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Stablecoin Beat S0/S1/S2 Monetary Aggregates

Specification 1.1.1

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Abstract

This paper specifies the S0/S1/S2 stablecoin monetary aggregates, a three-tier classification of fiat-denominated stablecoin claims expressed in United States dollars at official reference exchange rates. The tiers are ordered by claim form: primary claims, representations of those claims in other settlement environments, and other transferable claims derived from them. For each admitted instrument, the specification also records claim distance, defined as the number of redemption steps between the token held and the base instrument's redemption endpoint. That endpoint may be an issuer redemption obligation or a protocol redemption mechanism. S0 measures base stablecoin supply: native primary stablecoin claims intended to redeem at or track par. S1 measures represented supply by adding tokenized representations of S0 claims created in other settlement environments. S2 measures extended claims by adding transferable instruments whose principal exposure can be traced to an S0 asset. S1 and S2 are each defined on a net basis, which deduplicates backing relationships, and a gross basis, which counts every token layer circulating at the same time.

The ratio of gross extended claims to base supply, termed the representation multiplier, measures the amount of claim structure built on each unit of base supply. The specification defines the equations, constituent admission policy, and edge-case rules for bridge designs, wrapper chains, tranches, rebasing designs, issuer treasury balances, tokenized securities, and claims issued in excess of backing held. It also establishes the versioning and revisions policy. The aggregates are published as a maintained daily series.

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Status of this document

This document is Specification 1.1.1. It states the text of Specification 1.1 with the revisions recorded in Annex D, and it is normative. The numbered rules in sections 2 through 5 determine how the published S0/S1/S2 series is compiled, and every figure labeled S0, S1, or S2 by Stablecoin Beat is compiled under an identified version of this specification. Section 7 governs version changes and revisions to published values. Definitions use the present indicative; the phrases "is included" and "is excluded" have normative force.

Version note. Specification 1.1 is a minor version under section 7.1. The tier boundaries, net and gross conventions, and treatment of claim layers are unchanged. No value published under Specification 1.0 is revised.

Version 1.1 makes the following changes. It states the ordering principle of the tiers as claim form and records claim distance as an instrument property. Specification 1.0 described the ordering as claim distance and assigned each instrument to its layer as a base unit, a representa-

tion or a wrapper (section 2.5 of version 1.0); no instrument's layer or tier differs between the two descriptions, so the change clarifies an existing rule under section 7.1. It specifies the parameters of the par test that version 1.0 expressed as a principle, changes the test statistic to the median absolute deviation from parity, and defines the information set used for a verdict. It separates the definition of the base universe from compilation coverage, incorporates the covered sets into the equations, and commits to daily publication of coverage using a vocabulary of coverage and classification statuses alongside the exclusion vocabulary in section 5.4. It extends `U` from dollar par claims to par claims in any fiat unit of account, valued at official reference rates, as anticipated by section 7.5 of version 1.0, and publishes changes in S0 at constant exchange rates alongside the exchange-rate effect. It compiles S0 over every member carried by the issuance record for which the information required by rule R8 is available, instead of limiting the compilation to members for which a per-environment decomposition is collected, an approach permitted by version 1.0 but not applied by its compiler. It restates rule R9 so that the excess and admitted wrapper value each use a single valuation basis, which makes the ordering of the two multipliers hold by construction. It specifies the completeness gate and netting tolerance as a published set and a numerical threshold. It removes shares in pools that lend the base coin onward from the wrapper set and reports them as an adjacent segment. It also states the relationship between the two supply figures published by the platform.

No value published under version 1.0 is restated. The series as published under Specification 1.0 remains available at the address listed in section 9.3, and vintages from 14 August 2026 are retained by the compiler. The series published under version 1.1 covers the same dates on the 1.1 basis beginning 27 September 2018. The sixteen days from 11 September 2018 through 26 September 2018 do not satisfy the completeness requirement in section 5.5 under version 1.1 and therefore have no observation. As a result, the 1.1 series contains historical levels that differ from those compiled under version 1.0. The period covered by the backcast is stated below; section 7.4 gives the form of the vintage note that accompanies it. Several changes in this version alter the population, the coverage, or the valuation of the compilation and therefore the level compiled under version 1.1: the change of test statistic bears on a small number of instruments, the extension to non-dollar claims and the compilation over every member of the issuance record add members, membership is resolved per instrument rather than per ticker, and base units are valued at par under rule R8 where the version 1.0 compiler had summed the issuance record's market-valued figure. The change in the par-test statistic produces no constituent change at the effective date. Stored verdicts remain in force under section 7.2 until reopened, as stated in section 6.4.1. Three further constituent changes are recorded with their windows. The first is the removal of lending-pool shares from the wrapper set, with S0 and S1 unchanged. It enforces the stablecoin-lineage boundary that rule R6 already draws and leaves the definition of the wrapper layer unchanged, which is why it is a constituent change under a minor version and not a redefinition of a layer under section 7.1. The second is the removal from S0 of a representation that the version 1.0 compiler counts alongside its base coin. The third is the resolution of membership per instrument: the version 1.0 compiler identified members by ticker, so two instruments sharing a ticker were one member carrying one verdict, and a verdict formed on one instrument's prices admitted another. Under version 1.1 each instrument in the issuance record is a member in its own right, its verdict is the verdict of the coin whose prices

formed it, and an instrument whose coin holds no verdict is a candidate under section 5.6. The backcast of section 7.4 carries every level effect through the window it covers. The corrections to rule R9 move no value, because no documented excess exists at the effective date.

Figures compiled under version 1.1 carry its version label from 16 September 2026, the effective date of version 1.1. The first vintage compiled under version 1.1 is that of 19 September 2026. The vintages of 16 September 2026 through 18 September 2026 carry the version 1.1 label; membership keyed by instrument identifier and valuation at par under rule R8 apply from the vintage of 19 September 2026. Their figures were revised on 19 September 2026 under section 7.3, so every figure in the published series is compiled under version 1.1 from the vintage of 19 September 2026; the three earlier vintages are retained by the compiler. The treatment of instrument-days without a unit count under section 6.6 applies from the generation of 20 September 2026. For the period from 27 September 2018 through 18 September 2026, the version 1.1 series is published as a backcast, identified by the fourth vintage-note form in section 7.4. No value published under version 1.0 is restated. The series as last compiled under version 1.0 is available at the address listed in section 9.3.

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1. Introduction and motivation

Every monetary statistic begins with a choice about ordering. Central-bank fiat monetary aggregates, including the monetary base and the M1 and M2 money stock measures, order claims on the banking system by liquidity. Currency and transaction deposits come first, followed by instruments that take progressively more time or cost to convert into means of payment. That ordering reflects the question those aggregates are designed to answer: how much spending capacity exists.

Stablecoin supply raises a different measurement problem. With few exceptions, these instruments are transferable on demand and settle within seconds, so a liquidity ordering distinguishes little among them. A savings wrapper and the base token it wraps may both be liquid and may trade in the same venues within the same block. The relevant distinction is what stands between the token held and the point at which redemption is ultimately satisfied. That point is the **redemption endpoint**. Depending on the design, it may be an issuer's redemption obligation or a protocol redemption mechanism. A base-token holder has a direct claim. A holder of a bridge-issued representation has a claim on the representation issuer, which holds the base token immobilized one for one, effectively relocating the same claim to another settlement environment. A holder of a savings wrapper has a claim on an arrangement that holds base tokens and pays out of them, creating a different claim derived from the base. A holder of a savings wrapper over a representation is one further step removed.

The S0/S1/S2 aggregates retain the familiar three-tier form while using a different ordering principle. Fiat monetary hierarchies order money by liquidity. This hierarchy orders claims by form: primary claims first, representations of those claims in other environments second, and other claims derived from them third. The specification also records **claim distance** for every

instrument, defined as the number of redemption steps between the token held and the base instrument's redemption endpoint, with the base unit assigned a distance of zero. Claim distance is recorded for every instrument, is published in the constituent record as stated in section 5.2, and does not determine its tier. A representation and a direct wrapper, for example, both stand one step from the base unit but belong to different tiers because their claims differ in form. The analogy with the monetary base, M1, and M2 serves only as a mnemonic for the nesting of the tiers in constituent scope, under which `S0 ≤ S1_gross ≤ S2_gross`. It does not map economic functions across the two systems. S1 does not correspond to a stablecoin version of M1.

Three properties motivate the design.

Aggregation without double counting requires an explicit layer convention. The total value observable across settlement environments exceeds the total of base claims outstanding because a single base claim may support a representation on another chain and a wrapper over that representation, with each layer carrying an observable outstanding value. Treating the observable total as supply overstates the base claims outstanding. Restricting the measure to base claims omits information about the claim structure built on them. The aggregates report both quantities on a common base and connect them through an identity.

Claim structure is itself an object of measurement. Layering per unit of base supply changes over time and cannot be recovered from any single supply measure. Section 4 reports it as a series through the representation multiplier.

The boundary must be specified in advance. Yield-bearing wrappers, structured tranches, and tokenized securities settled in stablecoins sit at the outer edge of the hierarchy. They are also among the fastest-growing parts of the segment and among the instruments most easily aggregated incorrectly. Section 5 therefore adopts an admission policy under which exclusion is the default, while section 3 specifies the rules on which that policy depends.

The rest of the paper proceeds as follows. Section 2 defines the tiers and their net and gross variants. Section 3 presents the edge-case rules. Section 4 defines the representation multiplier and gives equal attention to the inferences the measure does not support. Section 5 sets out the constituent admission policy. Section 6 documents the measurement framework and source classes. Section 7 defines the versioning and revisions policy. Section 8 places the framework in relation to prior work on stablecoins and money. Section 9 provides citation forms.

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2. Definitions

2.1 Notation

Symbols are set in a fixed-width face. A subscript follows an underscore; a compound subscript is braced, as in `FX_{c(i)}(t)`. `S0`, `S1` and `S2` are names, not subscripted symbols.

Symbol	Meaning
`t`	Observation day, a calendar date in UTC
`U(t)`	The base universe: the set of instruments meeting the criteria of section 2.2 at `t`, per section 6.4. Membership is a property of the instrument; which members a compilation covers is stated separately under section 6.4.4
`U_0(t)`	Members of `U` covered by the `S0` compilation on day `t`: those with a qualifying issuance record carrying a unit count and, where required, an official reference rate under section 6.4.5
`U_b(t)`	Members of `S0` for which the issuance record tracks bridged units on day `t`; the representation layer is observed over this set under section 6.4.5. `U_b(t) ⊆ U_0(t) ⊆ U(t)`
`W(t)`	The admitted wrapper set at `t`, per section 5
`W_c(t)`	Admitted wrappers whose base coin belongs to `U_0(t)` on day `t`, as required by criterion A2. `W_c(t) ⊆ W(t)`
`n_i(t)`	Native issuance of base coin `i`, net of unreleased issuer treasury balances, consolidated across settlement environments
`b_i(t)`	Outstanding value of tokenized representations of coin `i` issued in settlement environments other than the one where the corresponding base units are held or immobilized
`x_i(t)`	Documented representation shortfall for coin `i`: the excess of representations outstanding over the base units held against them, measured at par and stated in United States dollars at `FX_{c(i)}(t)`
`ṽ_j(t)`	Observed outstanding value of admitted wrapper `j`
`C_j(t)`	Contractual claims outstanding on wrapper `j`, measured at par: the amount holders are entitled to redeem, stated in United States dollars at the reference rate of the base coin's peg currency
`ℓ_j(t)`	Documented layer-local excess of wrapper `j`: `C_j(t)` less the immediate backing claim held by the arrangement, measured at par in the same dollar-equivalent unit under rule R9; zero when backing covers the claims
`ρ_j(t)`	Backed fraction of wrapper `j`: `1 − ℓ_j(t) / C_j(t)`, bounded between zero and one and equal to one when no excess is documented
`v_j(t)`	Admitted outstanding value of wrapper `j`, equal to `ρ_j(t) · ṽ_j(t)`: the market value assigned to the backed share of its claims
`e(t)`	Total wrapper-layer excess at par in dollar-equivalent terms, equal to `Σ_{j ∈ W_c} ℓ_j(t)`
`S0(t)`, `S1(t)`, `S2(t)`	The aggregates, in the net or gross variant indicated

Symbol	Meaning
`m(t)`, `m_1(t)`	Representation multiplier and bridge-only multiplier
`c(i)`	The peg currency of base coin `i`: the fiat unit of account it is designed to hold parity with
`FX_c(t)`	The official reference rate for currency `c` on day `t`, stated as United States dollars per one unit of `c`, per section 6.4.2; `FX_{USD}(t) = 1`
`q_i(t)`	The par ratio of coin `i` on day `t`: its observed price in United States dollars divided by `FX_{c(i)}(t)`, so that `q = 1` is parity
`Q_c(t)`	The outstanding `S0` quantity in peg currency `c` on day `t`, in units of `c`

The exception terms `x_i` and `ℓ_j` have the same structure. Each measures claims outstanding at one layer in excess of the backing held against them at the layer immediately below. Because the terms are layer-local, they can be added without double counting. They are also the only terms through which the net measures can differ from S0.

