Core Emotion Framework (CEF): Technical Specification 20 (TS 20)

Knowledge Graph Architecture & Semantic Integration Layer

Canonical Architecture-Level Technical Document — Version 1.0

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0. Purpose and Canonical Position

TS-20 is the twentieth Technical Specification in the CEF canon.

Where:

- **TS-18** defines the *computational ontology*
- **TS-19** defines the *reasoning engine*
- **Appendix C (TS-18)** defines the *node/edge schema*

TS-20 defines the full CEF Knowledge Graph Architecture — the integrated, machine-operational graph that:

- stores all CEF entities
- encodes all lawful relations
- supports semantic inference
- enables cross-system interoperability
- powers the EL-Series
- enables simulation, prediction, and analysis
- anchors the CEF in semantic-web ecosystems

TS-20 does **not** introduce new emotional constructs.
It defines the **graph-level architecture** that binds TS-1 → TS-19 into a single computational system.

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1. Definition of the CEF Knowledge Graph (CEF-KG)

The CEF Knowledge Graph is:

A typed, directed, multi-relational, constraint-preserving graph that encodes the entire CEF architecture in machine-operational form.

It contains:

- nodes (entities)
- edges (relations)
- attributes (parameters)
- constraints (canonical rules)
- metadata (provenance, versioning, dependencies)

The CEF-KG is the **single source of truth** for all computational, semantic, and reasoning operations.

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2. Graph Architecture Overview

The CEF-KG consists of **five canonical layers**:

1. **Entity Layer**
2. **Relation Layer**
3. **Constraint Layer**
4. **Inference Layer**
5. **Metadata Layer**

Each layer is defined below.

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3. Entity Layer

The Entity Layer contains all identity-preserving components of the CEF.

3.1 Operator Nodes (10)

Each operator is a node with:

- operatorId
- centerId
- coreFunction
- facetSet
- canonicalSuccessors
- modulationRoles

3.2 Facet Nodes (50)

Each facet is a node with:

- facetId
- operatorId
- canonicalOrder
- functionalDefinition

3.3 Center Nodes (3)

Each center is a node with:

- centerId
- operatorMembership
- weightingParameters

3.4 Structural Nodes

Nodes representing:

- transitions
- modulation pathways
- capacity structures
- threshold structures
- dysregulation patterns
- predictive indicators
- plasticity parameters
- governance signals

All nodes must preserve identity and canonical boundaries.

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4. Relation Layer

The Relation Layer defines all lawful edges in the CEF-KG.

4.1 Identity Edges

- belongsToCenter
- hasFacet
- facetOf
- centerContains

4.2 Structural Edges

- canonicalSuccessor
- facetPrecedes
- centerModulates

4.3 Dynamic Edges

- modulates
- transitionFrom
- transitionTo

4.4 Predictive Edges

- predicts
- predictsDrift
- predictsCollapse
- predictsOverflow

4.5 Plasticity Edges

- adjusts
- reorders
- shifts

4.6 Governance Edges

- selfCorrects

- selfBalances
- selfProtects

Edges must always follow TS-1 → TS-19.

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5. Constraint Layer

The Constraint Layer enforces all canonical rules across the graph.

5.1 Identity Constraints

- No operator merging
- No facet migration
- No center blending

5.2 Directionality Constraints

- All transitions must follow TS-1
- No reversed transitions
- No illegal cross-center transitions

5.3 Modulation Constraints

- All modulation must follow TS-3
- No modulation inversion
- No chronic loops

5.4 Structural Constraints

- No new operators
- No new facets
- No new centers

5.5 Predictive Constraints

- Predictive edges must match TS-13
- No contradictions with TS-12

5.6 Plasticity Constraints

- No facet reordering beyond TS-11
- No identity-breaking micro-shifts

5.7 Governance Constraints

- No coherence violations
- No illegal autonomous actions

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6. Inference Layer

The CEF-KG integrates the TS-19 Reasoning Engine.

It supports:

- identity inference
- directionality inference
- modulation inference
- stability inference
- predictive inference
- plasticity inference
- governance inference

All inference must be:

- canonical
- constraint-preserving
- contamination-free

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7. Metadata Layer

The metadata layer encodes:

- versioning
- provenance
- canonical dependencies
- ontology namespace
- graph schema version
- validation status
- reasoning logs

This ensures:

- reproducibility
- auditability
- semantic-web interoperability

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8. Graph Operations

The CEF-KG supports:

8.1 Query Operations

- operator queries
- facet queries
- center queries
- transition queries
- modulation queries
- predictive queries
- governance queries

8.2 Update Operations

Updates are allowed **only** for:

- activation parameters
- stability parameters
- predictive parameters
- plasticity parameters
- governance parameters

No structural updates are allowed.

8.3 Reasoning Operations

- forward chaining
- backward chaining
- constraint propagation
- stability evaluation

- predictive forecasting

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9. Canonical Constraints of TS-20

The CEF-KG must:

- preserve identity
- preserve facet boundaries
- preserve center architecture
- preserve directionality
- preserve modulation legality
- preserve stability
- preserve predictive logic
- preserve plasticity limits
- preserve governance rules

It must never:

- introduce new operators
- introduce new facets
- introduce new centers
- violate TS-1 → TS-19

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10. Canonical Status

TS-20 is the authoritative Knowledge Graph Architecture specification of the CEF.
It defines the graph-level structure that integrates all prior TS documents into a single computational system.

It is subordinate only to:

- Core Essence Document
- TS-1 → TS-19
