

OSR Specification

The Outcome System Result Framework

Version 2.0

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Authored and published by PathFwd, LLC

The Outcome System Result Specification defines the formal grammar for governing outcomes in agentic systems, organized as a five-tier causal architecture from the Primary Outcome down to individual Milestones, with explicit relationships between every tier.

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Abstract

The Outcome System Result (OSR) Specification defines a five-tier causal architecture for governing outcomes in complex systems. The five tiers are the Primary Outcome (PO), Performance Lever (PL), Support Outcome (SO), Flow Rate (FR), and Milestone (MS). Each tier has a defined formal grammar consisting of mandatory and optional bracketed elements. The specification is precise enough to be machine-checked and readable enough to be implemented by hand.

OSR is designed for systems whose outcomes compound over time and whose state cannot be reduced to a single metric. It is the foundation of the PathFwd Open Standard, which also includes the OGS-1 conformance standard, the Causal Phase Protocol (CPP), the Decision Compliance Protocol (DCP), and the Decision Schema. Implementations are expected to be model-verified against a system dynamics simulation of the governed system.

Status of this document

This is OSR Specification v2.0, published April 2026. It supersedes OSR Specification v1.x in full.

This document is published under Creative Commons Attribution 4.0 International (CC BY 4.0). It is a living specification: errata and clarifications are issued as v2.x point releases. Substantive additions or breaking changes are reserved for v3.0.

Implementers seeking the OSR Verified certification mark must conform to all MUST clauses in Section 11. Conformance against SHOULD clauses is recommended but not required.

Conformance keywords

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL in this document are to be interpreted as described in RFC 2119 when, and only when, they appear in all uppercase.

Related specifications

OSR is the foundation of the PathFwd Open Standard. The full standard family consists of five specifications. Each builds on the OSR Specification and is conformant with this document by reference.

Specification	Role	Status
OSR Spec v2.0 (this	The five-tier causal architecture and formal grammar.	Live

Specification	Role	Status
document)		
OGS-1 v1.0	Outcome Governance Standard. Defines what conformance with OSR looks like for assessment and certification.	Draft
CPP v1.0	Causal Phase Protocol. Defines the sequencing intelligence that determines which Performance Lever dominates at each phase of the system.	Draft
DCP v1.0	Decision Compliance Protocol. Defines the runtime handshake that validates agent decisions against the OSR state before execution.	Draft
Decision Schema v1.0	The JSON wire format for L1 decisions in DCP. Used by all implementations of the Decision Compliance Protocol.	Draft

Change log

v2.0 (April 2026) — additions to the formal grammar

Three new mandatory or recommended elements were added to the formal grammar in v2.0. Two design guidance sections were added. Tier 2 terminology was unified across the PathFwd Open Standard family. All v2.0 additions are explicitly marked NEW throughout this document.

- **Measurement Infrastructure (PO):** Optional, recommended for percentage-based POs. Defines the tracker stocks and fraction formula that compute the PO metric.
- **Flow Binding (SO):** Mandatory for Guardrails, optional for Gates. Names the specific flow(s) governed by each Support Outcome and the action taken on breach or pass.
- **Auxiliary Variable Target (MS):** Mandatory. Names the specific auxiliary variable a milestone is designed to change, classified into one of five auxiliary types.
- **Model Verification Guidance (FR):** Recommended practice for documenting current model values, formulas, and key auxiliary variables alongside FR specifications.
- **Boundary Handshake Design Pattern (SO):** Design principle for arranging Support Outcomes across PL boundaries to prevent staleness during cross-PL transitions.
- **Terminology unified (Tier 2):** Performance Target (PT) is now Performance Lever (PL), aligning OSR Spec with CPP v1.0 and OGS-1 v1.0. The architecture and grammar are unchanged. Implementations using the v1.x term remain conformant; PL is the recommended terminology going forward.

v1.0 → v2.0 conformance impact

Implementations conformant with v1.x continue to be valid as v2.0 implementations with the following adjustments: Guardrails MUST add a Flow Binding to be conformant. Milestones

MUST add an Auxiliary Variable Target to be conformant. Percentage-based Primary Outcomes SHOULD add a Measurement Infrastructure block. The Tier 2 term Performance Target (PT) is renamed to Performance Lever (PL); v1.x implementations using the prior term remain valid. All other v1.x conformance carries forward.

1. Introduction

1.1 Purpose

Most metric systems treat outcomes as numbers. OSR treats outcomes as causal architecture. The specification provides the formal grammar required to express, audit, and govern outcomes in systems where state compounds over time and where outputs alone cannot prove that the underlying system is healthy.

1.2 Scope

This specification defines the five tiers of the OSR architecture, the mandatory and optional elements of each tier, the relationships between tiers, and the design patterns for arranging tiers across boundaries. It does not define the simulation methodology, the validator engine, or the certification process. Those are addressed in companion specifications (CPP, DCP, OGS-1).

1.3 Audience

Three audiences are addressed by this specification. Operators governing outcomes in complex systems will use OSR as the language for expressing what the system is for and how it should be measured. Architects designing AI agent governance systems will use OSR as the structural foundation that makes outcome billing and verifiable governance possible. Auditors and certification bodies will use OSR as the conformance reference for assessing whether a governed system is structurally complete.