Base and representation quantities are measured at par in the coin's peg currency and translated into United States dollars using the official reference rate specified in section 6.4.2. For a dollar-par coin, this translation is the identity. Wrapper layers are measured at outstanding market value. Rule R8 states and governs this deliberate valuation asymmetry. Because non-dollar members enter at a reference rate, S0 is a United States dollar-equivalent aggregate and may move even when no unit is issued or redeemed. Sections 4.2 and 6.4.6 state the implication and its treatment. The published series includes a decomposition of S0 by peg currency for each day of its trailing window of 90 days, so that issuance effects can be separated from exchange-rate effects.

2.2 S0, base stablecoin supply

S0 is the total of native primary stablecoin claims intended to redeem at or track par, as recognized by the issuing arrangement. It excludes unreleased issuer treasury balances and is consolidated across settlement environments so that each claim is counted once regardless of the number of environments in which it circulates.

```
S0(t) = Σ_{i ∈ U_0(t)} n_i(t)
```

S0 is the base measure in the hierarchy. It is a different compilation from the platform's market value figure; section 6.7 defines their relationship. An S0 holder has a claim at claim distance zero. The unit held is itself the redemption endpoint, with no intermediate claim between the holder and that endpoint.

Consolidation across settlement environments is embedded in `n_i`, rather than applied as a separate adjustment. When issuance is recorded by environment, the native measure for each environment excludes units issued against base units immobilized elsewhere. Representation flows therefore cancel within the sum, making S0 net by construction.

A redemption endpoint has one of two forms. Throughout the specification, the term "claim" is used broadly enough to encompass both. An instrument is eligible for S0 when it satisfies either form.

The first form is an identifiable redemption obligation, whether legal or technical. A fiat-backed stablecoin whose issuer undertakes to redeem at par meets the condition legally. A design whose redemption is enforced by contract code meets it technically. The relevant requirement is an identifiable counterparty or mechanism supporting redemption at par.

The second form is primary par issuance in which the redemption path is mediated by a protocol rather than embodied in a legal person. A collateralized design that allows any holder to retire units against collateral through an open mechanism has no obligor in the legal sense, yet still qualifies as a base instrument. Units are issued at par against value, and the route back to that value is defined and open.

The base universe `U` is determined exclusively by the following criteria. Criterion 3 is evaluated as provided in section 6.4.1, including through the proxy used for dates preceding the collection of daily prices and for instruments whose peg currency has no official reference rate under section 6.4.2. An instrument belongs to `U` when all four conditions hold:

1. it is a primary issued claim: units are created against value at issuance and the unit held is itself the redemption endpoint (claim distance zero), under either form described above;
2. it is designed to maintain parity with one fiat unit of account;
3. it maintains that parity in practice under the par test in section 6.4.1; and
4. it is neither a representation of another claim (section 2.3) nor a wrapper (section 2.4), preventing any unit of underlying value from being counted twice.

Membership is an attribute of the instrument. It is independent of the source that lists the instrument, the platform's current ability to observe it, and the platform's technical capacity on any given day. Those factors concern compilation coverage and are treated in section 6.4.4. When criterion 3 cannot yet be evaluated by the par test or by the proxy, membership remains unresolved rather than being assigned either member or non-member status. Section 5.6 records that state. An instrument whose peg currency has no official reference rate holds no par verdict; it is a member of `U` under the proxy, uncovered with status `no_official_reference_rate`, until a rate exists.

2.3 S1, represented stablecoin supply

S1 adds tokenized representations of S0 claims. These are units issued in one settlement environment against base units held or immobilized in another, with a redemption path that passes through the representation issuer before reaching the base redemption endpoint. S1 is reported in two variants.

```
S1_gross(t) = S0(t) + Σ_{i ∈ U_b} b_i(t)
S1_net(t)   = S0(t) + Σ_{i ∈ U_b} x_i(t)
```

The gross variant counts every token layer simultaneously in circulation. The net variant removes duplication arising from the backing relationship. Immobilizing one base unit to issue one representation creates no additional base claim, so the two layers reduce to one in the net measure.

When all representations are fully backed, the net identity becomes `S1_net(t) = S0(t)`, which is the normal state. The shortfall term `x_i` is nonzero only under the circumstances specified by rule R2. This is the sole case in which net represented supply departs from base supply.

2.4 S2, extended stablecoin claims

S2 adds transferable instruments whose principal economic exposure can be traced to a claim on an S0 asset, including savings receipts, staking receipts, and tranches over those claims. Shares in pools that lend the base coin onward belong to the adjacent segment defined in rule R7. Admission requires a documented redemption path that resolves to exactly one base coin, as specified in section 5.

```
ρ_j(t)      = 1 − ℓ_j(t) / C_j(t),   with ρ_j(t) = 1 where C_j(t) = 0
v_j(t)      = ρ_j(t) · ṽ_j(t)
S2_gross(t) = S1_gross(t) + Σ_{j ∈ W_c} v_j(t)
S2_net(t)   = S1_net(t) + e(t),   where e(t) = Σ_{j ∈ W_c} ℓ_j(t)
```

The gross variant counts every circulating layer that constitutes a claim on the base. Claims issued by a wrapper beyond the backing it holds, `ℓ_j`, do not constitute claims on that base. Rule R9 therefore admits only the backed share of the wrapper's market value, `ρ_j · ṽ_j`. A market premium or discount scales the admitted value without altering the excess, and admitted wrapper value cannot be negative. The excess itself is measured at par and enters the net identity through `e`. S2 includes every admitted derived claim regardless of claim distance. A wrapper directly over a base coin stands one step from it, while a wrapper over a representation or another wrapper stands farther away; all belong to the wrapper layer under rule R3. The sums run over `W_c`, the admitted wrappers whose base coin is covered on the observation day, so criterion A2 enters the equation directly. The gross measures therefore sum represented claims on the base without including every observable item of value in the segment.

The net measures represent deduplicated claims within the hierarchy. Placing a base unit into a wrapper creates no additional claim on the base coin, so wrapper layers net out and only `e(t)` remains. This term records documented claims created at the wrapper layer in excess of the backing held there. Those excess claims are obligations of the arrangement that issued them and do not constitute base claims. When no documented excess exists, `S2_net(t) = S1_net(t) = S0(t)`.

This specification publishes S0, S1 gross, S2 gross, and the multipliers defined in section 4 as measured series. S1 net and S2 net are **conditional accounting identities**. They depend on the full-backing assumption that section 6.6 states is not independently verified. The exception terms `x_i` and `ℓ_j` are recognized only when documented evidence reaches the compiler under rules R2 and R9; otherwise they are set to zero. The absence of a measured exception term

does not establish that no exception exists. The net measures are therefore identities that hold when the backing they assume is in fact present.

2.5 Layers, tiers and the non-overlap requirement

The specification distinguishes between two concepts that can otherwise be conflated.

A **claim layer** classifies an instrument by the form of its claim. Each admitted instrument belongs to exactly one layer: base units belong to the base layer, cross-environment representations of base units to the representation layer, and all other admitted derived claims to the wrapper layer. Claim distance is recorded separately and does not determine layer assignment. A bridged representation and a wrapper held directly over the base coin, for example, are both one redemption step from the base unit but occupy different layers because their claims have different forms.

A **tier** is an aggregate containing all layers through its boundary. The tiers are therefore nested in constituent scope, so that `S0 ≤ S1_gross ≤ S2_gross`, while assignment to the underlying layers is mutually exclusive. An instrument contributes once to every tier at or beyond its own layer. The wrapper layer has no upper bound on claim distance: a wrapper over another wrapper remains in the wrapper layer under rule R3.

R0. Non-overlap with the base record. A representation or wrapper is admitted only when its units are absent from the base coin's native issuance record. If the issuer's own reporting consolidates a variant token into the circulating supply of the base coin, the variant belongs to S0 and is classified as neither a representation nor a wrapper, regardless of its technical design.

Rationale. Layer counting requires a base that is measured once. The compilation check of R0 against the base coin's issuance record follows under Specification 1.2.

2.6 Worked example: one base unit through three tiers

Consider 100 issued and outstanding units of a base coin. Thirty are immobilized in a lock-and-mint bridge, against which 30 representation units circulate in a second settlement environment. A savings vault holds 21 units, consisting of 20 units deposited by holders and 1 unit received as yield paid in the base coin. Wrapper shares with a value of 21 units circulate against those vault holdings. The resulting tiers are:

Measure	Value	Composition
S0	100	Base issuance, consolidated, including the 30 immobilized and the 21 held by the vault
S1 gross	130	100 base plus 30 representations
S1 net	100	Representations fully backed, so `x = 0`
S2 gross	151	130 plus 21 of admitted wrapper value
S2 net	100	Wrapper claims fully backed by base units the vault holds, so `ℓ = 0` and `e = 0`

Measure	Value	Composition
`m`	1.51	`S2_gross / S0`
`m_1`	1.30	`S1_gross / S0`

S0 includes the 30 immobilized base units, while S1 gross also includes their representations. S0 likewise includes the 21 units held by the vault, while S2 gross also includes the wrapper shares issued against them. This duplication is the intended consequence of layer counting. Gross measures capture claim structure; net measures capture deduplicated claims, which in this example equal base supply.

The additional unit of yield illustrates rule R9. When yield is paid in the base coin, an already outstanding unit moves into the vault. Vault holdings and wrapper value rise by the same amount. Wrapper claims of 21 are backed by 21 base units, leaving the net measures at S0. Accrued yield increases S2 gross and the multiplier without entering `e`.

3. Edge-case rules

Every rule in this section is normative. Each rule is stated first, followed by its rationale and, where the treatment requires an observable decision criterion, the relevant observable.

RULE R1

R1. Bridge design: lock-and-mint against burn-and-mint

Rule. A cross-environment transfer that immobilizes base units in one environment and issues representation units in another creates a second claim. The representation units therefore enter `b_i`. A transfer that extinguishes the base units in the origin environment and issues canonical units in the destination creates no second claim. The destination units are native issuance and enter `n_i`. Burn-and-mint transfers make no contribution to `b_i`, leaving S1 gross unchanged relative to S0.

Rationale. The decisive observable is whether the origin units remain in existence after the transfer. Under lock-and-mint, they remain outstanding but immobilized, so two tokens exist against one redemption obligation. Under burn-and-mint, the origin units cease to exist, leaving one token against one obligation in a different location. A single issuer may use both designs for the same coin. Classification is therefore made for each environment pair rather than for the coin as a whole.

Consequence for interpretation. A migration from lock-and-mint to burn-and-mint reduces S1 gross relative to S0 without changing the base claims outstanding. Section 4.2 records that the decomposition identifies the channel of such a movement but does not establish its cause.

