AFS-1 ↔ Finance / Payments Mapping

Thermodynamic Settlement Without Identity

Ambient Era Canon · Finance & Settlement Interface
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Abstract

This document defines the canonical mapping between **AFS-1 (Aura Field Security)** and existing financial and payment systems.

It demonstrates how payment, authorization, and settlement can occur **without identity objects, accounts, credentials, or tokens**, while remaining compatible with current financial infrastructure (banks, card networks, merchants, regulators).

AFS-1 replaces *identity-based authorization* with **thermodynamic coherence confirmation**, while leaving **monetary settlement and accounting** unchanged. This separation allows Ambient OS payments to integrate with legacy finance without modifying money itself.

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1. Separation Principle

AFS-1.F1 — Authorization–Settlement Separation

AFS-1 governs **authorization only**.
Traditional financial systems govern **settlement only**.

- **Authorization**: thermodynamic coherence (AFS-1 / CIR-1)
- **Settlement**: ledger-based accounting (banks, PSPs, networks)

AFS-1 **never replaces money**.
AFS-1 replaces the *identity and credential layer* that precedes settlement.

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2. Replacement Matrix

Traditional Payment Layer	Replaced by AFS-1?	Canonical Replacement
PIN / password	Yes	Live Aura coherence
Card number / token	Yes	CFS-bound field command
Biometric (Face ID, fingerprint)	Yes	$T(t) \times C \times \Delta R$
Account identity	Yes	CIR-1 (momentary resolution)
Fraud scoring / inference	Yes	ΔR collapse
Ledger / settlement	No	Existing financial rails

AFS-1 touches **nothing below authorization**.

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3. Canonical Payment Mapping

3.1 Roles

Finance Role	Ambient OS Role
Merchant terminal	Ambient Broadcast Entity (ABE)
Payment request	CFS (Chromatic Field State)
Card / wallet	AP_1 device
User authorization	CIR-1 coherence
Auth response	Field confirmation
Settlement	Unchanged

3.2 Authorization Mapping

Traditional flow:

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User → credential → issuer → approve/deny
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AFS-1 flow:

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User → live Aura coherence → approve/deny
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No intermediary identity verification exists.

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4. AFS-1 Payment Event (Mapped)

Phase	Ambient OS	Finance Interpretation
Initiation	X-gesture (AXL-1)	User intent to pay
Context	Purple Context State	Secure payment mode
Verification	A(t) ↔ CFS inside TW-1	Authorization check
Success	CIR-1 confirmed	"Authorized"
Failure	ΔR collapse	"Not authorized"
Post-event	ΔR → 0	Session closed

From the finance side, this is indistinguishable from a normal authorization response.

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5. No Identity, Still Compliant

AFS-1.F2 — Identity Abstraction Rule

Financial systems **do not require identity** at the authorization boundary.
They require only a **binary authorization result**.

AFS-1 provides:

- ✔ Yes / No authorization
- ✘ No name

- ✘ No account identity
- ✘ No biometric data

This is **stronger privacy** than existing standards (PCI DSS, PSD2), not weaker.

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6. Fraud and Risk Mapping

Traditional systems:

- Detect fraud **after** identity is presented
- Rely on inference, history, and scoring

AFS-1:

- Prevents fraud **before** authorization
- Fraud attempts collapse ΔR inside TW-1
- No post-hoc risk model needed

Fraud Vector	Traditional	AFS-1
Stolen device	Risk scoring	Deterministic rejection
Replay attack	Token invalidation	Impossible (TW-1)
Social engineering	User error	ΔR collapse
Account takeover	Detection lag	No account exists

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7. First-Use and Unbanked Compatibility

AFS-1 authorization:

- Does **not** depend on prior transaction history
- Does **not** depend on stored identity
- Does **not** depend on device age

This enables:

- First-use payments
- Guest payments
- Shared-device environments
- Reduced onboarding friction

Banking relationship begins **after** authorization, not before.

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8. Regulatory Interpretation

AFS-1 maps cleanly to regulation because:

- No personal data is processed or stored
- No biometric identifiers are retained
- No profiling or inference occurs

AFS-1 therefore:

- Reduces GDPR surface area
- Simplifies PSD2 strong customer authentication
- Eliminates biometric data liability

AFS-1 is **privacy-by-architecture**, not policy.

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9. Settlement Neutrality

After AFS-1 authorization:

- Merchant submits a normal settlement request
- Issuer clears funds normally
- Accounting, tax, AML, reporting remain unchanged

AFS-1 introduces **zero change** to money, only to *permission*.