2. The five-tier architecture

2.1 Overview

OSR is organized as five tiers. Each tier has a defined role, a defined formal grammar, and a defined causal relationship to the tier above and below it. The tiers form a chain from the destination (the Primary Outcome) down to the discrete deliverables that move the system (the Milestones).

Tier	Name	Role
T1	Primary Outcome (PO)	The destination. The single externally-validated state the system is governed toward. Defined once. Measured continuously.
T2	Performance Lever (PL)	The action zones. The set of causal levers that move the system toward the PO. Each PL contains its own stock targets.
T3	Support Outcome (SO)	The diagnostic layer. Gates that confer status when criteria are met, and Guardrails that monitor the system continuously.
T4	Flow Rate (FR)	The rate signals. The flows between stocks that produce the PO. Where Counting Events get recorded.
T5	Milestone (MS)	The progress checkpoints. Discrete, time-bound deliverables that change auxiliary variables and unblock flows.

2.2 The PO → PL → SO → FR → MS chain

The five tiers are not independent measurement categories. They form a directional causal chain. Every Milestone changes an Auxiliary Variable. Every Auxiliary Variable governs a Flow. Every Flow moves a Stock. Every Stock target is named in a Performance Lever. Every Performance Lever is causally linked to the Primary Outcome. Every Support Outcome reads the diagnostic state of the chain and either confers status (Gate) or constrains a Flow (Guardrail) when the chain is at risk.

2.3 Causal completeness

A conformant OSR specification **MUST** be causally complete. Every PL **MUST** trace to the PO through an explicit causal link. Every SO **MUST** bind to either a status assignment (Gate) or a Flow (Guardrail). Every FR **MUST** name its impacted stock(s) and counting event. Every MS **MUST** name its auxiliary variable target and its related PL/FR/SO. There **MUST** be no orphan elements in the chain.

The causal completeness rule is what separates OSR from KPI dashboards. A KPI dashboard tolerates orphan metrics. OSR does not.

3. Shared conventions

The following conventions apply across all tiers. They are referenced from the formal grammar of each tier and have a single canonical definition here.

3.1 Target Type, Sustain Type, Cadence

- **Target Type (to | by):** to = reach and hold a level (e.g., "to 92%"). by = change relative to baseline (e.g., "by +10 pts").
- **Sustain Type (rolling | consecutive | fixed):** rolling = every day in last N days; consecutive = N uninterrupted periods; fixed = specified calendar periods (e.g., Q1–Q4 FY26).
- **Measurement Cadence:** How often the metric is evaluated (hourly, daily, weekly, monthly, quarterly).
- **Denominator Ref:** Short ID of the counting rule for percentage metrics. Prevents scope and gaming disputes.

3.2 System of Record (SoR)

- **SoR:** Authoritative datastore for evidence (e.g., CRM, ITSM, LMS, inspections database).
- **SoR Quality:** Minimum data completeness and maximum latency tolerated (e.g., ≥95% complete, ≤72h lag).

3.3 Hysteresis

Entry and exit rules that prevent label flapping. Example: enter AMBER at 95%, exit AMBER below 93%.

3.4 Sample/Cadence (SO-specific)

How often criteria are sampled and rolled up. Example: daily rollups.

3.5 Exception Authority

Role allowed to issue time-bound waivers, and the maximum waiver duration.

3.6 Trigger/Response Link

What action is taken when a guardrail is breached. Examples: pause flow, throttle by percentage, initiate corrective action.

3.7 Escalation Owner/Tier

Responsible role and severity tier on breach. Used when multi-team responses are required.

3.8 Exemption Class

Cohorts excluded from a guardrail (e.g., N<50) and how they are tracked.

3.9 Impacted Stock(s) and Counting Event (FR)

- **Impacted Stock(s):** Which ledger(s) the flow adds to or drains. Enables mass-balance verification.
- **Counting Event:** Timestamped boundary where state flips. Prevents double counting.
- **Min Dwell / No-Churn:** Required time in the prior state before counting a transition.

3.10 Approver/Sign-off and Intended Effect (MS)

- **Approver/Sign-off:** Who formally accepts the Definition of Done (name and role).
- **Intended Effect:** The specific stock or flow expected to move and roughly by how much.

NEW IN v2.0 · Sections 3.11 through 3.14 below define the four shared conventions added in v2.0. These elements are referenced by multiple tiers and have a single canonical definition here. Tier-specific use is detailed in Sections 4 through 10.

3.11 Flow Binding (SO) [NEW in v2.0]

The specific flow rate(s) a Support Outcome governs, and the action taken when the SO is breached (Guardrail) or the verdict is rendered (Gate).

Format

```
FR_ID + action
```

Examples

```
FR_002: throttle by -30% when AMBER
FR_003: block until ALL criteria MET
FR_002 (S0→S1): no constraint at GREEN; throttle by -30% at AMBER; pause flow at RED
```

3.12 Auxiliary Variable Target (MS) [NEW in v2.0]

The specific auxiliary variable a milestone is designed to change. Includes: variable name, current value, auxiliary type, and intended change.