RULE R2

R2. Under-collateralized representation: the one case S1 net departs from S0

Rule. If the outstanding representations of coin `i` exceed the base units held against them, the excess enters `x_i(t)` from the date the shortfall is documented. `S1_net(t)` then exceeds `S0(t)` by the sum of those excess amounts. A shortfall is recognized only when supported by documented evidence. Representation units that remain in circulation after a shortfall is recognized continue to enter `b_i` at par; they are not marked down to market value.

Rationale. This is the only circumstance in which the net variants contain information beyond S0. Recognition relies on documented evidence rather than price because the aggregate measures claims. A representation may trade below par because its backing is insufficient or because redemption is constrained, and price alone cannot distinguish between the two.

Consequence for interpretation. Recognizing a shortfall does not change S0 because the amount of base claims outstanding is unchanged. It changes only the relationship among the tiers.

RULE R3

R3. Wrapper-of-wrapper chains and tranches

Rule. Each circulating layer in a chain of claims enters the gross variants once at its admitted outstanding value, provided that every layer satisfies the admission policy in section 5 and that the chain resolves, through a finite sequence of documented redemption steps, to exactly one base coin. If the aggregate contractual claims issued by a tranche structure exceed the immediate backing claim, rule R9 governs the excess.

Rationale. A senior tranche over a staking receipt has claim distance two, with the base unit at zero: the tranche redeems into the receipt, and the receipt redeems into the base coin, which is itself the redemption endpoint. Including both the tranche and the receipt in S2 gross does not count the same instrument twice because they are separate transferable claims that remain outstanding at the same time. Any contractual claim amount above the immediate backing claim is treated under rule R9, preserving S2 as a measure of claims on the base rather than of exposure created against it.

Consequence for interpretation. Greater chain depth increases the multiplier by construction. When the increase results from adding a new layer over existing claims, it records greater layering and carries no implication about the condition of the base.

RULE R4

R4. Rebasing designs

Rule. Wrapper treatment is independent of the mechanism through which value accrues. A rebasing wrapper, whose unit balance increases while its unit price remains at par, and a share-price wrapper, whose unit balance remains fixed while its price rises, are both measured at outstanding value. Accrued yield therefore enters the gross measures under either design. A rebasing instrument that is fungible with the base coin and consolidated into the base coin's circulating-supply record belongs to S0 under rule R0 and is not treated as a wrapper.

Rationale. Measuring both designs at outstanding value places rebasing and share-price wrappers on a common basis, which is necessary for an aggregate that includes both. As disclosed in rule R8, S2 gross therefore includes accrued yield. That yield is not netted out because principal and accrued yield cannot be observed separately for every admitted instrument. Yield accrued in base-coin units does not create an excess under rule R9. It raises the arrangement's holdings and the value of its claims by the same amount, while the underlying units are already outstanding in S0.

RULE R5

R5. Unreleased issuer treasury balances

Rule. Authorized but unissued units, together with units held by the issuer or an affiliate that carry no redemption claim for an external holder, are excluded from `n_i` and therefore from every tier. When an issuance record reports both minted and circulating quantities, the circulating quantity is used. When only a minted quantity is reported, treatment of the coin is recorded in the coverage documentation in section 6.4, which governs the S0 universe. The admission criteria in section 5.1 apply to the wrapper set and do not govern base coins.

Rationale. A unit that has no external holder creates no claim. Treasury balances can also change in large discrete steps that would otherwise appear as supply events. Fiat monetary aggregates use the same convention. Federal Reserve M1, for example, counts currency outside the Treasury, the Federal Reserve Banks, and the vaults of depository institutions.

RULE R6

R6. Tokenized treasuries and fund shares

Rule. Instruments backed by a portfolio of securities, including tokenized Treasury bills, tokenized money market funds, and tokenized bond funds, have no stablecoin in their claim lineage and are excluded from all tiers. Stablecoin settlement at subscription or redemption does not create stablecoin lineage because settlement currency is separate from backing. These instruments form an adjacent segment and are reported outside the hierarchy.

Rationale. A tokenized Treasury fund share gives its holder a claim on securities through a fund structure. The claim chain terminates in the security rather than in a stablecoin redemption endpoint, leaving no defined claim distance to an S0 asset. Including such instruments would turn S2 into an aggregate of fiat-denominated tokenized assets, a distinct and broader object.

Consequence for interpretation. The exclusion follows from the definition of the hierarchy. The adjacent segment may be compared with S0 but is not added to it.

RULE R7

R7. Composite strategies and primary issuance

Rule. An instrument backed by multiple base coins or by multiple asset classes is excluded until its claim can be assigned to exactly one base coin. An instrument that constitutes primary issuance in its own right and has no parent stablecoin in its claim lineage may qualify for `U` under section 2.2 and enter S0 under the coverage rules of section 6.4, but it cannot be treated as a wrapper.

Rationale. S2 is compiled by base coin so that wrapper value can be reconciled to the base on which it claims. A claim that cannot be attributed to one base would enter as an unverifiable residual. Exclusion can be reversed, and any later change is recorded under section 7.

Lending-pool shares. A share in a pool that lends deposited base coins onward is excluded from S2. Such a pool holds loan receivables, meaning claims against borrowers denominated in the base coin, instead of holding the base coin itself. A receivable denominated and repayable in a stablecoin has no stablecoin in its claim lineage, following the same reasoning used in rule R6 for securities settled in stablecoins. The pool share is also a claim created through lending of the base coin against other collateral, a form of leverage outside the scope of the multiplier under section 4.3. Lending-pool shares therefore form an **adjacent segment**, reported alongside S2 and excluded from every tier, consistent with the treatment of tokenized securities under rule R6. A pool share qualifies as a wrapper only when the pool holds the base coin or another admitted claim on it and lends nothing onward. In that case, it is classified as a savings or staking claim under section 5.2.

RULE R8

R8. Valuation basis

Rule. Base and representation units are measured at par in their peg currency and translated into United States dollars at the official reference rate specified in section 6.4.2. Wrapper units are measured at outstanding market value. A departure of a base or representation unit from par does not alter the aggregate because the tiers measure claims rather than the market value of those claims. A change in a peg currency's reference rate, however, changes the dollar-equivalent value of an unchanged quantity of claims. That movement is classified as an exchange-rate effect rather than an issuance effect. The per-currency decomposition published under section 6.4.6 separates the two for each day of the trailing window of the published series.

Name of the resulting statistic. Because wrapper layers enter at market value, the quantity defined in section 4 is **market-valued claim layering**. This terminology is part of the specification. A wrapper trading above or below the redemption value of its underlying claim enters S2 at its market value. S2 gross and the multiplier therefore measure the market value of the outstanding claim structure, rather than the quantity of base units into which that structure could redeem.

Rationale. Measuring the base at par makes S0 a measure of claims outstanding rather than of their market price. Measuring wrappers at market value makes rebasing and share-price designs comparable under rule R4; otherwise the two designs cannot be measured on a common scale.

Recognized alternative. Applying each instrument's conversion rate to its outstanding units would produce a redemption-valued version of the same hierarchy. This is a valid alternative interpretation and differs from the specified measure whenever a wrapper's market value diverges from the value of its underlying claim. The variant is deferred because the standing publication rule excludes data that are not collected, and conversion rates are not currently collected. Section 7.5 records the variant as a candidate for a future minor version.

Tranche implication. A tranche admitted under rule R3 enters at the market value of the tranche claim rather than at its proportional share of underlying redemption value. Any difference between those amounts is therefore included in the statistic by construction.

RULE R9

R9. Claims in excess of the immediate backing claim

Rule. `ℓ_j(t)` is a **layer-local** excess measured at par. It equals the amount by which the contractual claims outstanding on an arrangement, `C_j(t)`, exceed the immediate backing claim held against them, provided that the backing claim is itself an admitted instrument and its backing resolves recursively through the chain to S0. The excess is not a claim on the layer below. It enters `e(t)` from the date on which it is documented and determines the backed fraction `ρ_j(t) = 1 − ℓ_j(t) / C_j(t)` used to admit wrapper market value to S2 gross: `v_j(t) = ρ_j(t) · ṽ_j(t)`. When no excess is documented, `ρ_j = 1` and the wrapper enters at its full market value. When no contractual claims are outstanding, `ρ_j = 1` and `v_j = 0`. Both `C_j` and `ℓ_j` are par amounts stated in United States dollars at the reference rate of the base coin's peg currency, allowing `e` to be added to S1 net across peg currencies. Because `ρ_j` is a ratio of amounts expressed on the same basis, it can also be calculated directly in units of the base coin. Admission of `ρ_j · ṽ_j` follows a proportional allocation convention. Separate market prices are unavailable for the backed and excess portions of a wrapper's claims, so observed market value is allocated between them in proportion to their contractual amounts. A redemption-valued alternative based on instrument conversion rates is deferred under rule R8. The rule covers two sources of excess: capital contributed to the arrangement in assets other than its backing claim, and claims issued by the arrangement beyond the backing it holds, including the tranche case in rule R3. Yield accrued in units of the backing claim does not constitute an excess.

Observable. The relevant comparison is between the arrangement's outstanding claim value and its holdings of the immediate backing claim, using the arrangement's own documentation. Recognition requires documented evidence under the same standard as rule R2.

Boundary with rule R8. A market price above or below the value of the immediate backing claim does not enter `ℓ_j`. The term applies only to documented issuance or exposure beyond the backing claim, meaning a difference in claim quantity or contractual amount. Market-price premiums and discounts remain within the market-valued claim-layering statistic defined by rule R8: they scale `ṽ_j` and, through it, admitted value `ρ_j · ṽ_j`, without changing `ℓ_j` or `e`. R8 therefore governs valuation effects, while R9 governs quantity effects. Their only connection is the backed fraction, a pure ratio of quantities. Because `ρ_j` lies between zero and one and `ṽ_j` cannot be negative, admitted wrapper value cannot be negative and S2 gross cannot fall below S1 gross.

Why the measure is layer-local. Measuring each excess against its immediate backing claim makes the exception terms additive. A wrapper two steps from the base may be backed by another wrapper that carries an excess of its own. Measuring both directly against S0 would count the lower-layer excess again in the upper-layer measure. The layer-local construction assigns to each term only the increment created at that layer. As a result, `Σ_i x_i + Σ_j ℓ_j` equals total incremental excess without double counting along the chain. The recursion terminates because rule R3 requires every admitted chain to be finite and to resolve to S0.

`ℓ_j` is the wrapper-layer counterpart of the representation shortfall `x_i`, which is also layer-local. Net measures depart from S0 only where claims exceed the backing held against them.

Boundary with rule R7. The admission policy already excludes instruments whose backing spans multiple asset classes. A wrapper admitted under section 5 therefore holds one admitted backing claim whose lineage resolves to a single base coin. R9 covers the remaining cases permitted by that policy: capital contributed as a buffer or junior support, and claims issued in excess of assets held. If an arrangement's backing becomes multi-asset in substance, rule R7 makes it a candidate for removal rather than treatment under R9.

Status in version 1.0. `ℓ_j` is recognized when documented evidence is available and is not compiled as a measured series. Section 6.5 states that neither term can be inferred mechanically from the compiled data, and section 6.6 records the resulting limitation.

---

4. The representation multiplier

4.1 Definition

```
m(t)   = S2_gross(t) / S0(t)
m_1(t) = S1_gross(t) / S0(t)
```

`m(t)` is the representation multiplier, defined as the total value of circulating stablecoin claim layers per unit of base stablecoin supply. Wrapper layers enter at market value under rule R8, making the measured quantity market-valued claim layering. `m_1(t)` is the bridge-only multiplier. It isolates the representation layer from the wrapper layer and is published alongside `m` because the two layers differ in coverage and observability.