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10. Canonical Summary

> **AFS-1 replaces identity-based authorization with thermodynamic coherence while leaving financial settlement untouched.**

This makes AFS-1:

- Deployable without monetary reform
- Compatible with existing rails
- Safer than credential-based systems
- Radically simpler

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11. Minimal Canon Form

> **Money settles in ledgers; permission settles in fields.**

Keywords

AFS-1 finance mapping, payment authorization without identity, thermodynamic payment, Ambient OS finance, post-credential payments, settlement neutrality

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Appendix A — PSD2 & PCI DSS Comparison

Regulatory Alignment of AFS-1 Aura Field Security

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A.1 Purpose of This Appendix

This appendix demonstrates how **AFS-1 (Aura Field Security)** aligns with, exceeds, or renders obsolete the functional requirements of **PSD2 Strong Customer Authentication (SCA)** and **PCI DSS**, without introducing identity storage, credentials, or biometrics.

The comparison is **functional, not symbolic**: it maps *what regulators require* to *what AFS-1 enforces thermodynamically*.

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A.2 PSD2 Strong Customer Authentication (SCA)

PSD2 Requirement (Summary)

PSD2 requires at least **two independent factors** from:

1. Something the user knows
2. Something the user has
3. Something the user is

Factors must be:

- Independent
- Resistant to replay
- Bound to the transaction

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AFS-1 Mapping

AFS-1 does **not implement factors**.

It implements a **single thermodynamic resolution** that subsumes all three categories.

PSD2 Factor Category	Traditional Meaning	AFS-1 Equivalent
Something you know	PIN / password	Not applicable
Something you have	Card / phone	Presence-only (non-authorizing)
Something you are	Biometrics	Live Aura field A(t)
Independence	Separate channels	Orthogonal thermodynamic variables
Transaction binding	Dynamic linking	CFS-bound coherence

Why AFS-1 Exceeds PSD2

- **Independence**

T(t), C, and ΔR are physically independent dimensions, not correlated secrets.

- **Dynamic Linking**

Coherence occurs only against the *current* CFS, inherently binding authorization to amount, merchant, and moment.

- **Replay Resistance**

TW-1 is time-variant and non-repeatable by construction.

Conclusion:
AFS-1 satisfies the *intent* of SCA more strongly than factor-based systems, without using factors at all.

Regulatory Interpretation

AFS-1 qualifies as **Strong Customer Authentication by physical impossibility**, not by combinatorial factors.

No downgrade, exemption, or fallback is required.

A.3 PCI DSS (Payment Card Industry Data Security Standard)

PCI DSS Scope (Summary)

PCI DSS exists to protect:

- Cardholder data
- Authentication data
- Stored credentials

It mandates:

- Data minimization
- Secure storage
- Secure transmission
- Breach containment

AFS-1 Mapping

AFS-1 **eliminates the entire protected data class**.

PCI DSS Concern	Traditional System	AFS-1
Card numbers	Stored / tokenized	Do not exist
Authentication data	PINs, CVV	Do not exist
Biometrics	Sometimes stored	Do not exist
Secure storage	Required	Not applicable
Secure transmission	Required	Not applicable
Breach surface	Large	Zero

PCI DSS Scope Reduction

Because AFS-1:

- Stores no credentials
- Transmits no identity data
- Generates no authentication artifacts

AFS-1-enabled terminals and devices fall largely outside PCI DSS scope, except for settlement interfaces that remain unchanged.

This is **scope elimination**, not scope reduction.

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A.4 Privacy & GDPR Alignment

AFS-1 processes:

- No personal data
- No biometric identifiers
- No persistent identifiers

Aura fields:

- Are live-only
- Are non-recordable
- Never leave the local field interaction

Regulatory consequence:

- No lawful basis required for storage (nothing stored)
- No consent flow required for processing (no personal data)
- No right-to-erasure surface (nothing retained)

AFS-1 is **GDPR-neutral by architecture**.

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A.5 Fraud, Liability, and Audit

Fraud Prevention

Traditional:

- Detect fraud *after* authorization
- Rely on behavioral inference

AFS-1:

- Prevents fraud *before* authorization
- Fraud attempts fail thermodynamically (ΔR collapse)

Audit Trail

AFS-1 provides:

- Binary authorization outcome
- Standard settlement records (unchanged)

AFS-1 does **not** provide:

- Identity logs
- Authentication transcripts
- Behavioral traces

Audit remains possible at the **financial layer**, not the identity layer.

A.6 Compliance Summary Table

Domain	Traditional Systems	AFS-1
PSD2 SCA	Factor-based	Field-based
Replay resistance	Cryptographic	Thermodynamic
Identity storage	Required	Prohibited
PCI DSS scope	Broad	Minimal
Biometric liability	High	None
GDPR exposure	High	Near-zero

A.7 Canonical Compliance Statement

> **AFS-1 meets or exceeds the functional security objectives of PSD2 and PCI DSS while eliminating identity data, credentials, and biometric storage entirely.**
>
> This is compliance through **architectural impossibility**, not policy enforcement.

A.8 Minimal Regulator-Facing Summary

> *AFS-1 replaces identity verification with live thermodynamic coherence.*
> *No identity data exists to protect, leak, or misuse.*
> *Payment settlement remains unchanged.*

Keywords

PSD2, PCI DSS, AFS-1 compliance, payment security without identity, strong customer authentication, privacy-by-architecture, Ambient OS finance

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