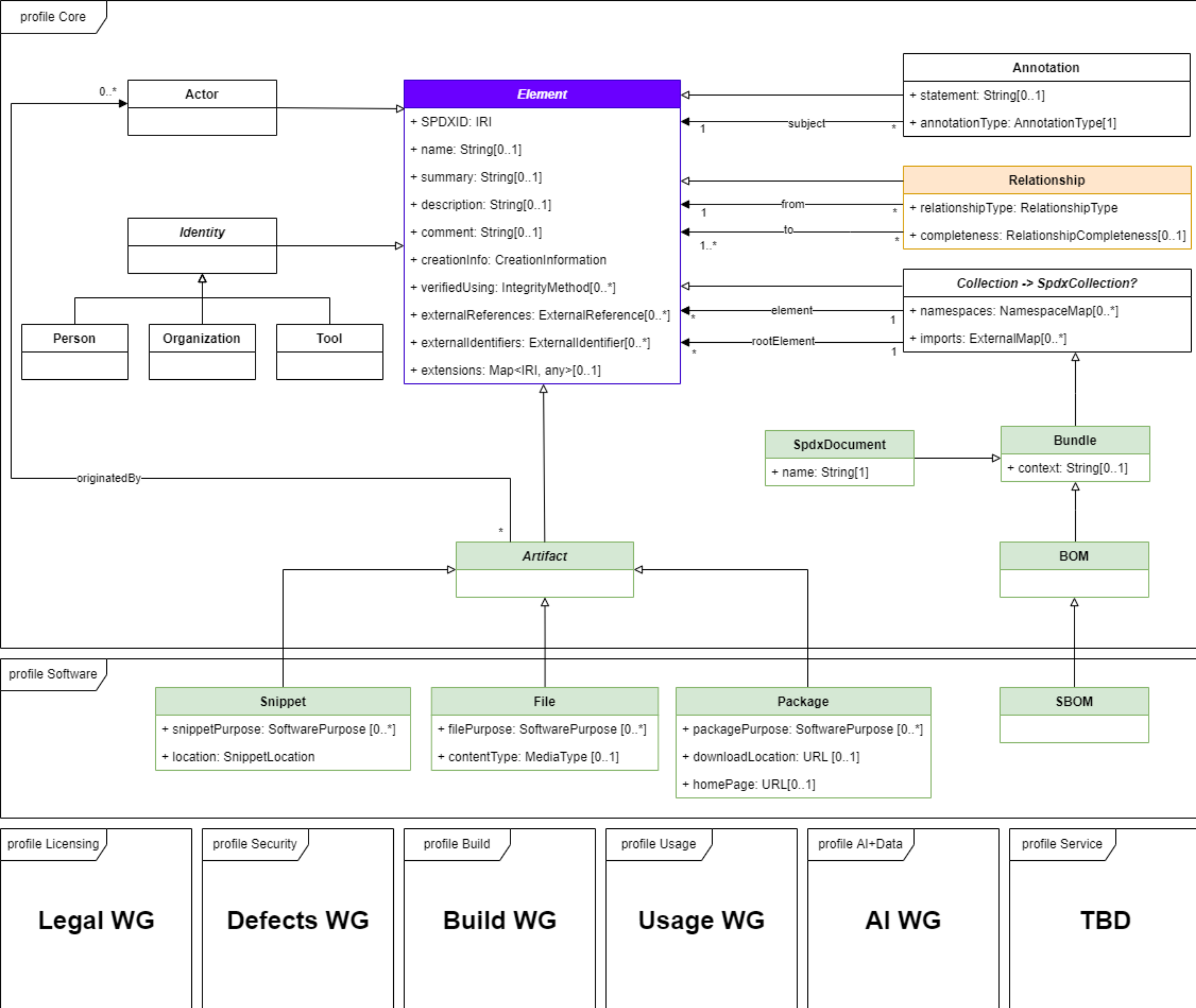


- Questions:
- * Are locator on ExternalReference now a URL not IRI?
- * If identifier is an IRI then I don't think we need a type, if we have a type it's possible we want the IRI to be a string w/ schema instead.
- * We have lots of overlapping relationship types for dependencies, should we have a DependencyRelationship subclass?