Format

```
variable_name (current → intended); type: auxiliary_type
```

Example

```
hours/family financial training given (20 → 30); type: Quality Gate
```

3.13 Measurement Infrastructure (PO) [NEW in v2.0]

For percentage-based POs, the tracker stocks and fraction formula that compute the metric. Includes: numerator stock, denominator components, computation formula, and rolling window drain mechanism.

Format

```
P0% = numerator_stock / (numerator + denominator_stock); window: N months
```

3.14 Auxiliary Variable Types [NEW in v2.0]

Five categories of auxiliary variables that milestones can target. Each milestone's Auxiliary Variable Target MUST be classified into exactly one of these five types.

Type	What it is	Example milestone
Staffing Lever	FTE allocations, percentage splits, per-FTE ratios.	Hire 5 financial trainers by Apr 15; changes FTE staff on finance training from 2.2 to 7.2.
Quality Gate	Lookup functions: pass-rate, skill-vs-training-hours curves.	Deploy revised 30-hour curriculum by May 20; changes hours/family from 20 to 30, raising pass rate via skill-v-hours lookup.
Budget Cascade	Total budget → percentage split → department budget → staff count.	Secure revised budget allocation by Apr 20; changes SET % budget on refurb from 30% to 50%, cascading to more FTEs.
Capacity Constraint	min()/max() functions that bind flow to lesser of inputs.	Launch material pre-positioning by Jun 1; reduces lead time from 6 to 2 weeks, removing a shadow bottleneck.
Infrastructure/ Tooling	System configs, platforms, counting event wiring.	Configure CMS audit trail by Apr 30; enables timestamped counting events for all PL-1 flows.

4. Primary Outcome (PO)

The Primary Outcome is the destination. It is the single externally-validated state that the entire system is governed toward. The PO MUST be defined exactly once. The PO MUST be expressible as a single metric with memory (no composites).

4.1 Formal grammar

```
[Essential Target] + [Action Verb] + [Target Level] + [Timeframe & Sustain Window]
+ [Population/Context] + [External Validator] + [BACKS element]
```

```
Optional: [Target Type: to|by], [Measurement Cadence], [Denominator Ref],
[Measurement Infrastructure] <-- NEW in v2.0
```

4.2 Mandatory elements

- **Essential Target:** One metric with memory. No composites.
- **Action Verb:** increase | achieve | sustain.
- **Target Level:** Percentage, index, or count.
- **Timeframe & Sustain Window:** Deadline and durability requirement.
- **Population/Context:** Who or where counts.
- **External Validator:** Auditable System of Record or third-party validator.
- **BACKS element:** Attitude | Behavior | Capability | Knowledge | Status.

4.3 Advanced and optional elements

- **Target Type (to | by):** Clarifies level versus delta. Use when "increase" could be misread.
- **Measurement Cadence:** Evaluation frequency. Use when cadence might affect governance or incentives.
- **Denominator Ref:** ID of the percentage denominator rule. Use when percentage measures are central and gaming risk exists.

4.4 Measurement Infrastructure [NEW in v2.0]

For percentage-based POs, the tracker stocks and fraction formula that compute the PO metric. The Essential Target is a fraction; this element defines the numerator, denominator, and rolling window mechanics that produce the fraction. Without it, teams may write clear PO statements with no defined way to actually calculate the number.

Use when

The PO is a percentage or ratio computed from underlying stocks. Example: "≥70% stable homeownership" requires defining what counts as the numerator and denominator.

Required sub-elements

- **Numerator stock:** The tracker that accumulates successful outcomes.
- **Denominator component(s):** The tracker(s) that, combined with the numerator, form the denominator.
- **Fraction formula:** The mathematical expression that computes the percentage.
- **Window mechanism:** How the rolling window is maintained (typically monthly drain flows that expire records).

4.5 Worked example: Road to Ownership PO

PO Statement

Achieve ≥70% stable homeownership among N≥400 program-enrolled families by December 31, 2026, sustained for a rolling 12-month window, as verified by county deed records, loan-servicer payment histories, and quarterly habitability inspections.

Measurement Infrastructure [NEW]

- **Numerator:** become stable 2 (success tracker) = 67.58. Fed by: $\text{delay}(\max(\% \text{ avg } \$\text{-skill}/100, 0) \times \text{placement flow}, 12)$.
- **Denominator add:** Cum. financial failed families (failure tracker) = 21.38. Fed by: $\text{delay}((1 - \% \text{ avg } \$\text{-skill}/100) \times \text{placement flow}, 6)$.
- **Fraction:** $67.58 / (67.58 + 21.38) = 75.97\%$.
- **Window:** 12-month drain flows expire records from all 3 tracker stocks automatically each month.

Why this matters: The 12-month success delay and 6-month failure delay create an asymmetric early warning window. Without documenting this infrastructure, teams cannot monitor progress toward the PO or detect problems early.