By construction, `m(t) ≥ m_1(t) ≥ 1`: every `b_i` is non-negative, and every admitted wrapper value `v_j = ρ_j · ṽ_j` is non-negative under rule R9. A value of 1.0 indicates that no representation or wrapper value is outstanding within the measured coverage of those layers. Values above 1.0 indicate the amount of claim structure accumulated on the same base. `m_1` is observed over `U_b`, the members whose bridges are tracked by the record, so its scope is bounded by that coverage and does not estimate representation value across all of `U`.

`m` is published only for observation days with wrapper-layer coverage. When wrapper coverage is absent, `m` is withheld and `m_1`, which depends only on the representation layer, is published separately. The two multipliers can therefore span different windows. Any comparison identifies the window used for each figure.

4.2 Interpretation

The multiplier measures **claim layering**: the value of admitted representations and derived claims outstanding per unit of base supply, within the stated coverage of each layer.

An increase means that representation or wrapper value has grown faster than base supply, leaving more claim layers outstanding per unit of base supply. A decline means the converse. The level expresses circulating claim value per unit of base and, correspondingly, the amount of observable segment value that a simple sum across all tokens would count more than once.

With a multi-currency `U`, changes in a peg currency's reference rate can also move `m` when coins denominated in that currency have a different layering ratio from the rest of the base. This is a composition effect and does not represent a change in claim structure. When a movement in `m` spans a period of reference-rate change, its description states the per-currency decomposition of S0 required by section 6.4.6.

The multiplier has an additive decomposition into the two channels that generate it:

```
m(t) = 1 + [ Σ_{i ∈ U_b} b_i(t) / S0(t) ] + [ Σ_{j ∈ W_c} v_j(t) / S0(t) ]
             representation channel           wrapper channel
```

The identity is exact, so the two channels account for every movement in `m` without a residual. `m_1` consists of the first two terms. The decomposition is published with the series.

The decomposition identifies the channel through which a movement occurs but does not establish its cause. Rule R1 shows that a change in bridge design can move the representation channel without changing the base claims outstanding. Rule R3 shows that adding a layer over existing claims can move the wrapper channel. Commentary on a movement in `m` therefore identifies the channel that changed and the relevant coverage boundary without assigning a cause.

4.3 What the multiplier does not measure

The multiplier shares the form of a fiat money multiplier, but the resemblance does not extend to interpretation. The following limitations are part of the specification.

No solvency or reserve-adequacy inference. A high multiplier is compatible with full backing at every layer. A multiplier of 1.0 is also compatible with impaired reserves at the base coin. The measure is compiled from outstanding quantities and contains no information about the quality of an issuer's reserves. No value of `m` is defined or published as a warning threshold.

No leverage measure. Rule R9 excludes from the S2 gross wrapper total value created through leverage within a wrapper structure and recognizes that value separately. In the normal case, the layers counted by the multiplier are fully backed claims on the same base, meaning the same obligation represented more than once rather than an obligation borrowed against more than once.

No measure of liquidity or velocity. None of the components is a transaction measure. Two segments with the same multiplier can have arbitrarily different turnover.

No measure of money creation. Under the net identities in section 2, the layers counted by the multiplier add no claim on the base coin. The documented exceptions under rules R2 and R9 are claims on the representation issuer or the wrapper arrangement that created them. They are not base claims, and the net measures record them accordingly. Deposit creation changes the aggregate quantity of claims. Representation and wrapping change the number of tokens through which an unchanged quantity of claims is held.

No redemption-value measure. Wrapper layers enter at market value under rule R8. A wrapper that trades away from the value of its underlying claim can therefore move the multiplier even when claim structure is unchanged. The specified statistic is market-valued claim layering. A redemption-valued version would be a separate statistic, recorded in section 7.5 as a candidate rather than a restatement of the present measure.

Comparability requires a common coverage boundary. A change in the coverage of either measure changes the ratio. Coverage is published daily under section 6.4.4 for the latest observation day, and a comparison of `m` across two dates states the coverage on each date. Coverage changes are not constituent changes and therefore do not enter the constituent-change log described in section 7.2.

4.4 Worked example: the published series

The following example is taken from the published series at observation date 16 September 2026, vintage 19 September 2026. Every figure in this section is stated at that vintage. Unless another generation is named, the figures of sections 5.5, 6.4.5, 6.5, 6.6, and 6.7 are stated at the vintage of this edition, observation date 2 October 2026, vintage 2 October 2026. A later vintage may restate this date under section 7.3.

Observation date 16 September 2026, vintage 19 September 2026.

Measure	Level (US$ billions)	Per unit of S0
S0	297.50	1.000000
Representations, `Σ b_i`	19.83	0.066668
S1 gross	317.33	`m_1` = 1.066668
Admitted wrapper value, `Σ v_j`	6.37	0.021425
S2 gross	323.71	`m` = 1.088093

For this observation date, the decomposition in section 4.2 is:

```
m = 1 + 0.066668 + 0.021425 = 1.088093
```

The components are reported to six decimal places so that the identity closes at the stated precision. The published series reports the multiplier to four decimal places, 1.0881, while retaining the three levels without rounding.

Under the interpretation in section 4.3, the figure reports the amount of market-valued claim structure circulating per unit of base supply. It contains no information about the backing quality of any layer.

For this vintage, the two published forms of the series, the downloadable artifact and the daily table, are written by one compilation and agree for this date. Both apply the constituent rules in force under this version, instead of those in force on the observation date: constituent map version 3, membership keyed by instrument identifier under section 6.2, valuation at par under rule R8 where a unit count is recorded, the exclusion of lending-pool shares under rule R7, and coverage-consistent S2 admission under criterion A2.

---

5. Constituent admission policy

5.1 Exclusion as the default

An instrument does not enter S2 merely because it is denominated in a fiat unit, bears yield, or resembles an admitted instrument economically.

Admission requires an explicit entry in the maintained constituent map. Any instrument absent from the map is excluded. That absence records the state of the compilation and does not constitute a judgment about the instrument itself.

A1. Documented redemption path. Admission requires a redemption path to exactly one base coin, documented by the issuing arrangement. The path must resolve through a finite sequence of steps, each independently documented. Admission follows from the documented path, not from price correlation with a base coin.

A2. Single-base attribution and base coverage. Each entry records the base coin to which its claim resolves. The instrument enters S2 only for vintages in which that base coin is within S0 coverage. An admitted entry whose base falls outside coverage on a given day contributes nothing to S2 for that day. Otherwise, its value would increase the multiplier's numerator while its base contributed nothing to the denominator. The condition is evaluated for each vintage and published for each entry. Once the base becomes covered, the entry enters the compilation without reopening the admission decision.

A3. Finite chain. Every step in the claim chain must be documented, and the chain must terminate in a base coin. Rule R3 governs multi-step chains and tranches.

5.2 Relation vocabulary

Each admitted entry records its claim form using a controlled vocabulary. The vocabulary forms part of the specification. Any addition to it constitutes a version change under section 7.

Relation	Claim form
`savings`	Savings-vault share redeemable into the base coin
`staked`	Staking receipt redeemable into the base coin, possibly after a stated waiting period
`structured-tranche`	Tranche over one of the above claim forms, resolving to the base coin under rule R3

Instruments reported alongside the hierarchy but excluded from it carry an adjacent-segment code outside the admission vocabulary. The code in use is `adjacent-lending`, for shares in pools that lend the base coin onward under rule R7. Tokenized securities excluded under rule R6 carry the exclusion reason `tokenized-treasury` of section 5.4, and tokenized commodity claims carry the coverage code `commodity` of section 5.6. Adjacent-segment codes are separate from relation codes, and an instrument assigned one belongs to no tier.

The constituent record publishes claim distance for each admitted entry from its relation: 1 for `savings` and `staked`, 2 for `structured-tranche`. Savings xDAI, a savings wrapper over a representation of DAI, stands at claim distance 2 under the definition in section 1.

A stated waiting period for redemption does not affect admission or tier assignment, because the hierarchy is ordered by claim form rather than liquidity. A waiting-period field on the entry follows under Specification 1.2.

5.3 Confidence vocabulary

Every admitted entry also carries a confidence grade. The grade governs permissible use of the entry rather than its inclusion in the compilation. All admitted entries are compiled. Allowing constituents to vary with an internal judgment would prevent the series from being reproduced from the published map.

Grade	Meaning	Use
`high`	Redemption path verified from the issuing arrangement's own documentation	Compiled into the series and available for citation individually
`medium`	Claim mechanism is clear, and either base attribution or coverage requires re-verification	Compiled into the series, flagged in the constituent map, and re-verified before the entry is named or relied on in published commentary

A `medium` grade cannot persist indefinitely. At each specification revision, every entry carrying a re-verification flag is either resolved or removed.

5.4 Exclusion vocabulary

Excluded instruments are assigned a reason so that the boundary remains auditable.

Reason	Meaning	Governing rule
`tokenized-treasury`	Claim on securities, no stablecoin lineage	R6
`composite`	Backing spans multiple assets, claim not attributable one step to a single base	R7
`composite-fund`	Claim on a fund share whose portfolio spans multiple assets	R6, R7
`primary-issue`	Own primary issuance, no parent stablecoin: an exclusion from the wrapper set, not from `U`, since a primary issue may itself qualify for S0	R7
`unclear-lineage`	Documentation insufficient to establish a redemption path	A1
`par-test-fail`	Fails the par test of section 6.4.1; a primary fiat-par claim outside `U` by criterion 3	6.4.1

An exclusion recorded as `unclear-lineage` reflects the state of the documentation. It is reconsidered when the documentation improves, and any resulting change is recorded under section 7.

The exclusion vocabulary applies to instruments outside `U` by definition or by the par test. Instruments that belong to `U` but are not reached by a particular compilation are described instead by one of the statuses in section 5.6.

5.5 Coverage boundary

Both the base universe and the admitted wrapper set have explicit boundaries, and those boundaries are stated wherever the aggregates are reported. For each daily compilation, the coverage record of section 6.4.4 states the share of `U` that is covered on the latest observation day and the status of every member that is not.

A compilation day is accepted only when every member of a published **required set** has reported for that date. The required set identifies the base coins whose absence would leave the day's level unrepresentative of the segment. It is carried in the constituent map, so a change to the set is a constituent change under section 7.2 and does not require a specification version change. The required set in force is USDT and USDC, together 86.23 percent of S0 at observation date 2 October 2026, vintage 2 October 2026. A day with incomplete reporting is withheld because a coverage gap in a level series cannot be distinguished from a contraction in supply. The rule is a completeness gate; it does not interpolate missing observations. Missing days remain missing.

5.6 Coverage and classification status vocabulary

For each daily compilation, the coverage record of section 6.4.4 assigns every instrument observed on the latest observation day one status. The statuses of members and unresolved candidates fall into three groups: covered members, uncovered members, and unresolved candidates. Instruments outside `U` carry either an exclusion reason from section 5.4 or a code naming the layer or segment they belong to: `wrapper` and `representation` for instruments of the wrapper and representation layers, `adjacent-lending` and `commodity` for the adjacent segments of section 6.4.7, and `non_fiat_peg` and `unknown_peg` for instruments without a fiat peg or without a recorded peg.

Status	Kind	Meaning
`covered`	member	In `U`, and the compilation carries a level for it
`no_issuance_record`	member, uncovered	In `U`; the issuance record in force carries no supply figure for it
`no_unit_count`	member, uncovered	In `U`; the issuance record provides a dollar figure for the day but no unit count. Rule R8 therefore cannot value the instrument-day, which is excluded from S0
`no_official_reference_rate`	member, uncovered	In `U` under the proxy of section 6.4.1; no official reference rate for its peg currency exists under section 6.4.2, and the instrument holds no par verdict
`reference_rate_stale`	member, uncovered	In `U`; the last published reference rate for its peg currency is older than the carry-forward limit of section 6.4.2
`unclassified`	candidate, unresolved	Fewer valid observations than the par test requires (section 6.4.1), or no recent price from a second independent source; membership not yet evaluated

Two flags are carried beside a member's status. `no_bridge_record` marks a member of S0 whose bridged units the issuance record does not track, so that its contribution to `b_i` is unobserved; an unobserved contribution is not assigned a value of zero, and the member lies outside the representation-layer coverage defined in section 6.4.5. `under_review` marks a member on which the review trigger of section 6.5 has fired, with the constituent decision pending.

