# **Pre-Coding Essentials (Component: crates/vm\_report/src/structure.rs, Version/FormulaID: VM-ENGINE v0) — 63/89**

## **1) Goal & Success**

**Goal:** Define the **report data model** (pure structs + mappers) that mirrors Doc 7’s **section order, bindings, and precision**, sourcing data only from Result, optional FrontierMap, and RunRecord.

**Success:** Building the model from identical artifacts yields identical content; sections appear **exactly** in Doc 7 order; percentages in the model are **already one-decimal formatted** for renderers.

## **2) Scope**

**In scope:** Define ReportModel sub-sections (§1–§10) and **mapping helpers** from artifacts; embed the **approval-denominator statement** toggle for approval ballots; carry footer identifiers.

**Out of scope:** File I/O, template rendering, external assets. (Renderers consume this model.)

## **3) Inputs → Outputs (with schemas/IDs)**

**Inputs:** Result (RES), optional FrontierMap (FR), RunRecord (RUN); Parameter names indirectly via Result/RunRecord.

**Output:** ReportModel with sections:

**Cover & Snapshot** (label; VM-VAR snapshot; registry/date)

**Eligibility & Rolls** (policy, provenance, totals, per-unit quorum note)

**Ballot** (method; approval-denominator sentence when applicable)

**Legitimacy Panel** (quorum/majority/double-majority/symmetry, pass/fail)

**Outcome/Label** (Decisive/Marginal/Invalid + reason)

**Frontier** (map/status + diagnostics/counters)

**Sensitivity** (±1 pp/±5 pp table, or “N/A”)

**Integrity & Reproducibility** (ID list; footer values)

**Fixed footer** fields (duplicated for convenience)

## **4) Entities/Tables (minimal)**

## **5) Variables (only ones used here)**

**Display only:** VM-VAR values printed from ParameterSet snapshot (no computation here). Include **approval-rate denominator** sentence flag for approval ballots.

## **6) Functions (signatures only)**

rust

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pub struct ReportModel { /\* sections per Doc 7A \*/ }

pub fn model\_from\_artifacts(result: &ResultDb, run: &RunRecordDb, frontier: Option<&FrontierMapDb>)

-> ReportModel;

fn map\_cover\_snapshot(..) -> CoverSnapshot;

fn map\_eligibility(..) -> EligibilityBlock;

fn map\_ballot(..) -> BallotBlock; // sets approval\_denominator\_sentence = true/false

fn map\_panel\_from\_gates(..) -> LegitimacyPanel;

fn map\_outcome\_from\_result(..) -> OutcomeBlock;

fn map\_frontier(..) -> Option<FrontierBlock>;

fn map\_sensitivity(..) -> Option<SensitivityBlock>;

fn map\_integrity\_footer(..) -> (IntegrityBlock, FooterIds);

// helpers: one-decimal formatters (percent, pp), ID/label extractors.

## **7) Algorithm Outline**

**Extract** identifiers & VM-VAR snapshot for snapshot box.

**Eligibility:** copy policy VM-VAR-028; provenance; sum turnout; add per-unit quorum note if VM-VAR-021 > 0.

**Ballot:** choose wording by ballot type; if approval, set approval\_denominator\_sentence=true.

**Panel:** bind gate values & pass/fail strictly from Result.gates.

**Outcome:** copy label + reason from Result.

**Frontier:** if FR present, map per-Unit status/band and diagnostics; mirror mediation/protected flags.

**Sensitivity:** include 2×3 table only if scenarios exist; else “N/A (not executed)”.

**Integrity & footer:** fill identifiers from RunRecord; include Result/Frontier IDs.

**Precision:** preformat all %/pp to **one decimal**; seats as integers.

## **8) State Flow (very short)**

Called by vm\_report::lib after packaging; **reads** artifacts only; **no external assets**.

## **9) Determinism & Numeric Rules**

No recomputation of gate math; **no double rounding**; all lists keep the same order as artifacts; **one-decimal** applied once here.

## **10) Edge Cases & Failure Policy**

**Validation/gates failed:** ensure Frontier is **omitted**, model carries “Invalid” text blocks accordingly.

**Frontier absent:** set frontier=None; still build other sections.

**Bilingual builds:** structure supports full **mirrored** models; never mix languages in one paragraph.

## **11) Test Checklist (must pass)**

Section order matches Doc 7; all values sourced from artifacts; approval-denominator sentence toggles correctly; footer IDs match RunRecord/Result.