5. Performance Lever (PL)

A Performance Lever is an action zone. PLs are the causal levers an operator or agent can pull to move the system toward the Primary Outcome. Each PL contains a header and a Stock Target Set. The Stock Target Set names the specific stocks the lever moves and the levels and deadlines for each.

Terminology note: OSR v1.x referred to this tier as Performance Target (PT). v2.0 adopts Performance Lever (PL) for terminology consistency with the Causal Phase Protocol (CPP v1.0) and the Outcome Governance Standard (OGS-1 v1.0). The architecture is unchanged.

5.1 Formal grammar

```
Header:
[PL Label (Verb + Lever)] + [BACKS-Enabling Focus] + [Scope/Context]
+ [Measurement Systems] + [Causal Link to PO]

Optional header: [Lever Type: Demand|Capacity|Balance], [SoR Quality]

Stock Target Set (one or more):
{ [Stock i] + [Verb] + [Target Level] + [Deadline] + [Sustain Window]
  Optional per-stock: [Sustain Type], [Target Type], [SoR] }
```

5.2 Mandatory header elements

- **PL Label (Verb + Lever):** Named lever. Example: "Develop Financial Readiness."
- **BACKS-Enabling Focus:** Transitions cultivated. Example: Knowledge → Condition.
- **Scope/Context:** Geography, segment, or product.
- **Measurement Systems:** Systems of Record for the set.
- **Causal Link to PO:** Why this lever advances the Primary Outcome.

5.3 Mandatory Stock Target Set elements

- **Stock i:** Demand or capacity stock moved by the lever.
- **Verb:** increase | achieve | sustain.
- **Target Level:** Numeric level.
- **Deadline:** Date to hit.
- **Sustain Window:** How long to hold.

5.4 Advanced and optional elements

- **Lever Type (Demand | Capacity | Balance):** Characterizes the lever. Use when portfolio needs role clarity.
- **SoR Quality:** Minimum completeness and maximum latency across the set. Use when multiple systems feed a PL.

- **Sustain Type (per-stock):** rolling | consecutive | fixed. Use when ambiguity exists.
- **Target Type (per-stock):** Level versus delta. Use when confusion is likely.
- **SoR (per-stock):** Overrides header systems for that stock. Use when items use different sources.

6. Support Outcome — Composite Gate

A Composite Gate confers a quality status when all its criteria are met. Gates sit on transitions between stocks. They validate that an entity is ready to move from one zone to the next.

6.1 Formal grammar

```
[Gate Label] + [BACKS] + [Validation Window]
+ [Criterion 1  $\wedge$  Criterion 2  $\wedge$  ...] + [Population/Context] + [Validator]

Optional: [Gate Decision], [Hysteresis], [Sample/Cadence],
          [Exception Authority], [Flow Binding] <-- NEW in v2.0
```

6.2 Mandatory elements

- **Gate Label:** Status conferred. Example: Program-Ready.
- **BACKS:** Dimension established (often Status).
- **Validation Window:** Continuous interval criteria must hold.
- **Criteria:** AND-only, auditable checks.
- **Population/Context:** Who or what applies.
- **Validator:** System(s) of Record.

6.3 Advanced and optional elements

- **Gate Decision:** Pass/Fail action text (assign or remove status). Use to remove ambiguity at enforcement.
- **Hysteresis:** Entry and exit thresholds or periods to prevent flapping. Use when metrics are noisy.
- **Sample/Cadence:** How often criteria are sampled or rolled up. Use when real-time versus batch matters.
- **Exception Authority:** Role and maximum waiver duration. Use when criteria may require controlled overrides.

6.4 Flow Binding [NEW in v2.0]

The specific flow rate(s) this gate blocks or permits, and the pass/fail action taken on each. Gates sit on transitions; this element names which specific FR the gate governs.

Use when

The gate controls a specific flow between stocks and you want to make the SO-to-FR connection explicit and auditable. Recommended for all gates. Optional because the gate's Population/Context often implies the flow.

Format

```
FR_ID: action when PASSED + action when NOT MET
```

Example

```
FR_003 (S1→S2): permit movement when ALL criteria MET; block movement when any criterion NOT MET
```

6.5 Worked example: Financial-Readiness Gate

- **Gate Label:** Financial-Readiness Gate
- **BACKS:** Condition → Knowledge
- **Validation Window:** Last 60 days
- **Criteria:** ALL: attendance $\geq 85\%$ \wedge budget adherence $\geq 3/4$ weeks \wedge emergency fund $\geq \$500$ \wedge curriculum completion $\geq 80\%$
- **Population/Context:** S1 families being assessed for S2 promotion
- **Validator:** LMS + bank API + budgeting app
- **Flow Binding [NEW]:** FR_003 (S1 → S2): permit movement when ALL = MET; block when any criterion NOT MET. Families remain in S1 with remediation plan until re-assessed.

7. Support Outcome — Guardrail

A Guardrail is a continuous protective constraint. Unlike a Gate (which renders a verdict at a point in time), a Guardrail monitors continuously and produces a graduated response. The flow binding on a Guardrail names which Flow Rate slows down and by how much when severity escalates.