An uncovered status describes a limitation of the compilation and does not characterize the instrument itself. A status may change as source coverage changes. Such changes are treated as coverage movements under section 6.4.4 and do not constitute constituent changes under section 7.2.

6. Measurement and data sources

6.1 Source classes and authority

The compilation follows a single authority principle. One source owns each data type, one source supplies each instrument within a given series, and no series changes source partway through its history. When a series must combine different data types, the combination occurs across instruments rather than within a single instrument and is documented as a composite. Section 6.6 records the one composite used in the aggregates, S2, which combines issuance-record values with market-data values across instruments.

Layer or input	Source class	Role
Base supply, n_i	On-chain issuance records	Per-environment minted, circulating and representation balances, from which the native and bridged decomposition is taken
Representations, b_i	On-chain issuance records	The bridged component of the same decomposition
Wrapper value, $\tilde{v}_j$	Market data	Outstanding value of admitted wrapper instruments
Constituent map	Maintained by Stablecoin Beat Research	Admission, base attribution, relation and confidence per section 5, published and versioned
Reference rates	Official sources	Exchange rates of the European Central Bank's daily reference series and, where section 6.4.2 provides, the issuing central bank's official rate; the valuation input for non-dollar members and the denominator of the par ratio
Par-test prices	Market data, two sources	The daily price that forms the par ratio of section 6.4.1: a primary market-data price; a verdict is stored only when a recent price from a second independent source is present. Each stored verdict records its statistic, the rule applied, the number of observations, and whether a second price is present
Reference series	Official sources	Interest-rate, money-stock and deposit series named where used, including Federal Reserve and European Central Bank series, United States Treasury data, and Federal Deposit Insurance Corporation data; used for comparison against the aggregates and never as an input to them

Official exchange reference rates are the only reference-series input to the aggregates. All other reference series are used solely for comparison. A dollar-par coin is unaffected by the exchange-rate input, whereas the dollar-equivalent level of a non-dollar member changes with that input. Section 6.6 records the resulting limitation.

6.2 Identifier resolution

Membership in `U` and in S0 is resolved per instrument and keyed by persistent instrument identifier. The wrapper join used to compile S2 is identifier-keyed. The base-universe exclusions, the completeness gate of section 5.5, and the base check of criterion A2 join by ticker symbol.

Renames and migrations do not alter instrument identity because identity follows the persistent identifier rather than the display name. A change in an instrument's recorded identifier is treated as a constituent change under section 7.2.

The data store used for the base and representation layers retains the source identifier alongside the instrument symbol.

6.3 Observation frequency, timing and latency

Observations are daily and carry a UTC calendar date. The base and representation layers and the wrapper layer are collected within the same daily cycle. The wrapper layer is compiled after the base layers.

If a collection cycle is incomplete at the cutoff, the wrapper layer may lag the base layer by one day. In that case, the latest published S2 and `m` values correspond to the most recent date on which wrapper coverage is complete. That date is shown with the figure and is not represented as the current day. S0, S1, and `m_1` are still published for the current day because they do not depend on the wrapper layer.

The completeness gate in section 5.5 applies to the base layer. If the constituents of the required set of section 5.5 have not reported for a day, no observation is published for that day.

6.4 Definition, test and coverage

6.4.1 The par test and its parameters

Base coins qualify through a par test rather than self-description. An instrument qualifies when it is designed to maintain parity with its reference unit and does so in practice. The decision to test observed par behavior rather than rely on a design label follows Kosse et al. (2023), who examined 68 stablecoins and found that none had maintained parity with its peg at all times. That finding motivates the existence of the test; the statistic and parameters specified below are specific to this methodology.

For each coin `i` and observation day `t`, the par ratio is

```
q_i(t) = P_i(t) / FX_{c(i)}(t)
```

where `P_i(t)` is the coin's observed daily price in United States dollars and `FX_{c(i)}(t)` is the official reference rate of its peg currency, expressed as dollars per unit, under section 6.4.2. For

a dollar-par coin, `FX = 1`. Parity is `q = 1` in every currency. A claim on one euro, one yen, or one real is therefore evaluated in the same way as a claim on one dollar.

The test statistic is the median absolute deviation from parity over the coin's entire observed history:

```
D_i = median_t | q_i(t) − 1 |
```

A coin passes when `D_i ≤ 0.025`. Absolute deviation prevents movements above and below parity from canceling. A coin alternating between 0.90 and 1.10 has a median price of one but a median distance from parity of 10 percent, and the latter quantity is the one measured by the test. The 1.0 compiler applied the same band to the signed median `median_t q_i(t)`. Verdicts stored under the signed median stand under section 7.2 until reopened.

A verdict is stored only after the coin has at least 30 valid daily observations and only when a recent price from a second independent source is present under section 6.1. Until both requirements are met, the coin is `unclassified` under section 5.6. Its membership remains unresolved, and it stays outside every compilation. The 1.0 compiler stored an initial verdict after three valid daily observations from a single source.

The median is preferred to the mean or the most recent price because a bounded episode should not determine membership. A coin that traded at 87 cents for two days within a 500-day history remains a base coin. The episode is recorded in the peg-stability series and the coin's depeg record. The 2.5 percent band is a classification parameter rather than a measure of peg quality; peg deviations are measured separately in the platform's peg-stability series.

Information set and precedence. A coin's verdict is formed from the observations available on the day the verdict is stored. Later observations do not alter it, and the whole-history statistic is not reapplied after the verdict has been frozen. A frozen verdict can be reopened only by the review trigger in section 6.5 or through a logged constituent change under section 7.2. Any resulting change applies prospectively: a verdict stored or ruling made after the backcast's compilation date, 19 September 2026, takes effect from the date on which it is stored or ruled. A backcast compiled under this version applies the verdicts in force on its compilation date throughout the backcast window, and the vintage note discloses that treatment.

Proxy for dates before daily prices and for currencies without an official rate. For observation days before the platform's daily price history, which begins on 9 April 2025 and is published with the series as `test_era_start`, criterion 3 of section 2.2 is evaluated by proxy. An instrument is treated as maintaining parity when the issuance record classifies it as a par claim on a fiat unit. Those days are identified by the published start date rather than by an instrument-level status. From 9 April 2025 onward, an instrument without a computed verdict is treated as a candidate under section 5.6, with one exception: an instrument whose peg currency has no official reference rate under section 6.4.2 is evaluated by the same proxy, holds no par verdict, and is a member of `U` with status `no_official_reference_rate` until a rate exists. An instrument is not removed from a historical observation solely because no computed verdict exists

for a date before the start of the price history. Where a stored verdict exists, it applies throughout the backcast window under the preceding paragraph; the proxy reaches only instruments without one.

Verdicts are frozen by vintage under section 7.2. Once frozen, a verdict changes only through a logged constituent change stating the reason. Because a whole-history statistic can respond slowly to a permanent collapse, section 6.5 defines a review trigger that surfaces such a case while preserving the rule.

6.4.2 Reference rates

A par claim denominated in a non-dollar unit is valued in dollars, and its par ratio is formed, using an official reference rate. The applicable rate for a given day is chosen mechanically according to the following hierarchy:

1. the European Central Bank's daily euro reference rate for the currency, crossed into dollars per unit through the same day's euro reference rate for the dollar;
2. otherwise, the official exchange rate for the currency published by its issuing central bank, stated or crossed into dollars per unit through that bank's same-day official dollar rate;
3. otherwise, no rate.

Commercial and venue-derived exchange rates are excluded from both valuation and the par ratio at every step. When no rate is published on a given day, the most recently published rate is carried forward for at most seven calendar days. After that period, the rate is stale and the coin is assigned `reference_rate_stale` until publication resumes.

If no rate exists under this hierarchy for a currency, its coins remain inside `U` but outside the compilation with status `no_official_reference_rate`: criterion 3 is evaluated for them by the proxy of section 6.4.1, and no par verdict is formed until a rate exists. The platform holds official reference rates for 17 currencies under step 1 and applies step 2 to the rouble. The rouble is the material case for the second step: the European Central Bank suspended its rouble reference rate on 2 March 2022, and the issuing central bank publishes a daily official rate, which is applied under step 2.

6.4.3 Definition and coverage are separate statements

The definition of `U` is kept separate from the coverage achieved by a particular compilation, consistent with monetary-statistics practice. An aggregate's definition does not change when a reporting institution is absent, and compilers state the share of the defined population reached by their collection. The International Monetary Fund's Monetary and Financial Statistics Manual and Compilation Guide (2016) states an institutional coverage boundary as part of compilation practice. The European Central Bank defines the population of monetary financial institutions and allows derogations for small institutions whose combined share of the national balance sheet does not exceed 5 percent (Regulation (EU) 2021/379, Article 9(1)). Its compilation manual refers to those derogated institutions as the reporting tail and requires collection of the

size of that tail so it can be monitored (European Central Bank 2024, section 2.7.1). The base universe is handled on the same principle: the tail remains within the definition, its size is measured, and its share is reported as coverage. No gross-up is performed, and no level in this specification is estimated for an uncovered member.

6.4.4 Coverage, stated daily

The coverage record published with every daily S0 compilation (section 9.3) reports, for the latest observation day:

- the share of `U` covered, both by count and by value;
- each member of `U` that is omitted, with one status from section 5.6; and
- unresolved candidates, listed separately and excluded from the coverage denominator.

Coverage for higher tiers is reported separately whenever assignment to a tier requires information beyond the base level. A base claim may be fully measured in S0 while its units are only partly attributed across settlement environments for S1. Missing environment attribution therefore limits representation-layer coverage without reducing S0.

Value coverage requires a value for members that the compilation itself cannot value. For this purpose, coverage is measured against a **coverage benchmark**: the broadest independently observable United States dollar value for each confirmed member of `U` on the day, taken from market data. The benchmark is diagnostic only. It never enters S0 or any higher tier, is not valued at official reference rates, and does not imply the level the compilation would carry for the member. Count coverage requires no benchmark and is published alongside value coverage. A confirmed member of `U` with neither an issuance value nor an independently observable market-data value counts in coverage by count, is listed as unvalued, and is outside the value denominator, so the value share remains defined. In the machine-readable coverage record, the share is reported in the field `coverage_pct_value`, computed over value-observable members of `U`.

Coverage increases when collection improves and decreases when a source withdraws. Neither movement changes the definition, neither constitutes a revision under section 7.3, and neither is announced instrument by instrument. The movement is visible in the coverage figure, while the daily list identifies its source.

6.4.5 The compilation in force

S0 includes every member of `U` for which the platform has a qualifying issuance record under section 6.1 carrying a unit count and, when the peg currency is not the dollar, an official reference rate under section 6.4.2. Membership in `U`, coverage of a member, and the quantity measured for that member are distinct statements and are kept separate by the specification. For each instrument, the circulating figure carried by the record is its issuance net of units immobilized against representations elsewhere. S0 is therefore net by construction for every covered member, whether or not a per-environment decomposition has been collected. At ob-

servation date 2 October 2026, vintage 2 October 2026, S0 covers 99.92 percent of `U` by benchmark value and 70.74 percent by count, over 162 instruments. Uncovered members by status: `no_issuance_record`, $0.24 billion; `no_official_reference_rate`, $0.02 billion; `reference_rate_stale`, none; `no_unit_count`, none. Unresolved candidates: 206 instruments, $2.29 billion by benchmark value; of these, 133 are instruments in the issuance record whose market-data identity the platform cannot yet establish, and the remainder are instruments whose coin holds no verdict.

