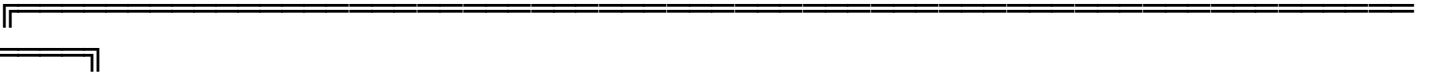
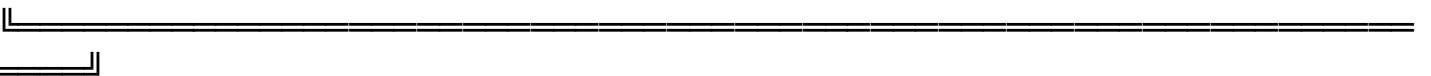


```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<!--
```



```
|| AEQUITAVERSE — SCHÉMA XSD MAÎTRE ||  
|| Version : 1.0.0 ||  
|| Rôle : Grammaire de toute la blockchain MET ||  
|| Règle : Tout bloc non conforme à ce schéma est invalide ||
```



```
-->
```

```
<xsd:schema
```

```
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
```

```
xmlns:met="https://protocol.aequitaverse.org/v1"
```

```
targetNamespace="https://protocol.aequitaverse.org/v1"
```

```
elementFormDefault="qualified"
```

```
attributeFormDefault="unqualified">
```

```
<!--
```

```
-->
```

```
<!-- SECTION 1 — TYPES SCALAIRES FONDAMENTAUX -->
```

```
<!--
```

```
-->
```

```
<!--
```

MicroGU : Unité monétaire atomique du système MET.

Précision à 6 décimales. Toujours positif ou nul.

1 μ GU = énergie nécessaire pour produire 1 gramme

de blé dur grade B dans des conditions mondiales moyennes.

-->

```
<xsd:simpleType name="MicroGU">  
  <xsd:restriction base="xsd:decimal">  
    <xsd:fractionDigits value="6"/>  
    <xsd:minInclusive value="0"/>  
    <xsd:maxInclusive value="9999999999999999.999999"/>  
  </xsd:restriction>  
</xsd:simpleType>
```

<!--

HashSHA3 : Empreinte cryptographique de tout bloc.

Format : "sha3:" suivi de 64 caractères hexadécimaux.

Garantit l'immutabilité de la chaîne.

-->

```
<xsd:simpleType name="HashSHA3">  
  <xsd:restriction base="xsd:string">  
    <xsd:pattern value="sha3:[a-f0-9]{64}"/>  
  </xsd:restriction>  
</xsd:simpleType>
```

<!--

Signature cryptographique d'un acteur.

Format : "sig:" suivi de 64 caractères hexadécimaux.

-->

```
<xsd:simpleType name="Signature">  
  <xsd:restriction base="xsd:string">  
    <xsd:pattern value="sig:[a-f0-9]{64}"/>  
  </xsd:restriction>
```

```
</xsd:simpleType>
```

```
<!--
```

Adresse de portefeuille MET.

Chaîne principale : préfixe "met1:"

Casino : préfixe "met-casino1:"

Fonds Commun : préfixe "met-fc:"

```
-->
```

```
<xsd:simpleType name="AdressePortefeuille">
```

```
<xsd:restriction base="xsd:string">
```

```
<xsd:pattern value="(met1:|met-casino1:|met-fc:)[a-f0-9]{40}"/>
```

```
</xsd:restriction>
```

```
</xsd:simpleType>
```

```
<!--
```

Identifiant unique d'un bloc dans la chaîne.

Format : MET-{CHAINE}-{HAUTEUR_9CHIFFRES}

Exemples : MET-MAIN-000847392, MET-CASINO-000291847

```
-->
```

```
<xsd:simpleType name="BlocID">
```

```
<xsd:restriction base="xsd:string">
```

```
<xsd:pattern value="MET-(MAIN|CASINO|SHARED)-[0-9]{9}"/>
```

```
</xsd:restriction>
```

```
</xsd:simpleType>
```

```
<!--
```

Identifiant d'une transaction.