7.1 Formal grammar

```
[Guardrail Label] + [BACKS] + [Rolling Window]
+ [Metric Comparator] + [Population/Context] + [Validator]
+ [Flow Binding] <-- NEW in v2.0, MANDATORY for Guardrails
```

```
Optional: [Trigger/Response Link], [Hysteresis],
           [Escalation Owner/Tier], [Exemption Class], [Sample/Cadence]
```

7.2 Mandatory elements

- **Guardrail Label:** Protective constraint name.
- **BACKS:** Reflected dimension.
- **Rolling Window:** Proof interval.
- **Metric Comparator:** Single bound (\leq , \geq , between).
- **Population/Context:** Scope.
- **Validator:** System of Record.

7.3 Flow Binding [NEW in v2.0, MANDATORY]

The specific flow rate(s) this guardrail throttles or pauses when breached, and the graduated action at each severity level. Unlike gates (which block or permit a single transition), guardrails monitor continuously and their response is graduated. The flow binding names which flow slows down and by how much.

NEW IN v2.0 · A guardrail without a flow binding is a monitoring dashboard, not an outcome. The Trigger/Response Link describes what action to take; the Flow Binding names which specific flow is affected. Together they close the SO → FR causal link. Without it, a team cannot tell which flow a guardrail governs when it breaches.

Format

```
FR_ID: action at GREEN | action at AMBER | action at RED
```

Example

```
FR_002 (S0→S1): no constraint at GREEN; throttle by -30% at AMBER; pause flow at
```

RED

7.4 Advanced and optional elements

- **Trigger/Response Link:** Prescribed action on breach (pause, throttle, corrective action plan). Use to make responses automatic.
- **Hysteresis:** Entry and exit rules to reduce oscillation. Use when threshold chatter is common.
- **Escalation Owner/Tier:** Responsible role and severity tier. Use when multi-team responses are required.
- **Exemption Class:** Small or special cohorts excluded and how tracked. Use when sample size volatility exists.
- **Sample/Cadence:** Data refresh rate (daily, weekly). Use when window logic plus refresh cadence must be explicit.

7.5 Worked example: Class Attendance Guardrail

- **Guardrail Label:** Class Attendance Guardrail
- **BACKS:** Behavior
- **Rolling Window:** 30 days
- **Metric Comparator:** $\text{class_attendance_rate} \geq 85\%$
- **Population/Context:** S0 and S1 families in outreach sessions
- **Validator:** LMS attendance logs
- **Flow Binding [NEW]:** FR_002 (S0 → S1): no constraint at GREEN ($\geq 85\%$); throttle by -30% at AMBER (75–84%); pause forward flow and trigger FR_004 (S1 → S0 regression) at RED ($< 75\%$).
- **Trigger/Response:** AMBER = case manager outreach within 48 hours + attendance recovery plan. RED = mandatory re-engagement before any further progression.

8. Design pattern — Boundary Handshake [NEW in v2.0]

When entities cross Performance Lever boundaries (families moving from one program zone to the next, accounts moving from acquisition to onboarding, tickets moving from triage to resolution), a design pattern called the Boundary Handshake ensures quality is maintained during the transition.

8.1 Pattern definition

The Boundary Handshake has two components arranged across the boundary:

- **Exit Gate (upstream PL).** The final SO in the upstream PL is a Composite Gate that confers a quality status. The gate's criteria validate that the entity is ready to leave the current zone. The gate's flow binding blocks the cross-PL transition until ALL criteria are MET.
- **Freshness Guardrail (downstream PL).** The first SO in the downstream PL is a Guardrail that monitors the currency of documents, certifications, or status conferred by the upstream gate. This guardrail catches staleness — entities that passed the exit gate weeks or months ago but whose documents have since expired.

8.2 Why this matters

Gates validate quality at a point in time. But if there is a delay between gate passage and downstream consumption (a family passes the Qualification-Ready Gate in April but does not start training until June), documents can go stale. The freshness guardrail catches this gap. Without it, entities can enter the next zone with expired credentials.

8.3 How to apply

For every cross-PL boundary where entities carry documents, certifications, or status stamps:

- Ensure the upstream PL's final SO is a gate with flow binding that blocks the boundary flow.
- Add a document-currency guardrail (rolling 30-day window, $\geq 95\%$ currency rate) at the downstream PL's intake, with flow binding that caps the boundary flow if freshness drops.
- The guardrail's validator should check the same documents the gate validated, but for currency rather than completeness.

8.4 Worked example — three Boundary Handshakes in Road to Ownership

Boundary	Exit Gate (upstream)	Freshness Guardrail (downstream)	What it catches
PL-1 → PL-3	SO_GATE2: Qualification-Ready Gate (docs 100%, DTI, savings, credit)	SO_G2: Document-Currency Guardrail (≥95% on 30d rolling)	Families who qualified months ago but whose ID, income docs, or credit reports have expired before training enrollment.
PL-2 → PL-4	SO_GATE4: Habitability-Ready Gate (life-safety, utilities, env, inspection)	SO_G5: Cert Doc-Currency Guardrail (≥95% on 30d rolling)	Homes that passed inspection weeks ago but whose habitability certificates have expired before placement occurs.
PL-3 → PL-4	SO_GATE5: Graduation-Ready Gate (curriculum, assessment, capstone, delinquencies, docs)	SO_G8: Graduation Doc-Currency Guardrail (≥95% on 30d rolling)	Graduates waiting for placement whose financial documents, credit reports, or training certificates have expired.