<u>RelationshipCompleteness: String</u>
KNOWN [Default]
INCOMPLETE
UNKNOWN

2022-09-20: 1df6f25 Tech Meeting 2022-09-20



Minimal Example (JSON)

```
{
  "@type": "SpdxDocument",
  "@id": "urn:spdx.dev:null-document",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "elements": [
    {
      "@type": "Person",
      "@id": "urn:spdx.dev:iamwillbar"
    }
  ]
}
```

```
{
  "@type": "Person",
  "@id": "urn:spdx.dev:iamwillbar",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar"
}
```

SBOM Example (JSON)

```
{
  "@type": "SBOM",
  "@id": "urn:spdx.dev:null-sbom",
  "creationInfo": {
    "specVersion": "3.0",
    "created": "2022-05-02T20:28:00.000Z",
    "profile": ["core"],
    "dataLicense": "CC0",
    "createdBy": "urn:spdx.dev:iamwillbar"
  },
  "rootElements": ["urn:spdx.dev:spdx-tools-3.0.1"],
  "externalMap": [
    {
      "elementId": "urn:spdx.dev:project",
      "elementURL": "",
      "verifiedUsing": []
    },
    {
      "elementId": "urn:spdx.dev:doc",
      "elementURL": "https://spdx.dev/docs/v1.0.json",
      "verifiedUsing": []
    }
  ],
  "elements": [
    {
      "@type": "Person",
      "@id": "urn:spdx.dev:iamwillbar",
      "name": "William Bartholomew",
      "identifiedBy": [
        {
          "type": "EmailAddress",
          "email": "willbar@microsoft.com"
        },
        {
          "type": "Account",
          "authority": "github.com",
          "locator": "iamwillbar"
        }
      ]
    },
    {
      "@type": "Package",
      "@id": "urn:spdx.dev:spdx-tools-3.0.1",
      "package-purpose": "APPLICATION",
      "downloadLocation": "https://spdx.dev/downloads/spdx-tools-3.0.1.tgz",
      "homePage": "https://spdx.dev/tools.3.0",
      "originator": "urn:spdx.dev:project",
      "identifiedBy": [
        {
          "type": "ExternalReference",
          "externalReferenceType": "purl",
          "locator": ""
        },
        {
          "type": "ExternalReference",
          "externalReferenceType": "cpe22",
          "locator": ""
        }
      ],
      "verifiedUsing": [
        {
          "type": "Hash",
          "hashAlgorithm": "SHA256",
          "hashValue": "..."
        }
      ]
    }
  ]
}
```

Data Types

These have value type/struct semantics - equality is determined by comparing values and they MUST NOT be referenced by name across documents. Serialization formats MAY enable de-duplication within a single document.

IntegrityMethod

Hash

- + algorithm: HashAlgorithm
- + hashValue: String

ExternalReference

- + externalReferenceType: ExternalReferenceType
- + locator: IRI
- + comments: String[0..1]

ExternalIdentifier

- + externalIdentifierType: ExternalIdentifierType
- + locator: IRI
- + comments: String[0..1]

How to handle partial/incomplete identifiers?

ExternalMap

- + externalId: IRI
- + locationHint: URL[0..1]
- + verifiedUsing: IntegrityMethod[0..*]
- + definingDocument: DocumentRef[0..1]

NamespaceMap

- + prefix: String
- + namespace: IRI

CreationInformation

- + specVersion: SemVer
- + profile: ProfileIdentifier[1..*]
- + created: DateTime
- + dataLicense: 'CC0'
- + createdBy: Actor[1..*]

ProfileIdentifier

- + name: String
- + version: SemVer

IdentifierRange/Query/Search

Serialization

* Collections MAY nest contained elements (i.e. elements referenced by the "element" property but the hash of the canonical representation MUST be equivalent to those elements not being nested. Nesting SHOULD NOT be extended beyond a single level (Q: Is this restriction possible for aggregated documents?).

HashAlgorithm: String

SHA1
SHA224
SHA256 [default]
SHA384
SHA512
SHA3-224
SHA3-256
SHA3-384
SHA3-512
MD2
MD4
MD5
MD6
SPDX-PVC-SHA1
SPDX-PVC-SHA256
BLAKE2b-256
BLAKE2b-384
BLAKE2b-512
BLAKE3

SoftwarePurpose: String

APPLICATION
FRAMEWORK
LIBRARY
CONTAINER
OPERATING-SYSTEM
DEVICE
FIRMWARE
SOURCE
PATCH
ARCHIVE
CONFIGURATION
DATA
DOCUMENTATION
EXECUTABLE
MODULE
BOM
OTHER

RelationshipType: String

DESCRIBES
CONTAINS
DEPENDS_ON
GENERATES

ANCESTOR_OF
DESCENDANT_OF
VARIANT_OF
DISTRIBUTION_ARTIFACT

FILE_ADDED
FILE_DELETED
FILE_MODIFIED

... (more to be brought in from SPDX 2.x)

SUPPLIED_BY *new*
ALSO_KNOWN_AS *new*

RelationshipCompleteness: String

KNOWN [Default]
INCOMPLETE
UNKNOWN

ExternalReferenceType: String

TBD

AnnotationType: String

REVIEW
OTHER

SemVer: String

String constrained to SemVer 2.0.0 specification.