Format : TX-{TYPE}-{ANNEE}-{SEQUENCE_8CHIFFRES}

```
-->
```

```
<xsd:simpleType name="TransactionID">
  <xsd:restriction base="xsd:string">
    <xsd:pattern value="TX-[A-Z_]+-[0-9]{4}-[0-9]{8}"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
<!-- — Énumérations de type — -->
```

```
<xsd:simpleType name="TypeChaine">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="PRINCIPALE"/> <!-- Économie réelle -->
    <xsd:enumeration value="CASINO"/> <!-- Marché des options -->
    <xsd:enumeration value="PARTAGEE"/> <!-- Fonds Commun + Gouvernance -->
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="TypeBloc">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="GENESE"/>
    <xsd:enumeration value="PRODUCTION"/>
    <xsd:enumeration value="TRANSACTION"/>
    <xsd:enumeration value="OPTION"/>
    <xsd:enumeration value="EXERCICE"/>
    <xsd:enumeration value="EXPIRATION"/>
    <xsd:enumeration value="MEMBRANE"/>
    <xsd:enumeration value="BUDGET"/>
    <xsd:enumeration value="VOTE"/>
    <xsd:enumeration value="AUDIT"/>
    <xsd:enumeration value="SANCTION"/>
```

```
</xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="TypeTransaction">
  <xsd:restriction base="xsd:string">
    <!-- Chaîne principale -->
    <xsd:enumeration value="EMISSION"/>
    <xsd:enumeration value="TRANSFERT"/>
    <xsd:enumeration value="CONVERSION_FIAT"/>
    <xsd:enumeration value="TAXE_CREATION"/>
    <xsd:enumeration value="TAXE_BANCAIRE"/>
    <xsd:enumeration value="TAXE_FRAIS_RESEAU"/>
    <xsd:enumeration value="RECUPERATION_FRAUDE"/>
    <xsd:enumeration value="RECOMPENSE_AUDITEUR"/>
    <xsd:enumeration value="BURN"/>
    <!-- Casino -->
    <xsd:enumeration value="OPTION_EMISSION"/>
    <xsd:enumeration value="OPTION_EXERCICE"/>
    <xsd:enumeration value="OPTION_EXPIRATION"/>
    <xsd:enumeration value="TAXE_CASINO"/>
    <!-- Membrane -->
    <xsd:enumeration value="MEMBRANE_CASINO_REEL"/>
    <xsd:enumeration value="TAXE_MEMBRANE"/>
    <!-- Fonds Commun -->
    <xsd:enumeration value="DEPOT_FONDS_COMMUN"/>
    <xsd:enumeration value="DECAISSEMENT_FONDS_COMMUN"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="StatutValidation">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="EN_ATTENTE"/>
    <xsd:enumeration value="EN_VALIDATION"/>
    <xsd:enumeration value="APPROUVÉ"/>
    <xsd:enumeration value="REJETÉ"/>
    <xsd:enumeration value="SUSPENDU"/>
    <xsd:enumeration value="CONTESTÉ"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="StatutPaiement">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="PAYÉE"/>
    <xsd:enumeration value="EN_ATTENTE"/>
    <xsd:enumeration value="ÉCHOUÉE"/>
    <xsd:enumeration value="ANNULÉE"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="TypeProducteur">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="cooperative_agricole"/>
    <xsd:enumeration value="agriculteur_individuel"/>
    <xsd:enumeration value="entreprise_agroalimentaire"/>
    <xsd:enumeration value="producteur_energie"/>
    <xsd:enumeration value="prestataire_service"/>
    <xsd:enumeration value="institution_recherche"/>
    <xsd:enumeration value="noeud_validateur"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
</xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="TypeDenree">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="blé_dur"/>
    <xsd:enumeration value="blé_tendre"/>
    <xsd:enumeration value="riz"/>
    <xsd:enumeration value="maïs"/>
    <xsd:enumeration value="soja"/>
    <xsd:enumeration value="orge"/>
    <xsd:enumeration value="café"/>
    <xsd:enumeration value="cacao"/>
    <xsd:enumeration value="energie_solaire"/>
    <xsd:enumeration value="energie_eolienne"/>
    <xsd:enumeration value="energie_geothermique"/>
    <xsd:enumeration value="eau_douce_certifiee"/>
    <xsd:enumeration value="poisson_durable"/>
    <xsd:enumeration value="bois_certifie"/>
    <xsd:enumeration value="service_medical"/>
    <xsd:enumeration value="service_educatif"/>
    <xsd:enumeration value="service_logiciel"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="GradeDenree">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="AAA"/>
    <xsd:enumeration value="A1"/>
```

```
<xsd:enumeration value="A2"/>
<xsd:enumeration value="B"/>
<xsd:enumeration value="C"/>
<xsd:enumeration value="D"/>
</xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="TypeOption">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="CALL"/> <!-- Droit d'acheter -->
    <xsd:enumeration value="PUT"/> <!-- Droit de vendre -->
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="StatutOption">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="ACTIF"/>
    <xsd:enumeration value="EXERCÉ"/>
    <xsd:enumeration value="EXPIRÉ"/>
    <xsd:enumeration value="ANNULÉ"/>
  </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:simpleType name="NiveauAuditeur">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="OBSERVATEUR"/> <!-- Niveau 1 -->
    <xsd:enumeration value="ANALYSTE"/> <!-- Niveau 2 -->
    <xsd:enumeration value="CERTIFIÉ"/> <!-- Niveau 3 -->
  </xsd:restriction>
```

```
</xsd:simpleType>
```

```
<xsd:simpleType name="NiveauSanction">
```

```
<xsd:restriction base="xsd:string">
```

```
<xsd:enumeration value="AVERTISSEMENT"/>
```

```
<xsd:enumeration value="NÉGLIGENCE"/>
```

```
<xsd:enumeration value="FRAUDE_DÉLIBÉRÉE"/>
```

```
<xsd:enumeration value="FRAUDE_SYSTÉMIQUE"/>
```

```
</xsd:restriction>
```

```
</xsd:simpleType>
```

```
<xsd:simpleType name="TerritoireAequitaverse">
```

```
<xsd:restriction base="xsd:string">
```

```
<xsd:enumeration value="AURUM"/> <!-- Céréales, production agricole -->
```

```
<xsd:enumeration value="VIRIDIS"/> <!-- Forêts, cycles longs -->
```

```
<xsd:enumeration value="SOLARA"/> <!-- Énergie renouvelable -->
```

```
<xsd:enumeration value="AQUA"/> <!-- Eau, pêche durable -->
```

```
<xsd:enumeration value="NEXUS"/> <!-- Marché, casino -->
```

```
<xsd:enumeration value="CIVITAS"/> <!-- Gouvernance, Fonds Commun -->
```

```
</xsd:restriction>
```

```
</xsd:simpleType>
```

```
<!-- — Types composites réutilisables — -->
```

```
<xsd:complexType name="TypePeriode">
```

```
<xsd:attribute name="debut" type="xsd:dateTime" use="required"/>
```

```
<xsd:attribute name="fin" type="xsd:dateTime" use="required"/>
```

```
</xsd:complexType>
```

```
<xsd:complexType name="TypeCoordonnees">
  <xsd:attribute name="lat" type="xsd:decimal" use="required"/>
  <xsd:attribute name="lng" type="xsd:decimal" use="required"/>
</xsd:complexType>
```

```
<xsd:complexType name="TypePaiementTaxe">
  <xsd:sequence>
    <xsd:element name="statut" type="met:StatutPaiement"/>
    <xsd:element name="timestamp" type="xsd:dateTime"/>
    <xsd:element name="tx_id" type="met:TransactionID"/>
    <xsd:element name="destination" type="xsd:string"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="TypeValidation">
  <xsd:attribute name="noeud" type="xsd:string" use="required"/>
  <xsd:attribute name="categorie" type="xsd:string" use="required"/>
  <xsd:attribute name="resultat" type="met:StatutValidation" use="required"/>
  <xsd:attribute name="timestamp" type="xsd:dateTime" use="required"/>
  <xsd:attribute name="signature" type="met:Signature" use="required"/>
</xsd:complexType>
```

```
<!--
```

```
-->
```

```
<!-- SECTION 2 — STRUCTURE D'UN BLOC (commune aux 3 chaînes) -->
```

```
<!--
```

```
-->
```

```

<xsd:complexType name="TypeEnteteBloc">
  <xsd:sequence>
    <xsd:element name="version_protocole" type="xsd:string"/>
    <xsd:element name="hauteur" type="xsd:positiveInteger"/>
    <xsd:element name="chaine" type="met:TypeChaine"/>
    <xsd:element name="territoire" type="met:TerritoireAequitaverse" minOccurs="0"/>
    <xsd:element name="masse_monetaire_totale" type="met:MicroGU"/>
    <xsd:element name="noeud_emetteur">
      <xsd:complexType>
        <xsd:attribute name="id" type="xsd:string" use="required"/>
        <xsd:attribute name="categorie" type="xsd:string" use="required"/>
        <xsd:attribute name="region" type="xsd:string" use="required"/>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