9. Flow Rate (FR)

Flow Rates are the rate signals between stocks. Every flow that moves entities between stocks in the governed system MUST be specified as an FR. The FR specification names what moves, how fast, between which stocks, and at what counting event.

9.1 Formal grammar

```
[Flow Direction: Inflow|Outflow] + [BACKS Transition Direction]
+ [Unit/Population] + [Time Horizon] + [Quality Threshold]
+ [Impacted Stock(s)] + [Counting Event]
```

Optional: [Change Plan], [Min Dwell/No-Churn Rule]

Recommended: Model Verification documentation <-- NEW in v2.0

9.2 Mandatory elements

- **Flow Direction:** Inflow adds to a stock. Outflow removes from a stock.
- **Transition Direction:** From-state → To-state.
- **Unit/Population:** What moves each period.
- **Time Horizon:** Per week, month, quarter, etc.
- **Quality Threshold:** Minimum standard to count.
- **Impacted Stock(s):** Ledger being changed.
- **Counting Event:** Timestamped boundary where state flips.

9.3 Advanced and optional elements

- **Change Plan:** Desired pace. Example: "grow to 300/mo by Q2." Use when you want a forward trajectory, not just measurement.
- **Min Dwell / No-Churn Rule:** Required time in prior state before counting. Example: ≥14d. Use when churn or yo-yo risk exists.

9.4 Model Verification Guidance [NEW in v2.0]

For each Flow Rate, it is RECOMMENDED to document the following model verification data alongside the FR specification. This guidance is not formally required in the bracketed grammar because OSR is intended to work regardless of which simulation tool implementers use (PathFwd, Vensim, Stella, iThink, or a spreadsheet).

Recommended documentation

- **Current Model Value:** The flow rate's current numerical value from the system dynamics model. Provides a baseline for the Change Plan.

- **Model Formula:** The mathematical expression that produces the flow rate. Makes the flow's drivers transparent.
- **Key Auxiliary Variables:** The auxiliary variables that appear in the formula. These become the targets for Tier 5 Milestones.
- **Model Source:** Where the value was verified (PathFwd, Vensim, Stella, etc.).

The expectation is clear: every FR SHOULD be model-verified. Teams that skip this step produce flow rates with no way to confirm whether the stated value is realistic or whether the Change Plan is achievable.

9.5 Worked example: S0 → S1 forward flow

- **Flow Direction:** Outflow from S0 / Inflow to S1
- **BACKS Transition:** Attitude: Resigned → Realistically Wishful
- **Unit/Population:** families
- **Time Horizon:** per month
- **Quality Threshold:** Class Attendance Guardrail (SO_G1) = MET
- **Impacted Stocks:** S0 Resigned poor tenants ↓ ; S1 Realistically wishful ↑
- **Counting Event:** CMS state_code changed from 'Resigned' to 'Wishful' AND Readiness Index attitude_score ≥ threshold AND date_stamped
- **Change Plan:** Sustain ≥20/month; grow to 30/month by Jun 2026
- **Min Dwell:** ≥30 days in S0
- **Model Verification [NEW]:** Current value = 22.31/month. Formula = FTE staff on realism (1.116) × families/month to realistic per FTE (20). Key auxiliaries: FTE realism, per-FTE rate, early-support % allocation. Source: PathFwd.

10. Milestone (MS)

A Milestone is a discrete, time-bound deliverable that changes an auxiliary variable, which in turn governs a flow. Milestones are the action layer of the OSR architecture. Every milestone MUST name the specific auxiliary variable it changes.

10.1 Formal grammar

```
[Milestone Verb] + [Deliverable/Artifact] + [Acceptance Criteria (DoD)]
+ [Due Date (absolute)] + [Owner] + [Dependency/Predecessor]
+ [Related PL/FR/SO] + [Evidence/Link]
+ [Auxiliary Variable Target] <-- NEW in v2.0, MANDATORY

Optional: [Approver/Sign-off], [Intended Effect]
```

10.2 Mandatory elements

- **Milestone Verb:** deliver | deploy | launch | enable | conduct | verify | assign | run.
- **Deliverable/Artifact:** The tangible thing (not an activity).
- **Acceptance Criteria (DoD):** Observable pass/fail conditions.
- **Due Date (absolute):** A specific calendar date.
- **Owner:** Single accountable team or person.
- **Dependency/Predecessor:** What must exist first.
- **Related PL/FR/SO:** The lever, flow, or gate this milestone unblocks.
- **Evidence/Link:** Where proof lives.

10.3 Auxiliary Variable Target [NEW in v2.0, MANDATORY]

The specific auxiliary variable this milestone is designed to change. Every flow between stocks is computed from a formula that references auxiliary variables — staffing levels, productivity rates, quality gates, capacity constraints, budget allocations. Milestones act on those auxiliaries. The milestone never touches the stock directly. It touches the machinery that makes the pipe work.