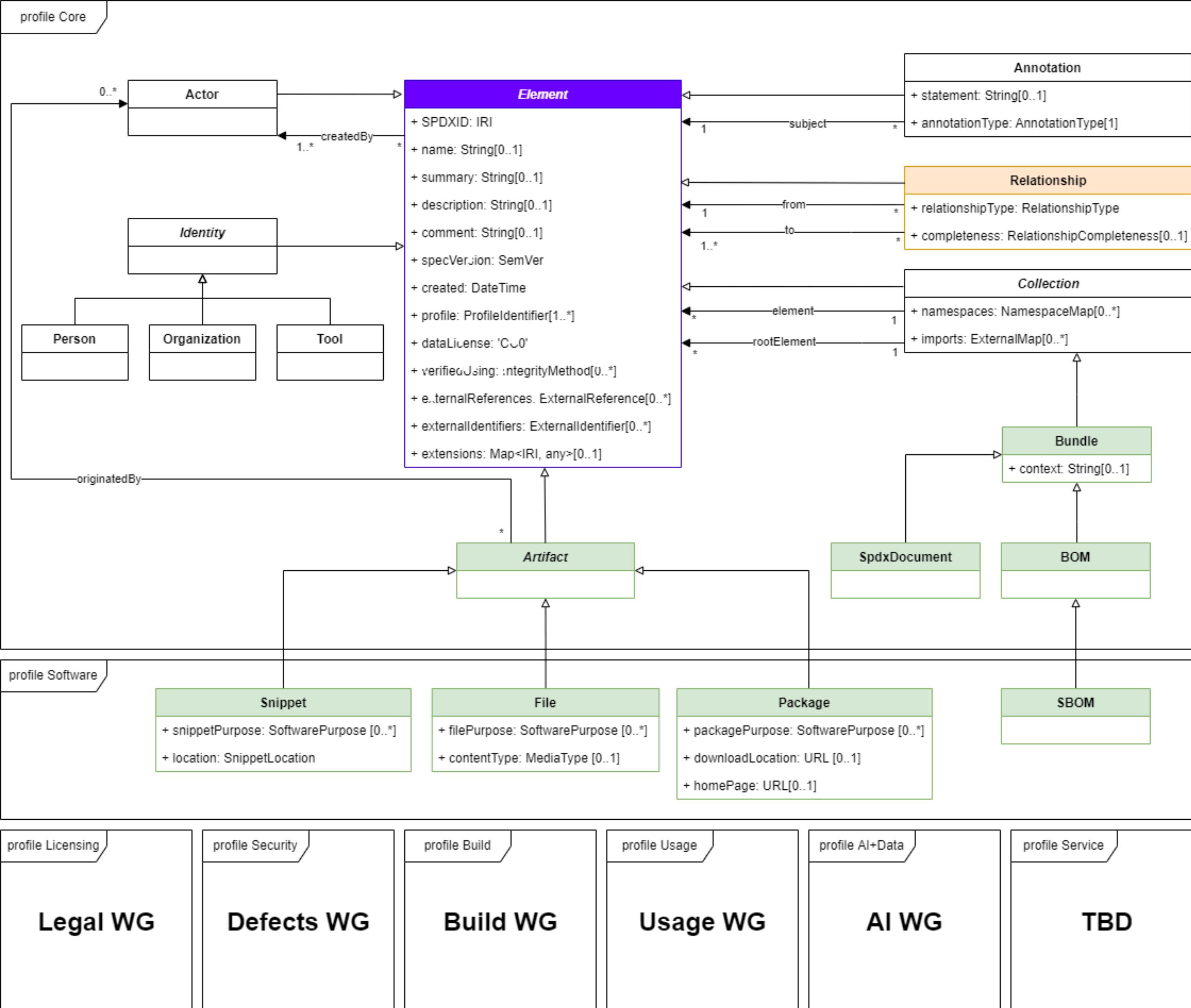
MediaType: String

String constrained to RFC 2046 specification.

Legend

Italics - abstract, you must use a subclass

Underscore - value type/struct semantics, equality determined by comparing values



Minimal Example

```
{
  "@type": "SpdxDocument",
  "@id": "urn:spdx.dev:null-document",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "elements": [
    {
      "@type": "Person",
      "@id": "urn:spdx.dev:iamwillbar"
    }
  ]
}
```