```

<!--

Règle fondamentale : tout bloc doit avoir

- un id unique conforme au format BlocID
- un hash SHA3 de son contenu
- le hash du bloc précédent (immuabilité de la chaîne)
- un timestamp UTC précis
- un type parmi les types autorisés

-->

```

<xsd:complexType name="TypeBlocBase" abstract="true">
  <xsd:sequence>
    <xsd:element name="entete" type="met:TypeEnteteBloc"/>
    <xsd:element name="validations" minOccurs="0">

```

```
<xsd:complexType>
  <xsd:sequence>
    <xsd:element name="validation"
      type="met:TypeValidation"
      minOccurs="1"
      maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="quorum_requis" type="xsd:string" use="required"/>
  <xsd:attribute name="quorum_atteint" type="xsd:string" use="required"/>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
<xsd:attribute name="id" type="met:BlocID" use="required"/>
<xsd:attribute name="hash" type="met:HashSHA3" use="required"/>
<xsd:attribute name="hash_precedent" type="met:HashSHA3" use="required"/>
<xsd:attribute name="hauteur" type="xsd:positiveInteger" use="required"/>
<xsd:attribute name="timestamp" type="xsd:dateTime" use="required"/>
<xsd:attribute name="type" type="met:TypeBloc" use="required"/>
<xsd:attribute name="chaine" type="met:TypeChaine" use="required"/>
</xsd:complexType>
```