NEW IN v2.0 · The existing [Related PL/FR/SO] field says which flow a milestone supports, but not how. Without naming the auxiliary variable, teams produce milestones that are causally orphaned. The causal chain MUST be complete: Milestone → changes Auxiliary Variable → Auxiliary governs Flow → Flow moves Stock. This element closes the last link.

Required sub-elements

- **Variable Name:** The auxiliary variable as named in the model or system.
- **Current Value:** The variable's current value.

- **Auxiliary Type:** One of: Staffing Lever | Quality Gate | Budget Cascade | Capacity Constraint | Infrastructure/Tooling. See Section 3.14.
- **Intended Change:** What the milestone will change the value to.

Format

```
variable_name (current_value → intended_value); type: auxiliary_type
```

10.4 Advanced and optional elements

- **Approver/Sign-off:** Role or person who accepts the DoD. Use when formal acceptance is required.
- **Intended Effect:** The stock or flow expected to move (and approximate magnitude). Use when you want execution to be value-linked, not just output-linked.

10.5 Worked example: Milestone with Auxiliary Variable Target

- **Milestone Verb:** deploy
- **Deliverable:** Revised 30-hour financial training curriculum with expanded practice modules
- **DoD:** Curriculum redesigned from 20 to 30 hours; pilot tested with 1 cohort (≥ 15 families); pilot shows $\geq 10\%$ skill improvement vs. control; LMS updated
- **Due Date:** May 20, 2026
- **Owner:** PL-3 Training Coordinator
- **Dependency:** None (can proceed in parallel)
- **Related PL/FR/SO:** FR_009 (T1 → S3), SO_GATE5 (Graduation-Ready Gate), FR_012 (families/month become stable)
- **Evidence:** LMS curriculum configuration + pilot comparison report + training board approval
- **Auxiliary Variable Target [NEW]:** hours/family financial training given (20 → 30); type: Quality Gate. Changes the skill-v-training-hours lookup, raising average \$-skill from ~55% to ~65%. This improves both the pass rate (more graduates per cohort) AND the PO success rate (more placed families become stable).
- **Approver:** Training Board
- **Intended Effect:** Raises \$-skill from ~55% to ~65%, improving both FR_009 throughput and FR_012 success rate. Double impact on PO.

11. Implementation requirements

This section defines conformance requirements for OSR Specification v2.0. Implementers seeking the OSR Verified — Design certification mark **MUST** satisfy all clauses in 11.1. Clauses in 11.2 are **RECOMMENDED**. Clauses in 11.3 are **OPTIONAL**.

11.1 Conformant implementations **MUST**

- Define exactly one Primary Outcome with all seven mandatory PO elements present.
- Define one or more Performance Levers, each with all five mandatory header elements and a Stock Target Set with at least one entry containing all five mandatory stock elements.
- Specify every Support Outcome as either a Composite Gate or a Guardrail. Mixed types are not permitted.
- Include a Flow Binding on every Guardrail. Guardrails without a Flow Binding are non-conformant in v2.0.
- Define every Flow Rate with all seven mandatory FR elements.
- Include an Auxiliary Variable Target on every Milestone, with all four required sub-elements (Variable Name, Current Value, Auxiliary Type, Intended Change).
- Maintain causal completeness: every PL **MUST** link to the PO; every SO **MUST** link to a status assignment or a Flow; every FR **MUST** link to its impacted stocks; every MS **MUST** link to its auxiliary variable target.
- Use sentence-case OR proper labels for all Gate Labels, Guardrail Labels, and PL Labels (not ALL CAPS, not numeric IDs alone).

11.2 Conformant implementations **SHOULD**

- Include a Measurement Infrastructure block on every percentage-based Primary Outcome.
- Include a Flow Binding on every Composite Gate (mandatory for Guardrails, recommended for Gates).
- Document Model Verification data (current value, formula, key auxiliaries, source) alongside every Flow Rate.
- Apply the Boundary Handshake design pattern at every cross-PL boundary where entities carry documents, certifications, or status stamps.
- Use Hysteresis on Guardrails monitoring noisy metrics.
- Use Min Dwell rules on Flow Rates with churn risk.

11.3 Conformant implementations MAY

- Define additional advanced/optional elements beyond those listed in this specification, provided they do not conflict with mandatory elements.
- Implement vertical-specific extensions (industry rule packs, specialized auxiliary types) provided the core five-tier architecture is preserved.
- Use any system dynamics simulation tool to model-verify Flow Rates. PathFwd is the reference implementation; conformance does not require its use.

12. Mandatory vs advanced — at a glance

This summary table consolidates the conformance requirements across all five tiers. Use it as a quick reference when authoring or auditing OSR specifications.