The representation layer `b_i` is measured from the per-environment decomposition specified in section 2.2, which the record carries for members whose bridges it tracks. The decomposition is sought for every S0 member. A member for which no bridged units are tracked carries the flag `no_bridge_record`, contributes its full circulating figure to S0, remains outside `U_b`, and is excluded from representation-layer coverage. The representation sum in section 2.3 therefore runs over `U_b` and not over all of S0. An untracked bridge is absent from the sum and is never assigned a value of zero. At the same vintage the representation layer is measured for members constituting 99.90 percent of S0 by value, 140 of 162. Version 1.0 stated the same rule, but its compiler did not apply it. S0 was summed only across members with a collected decomposition, 18 instruments on the final day compiled under that version, while the rest of `U` appeared only in the coverage denominator. Under version 1.1, those remaining members enter S0. The level therefore rises on the effective date by the share previously outside compilation coverage. Section 6.4.4 classifies the increase as a coverage movement, and section 7.4 carries it through the backcast. The increase is not treated as a revision.

The issuance record is a compiled source rather than the primary source. Primary issuance is recorded on chain, and the platform's program of reading issuer contracts directly is expected to increase coverage over the life of this version without requiring a version change.

6.4.6 Changes at constant exchange rates

Because non-dollar members are converted at reference rates, the change in S0 between two dates has two components. The constant-exchange-rate quantity effect measures the change in outstanding units within each peg currency at the earlier day's exchange rate. The exchange-rate effect measures the change in rates applied to the later day's outstanding units.

```
ΔS0 = Σ_c FX_c(t−1) · [ Q_c(t) − Q_c(t−1) ]  +  Σ_c Q_c(t) · [ FX_c(t) − FX_c(t−1) ]
        constant-exchange-rate quantity effect          exchange-rate effect
```

The quantity effect includes more than issuance and redemption. It also captures members entering or leaving coverage under section 6.4.4 and constituent changes under section 7.2. Where a further decomposition is published, the quantity effect is divided between changes in members present on both dates, representing issuance and redemption, and changes associated with members present on only one date, representing coverage and constituent movements. Both components are published with the series for each day of its trailing window. Statements about growth in S0 or a higher tier use the quantity effect, or its continuing-member component where available, because exchange-rate movements are holding gains or losses on

outstanding positions. This follows the distinction used in monetary statistics when transactions are derived from changes in outstanding amounts (European Central Bank 2024, section 5.8). The same decomposition is published for the components of the multiplier, in the block `decomposition_multiplier` of the series at https://stablecoinbeat.com/aggregates-data.json, so that movements in `m`, as described in section 4.2, can be evaluated net of currency composition.

6.4.7 Further rules in force

New instruments. The base universe and the wrapper set use opposite defaults. Admission to `W` requires an explicit entry, so an instrument not yet ruled on is excluded from S2 under section 5.1. When the issuance record first begins to carry an instrument, that instrument enters as a candidate. It remains `unclassified` until the par test in section 6.4.1 produces a stored verdict, and it enters S0 on the first vintage with a passing verdict. Section 6.5 lists candidates awaiting adjudication.

Adjacent segments. Tokenized commodity claims fall outside the hierarchy because their parity is to a commodity rather than a currency. Tokenized securities fall outside under rule R6, and shares in pools that lend the base coin onward fall outside under rule R7. None of the three is added to any tier; each is reported beside the hierarchy where the platform tracks it.

Minted-only instruments under rule R5. If the issuance record contains a minted quantity but no circulating quantity for an instrument, rule R5 excludes the instrument from `n_i`. A minted quantity alone does not establish that units are externally held. At the observation date of 16 September 2026, no instrument in coverage is in this state.

Entries outside base coverage under criterion A2. An admitted wrapper is excluded from the compilation for any vintage on which its base coin is not covered by S0, whether because the base is outside `U` or because it is a member that S0 does not cover. This condition preserves the literal meaning of the multiplier in section 4: every instrument in the numerator has its base represented in the denominator, so `m` compares claim layers with the base of the same population. The condition is a coverage state rather than an admission error, because each affected entry still satisfies A1. Those entries remain admitted, are disclosed for each vintage through a published base-coverage flag, and enter the compilation on the first vintage in which their base is covered. The flag is calculated for each vintage rather than stored in the map and therefore applies only to the day being compiled.

6.5 Reconciliation and monitoring checks

The compilation is subject to deterministic checks that run daily and feed an operational digest. The following checks are in force. A series-continuity check, for discontinuities at points where an input changes in coverage or vintage, follows under Specification 1.2.

Completeness. The section 5.5 gate withholds any day on which a member of the required set has not reported.

Cross-source agreement. When an instrument appears in both the issuance record and market data, the two measures of outstanding value are published side by side in the coverage ledger. A widening difference indicates that one source has moved away from its stated measurement basis.

Market value comparison. S0 is compared daily with the market value figure in section 6.7. Because the two populations differ by construction, the difference is published as information rather than treated as a defect signal. Movements in the difference are read against the daily coverage statement and changes within the market category itself. When the market value figure is unavailable, the value is recorded as absent rather than carried forward.

Netting. For every member with a collected per-environment decomposition, the instrument-level circulating figure in the record is compared with the sum of native circulating figures across environments. Agreement within 1 percent confirms that the instrument-level figure is net of bridged units for that member. A difference beyond 1 percent constitutes a finding about the record. At observation date 2 October 2026, vintage 2 October 2026, 140 members are compared and 18 differ by more than 1 percent; the differences total $0.253 billion, 0.085 percent of the value compared, and the largest is 27.2 percent. Under version 1.0 the comparison ran on market-valued figures and reported differences that were movements in price rather than in units; under rule R8 both sides are unit counts.

Reference-rate availability. For every peg currency represented in `U`, the check reports the age of the most recent official reference rate under section 6.4.2 and the coins affected when the carry-forward limit has been exceeded.

Constituent review trigger. For every member with a stored par verdict, the compiler calculates the median absolute deviation from parity over the latest 30 valid observations. A value above 0.025 does not change membership. It flags the member `under_review` under section 5.6 and sends the case to a reviewer. Any resulting membership change is prospective and is logged under section 7.2. Each flag records whether the market-data price and the price carried by the issuance record agree on the member's last observed price, so that a venue-data error is read as a data question before it is read as a peg question. At observation date 2 October 2026, vintage 2 October 2026, the trigger stands on 26 members, of which the 18 in S0 total $0.18 billion; for 12 of the 26 the two prices agree, for 0 they differ, and 14 carry a single price. The whole-history statistic also exceeds the band for 11 of them. Every flag is a constituent decision under section 7.2, and each ruling is logged.

Coverage. The coverage share of section 6.4.4 is calculated daily in the coverage record and retained in the same vintage as the series it qualifies, so that the coverage statement and the associated levels refer to the same vintage.

Unclassified instruments. Symbols present on the latest day of the issuance record that are neither classified as par members nor excluded under section 6.4 are listed for adjudication. A newly listed instrument therefore reaches a reviewer within one day rather than entering S0 without an explicit decision.

Neither `x_i` under rule R2 nor `ℓ_j` under rule R9 can be inferred mechanically from the data used to compile the aggregates. Both require documented evidence about the relationship between claims outstanding and backing held. Section 6.6 states the consequence.

6.6 Known limitations of the measurement

The aggregates combine source classes. S2 combines base and representation values from issuance records with wrapper values from market data. The combination occurs across instruments, which is permitted by the authority principle in section 6.1.

Valuation differs across layers. Rule R8 measures base and representation layers at par and wrapper layers at market value. The multiplier is consequently a ratio in which a market-valued component appears in the numerator but not in the denominator.

Accrued yield enters S2 gross. Under rule R4, wrapper value rises with accrued yield even if no new deposit is made. No principal-only variant is published.

The exception terms are not measured. `x_i` under rule R2 and `ℓ_j` under rule R9 are recognized when documented evidence is available and cannot be inferred mechanically from the data used to compile the aggregates, as section 6.5 states. The net measures are therefore conditional accounting identities and are not measured quantities. They hold under full backing, which the compilation does not independently verify. This is the most consequential limitation in this section and explains why section 2.4 identifies the gross measures as the measured series.

Representation-layer coverage is bounded. The native and bridged decomposition is published only for the coins it covers, and the bridge-design effect in rule R1 operates within that boundary.

Survivorship affects snapshot-derived inputs. When an input series is reconstructed backward from the instruments present at reconstruction time, instruments that ceased to exist earlier are absent from the reconstructed window. The base layer is drawn from issuance records that retain instruments after circulation ends, whereas the wrapper layer comes from market data that does not. The wrapper layer is therefore the affected component, and its coverage begins in April 2025. Wrappers that ceased circulating before that date are absent from the compiled wrapper total. For the earliest part of the window, this makes S2 gross and the multiplier lower than they would otherwise be, rather than higher.

The base and representation layers extend further back than the wrapper layer. For that reason, `m_1` is published over a longer window than `m`, as specified in section 4.1. A comparison of `m` across the date on which wrapper coverage begins crosses a coverage boundary and therefore does not compare claim layering on a like-for-like basis.

Structural breaks can arise at input boundaries. When an input's coverage expands on a known date, series derived from that input contain a break reflecting the coverage change rather than a change in the segment. Section 7.4 marks the affected windows.

An instrument-day without a unit count is not valued. Rule R8 values each base unit at par in its peg currency and converts that amount at the official reference rate, so the compilation requires a unit count for every instrument-day. If the issuance record provides a dollar figure but no unit count, that figure is treated as market value and excluded from S0. The instrument remains a member of `U` but is uncovered for that day, reported under section 6.4.4 with status `no_unit_count` under section 5.6. The count of instrument-days excluded on this basis is published with each generation of the series in the field `no_unit_count_rows`: 1,200 of 318,086 instrument-days in the generation of 20 September 2026, the first generation under this rule, and 1,131 of 322,782 in the generation of 2 October 2026. Version 1.0 values every member at the issuance record's dollar figure; at observation date 2 October 2026, vintage 2 October 2026, the two valuations of the covered members differ by 0.04 percent of S0.

Non-dollar members are translated at official reference rates. The dollar-equivalent level of a non-dollar member changes with its reference rate. Exchange rates are an input under section 6.1 and can move the level without any issuance. The per-currency decomposition and constant-rate change reported under section 6.4.6 permit the two effects to be separated. No level is published for a currency without a qualifying rate.

Value coverage depends on a market-data benchmark. The value-coverage share in section 6.4.4 uses a market-data benchmark for members absent from the issuance record. The benchmark diagnoses compilation coverage and does not measure the segment itself.

Bridge tracking bounds representation-layer coverage. `b_i` is observable only for instruments whose bridges are tracked by the issuance record. A member without a bridged figure carries the flag `no_bridge_record`; no zero value is assigned. Representation-layer coverage is therefore the share of S0 for which bridge tracking exists. This replaces the version 1.0 statement that the representation layer covered all of S0, which followed from that compilation's restriction of S0 to members with a decomposition.

The par test reaches only dates for which daily prices exist. Computed verdicts are available only for the period covered by the daily price history. Earlier days use the proxy rule in section 6.4.1 and are identified by the published start of the price history, 9 April 2025. Those observations carry the issuance record's classification and do not represent results of the par test.

6.7 Relation to the platform's other supply figure

The platform publishes two supply figures that may appear on the same day. They measure different populations and therefore produce different totals. Wherever either appears, its universe, source class, and coverage are stated. The two figures are never presented as a single measure.

Tracked stablecoin market value. The market value of the population identified as stablecoins by a market-data category, after subtracting representations and instruments flagged as yield-bearing. This is a descriptive market statistic over a category that the platform does not define. It applies no par test and does not compile `U`.

S0, base stablecoin supply. The supply of every member of `U` covered by the S0 compilation, across all currencies for which an official reference rate is available, valued under section 6.4.2 and compiled under this specification. It is the series underlying the platform's supply charts and the base of the hierarchy. No third supply measure sits between these two.

