Core Emotion Framework (CEF): TS 20 Appendix A — Graph Serialization Formats

Canonical Serialization Standards for the CEF Knowledge Graph (CEF-KG)
Version 1.0 — Phase 4

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Status: Canonical Appendix (TS-20)

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0. Purpose and Canonical Position

Appendix A defines the **canonical serialization formats** for the CEF Knowledge Graph (CEF-KG) described in TS-20.

It specifies:

- how nodes and edges must be encoded
- how graph metadata must be stored
- how identity, directionality, and constraints must be preserved
- how the graph must be serialized for interoperability

This appendix introduces **no new emotional constructs**.
It defines the **formats** through which the CEF-KG is represented and exchanged.

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1. Supported Serialization Formats

The CEF-KG must support **four canonical serialization formats**:

1. **JSON-LD Graph Format**
2. **RDF/Turtle Format**

3. **RDF/XML Format**
4. **GraphML Format**

Each format must preserve:

- operator identity
- facet boundaries
- center architecture
- lawful transitions
- lawful modulation
- canonical constraints
- metadata integrity

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2. JSON-LD Graph Serialization

JSON-LD is the **primary serialization format** for the CEF-KG.

2.1 Structure

A JSON-LD graph must contain:

- "@context" (from TS-18 Appendix A)
- "@graph" (list of all nodes and edges)

2.2 Example

```
{
 "@context": "https://cef.schema.org/context.json",
 "@graph": [
  {
   "@id": "cef:Sensing",
   "@type": "Operator",
   "belongsToCenter": "cef:Head",
   "canonicalSuccessor": "cef:Calculating"
  },
  {
```

```
    "@id": "cef:Sensing_Calculating",
    "@type": "Transition",
    "transitionFrom": "cef:Sensing",
    "transitionTo": "cef:Calculating"
  }
 ]
}
```


2.3 Requirements

- All IDs must use canonical URIs.
- All relations must use TS-18 property names.
- No illegal edges may appear.
- No new entities may be introduced.

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3. RDF/Turtle Serialization

Turtle is the **canonical semantic-web format** for the CEF-KG.

3.1 Structure

A Turtle graph must include:

- namespace declarations
- class instances
- object properties
- data properties

3.2 Example


```
cef:Sensing a cef:Operator ;
  cef:belongsToCenter cef:Head ;
  cef:canonicalSuccessor cef:Calculating .

cef:Sensing_Calculating a cef:Transition ;
  cef:transitionFrom cef:Sensing ;
```

cef:transitionTo cef:Calculating .

3.3 Requirements

- Must conform to TS-18 Appendix B ontology.
- Must preserve all canonical constraints.
- Must not introduce new classes or properties.

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4. RDF/XML Serialization

RDF/XML is required for compatibility with legacy semantic-web systems.

4.1 Example

```
<rdf:Description rdf:about="cef:Sensing">
  <rdf:type rdf:resource="cef:Operator"/>
  <cef:belongsToCenter rdf:resource="cef:Head"/>
  <cef:canonicalSuccessor rdf:resource="cef:Calculating"/>
</rdf:Description>
```

4.2 Requirements

- Must preserve all identity and directionality constraints.
- Must use canonical URIs.
- Must not introduce non-canonical XML attributes.

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5. GraphML Serialization

GraphML is required for:

- visualization
- graph analytics
- simulation engines

5.1 Structure

GraphML must include:

- <graph>
- <node> elements

- <edge> elements
- <data> attributes for parameters

5.2 Example

```
<graph edgedefault="directed">
  <node id="Sensing"/>
  <node id="Calculating"/>
  <edge id="Sensing_Calculating" source="Sensing" target="Calculating"/>
</graph>
```

5.3 Requirements

- Node IDs must match canonical operator/facet IDs.
- Edges must match TS-18 relation types.
- No non-canonical edges allowed.

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6. Metadata Serialization

All formats must serialize:

- version number
- ontology version
- graph schema version
- timestamp
- provenance
- validation status

6.1 Example (JSON-LD)

```
{
  "metadata": {
    "cefVersion": "1.0",
    "tsVersion": "TS-20",
    "graphSchemaVersion": "1.0",
    "validatedAgainst": ["TS-2", "TS-18", "TS-19"],
```

```
    "timestamp": "2026-01-11T20:00:00Z"
  }
}
```

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7. Canonical Constraints of Appendix A

All serialization formats 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

They must never:

- introduce new operators
- introduce new facets
- introduce new centers
- violate TS-1 → TS-20

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8. Canonical Status

Appendix A is the authoritative serialization specification for TS-20.
It defines how the CEF-KG must be encoded, stored, and exchanged.

It is subordinate only to:

- Core Essence Document
- TS-1 → TS-20