<!--

-->

<!-- SECTION 3 — ACTEURS DU SYSTÈME -->

<!--

-->

```
<xsd:complexType name="TypeCertification">
```

```
<xsd:sequence>
  <xsd:element name="organisme" type="xsd:string"/>
  <xsd:element name="numero" type="xsd:string"/>
  <xsd:element name="validite" type="xsd:date"/>
  <xsd:element name="specialite" type="xsd:string"/>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeHistoriqueFiabilite">
  <xsd:sequence>
    <xsd:element name="score" type="xsd:decimal"/>
    <xsd:element name="productions_validees" type="xsd:nonNegativeInteger"/>
    <xsd:element name="incidents" type="xsd:nonNegativeInteger"/>
    <xsd:element name="derniere_fraude" type="xsd:string"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeCautionDeposee">
  <xsd:sequence>
    <xsd:element name="montant" type="met:MicroGU"/>
    <xsd:element name="verrouillage_jusqua" type="xsd:date"/>
    <xsd:element name="taux_applicable" type="xsd:string"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypePortefeuille">
  <xsd:sequence>
    <xsd:element name="adresse" type="met:AdressePortefeuille"/>
    <xsd:element name="solde_disponible" type="met:MicroGU"/>
```

```
<xsd:element name="solde_bloque" type="met:MicroGU"/>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeAvatarAequitaverse">
  <xsd:sequence>
    <xsd:element name="pseudonyme" type="xsd:string"/>
    <xsd:element name="territoire" type="met:TerritoireAequitaverse"/>
    <xsd:element name="niveau_acces" type="xsd:string"/>
    <xsd:element name="date_creation" type="xsd:dateTime"/>
  </xsd:sequence>
  <xsd:attribute name="id_avatar" type="xsd:string" use="required"/>
</xsd:complexType>

<xsd:complexType name="TypeProducteur">
  <xsd:sequence>
    <xsd:element name="certification" type="met:TypeCertification"/>
    <xsd:element name="historique_fiabilite" type="met:TypeHistoriqueFiabilite"/>
    <xsd:element name="caution_depousee" type="met:TypeCautionDeposee"/>
    <xsd:element name="portefeuille" type="met:TypePortefeuille"/>
    <xsd:element name="avatar_aequitaverse" type="met:TypeAvatarAequitaverse" minOccurs="0"/>
  </xsd:sequence>
  <xsd:attribute name="id" type="xsd:string" use="required"/>
  <xsd:attribute name="type" type="met:TypeProducteur" use="required"/>
  <xsd:attribute name="pseudonyme" type="xsd:string" use="required"/>
  <xsd:attribute name="membre_depuis" type="xsd:date" use="required"/>
</xsd:complexType>
```

<!--

-->

<!-- SECTION 4 — PRODUCTION RÉELLE -->

<!--

-->

<xsd:complexType name="TypeQualiteDenree">

<xsd:sequence>

<xsd:element name="humidite" type="xsd:decimal" minOccurs="0"/>

<xsd:element name="proteines" type="xsd:decimal" minOccurs="0"/>

<xsd:element name="impuretes" type="xsd:decimal" minOccurs="0"/>

<xsd:element name="notes" type="xsd:string" minOccurs="0"/>

</xsd:sequence>

</xsd:complexType>

<xsd:complexType name="TypeDenreeProduction">

<xsd:sequence>

<xsd:element name="type" type="met:TypeDenree"/>

<xsd:element name="grade" type="met:GradeDenree"/>

<xsd:element name="quantite">

<xsd:complexType>

<xsd:simpleContent>

<xsd:extension base="xsd:decimal">

<xsd:attribute name="unite" type="xsd:string" use="required"/>

</xsd:extension>

</xsd:simpleContent>

</xsd:complexType>

</xsd:element>

```

    <xsd:element name="qualite" type="met:TypeQualiteDenree" minOccurs="0"/>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeLocalisation">
  <xsd:sequence>
    <xsd:element name="pays" type="xsd:string"/>
    <xsd:element name="region" type="xsd:string"/>
    <xsd:element name="coordinates" type="met:TypeCoordonnees"/>
    <xsd:element name="silo" minOccurs="0">
      <xsd:complexType>
        <xsd:attribute name="id" type="xsd:string" use="required"/>
        <xsd:attribute name="capacite_kg" type="xsd:decimal" use="required"/>
        <xsd:attribute name="certifie_jusqua" type="xsd:date" use="required"/>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeOracleExterne">
  <xsd:sequence>
    <xsd:element name="source" type="xsd:string"/>
    <xsd:element name="reference" type="xsd:string"/>
    <xsd:element name="signature" type="xsd:string"/>
    <xsd:any namespace="##any" processContents="lax"
      minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="type" use="required">
    <xsd:simpleType>