Their relationship is descriptive rather than normative. The market-value population will usually contain `U` and be larger because it includes instruments rejected by the par test, but a market category can also omit a member of `U` just as it can include a non-member.

Comparison. Reconciliation between the two totals is neither expected nor required because their populations, valuation methods, and purposes differ. The daily difference is calculated and published under section 6.5 for information. It is not treated as a defect signal, and a legitimate change in the category defining the first figure can move the difference. At observation date 2 October 2026, vintage 2 October 2026, the difference is 1.70 percent of the market value figure, $304.64 billion against $299.46 billion. Version 1.0 treated the difference as a reconciliation subject to thresholds. Specification 1.1 withdraws those thresholds and uses the coverage statement in section 6.4.4 as the compilation's defect signal.

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7. Versioning and revisions

Canonical status depends on the way a series changes after publication, not on the way it is first defined.

7.1 Specification versions

The specification uses a two-part version number. A **minor version** change, such as 1.0 to 1.1, adds a rule, adds an item to a controlled vocabulary, or clarifies an existing rule while preserving the definitional core of the tiers. A **major version** change, such as 1.x to 2.0, redefines a tier, changes the ordering principle, or changes the treatment of a layer in a way that alters the object measured by the aggregate. A third part, as in 1.1.1, identifies an edition of a version that adds no rule and records its revisions in an annex.

Each version has a dated document of record and a persistent identifier. Superseded versions remain retrievable. Every figure labeled S0, S1, or S2 states the version under which it is compiled; the version note states the label of the vintages of 16 September 2026 through 18 September 2026.

7.2 Constituent changes

The constituent map is dated, versioned, and published. Every change appears in a constituent-change log stating the effective date, the instrument, the direction of the change, and the governing rule or admission criterion. Logged changes include additions to the admitted set, removals, changes in the recorded base coin, changes in relation, changes in confidence grade, and changes in exclusion reason.

A constituent change alters the definition of the series for the days it affects and is handled accordingly under section 7.3.

A change in a member's coverage status under section 5.6 is a coverage change rather than a constituent change. It appears in the daily coverage statement under section 6.4.4 and does not enter the constituent-change log. A change in the par-test verdict, including one resulting from the section 6.5 review trigger, is a constituent change and is logged.

The log is published with the constituent map and begins before this specification was frozen. Its first entry records a correction to the base universe. Claims on securities, which rule R6 excludes from the hierarchy, had been entering S0 because the universe rule was not fully enforced at compilation. The source data themselves had not reported those instruments incorrectly. The entry records the change, affected window, effect on the published level, and revision classification.

7.3 Revisions

Published values are never restated silently. A value changes only through a dated revision accompanied by a note identifying the affected series and window. Vintages from 14 August 2026 are retained by the compiler. The series as published under Specification 1.0 remains available at https://stablecoinbeat.com/aggregates-data-v1.0.json. Dated vintage files are not part of the published series under this edition.

Revisions are classified as follows.

Constituent revisions arise from a change recorded under section 7.2. The affected window is stated.

Source revisions arise from a restatement in an input record.

Compilation revisions arise from a correction to the compilation process itself.

Routine updates to the current observation within the same day do not constitute a revision.

A change in coverage under section 6.4.4 is also outside the revision framework. No published value is being changed, the defined population remains the same, and only the share of that population reached by the compilation has changed.

7.4 Vintage notes

When a series is revised, the affected window carries a vintage note. The note states what changed and when, using neutral language, without explaining why the underlying data changed.

Permitted forms:

> Figures for [window] were revised on [date]. The revision reflects a constituent change recorded in the constituent-change log for [effective date]. The figures as previously published are retained by the compiler.
>
> Figures for [window] were revised on [date] following a restatement in an input record. The figures as previously published are retained by the compiler.
>
> No observation is published for [date]. Constituent reporting for that day did not meet the completeness requirement of section 5.5.
>
> Figures under Specification [1.1] for [window] were compiled on [date] as a backcast. Figures for the same window under Specification [1.0] remain retrievable and are not restated.

Vintage notes do not characterize or attribute the cause of an input restatement and do not describe its effect as material or immaterial.

7.5 Candidate additions to a future minor version

The following candidates are recorded to make the boundary of version 1.1 explicit: a redemption-valued variant of the hierarchy under rule R8, to be introduced if instrument conversion rates enter collection; publication of `e` as a measured term rather than a definitional term; a per-base-coin multiplier alongside the segment aggregate; and recording in the constituent registry the redemption-endpoint form under which each base instrument is admitted. A compiled issuance record read directly from issuer contracts is excluded from this list because it constitutes a coverage improvement under section 6.4.4 and requires no version change.

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8. Related work and provenance

8.1 Prior work

Policy and academic literature has long compared stablecoins with forms of money. This specification makes no claim to originating that comparison.

Central-bank and standard-setting work evaluates stablecoins against the functions and requirements of monetary and settlement systems. The Bank for International Settlements (2023, 2025) considers whether privately issued tokenized monies preserve the singleness of money and assesses stablecoins against the criteria of singleness, elasticity, and integrity. The Committee on Payments and Market Infrastructures and IOSCO (2022) apply financial-market-infrastructure standards to systemically important stablecoin arrangements that perform a transfer function. The Financial Stability Board (2023) provides high-level recommendations for the regulation, supervision, and oversight of global stablecoin arrangements. Arner, Auer, and Frost (2020) set out principles for stablecoin regulation and the associated risks, including financial stability, market integrity, and consumer protection.

Two studies provide classification frameworks for the field. Adrian and Mancini-Griffoli (2019) classify means of payment along four dimensions: type, meaning claim or object; value, meaning fixed or variable at redemption; backstop, meaning government or private; and technology, meaning centralized or decentralized settlement. Their framework explicitly excludes issuer identity. Bullmann, Klemm, and Pinna (2019) classify stablecoin designs according to issuer accountability, decentralization of responsibilities, and the source underpinning the asset's value, producing a taxonomy organized primarily around the stabilization mechanism.

The closest antecedents apply a hierarchy of claims directly to this asset class. Aldasoro, Mehrling, and Neilson (2023) analyze stablecoins through the money view, which places monetary instruments at different levels according to the settlement claims they represent. They identify a second layer in the stablecoin hierarchy in which one stablecoin is collateralized by another and treat cross-chain bridge protocols as foreign-exchange dealers linking two ledgers. Wu (2026) applies the same perspective to decentralized finance more broadly, assigning tokens to tiers according to their derivation from base assets and defining a layering multiplier as the ratio of total mapped claims to base-tier value, explicitly by analogy with the money multiplier.

Section 8.2 states the relationship between those works and this specification.

The literature treating stablecoins as private money is also well established. Gorton and Zhang (2023) compare stablecoins with the historical experience of privately issued bank notes trading at time-varying discounts from par. A separate strand examines the redemption and arbitrage mechanism directly, including Ma, Zeng, and Zhang (2026) on the concentration of redemption rights among a small group of authorized participants and Lyons and Viswanath-Natraj (2023) on arbitrage that sustains the peg. Related work addresses run dynamics (Liu, Makarov, and Schoar, 2026) and the design conditions under which a peg can be maintained, including the credibility of a repurchase commitment (d'Avernas, Maurin, and Vandeweyer, 2026).

On aggregate construction, the closest methodological antecedents lie in monetary statistics rather than the digital-asset literature. The International Monetary Fund's Monetary and Financial Statistics Manual and Compilation Guide (2016) provides the methodological basis for several practices adopted here: consolidation, exclusion of issuer-held balances, explicit statement of an institutional coverage boundary, and a formal revisions policy. The distinction in this specification between the definition of `U` and the coverage of a particular compilation follows the same body of practice. The European Central Bank defines the reporting population of monetary financial institutions, permits derogations for small institutions within a stated share of the national balance sheet (Regulation (EU) 2021/379, Article 9(1)), and requires the size of that reporting tail to be collected and monitored (European Central Bank 2024, section 2.7.1). The same manual distinguishes transactions from exchange-rate valuation effects, the distinction applied in section 6.4.6 (section 5.8). Federal Reserve money-stock measures apply comparable practices in a published series. Rule R5 in section 3 has a direct parallel in that system: M1 counts currency outside the Treasury, the Federal Reserve Banks, and the vaults of depository institutions, excluding units held by the issuing authority from the aggregate. Friedman and Schwartz (1970) and Barnett (1980) argue that constructing a monetary aggregate requires choices about which instruments to admit and how their quantities should be combined,

choices that require justification rather than being natural facts. Friedman and Schwartz state the point directly: the choice "cannot be made by any single set of hard and fast rules", and "the test of the choice is in the results". Section 1 begins from that premise.

A recent Federal Reserve staff note, Payne and Styczynski (2026), considers whether payment stablecoins belong in the United States monetary aggregates. It approaches the question in the manner of the existing fiat aggregates, examining whether an instrument is used for transactions or saving, and identifies a potential double-counting problem when a stablecoin is backed by a bank deposit already included in M2. This specification addresses a different measurement question. It classifies stablecoin claims by form, records their distance from the redemption endpoint, and counts the claim layers built on a common base. Its double-counting concern arises when multiple token layers represent the same base unit, while the Federal Reserve note considers overlap between a stablecoin and the deposit backing it. The two approaches are complementary. The note also observes that reliable and timely circulation data are a prerequisite for inclusion in monetary aggregates, a measurement gap that the series compiled under this specification is designed to address.

8.2 What is claimed and what is not

The distinction is stated narrowly because the value of the priority record depends on claims that can be defended precisely.

Outside the claim. The literature already contains the propositions that stablecoins resemble money and that stablecoin claims can be arranged in tiers. This specification claims neither. Two antecedents are identified because they are the closest. Aldasoro, Mehrling, and Neilson (2023) apply a hierarchy of claims to stablecoins and identify a layer in which one stablecoin is collateralized by another. Wu (2026) assigns tokens to tiers according to derivation and defines a layering multiplier, the ratio of mapped claims to base-tier value, by analogy with the money multiplier. Accordingly, this specification makes no priority claim over either the application of a hierarchy to the asset class or the ratio of layered claims to a base.

Claimed contribution. The claimed contribution is the operationalization: the S0, S1, and S2 tier boundaries defined in section 2 and restricted to claims rooted in stablecoins rather than tokens generally; the application of net and gross variants to S1 and S2, including explicit net identities and exception terms; the constituent admission policy under which exclusion is the default; the edge-case rules in section 3, including the bridge-design rule and the separation of valuation effects from quantity effects; and the compilation of the entire framework as a maintained daily series governed by a versioned specification, a constituent-change log, and a revisions policy.

Provenance. Stablecoin Beat introduced the S0/S1/S2 stablecoin monetary aggregates in 2026: labeled three-tier boundaries restricted to stablecoin-rooted claims, net and gross variants of S1 and S2, an admission policy that defaults to exclusion, and a maintained daily compilation governed by a versioned specification.

8.3 Reuse

The specification and series may be reused under the terms stated in section 9. Reuse of the framework, including the tier names, multiplier, and admission policy, is encouraged with citation of this document as the source of the definitions, under the same conventions used for published statistical methodologies.

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9. Citation

9.1 Citing the specification

> Silenzi, M. and Stablecoin Beat Research (2026): "Stablecoin Beat S0/S1/S2 monetary aggregates: specification 1.1.1", SB Methodology Papers, No 1, October. DOI: 10.5281/zenodo.23019327

Specification 1.1 (20 September 2026) remains retrievable under DOI 10.5281/zenodo.22744683. Specification 1.0 (August 2026) remains retrievable under DOI 10.5281/zenodo.21861584 and governs every figure compiled before 16 September 2026.

9.2 Citing the series

A series citation identifies the aggregate, observation date or window, and vintage because section 7 permits revisions to the series.

> Stablecoin Beat Research: S0/S1/S2 stablecoin monetary aggregates, [series and window], vintage [vintage date], compiled under SB Methodology Papers No 1, specification version 1.1. https://stablecoinbeat.com/charts/aggregates/, accessed [access date].

