code.
- Input validation on every menu step; PIN attempt limits where applicable.
- Separate DEV / UAT / PROD environments.
- Audit logs (session / MSISDN / timestamp) with agreed retention.
- Alignment with **INCM** requirements and data-protection obligations in Mozambique.

8. Related documents & contact

- Technical requirements: available from Checkmate (USSD integration requirements PDF).
- Website: **https://checkmate.co.mz**
- Email: **info@checkmate.co.mz**

Informative architecture overview — November 2026. Commercial terms, SLAs and sizing are confirmed in t… and requirements phase.