```

```

<xsd:restriction base="xsd:string">
  <xsd:enumeration value="satellite"/>
  <xsd:enumeration value="meteo"/>
  <xsd:enumeration value="marche"/>
  <xsd:enumeration value="humain"/>
</xsd:restriction>
</xsd:simpleType>
</xsd:attribute>
</xsd:complexType>

<xsd:complexType name="TypeProduction">
  <xsd:sequence>
    <xsd:element name="denree" type="met:TypeDenreeProduction"/>
    <xsd:element name="localisation" type="met:TypeLocalisation"/>
    <xsd:element name="preuves_externes">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="oracle"
            type="met:TypeOracleExterne"
            minOccurs="2"
            maxOccurs="unbounded"/>
        <!--
          Minimum 2 oracles indépendants obligatoires.
          Convergence requise à ±5%.
        -->
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element name="temoins_locaux" minOccurs="0">

```

```
<xsd:complexType>
  <xsd:sequence>
    <xsd:element name="temoin" maxOccurs="unbounded">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="attestation" type="xsd:string"/>
          <xsd:element name="signature" type="met:Signature"/>
        </xsd:sequence>
        <xsd:attribute name="id" type="xsd:string" use="required"/>
        <xsd:attribute name="role" type="xsd:string" use="required"/>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
<xsd:attribute name="id" type="xsd:string" use="required"/>
<xsd:attribute name="statut" type="met:StatutValidation" use="required"/>
<xsd:attribute name="cycle" type="xsd:string" use="required"/>
</xsd:complexType>
```

<!--

-->

<!-- SECTION 5 — CALCUL D'ÉMISSION ET TAXE -->

<!--

-->

<!--

Formule d'émission :

$$\mu_{GU} = Q \times P_{ref} \times F_q \times F_r \times F_c \times F_t \times 0.99$$

Où $0.99 = (1 - \text{taux_taxe_création})$

F_q = facteur qualité (grade de la denrée)

F_r = facteur région (conditions et IDH local)

F_c = facteur carbone (empreinte environnementale)

F_t = facteur temps (durée du cycle de production)

-->

```
<xsd:complexType name="TypeCalculEmission">
  <xsd:sequence>
    <xsd:element name="formule_version" type="xsd:string"/>
    <xsd:element name="variables">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="var" maxOccurs="unbounded">
            <xsd:complexType>
              <xsd:simpleContent>
                <xsd:extension base="xsd:string">
                  <xsd:attribute name="nom" type="xsd:string" use="required"/>
                  <xsd:attribute name="valeur" type="xsd:decimal" use="required"/>
                  <xsd:attribute name="description" type="xsd:string" use="optional"/>
                </xsd:extension>
              </xsd:simpleContent>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:element name="etapes">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="etape" maxOccurs="unbounded">
        <xsd:complexType>
          <xsd:simpleContent>
            <xsd:extension base="xsd:string">
              <xsd:attribute name="ordre" type="xsd:positiveInteger" use="required"/>
              <xsd:attribute name="resultat" type="xsd:decimal" use="optional"/>
            </xsd:extension>
          </xsd:simpleContent>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="micro_GU_bruts" type="met:MicroGU"/>
</xsd:sequence>
</xsd:complexType>
```

<!--

Taxe de création : CONDITION SINE QUA NON.

Sans paiement confirmé, le bloc est invalide.

Le système refuse toute émission non taxée.