SBOM Example

```
{
  "@type": "SBOM",
  "@id": "urn:spdx.dev:null-sbom",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "rootElements": ["urn:spdx.dev:spdx-tools-3.0.1"],
  "externalMap": [
    {
      "elementId": "urn:spdx.dev:project", "elementURL": "", "verifiedUsing": [],
      "elementId": "urn:spdx.dev:doc", "elementURL": "https://spdx.dev/docs/v1.0.json", "verifiedUsing": []
    }
  ]
  "elements": [
    {
      "@type": "Person",
      "@id": "urn:spdx.dev:iamwillbar",
      "name": "William Bartholomew",
      "identifiedBy": [
        {
          "type": "EmailAddress", "email": "willbar@microsoft.com",
          "type": "Account", "authority": "github.com", "locator": "iamwillbar"
        }
      ]
    },
    {
      "@type": "Package",
      "@id": "urn:spdx.dev:spdx-tools-3.0.1",
      "packagePurpose": "APPLICATION",
      "downloadLocation": "https://spdx.dev/downloads/spdx-tools-3.0.1.tgz",
      "homePage": "https://spdx.dev/tools/3.0",
      "originator": ["urn:spdx.dev:project"],
      "identifiedBy": [
        {
          "type": "ExternalReference", "externalReferenceType": "purl", "locator": ""},
        {
          "type": "ExternalReference", "externalReferenceType": "cpe22", "locator": ""}
      ],
      "verifiedUsing": [
        {
          "type": "Hash", "hashAlgorithm": "SHA256", "hashValue": "..."
        }
      ]
    }
  ]
}
```

Data Types

These types have value type/struct semantics - equality is determined by comparing values and they MUST NOT be referenced by name across documents. Serialization formats MAY enable de-duplication within a single document.

IntegrityMethod

Hash

- + algorithm: HashAlgorithm
- + hashValue: String

ExternalReference

- + externalReferenceType: ExternalReferenceType
- + locator: IRI
- + comments: String[0..1]

ExternalIdentifier

- + externalIdentifierType: ExternalIdentifierType
- + locator: IRI
- + comments: String[0..1]

How to handle partial/incomplete identifiers?

ExternalMap

- + externalId: IRI
- + locationHint: URL[0..1]
- + verifiedUsing: IntegrityMethod[0..*]
- + definingDocument: DocumentRef[0..1]

NamespaceMap

- + prefix: String
- + namespace: IRI

CreationInformation

- + specVersion: SemVer
- + profile: ProfileIdentifier[1..*]
- + created: DateTime
- + createdBy: Actor[1..*]

ProfileIdentifier

- + name: String
- + version: SemVer

IdentifierRange/Query/Search

Serialization

* Collections MAY nest contained elements (i.e. elements referenced by the "element" property but the hash of the canonical representation MUST be equivalent to those elements not being nested. Nesting SHOULD NOT be extended beyond a single level (Q: Is this restriction possible for aggregated documents?).

HashAlgorithm: String

SHA1
SHA224
SHA256 [default]
SHA384
SHA512
SHA3-224
SHA3-256
SHA3-384
SHA3-512
MD2
MD4
MD5
MD6
SPDX-PVC-SHA1
SPDX-PVC-SHA256
BLAKE2b-256
BLAKE2b-384
BLAKE2b-512
BLAKE3

RelationshipType: String

DESCRIBES
CONTAINS
DEPENDS_ON
GENERATES

ANCESTOR_OF
DESCENDANT_OF
VARIANT_OF
DISTRIBUTION_ARTIFACT

FILE_ADDED
FILE_DELETED
FILE_MODIFIED

... (more to be brought in from SPDX 2.x)

SUPPLIED_BY *new*
ALSO_KNOWN_AS *new*

ExternalReferenceType: String

TBD

AnnotationType: String

REVIEW
OTHER

SemVer: String

String constrained to SemVer 2.0.0 specification.

MediaType: String

String constrained to RFC 2046 specification.

SoftwarePurpose: String

APPLICATION
FRAMEWORK
LIBRARY
CONTAINER
OPERATING-SYSTEM
DEVICE
FIRMWARE
SOURCE
PATCH
ARCHIVE
CONFIGURATION
DATA
DOCUMENTATION
EXECUTABLE
MODULE
BOM
OTHER