The citing reader supplies all bracketed fields except the vintage, which is a property of the download and is embedded in the series artifact. An access date without a vintage does not identify the quoted values because, under section 7.3, a published value may differ across vintages.

9.3 Data availability and terms

The published series, constituent record, and constituent-change log are available at stable addresses. The complete series can be downloaded rather than accessed only as displayed values. Each download carries its vintage, allowing any quoted figure to be identified later under section 7.3.

The specification and the S0/S1/S2 series defined in it are published under the Creative Commons Attribution 4.0 International license. The license covers this document and that series; it does not extend to other datasets published by the platform. Reuse, including commercial reuse and the construction of derived aggregates, requires attribution to this document as the source of the definitions and to the series as the source of any figures.

Item	Address
This specification, version 1.1.1	https://stablecoinbeat.com/papers/sbmp-01/v1.1.1/
Specification 1.1 (superseded, retrievable)	https://stablecoinbeat.com/papers/sbmp-01/v1.1/
Current specification	https://stablecoinbeat.com/papers/sbmp-01/
Persistent identifier, version 1.1.1	https://doi.org/10.5281/zenodo.23019327
Persistent identifier, version 1.1 (superseded, retrievable)	https://doi.org/10.5281/zenodo.22744683
Persistent identifier, version 1.0 (superseded, retrievable)	https://doi.org/10.5281/zenodo.21861584
Aggregate series, presentation	https://stablecoinbeat.com/charts/aggregates/
Aggregate series, full history	https://stablecoinbeat.com/aggregates-data.json
Aggregate series, last compiled under Specification 1.0	https://stablecoinbeat.com/aggregates-data-v1.0.json
Constituent record and change log	https://stablecoinbeat.com/charts/aggregates/constituents/
Coverage record, daily, machine-readable	https://stablecoinbeat.com/universe-ledger.json
Constituent record, machine-readable	https://stablecoinbeat.com/aggregates/constituents.json

The series is not deposited separately. Because it is regenerated daily and may be revised under section 7.3, it is identified by its stable address together with the vintage embedded in the download, which is the citation convention specified in section 9.2. Depositing a snapshot would freeze a single vintage and encourage citation of a version that the maintained series may already have superseded.

The constituent record places the admitted set, exclusions and their reasons, and the change log on a single page, with a machine-readable version at the address above. The series download includes the per-entry base-coverage flag of criterion A2 for the latest observation day, and the coverage record carries the coverage shares of section 6.4.4 for that day. A reader can therefore reproduce, for the latest observation day, the coverage share, the difference described in section 6.7, and the criterion A2 effect without rerunning the compilation.

Appendix A. Index of rules and criteria

The table below lists every normative statement in the specification together with the section in which it appears. An implementation of the aggregates can be built from this table and the equations in section 2.

Rule	Statement	Section
R0	An instrument is a representation or a wrapper only if its units are not already in the base coin's issuance record	2.5
R1	Lock-and-mint transfers create a second claim and enter `b_i`; burn-and-mint transfers do not and enter `n_i`	3
R2	Representations outstanding in excess of the base held are recognized in `x_i` on documented evidence; the one case S1 net departs from S0	3
R3	Each layer of a claim chain counts once at admitted value, provided the chain resolves in finite documented steps to one base coin	3
R4	Accrual design does not affect treatment; rebasing and share-price wrappers are both measured at outstanding value	3
R5	Authorized-but-unissued and issuer-held balances are excluded from `n_i`	3
R6	Instruments backed by securities have no stablecoin lineage and are excluded from every tier	3
R7	Instruments with multi-asset backing are excluded until their claims can be attributed to one base coin; primary issuance is never classified as a wrapper; shares in pools that lend the base coin onward hold loan receivables and are reported as an adjacent segment outside every tier	3
R8	Base and representation layers are measured at par, wrapper layers at market value; the resulting statistic is market-valued claim layering	3
R9	Claims exceeding the immediate backing claim are measured at par on a layer-local basis and recognized in `e` when their backing resolves recursively to S0; S2 gross admits the backed fraction of wrapper market value, `ρ_j · ṽ_j`; market-price divergence does not enter the excess term	3
A1	Admission requires a documented redemption path to exactly one base coin	5.1

Rule	Statement	Section
A2	The base coin is recorded on the entry; an entry whose base is not covered by S0 on a vintage is flagged and excluded from S2 for that vintage, whether the base is outside `U` or a member S0 does not cover	5.1
A3	Each step of the chain is documented and the chain terminates in a base coin	5.1
T1	A coin satisfies the par-test criterion for `U` when its median absolute deviation from parity over its whole history, in its own peg currency at official reference rates, is at most 0.025 over at least 30 valid observations, and a verdict is stored only after that many observations and when a recent price from a second independent source is present (section 6.1)	6.4.1
T2	Reference rates follow the hierarchy of 6.4.2 without discretion; a rate older than seven days is stale, and no commercial or venue rate is used	6.4.2

The controlled vocabularies are relation in section 5.2, confidence in section 5.3, exclusion reason in section 5.4, and coverage and classification status in section 5.6. Adding an item to any of the four constitutes a version change under section 7.1.

Appendix B. Summary of identities

```
S0(t)       = Σ_{i ∈ U_0} n_i(t)
S1_gross(t) = S0(t) + Σ_{i ∈ U_b} b_i(t)
S1_net(t)   = S0(t) + Σ_{i ∈ U_b} x_i(t)
ρ_j(t)      = 1 − ℓ_j(t) / C_j(t),     ρ_j(t) = 1 where C_j(t) = 0
v_j(t)      = ρ_j(t) · ṽ_j(t)
S2_gross(t) = S1_gross(t) + Σ_{j ∈ W_c} v_j(t)
S2_net(t)   = S1_net(t) + e(t),        e(t) = Σ_{j ∈ W_c} ℓ_j(t)
                                        U_b(t) ⊆ U_0(t) ⊆ U(t),  W_c(t) ⊆ W(t)
m(t)        = S2_gross(t) / S0(t)
m_1(t)      = S1_gross(t) / S0(t)
m(t)        = 1 + [Σ_{i ∈ U_b} b_i(t) / S0(t)] + [Σ_{j ∈ W_c} v_j(t) / S0(t)]
```

Under normal conditions, `x_i = 0` and `ℓ_j = 0` for every constituent. In that case, `ρ_j = 1`, each wrapper enters the gross measure at its full market value, and `S1_net(t) = S2_net(t) = S0(t)`. S1 net and S2 net remain conditional accounting identities because they depend on the full-backing assumption described in section 6.6, which the compilation does not independently verify. The exception terms are layer-local and therefore additive. Each is recognized only when documented evidence becomes available under rule R2 or rule R9, respectively.

Appendix C. Fields of the published constituent map

The map is the machine-readable implementation of section 5. It is published, versioned, and dated. The published map is the version in force, and changes to the map are recorded in the constituent-change log of section 7.2.

Field	Content
Map version and date	Version integer and the date the version took effect
Required set	The base coins of the completeness gate of section 5.5
Admitted entries	One record per admitted wrapper
Entry: symbol and name	Display fields, never used as join keys
Entry: base	The base coin the claim resolves to, per criterion A2
Entry: relation	One term from the vocabulary of section 5.2
Entry: confidence	One grade from the vocabulary of section 5.3
Entry: claim distance	The distance published for the entry's relation under section 5.2
Entry: base coverage	The criterion A2 flag for the latest observation day
Base-universe exclusions	Tokenized securities held out of S0 under rule R6, listed by ticker symbol
Adjacent segments	One record per instrument reported in an adjacent segment, with its code from section 5.2
Excluded entries	One record per considered and rejected instrument
Excluded: reason	One term from the vocabulary of section 5.4

Instrument identifiers and coverage statuses in the published map follow under Specification 1.2; the coverage statuses of section 5.6 are carried by the coverage record of section 6.4.4.

The excluded list is published beside the admitted set. An instrument appearing in neither list has not yet been ruled on, and section 6.5 lists such instruments for adjudication. An instrument appearing in the coverage record as `unclassified` is a candidate awaiting either the observations or the second price required by the par test. That status is distinct from an instrument on which no ruling has yet been made.

Annex D. Revision record

Specification 1.1.1 states the text of Specification 1.1 of 20 September 2026 with the revisions below. No value of S0, S1 or S2 quoted in Specification 1.1 changes.

1. §4.4: figures for observation date 16 September 2026 are stated at the vintage of 19 September 2026.

2. Version note, §4.4, §7.3, §7.4, §9.3: vintages from 14 August 2026 are retained by the compiler. The series as published under Specification 1.0 remains available at /aggregates-data-v1.0.json. Dated vintage files are not part of the published series under this edition.
3. §6.4.1, §5.6, Appendix A: a verdict requires a second independent price to be present.
4. §6.4.1: verdicts and rulings take effect from the date stored or ruled. Effective 27 September 2026.
5. Version note: the ordering principle is stated as claim form, a clarification under §7.1; the layer and tier of every instrument are unchanged.
6. §6.6: instrument-days without a unit count are stated per generation. §6.5: netting, the review trigger and the largest breach are stated at the vintage of this edition.
7. §6.7: the difference is stated at the vintage of this edition; the valuation and population figures are withdrawn.
8. §6.4.6: the multiplier decomposition is published at https://stablecoinbeat.com/aggregates-data.json (block `decomposition_multiplier`).
9. §4.3, §5.5, §6.4.4, §6.5, §9.3: coverage shares are published for the latest day in the universe ledger. Appendix C: member identifiers and statuses in the constituent map follow under Specification 1.2.
10. §2.2 and §6.4.2 state one rule for instruments without an official reference rate; §7.3 and §9.3 aligned; bibliography updated.
11. Version note, §7.1: membership by instrument identifier and par valuation under rule R8 apply from the vintage of 19 September 2026; the vintages of 16 September 2026 through 18 September 2026 carry the version 1.1 label.
12. Version note: the effect of the removal of lending-pool shares at the effective date is withdrawn.
13. Version note: the value of the representation removed from S0 is withdrawn.
14. Version note: the value moved to the candidate set by per-instrument membership is withdrawn.
15. §1, §5.2: claim distance is published by relation; Savings xDAI stands at claim distance 2.
16. §2.1, rule R8, §6.4.6: the per-currency decomposition of S0 and the components of its change are published for the trailing window of the series.
17. §2.5: the compilation check of rule R0 follows under Specification 1.2.
18. §5.2: `adjacent-lending` is the adjacent-segment code in use; tokenized securities carry the exclusion reason `tokenized-treasury` and tokenized commodity claims the coverage code `commodity`.
19. §5.2: the waiting-period field follows under Specification 1.2.
20. §5.5: the share of the required set in S0 is stated at the vintage of this edition.
21. §5.6: the coverage record assigns one status per instrument for the latest observation day; the codes for instruments outside `U` and the flags `no_bridge_record` and `under_review` are stated.

22. §6.1: a stored verdict records its statistic, the rule applied, the number of observations and whether a second price is present.
23. §6.2: membership and the wrapper join are keyed by instrument identifier; the base-universe exclusions, the completeness gate and the criterion A2 base check join by ticker symbol.
24. §6.4.1: the comparison of the two statistics at the effective date is withdrawn.
25. §6.4.2: the step 1 currencies are stated from the rate hierarchy in force; the date of the first step 2 rate is withdrawn.
26. §6.4.5: coverage, uncovered members, candidates and representation-layer coverage are stated at the vintage of this edition.
27. §6.5: the series-continuity check follows under Specification 1.2.
28. §6.5: the review trigger compares the market-data price with the price carried by the issuance record.
29. §6.6: the difference between par valuation and dollar-figure valuation is stated at the vintage of this edition.
30. Appendix B: the full-backing assumption refers to §6.6.
31. Appendix C: the fields listed are those of the published map, which is the version in force.