-->

```
<xsd:complexType name="TypeTaxeCreation">
  <xsd:sequence>
    <xsd:element name="taux_applicable" type="xsd:string"/>
    <xsd:element name="montant_du" type="met:MicroGU"/>
```

```
<xsd:element name="paiement" type="met:TypePaiementTaxe"/>
<xsd:element name="validation_conditionnelle">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="condition" type="xsd:string"/>
      <xsd:element name="si_vrai" type="xsd:string"/>
      <xsd:element name="si_faux" type="xsd:string"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>

<xsd:complexType name="TypeEmission">
  <xsd:sequence>
    <xsd:element name="micro_GU_bruts" type="met:MicroGU"/>
    <xsd:element name="taxe_deduite" type="met:MicroGU"/>
    <xsd:element name="micro_GU_nets" type="met:MicroGU"/>
    <xsd:element name="distribution">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="part" maxOccurs="unbounded">
            <xsd:complexType>
              <xsd:simpleContent>
                <xsd:extension base="met:MicroGU">
                  <xsd:attribute name="destinataire" type="xsd:string" use="required"/>
                  <xsd:attribute name="pct" type="xsd:decimal" use="required"/>
                  <xsd:attribute name="tx_id" type="xsd:string" use="required"/>
                </xsd:extension>
              </xsd:simpleContent>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
</xsd:sequence>
</xsd:complexType>
```

```
</xsd:simpleContent>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:element name="masse_monetaire_apres" type="met:MicroGU"/>
</xsd:sequence>
<xsd:attribute name="statut" type="met:StatutValidation" use="required"/>
</xsd:complexType>
```

```
<!--
```

```
-->
```

```
<!-- SECTION 6 — CONTRATS D'OPTIONS (CASINO) -->
```

```
<!--
```

```
-->
```

```
<xsd:complexType name="TypeParametresOption">
  <xsd:sequence>
    <xsd:element name="type_option" type="met:TypeOption"/>
    <xsd:element name="prix_exercice" type="met:MicroGU"/>
    <xsd:element name="echeance" type="xsd:dateTime"/>
    <xsd:element name="prime_payee" type="met:MicroGU"/>
    <xsd:element name="levier" type="xsd:string"/>
    <xsd:element name="taux_taxe_applicable" type="xsd:string"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="TypeSousJacentOption">
  <xsd:sequence>
    <xsd:element name="commodite" type="met:TypeDenree"/>
    <xsd:element name="quantite_kg" type="xsd:decimal"/>
    <xsd:element name="production_reference" type="xsd:string"/>
    <!--
      production_reference doit pointer vers un bloc
      de type PRODUCTION dans la chaîne principale.
      Garantit que tout contrat a un sous-jacent réel.
    -->
    <xsd:element name="pct_production_couverte" type="xsd:decimal"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="TypeTaxeCasino">
  <xsd:sequence>
    <xsd:element name="base_calcul" type="xsd:string"/>
    <xsd:element name="taux" type="xsd:string"/>
    <xsd:element name="montant" type="met:MicroGU"/>
    <xsd:element name="paiement" type="met:TypePaiementTaxe"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:complexType name="TypeContratOption">
  <xsd:sequence>
    <xsd:element name="acheteur_option">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="pseudonyme" type="xsd:string"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:element name="adresse_casino" type="met:AdressePortefeuille"/>
<xsd:element name="position_pct_marche" type="xsd:decimal"/>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:element name="vendeur_option">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="pseudonyme" type="xsd:string"/>
      <xsd:element name="adresse_casino" type="met:AdressePortefeuille"/>
      <xsd:element name="lien_production_reelle" type="xsd:string" minOccurs="0"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="sous_jacent" type="met:TypeSousJacentOption"/>
<xsd:element name="parametres" type="met:TypeParametresOption"/>
<xsd:element name="taxe_casino" type="met:TypeTaxeCasino"/>
<xsd:element name="mouvement_net">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="de" type="xsd:string"/>
      <xsd:element name="vers" type="xsd:string"/>
      <xsd:element name="montant_net" type="met:MicroGU"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:sequence>
<xsd:attribute name="id" type="xsd:string" use="required"/>
<xsd:attribute name="type" type="met:TypeOption" use="required"/>
```

```

<xsd:attribute name="statut" type="met:StatutOption" use="required"/>
</xsd:complexType>

<!--
=====
-->
<!-- SECTION 7 — MEMBRANE CASINO → ÉCONOMIE RÉELLE -->
<!--
=====
-->

<!--
La membrane est le filtre entre les deux économies.
Tout micro-GU passant du Casino vers l'économie réelle
paie 1% supplémentaire au Fonds Commun.
Ce passage génère automatiquement un bloc
dans la chaîne principale.
-->
<xsd:complexType name="TypeMembraneSeparation">
<xsd:sequence>
<xsd:element name="montant_transfere" type="met:MicroGU"/>
<xsd:element name="taxe_membrane">
<xsd:complexType>
<xsd:sequence>
<xsd:element name="taux" type="xsd:string"/>
<xsd:element name="montant" type="met:MicroGU"/>
<xsd:element name="destination" type="xsd:string"/>
</xsd:sequence>
</xsd:complexType>
</xsd:element>

```

```
<xsd:element name="montant_net_vers_economie_reelle" type="met:MicroGU"/>
<xsd:element name="tx_chaine_principale_generee">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="bloc_principale_ref" type="met:BlocID"/>
      <xsd:element name="type" type="xsd:string"/>
      <xsd:element name="montant" type="met:MicroGU"/>
      <xsd:element name="destinataire" type="xsd:string"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="livraison_physique" minOccurs="0">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="option_livraison" type="xsd:string"/>
      <xsd:element name="silo_disponible" type="xsd:string"/>
      <xsd:element name="quantite_kg" type="xsd:decimal"/>
      <xsd:element name="bon_livraison" type="xsd:string"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>

<!--


---


-->

<!-- SECTION 8 — AUDIT ET SANCTIONS -->
```