RelationshipCompleteness: String

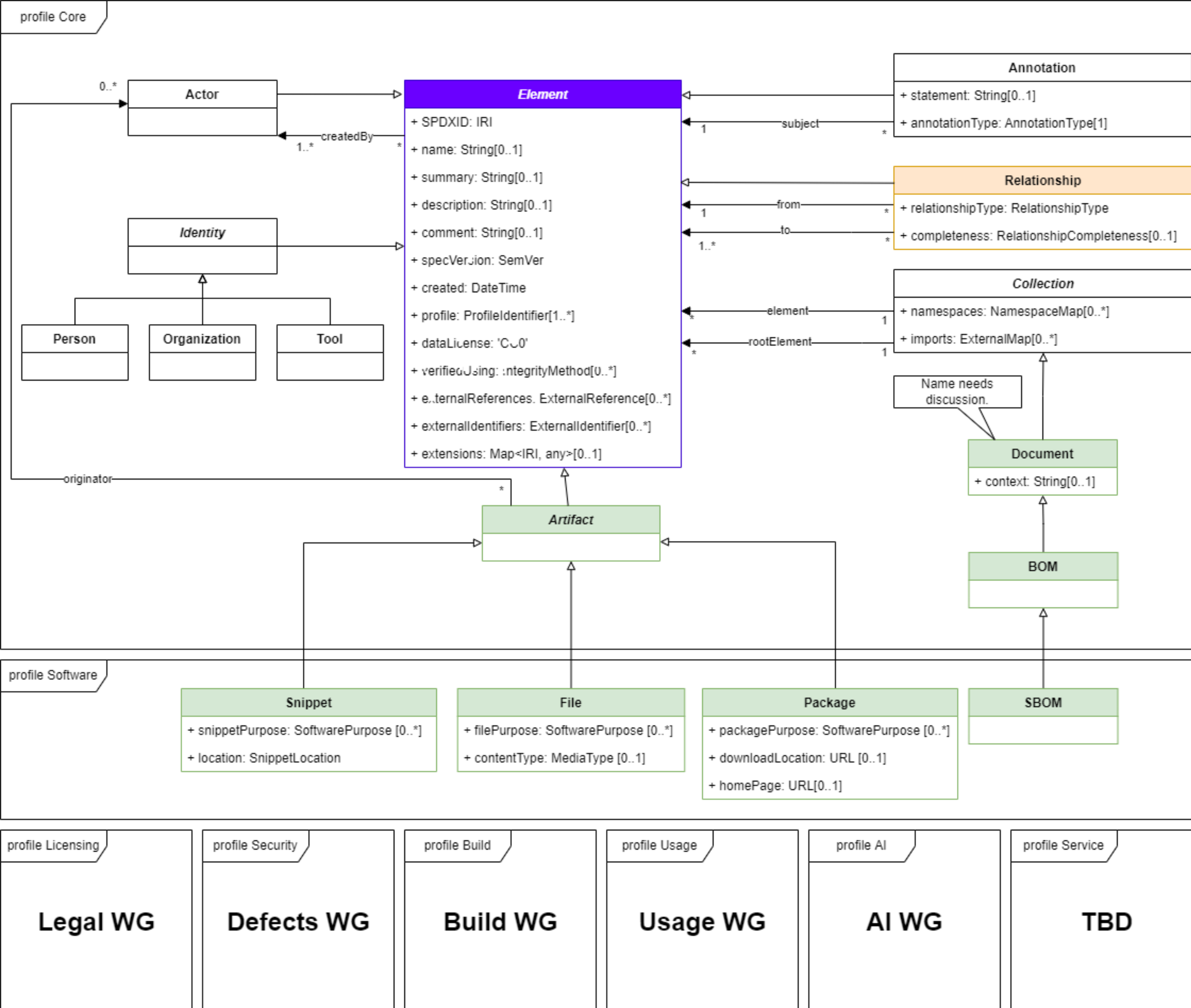
KNOWN [Default]
INCOMPLETE
UNKNOWN

Legend

Italics - abstract, you must use a subclass

Underscore - value type/struct semantics, equality determined by comparing values

Core Data Types



Minimal Example

```
{
  "type": "Document",
  "id": "urn:spdx.dev:null-document",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "elements": [
    {
      "type": "Person",
      "id": "urn:spdx.dev:iamwillbar"
    }
  ]
}
```

SBOM Example

```
{
  "type": "SBOM",
  "id": "urn:spdx.dev:null-sbom",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "rootElements": ["urn:spdx.dev:spdx-tools-3.0.1"],
  "externalMap": [
    { "elementId": "urn:spdx.dev:project", "elementURL": "", "verified": true },
    { "elementId": "urn:spdx.dev:doc", "elementURL": "https://spdx.dev/docs/v1.0.json", "verified": false }
  ],
  "verifiedUsing": []
}

{
  "elements": [
    {
      "type": "Person",
      "id": "urn:spdx.dev:iamwillbar",
      "name": "William Bartholomew",
      "identifiedBy": [
        { "type": "EmailAddress", "email": "willbar@microsoft.com" },
        { "type": "Account", "authority": "github.com", "locator": "iamwillbar" }
      ]
    },
    {
      "type": "Package",
      "id": "urn:spdx.dev:spdx-tools-3.0.1",
      "packagePurpose": "APPLICATION",
      "downloadLocation": "https://spdx.dev/downloads/spdx-tools-3.0.1.tgz",
      "homePage": "https://spdx.dev/tools/3.0",
      "originator": ["urn:spdx.dev:project"],
      "identifiedBy": [
        { "type": "ExternalReference", "externalReferenceType": "purl", "locator": "" },
        { "type": "ExternalReference", "externalReferenceType": "cpe22", "locator": "" }
      ],
      "verifiedUsing": [
        { "type": "Hash", "hashAlgorithm": "SHA256", "hashValue": "..." }
      ]
    }
  ]
}
```

Data Types

These types have value type/struct semantics - equality is determined by comparing values and they MUST NOT be referenced by name across documents. Serialization formats MAY enable de-duplication within a single document.

