BioXSD

A data model for sequences, alignments, features, and measurements

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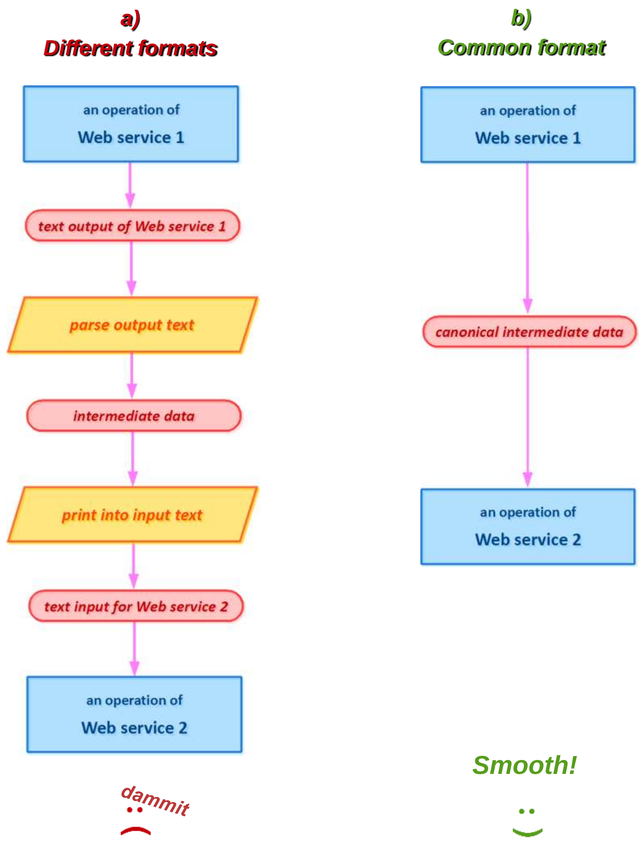
MOTIVATION

Without a common format, communication between diverse tools demands conversions, "shims", or do-it-yourself parsing. And worst of all, **maintaining** them in the future.

The 2 scenarios show demands for connecting 2 tools (for example web services) that use:

a) Different formats

b) Common format



TECHNOLOGY CHOICES

Different paradigms of data formatting represent data differently

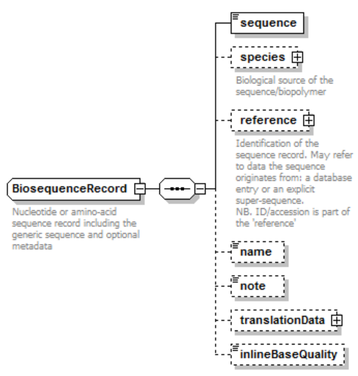
Traditional formats:	Middle way:	Semantic Web:
1D Key-value pairs	XML format	RDF format
2D Tab-separated values	JSON format	
Binary format	**Tree**	**Graph**

A machine-understandable definition of a specific format (a data model) is highly beneficial for validation and maintainability

GTrack format	XML Schema (XSD) Relax NG XML Schema 1.1 JSON Schema	OWL

EXAMPLE RESULT: BioXSD sequence record

Type diagram from the schema:

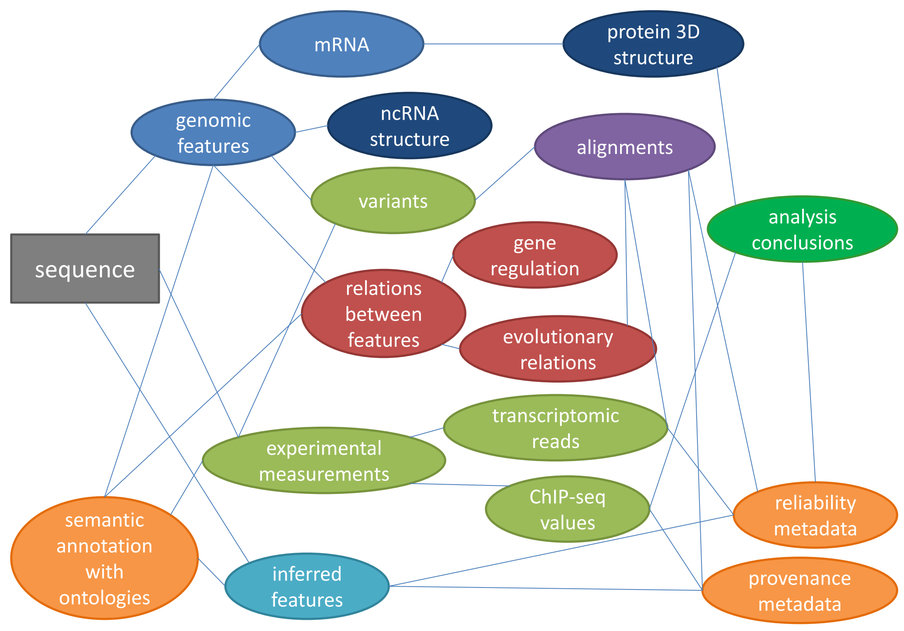


Example data instance:

```
<mySequence xsi:type="bx:GeneralAminoacidSequenceRecord">
    <bx:sequence>MDPLGDTLRRLREAFHAGRTRPAEFRAAQLQGLGRFLQENKQLLHDALAQDLHKSAFESEVSEVAISQGEVTL
AELGGKNPCYVDDNCDPQTVANRVAWFRYFNAGQTCVAPDYVLCSPEMQERLLPALQSTITRFYGDDPQSSPNLGRIINQKQFQRLRALLG
GKFSFDTFSHHRACLLRSPGMEKLNALRYPPQSPRRLRMLLVAMEAQGCSCTLL</bx:sequence>
    <bx:species
        dbName="NCBI Taxonomy"
        accession="9606"
        entryUri="http://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606"
        speciesName="Human"
    />
    <bx:reference
        dbName="UniProt"
        accession="P43353"
        entryUri="http://www.uniprot.org/uniprot/P43353"
        sequenceVersion="1"
        variantAccession="P43353-1"
    />
    <bx:name>Aldehyde dehydrogenase family 3 member B1 (ALDH3B1)</bx:name>
</mySequence>
```

EXAMPLE RESULT: BioXSD feature record

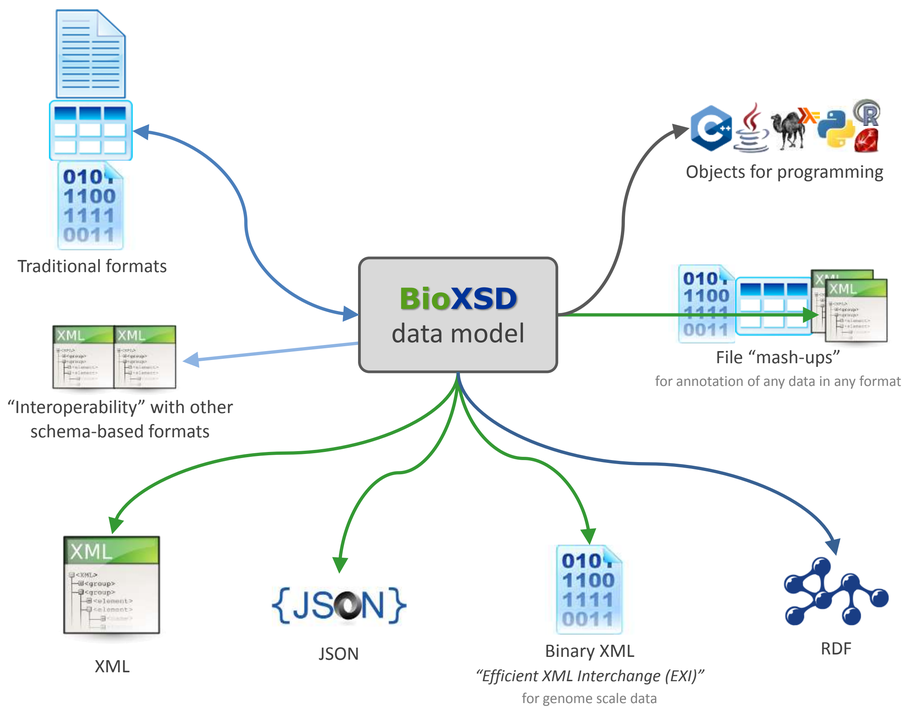
BioXSD can represent diverse interconnected data and annotations in an integrated data record



ONGOING DEVELOPMENT: single data model with multiple choices of exchange formats and conversions

BioXSD is rich enough to enable:

- loss-less capture of diverse data that would otherwise require use of multiple different formats
- loss-less conversions between diverse formats



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