<!--

-->

```
<xsd:complexType name="TypeAuditeur">
  <xsd:sequence>
    <xsd:element name="niveau" type="met:NiveauAuditeur"/>
    <xsd:element name="specialites">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="specialite" type="xsd:string"
            minOccurs="1" maxOccurs="unbounded"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
    <xsd:element name="historique">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="audits_completes" type="xsd:nonNegativeInteger"/>
          <xsd:element name="fraudes_detectees" type="xsd:nonNegativeInteger"/>
          <xsd:element name="taux_confirmation" type="xsd:decimal"/>
          <xsd:element name="faux_positifs" type="xsd:nonNegativeInteger"/>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
    <xsd:element name="recompenses_cumulees" type="met:MicroGU"/>
    <xsd:element name="reputation_score" type="xsd:decimal"/>
    <xsd:element name="caution_depositree" type="met:MicroGU"/>
  </xsd:sequence>
</xsd:complexType>
```

```
<xsd:attribute name="id" type="xsd:string" use="required"/>
</xsd:complexType>

<xsd:complexType name="TypeSanction">
  <xsd:sequence>
    <xsd:element name="niveau" type="met:NiveauSanction"/>
    <xsd:element name="producteur_cible" type="xsd:string"/>
    <xsd:element name="montant_fraude" type="met:MicroGU"/>
    <xsd:element name="distribution_saisie">
      <xsd:complexType>
        <xsd:sequence>
          <xsd:element name="part" maxOccurs="unbounded">
            <xsd:complexType>
              <xsd:simpleContent>
                <xsd:extension base="met:MicroGU">
                  <xsd:attribute name="destinataire" type="xsd:string" use="required"/>
                  <xsd:attribute name="pct" type="xsd:decimal" use="required"/>
                </xsd:extension>
              </xsd:simpleContent>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:element>
  </xsd:sequence>
  <xsd:element name="auditeur_denonciateur" type="xsd:string"/>
  <xsd:element name="decision_tribunal" type="xsd:string"/>
  <xsd:element name="duree_suspension" type="xsd:string" minOccurs="0"/>
  <xsd:element name="bannissement_permanent" type="xsd:boolean"/>
</xsd:complexType>
```

```
<xsd:attribute name="id" type="xsd:string" use="required"/>
<xsd:attribute name="timestamp" type="xsd:dateTime" use="required"/>
</xsd:complexType>
```

```
<!--
```

```
-->
```

```
<!-- SECTION 9 — ÉLÉMENTS RACINES (points d'entrée des 3 chaînes) -->
```

```
<!--
```

```
-->
```

```
<!--
```

Élément racine de la CHAÎNE PRINCIPALE (économie réelle).