IntegrityMethod

Hash

- algorithm: HashAlgorithm
- hashValue: String

ExternalReference

- externalReferenceType: ExternalReferenceType
- locator: IRI
- comments: String[0..1]

ExternalIdentifier

- externalIdentifierType: ExternalIdentifierType
- locator: IRI
- comments: String[0..1]

How to handle partial/incomplete identifiers?

ExternalMap

- externalId: IRI
- locationHint: URL[0..1]
- verifiedUsing: IntegrityMethod[0..*]
- definingDocument: DocumentRef[0..1]

ProfileIdentifier

- name: String
- version: SemVer

IdentifierRange/Query/Search

NamespaceMap

- prefix: String
- namespace: IRI

CreationInformation

- specVersion: SemVer
- profile: ProfileIdentifier[1..*]
- created: DateTime
- createdBy: Actor[1..*]

HashAlgorithm: String

SHA1
SHA224
SHA256 [default]
SHA384
SHA512
SHA3-224
SHA3-256
SHA3-384
SHA3-512
MD2
MD4
MD5
MD6
SPDX-PVC-SHA1
SPDX-PVC-SHA256
BLAKE2b-256
BLAKE2b-384
BLAKE2b-512
BLAKE3

RelationshipType: String

DESCRIBES
CONTAINS
DEPENDS_ON
GENERATES

ANCESTOR_OF
DESCENDANT_OF
VARIANT_OF
DISTRIBUTION_ARTIFACT

FILE_ADDED
FILE_DELETED
FILE_MODIFIED

... (more to be brought in from SPDX 2.x)

SUPPLIED_BY *new*
ALSO_KNOWN_AS *new*

ExternalReferenceType: String

TBD

AnnotationType: String

REVIEW
OTHER

SemVer: String

String constrained to SemVer 2.0.0 specification.

MediaType: String

String constrained to RFC 2046 specification.

SoftwarePurpose: String

APPLICATION
FRAMEWORK
LIBRARY
CONTAINER
OPERATING-SYSTEM
DEVICE
FIRMWARE
SOURCE
PATCH
ARCHIVE
CONFIGURATION
DATA
DOCUMENTATION
EXECUTABLE
MODULE
BOM
OTHER