Tier	Mandatory	Advanced / optional
PO	All seven core brackets.	Target Type, Measurement Cadence, Denominator Ref, Measurement Infrastructure [NEW].
PL	Header (5 elements) + Stock Target Set with all 5 stock elements.	Lever Type, SoR Quality, per-stock Sustain Type, Target Type, SoR.
SO — Gate	Label, BACKS, Window, Criteria, Population, Validator.	Gate Decision, Hysteresis, Sample/Cadence, Exception Authority, Flow Binding [NEW].
SO — Guardrail	Label, BACKS, Rolling Window, Comparator, Population, Validator, Flow Binding [NEW].	Trigger/Response, Hysteresis, Escalation Owner/Tier, Exemption Class, Sample/Cadence.
FR	Direction, Transition, Unit, Horizon, Quality Threshold, Impacted Stock(s), Counting Event.	Change Plan, Min Dwell. Model Verification recommended [NEW].
MS	Verb, Deliverable, DoD, Date, Owner, Dependency, Related PL/FR/SO, Evidence, Auxiliary Variable Target [NEW].	Approver/Sign-off, Intended Effect.

Annex A — OSR Spec Card v2.0

This is the canonical one-page reference for the OSR formal grammar. Print it. Tape it to your monitor. Quote it in code reviews.

Primary Outcome (PO)

[Essential Target] + [Action Verb] + [Target Level] + [Timeframe & Sustain Window]
+ [Population/Context] + [External Validator] + [BACKS element]

Optional: [Target Type: to|by], [Measurement Cadence], [Denominator Ref],
[Measurement Infrastructure]

Performance Lever (PL)

[PL Label (Verb + Lever)] + [BACKS-Enabling Focus] + [Scope/Context]
+ [Measurement Systems] + [Causal Link to PO]

Optional: [Lever Type], [SoR Quality]

+ { [Stock 1] + [Verb] + [Target Level] + [Deadline] + [Sustain Window], ... }

SO — Composite Gate

[Gate Label] + [BACKS] + [Validation Window]
+ [Criteria \wedge ...] + [Population/Context] + [Validator]

Optional: [Gate Decision], [Hysteresis], [Sample/Cadence],
[Exception Authority], [Flow Binding]

SO — Guardrail

[Guardrail Label] + [BACKS] + [Rolling Window]
+ [Metric Comparator] + [Population/Context] + [Validator] + [Flow Binding]

Optional: [Trigger/Response], [Hysteresis], [Escalation Owner/Tier],
[Exemption Class], [Sample/Cadence]

Flow Rate (FR)

[Flow Direction] + [BACKS Transition Direction] + [Unit/Population]
+ [Time Horizon] + [Quality Threshold] + [Impacted Stock(s)] + [Counting Event]

Optional: [Change Plan], [Min Dwell/No-Churn]
Recommended: Model Verification documentation

Milestone (MS)

[Milestone Verb] + [Deliverable/Artifact] + [Acceptance Criteria (DoD)]
+ [Due Date] + [Owner] + [Dependency/Predecessor] + [Related PL/FR/SO]
+ [Evidence/Link] + [Auxiliary Variable Target]

Optional: [Approver/Sign-off], [Intended Effect]

Annex B — Glossary

Defined terms used in this specification. All term references in the body text resolve to the definitions here.

Term	Definition
Auxiliary Variable	A model variable that governs a flow but is not itself a stock. Examples: FTE counts, productivity ratios, budget allocations, capacity constraints. Milestones change auxiliary variables.
BACKS	The five dimensions of meaningful progress: Behavior, Attitude, Capability, Knowledge, Status. Used in PO, PL, SO, and FR specifications to anchor the dimension being moved.
Counting Event	The timestamped boundary where an entity's state flips from one value to another. Counting events are what make Flow Rates auditable.
External Validator	An auditable System of Record or third-party verifier that confirms the PO is achieved.
Flow Binding	The specific Flow Rate(s) a Support Outcome governs, and the action taken on breach or pass. New in v2.0.
Flow Rate (FR)	Tier 4. The rate at which entities move between stocks per period.
Gate	A Composite Gate. A Support Outcome that confers a quality status when all criteria are met.
Guardrail	A Support Outcome that monitors a metric continuously and produces a graduated response when severity escalates.
Hysteresis	Asymmetric entry and exit thresholds that prevent label flapping in noisy data.
Measurement Infrastructure	The tracker stocks and fraction formula that compute a percentage-based PO. New in v2.0.
Milestone (MS)	Tier 5. A discrete deliverable that changes an auxiliary variable to unblock a flow.
OSR	Outcome System Result. The five-tier framework defined by this specification.
Performance Lever (PL)	Tier 2. An action zone containing a Stock Target Set. Equivalent to Performance Lever (PL) in CPP and OGS-1.
Primary Outcome (PO)	Tier 1. The single state the system is governed toward.
Stock	A quantity that accumulates over time. Stocks are moved by Flow Rates.
Support Outcome (SO)	Tier 3. Either a Gate (status verdict) or a Guardrail (continuous monitor).
System of Record (SoR)	The authoritative datastore for evidence supporting a metric or criterion.

Annex C — License and attribution

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The terms "OSR," "Outcome System Result," "Performance Lever," "Support Outcome," "Flow Rate," "Milestone," "Boundary Handshake," and "Causal Phase Protocol" may be used freely to refer to the architecture defined by this specification.

End of OSR Specification v2.0