Contient toutes les productions, émissions, transactions.

```
-->
```

```
<xsd:element name="registre_principal">
```

```
<xsd:complexType>
```

```
<xsd:sequence>
```

```
<xsd:element name="bloc_genese">
```

```
<xsd:complexType>
```

```
<xsd:sequence>
```

```
<xsd:element name="constitution">
```

```
<xsd:complexType>
```

```
<xsd:sequence>
```

```
<xsd:element name="regle" maxOccurs="unbounded">
```

```
<xsd:complexType>
```

```
<xsd:simpleContent>
```

```
<xsd:extension base="xsd:string">
```

```
<xsd:attribute name="id" type="xsd:string" use="required"/>
```

```
</xsd:extension>
</xsd:simpleContent>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:element name="masse_monetaire_initiale" type="met:MicroGU"/>
</xsd:sequence>
<xsd:attribute name="id" type="met:BlocID" use="required"/>
<xsd:attribute name="hash" type="met:HashSHA3" use="required"/>
<xsd:attribute name="hash_precedent" type="met:HashSHA3" use="required"/>
<xsd:attribute name="timestamp" type="xsd:dateTime" use="required"/>
</xsd:complexType>
</xsd:element>
<xsd:element name="bloc_production" maxOccurs="unbounded" minOccurs="0">
  <xsd:complexType>
    <xsd:complexContent>
      <xsd:extension base="met:TypeBlocBase">
        <xsd:sequence>
          <xsd:element name="producteur" type="met:TypeProducteur"/>
          <xsd:element name="production" type="met:TypeProduction"/>
          <xsd:element name="calcul_emission" type="met:TypeCalculEmission"/>
          <xsd:element name="taxe_creation" type="met:TypeTaxeCreation"/>
          <xsd:element name="emission" type="met:TypeEmission"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:element>
```

```
</xsd:element>
<xsd:element name="bloc_transaction" maxOccurs="unbounded" minOccurs="0">
  <xsd:complexType>
    <xsd:complexContent>
      <xsd:extension base="met:TypeBlocBase">
        <xsd:sequence>
          <xsd:element name="transaction">
            <xsd:complexType>
              <xsd:sequence>
                <xsd:element name="expediteur">
                  <xsd:complexType>
                    <xsd:attribute name="id" type="xsd:string" use="required"/>
                    <xsd:attribute name="solde_avant" type="xsd:string" use="required"/>
                  </xsd:complexType>
                </xsd:element>
                <xsd:element name="destinataire">
                  <xsd:complexType>
                    <xsd:attribute name="id" type="xsd:string" use="required"/>
                    <xsd:attribute name="type" type="xsd:string" use="optional"/>
                  </xsd:complexType>
                </xsd:element>
                <xsd:element name="montant" type="met:MicroGU"/>
                <xsd:element name="sous_jacent_physique" minOccurs="0">
                  <xsd:complexType>
                    <xsd:sequence>
                      <xsd:element name="description" type="xsd:string"/>
                      <xsd:element name="silo_origine" type="xsd:string" minOccurs="0"/>
                      <xsd:element name="bon_livraison" type="xsd:string" minOccurs="0"/>
                      <xsd:element name="livraison_prevue" type="xsd:date" minOccurs="0"/>
                    </xsd:sequence>
                  </xsd:complexType>
                </xsd:element>
              </xsd:sequence>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:element>
```

```
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:element name="frais_reseau">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="montant" type="met:MicroGU"/>
      <xsd:element name="destination" type="xsd:string"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="soldes_apres">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="expediteur" type="met:MicroGU"/>
      <xsd:element name="destinataire" type="xsd:string"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element name="signature_expediteur" type="met:Signature"/>
<xsd:element name="timestamp_confirmation" type="xsd:dateTime"/>
</xsd:sequence>
<xsd:attribute name="id" type="met:TransactionID" use="required"/>
<xsd:attribute name="type" type="met:TypeTransaction" use="required"/>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:extension>
</xsd:complexContent>
```

```

    </xsd:complexType>
  </xsd:element>
</xsd:sequence>
<xsd:attribute name="chaine" type="met:TypeChaine" use="required" fixed="PRINCIPALE"/>
<xsd:attribute name="version" type="xsd:string" use="required"/>
<xsd:attribute name="genese" type="xsd:dateTime" use="required"/>
<xsd:attribute name="namespace" type="xsd:anyURI" use="required"/>
</xsd:complexType>
</xsd:element>

<!--
  Élément racine de la CHAÎNE CASINO (marché des options).
  Contient le règlement, les contrats, les exercices, la membrane.
-->
<xsd:element name="registre_casino">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="reglement_casino">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="principe_fondamental" type="xsd:string"/>
            <xsd:element name="sous_jacents_autorises">
              <xsd:complexType>
                <xsd:sequence>
                  <xsd:element name="commodite" type="met:TypeDenree"
                    minOccurs="1" maxOccurs="unbounded"/>
                </xsd:sequence>
              </xsd:complexType>
            </xsd:element>

```

```

<xsd:element name="levier_et_taxe">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="palier" maxOccurs="unbounded">
        <xsd:complexType>
          <xsd:attribute name="levier" type="xsd:string" use="required"/>
          <xsd:attribute name="taux_taxe" type="xsd:string" use="required"/>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>

<xsd:element name="interdit">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="item" type="xsd:string"
        minOccurs="1" maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>

<xsd:element name="bloc_option" maxOccurs="unbounded" minOccurs="0">
  <xsd:complexType>
    <xsd:complexContent>
      <xsd:extension base="met:TypeBlocBase">
        <xsd:sequence>
          <xsd:element name="contrat_option" type="met:TypeContratOption"/>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:element>

```

```

    </xsd:sequence>
  </xsd:extension>
</xsd:complexContent>
</xsd:complexType>
</xsd:element>
<xsd:element name="bloc_exercice" maxOccurs="unbounded" minOccurs="0">
  <xsd:complexType>
    <xsd:complexContent>
      <xsd:extension base="met:TypeBlocBase">
        <xsd:sequence>
          <xsd:element name="exercice">
            <xsd:complexType>
              <xsd:sequence>
                <xsd:element name="prix_marche_au_moment" type="met:MicroGU"/>
                <xsd:element name="prix_exercice" type="met:MicroGU"/>
                <xsd:element name="gain_brut_acheteur" type="xsd:string"/>
                <xsd:element name="membrane_separation" type="met:TypeMembraneSeparation"/>
              </xsd:sequence>
              <xsd:attribute name="contrat_ref" type="xsd:string" use="required"/>
            </xsd:complexType>
          </xsd:element>
        </xsd:sequence>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>
</xsd:element>
</xsd:sequence>
<xsd:attribute name="chaine" type="met:TypeChaine" use="required" fixed="CASINO"/>
<xsd:attribute name="version" type="xsd:string" use="required"/>

```

```
<xsd:attribute name="lien_chaine_principale" type="met:HashSHA3" use="required"/>
</xsd:complexType>
</xsd:element>

</xsd:schema>
```