RelationshipCompleteness: String

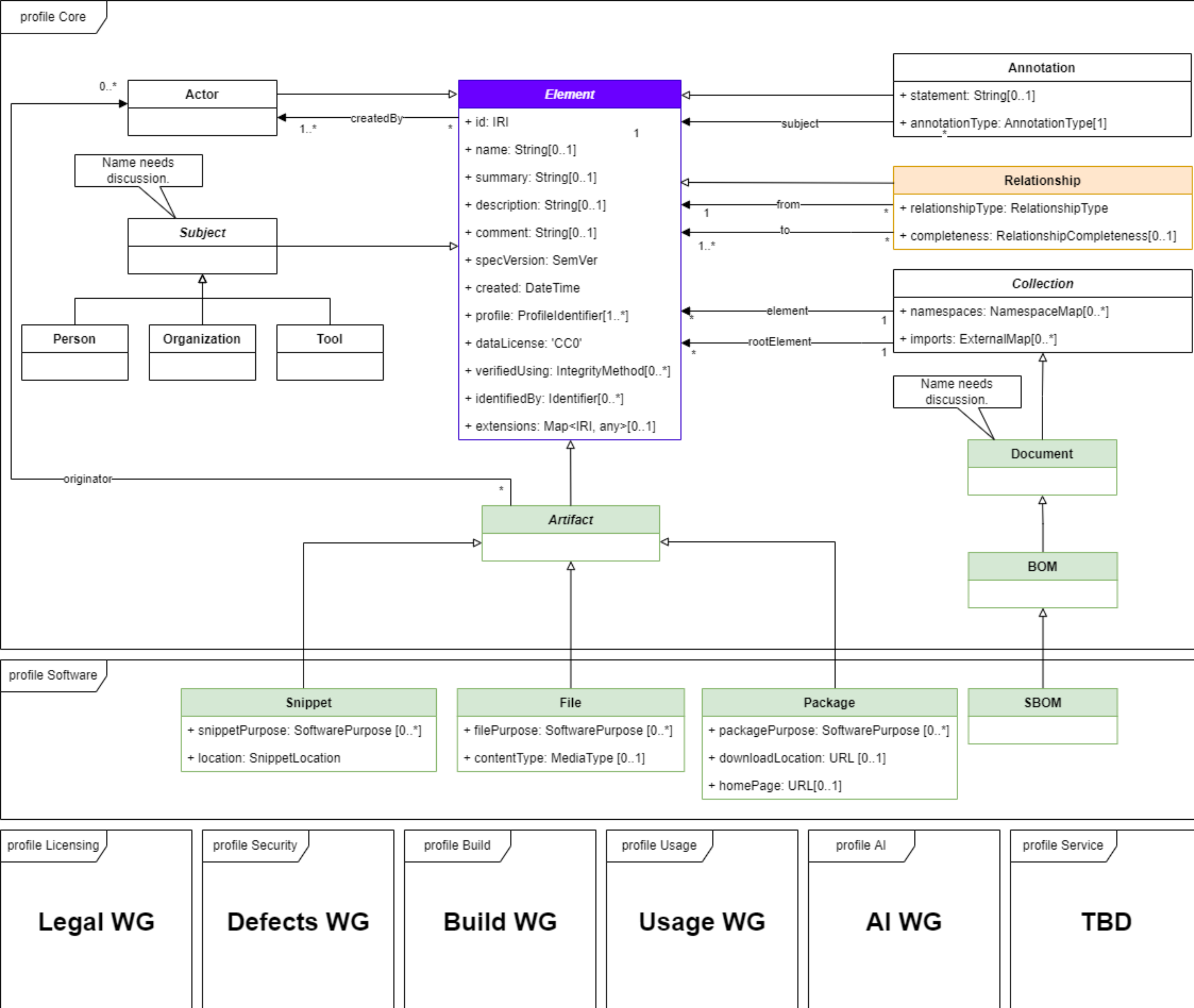
KNOWN [Default]
INCOMPLETE
UNKNOWN

Legend

- Italics* - abstract, you must use a subclass
- Underscore - value type/struct semantics, equality determined by comparing values

Core Data Types

2022-07-19: 2082824 Last tech meeting



Minimal Example

```
{
  "type": "Document",
  "id": "urn:spdx.dev:null-document",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "elements": [
    {
      "type": "Person",
      "id": "urn:spdx.dev:iamwillbar"
    }
  ]
}
```

SBOM Example

```
{
  "type": "SBOM",
  "id": "urn:spdx.dev:null-sbom",
  "specVersion": "3.0",
  "created": "2022-05-02T20:28:00.000Z",
  "profile": ["core"],
  "dataLicense": "CC0",
  "createdBy": "urn:spdx.dev:iamwillbar",
  "rootElements": ["urn:spdx.dev:spdx-tools-3.0.1"],
  "elements": [
    {
      "type": "Person",
      "id": "urn:spdx.dev:iamwillbar",
      "name": "William Bartholomew",
      "identifiedBy": [
        {
          "type": "EmailAddress", "email": "willbar@microsoft.com"
        },
        {
          "type": "Account", "authority": "github.com", "locator": "iamwillbar"
        }
      ]
    },
    {
      "type": "Organization",
      "id": "urn:spdx.dev:project",
      "name": "SPDX Project"
    },
    {
      "type": "Package",
      "id": "urn:spdx.dev:spdx-tools-3.0.1",
      "packagePurpose": "APPLICATION",
      "downloadLocation": "https://spdx.dev/downloads/spdx-tools-3.0.1.tgz",
      "homePage": "https://spdx.dev/tools/3.0",
      "originator": ["urn:spdx.dev:project"],
      "identifiedBy": [
        {
          "type": "ExternalReference", "externalReferenceType": "purl", "locator": ""
        },
        {
          "type": "ExternalReference", "externalReferenceType": "cpe22", "locator": ""
        }
      ],
      "verifiedUsing": [
        {
          "type": "Hash", "hashAlgorithm": "SHA256", "hashValue": "..."
        }
      ]
    }
  ]
}
```

Data Types

These types have value type/struct semantics - equality is determined by comparing values and they MUST NOT be referenced by name across documents. Serialization formats MAY enable de-duplication within a single document.

IntegrityMethod

Hash

- algorithm: HashAlgorithm
- hashValue: String

Identifier

EmailAddress

- email: String

ExternalReference

- externalReferenceType: ExternalReferenceType
- locator: IRI

ExternalMap

- externalId: IRI
- elementURL: URL
- verifiedUsing: IntegrityMethod[1..*]
- definedDocument: DocumentRef[0..1]

NamespaceMap

- prefix: String
- namespace: IRI

RelationshipType: String

DESCRIBES
CONTAINS
DEPENDS_ON
GENERATES
ANCESTOR_OF
DESCENDANT_OF
VARIANT_OF
DISTRIBUTION_ARTIFACT
FILE_ADDED
FILE_DELETED
FILE_MODIFIED
... (more to be brought in from SPDX 2.x)
SUPPLIED_BY *new*
ALSO_KNOWN_AS *new*

RelationshipCompleteness: String

KNOWN [Default]
INCOMPLETE
UNKNOWN

SoftwarePurpose: String

APPLICATION
FRAMEWORK
LIBRARY
CONTAINER
OPERATING-SYSTEM
DEVICE
FIRMWARE
SOURCE
PATCH
ARCHIVE
CONFIGURATION
DATA
DOCUMENTATION
EXECUTABLE
MODULE
BOM
OTHER

ExternalReferenceType: String

TBD

AnnotationType: String

REVIEW
OTHER

SemVer: String

String constrained to SemVer 2.0.0 specification.

MediaType: String

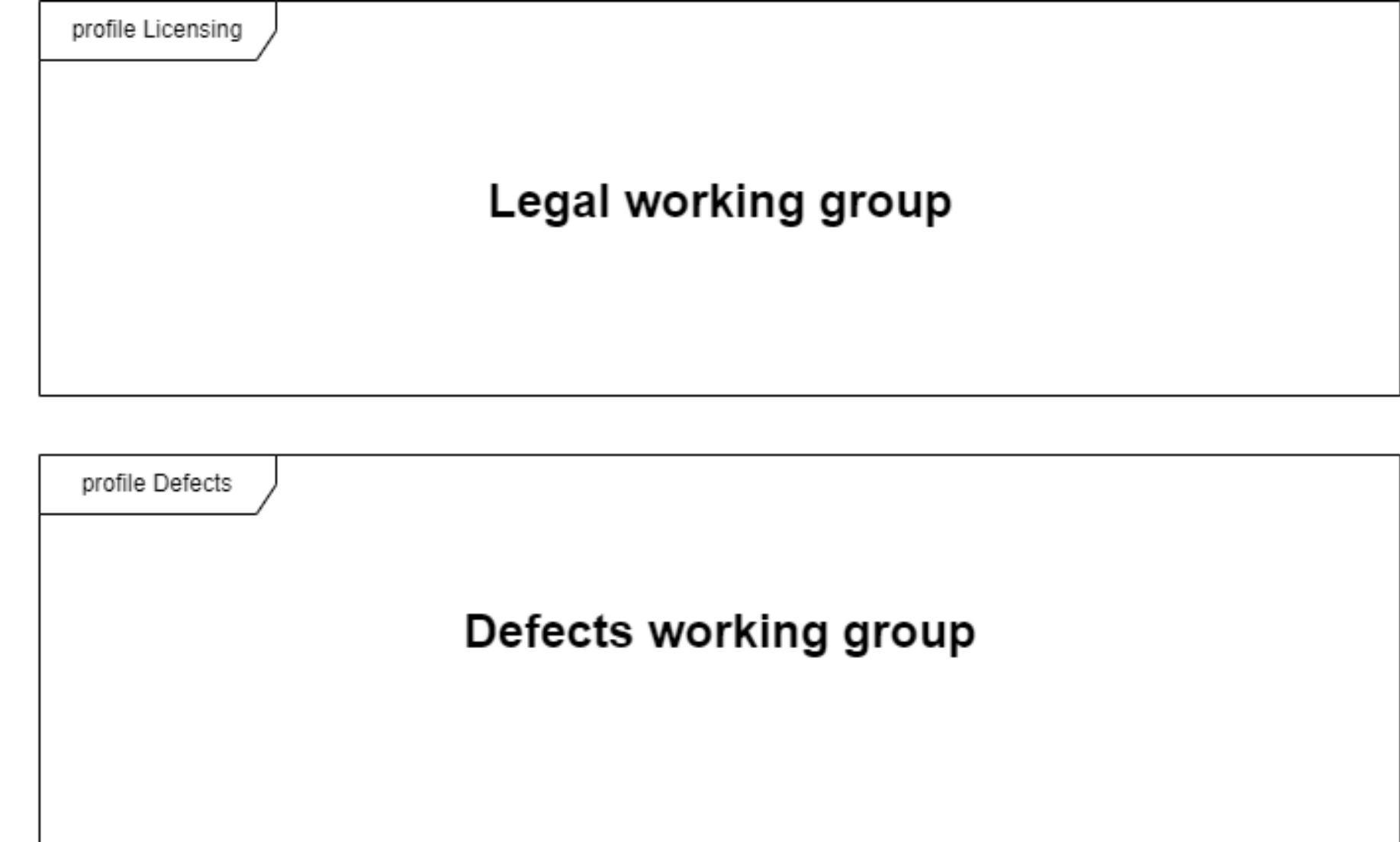
String constrained to RFC 2046 specification.

Legend

Italics - abstract, you must use a subclass

Underscore - value type/struct semantics, equality determined by comparing values

2022-05-17: 4db2df8 Proposed model post 2022-05-17 tech meeting



2022-04-18: 7837031 Model update (pre Identity changes)

