Digital Signatures in XBRL

EuroFiling, 14th June 2023

Paul Warren
Technical Directory, XBRL International

@xbrlint

Digital Signatures in XBRL

- Applying digital signatures to XBRL is a logical step
- Has been discussed for a number of years
- New working group established in 2022

Digital **S**ignatures **I**n **X**BRL WG

DSIXWG

D6WG

Goal

How to apply existing signature technologies to XBRL reports

Not invent a new signature standard.

What are Digital Signatures?

Digital signatures provide verifiable proof that a document was signed by the claimed signatory.

- Any modification to the document will invalidate the signature – guarantees that the document is as it was when signed.
- Proves that the signatory had a particular "private key" – ensuring that only the stated person/entity has that key requires PKI (Public Key Infrastructure)

Why are signatures needed in XBRL?

- Guarantees that the document was created by the claimed author - and not modified since
- Guarantees that the document was audited by the stated auditor - and not modified since
- Non-repudiation - signatories cannot later deny that they created/reviewed document

xBRL

Is this a real problem?

hindenburgresearch.com/tingo/

HINDENBURG RESEARCH

HOME   ABOUT US   CONTACT US

Tingo Financial Statements Are Riddled With Errors And Typos, Including A Note To Itself That It Apparently Forgot To Delete: "Please Update For The Tingle (sic) Transaction"

It Gave Tingo A Clean Audit Opinion For 2022 Despite What We View As Glaring, Obvious Anomalies That Even Basic Auditing Checks Would Have Spotted From A Mile Away

While th   ctually
61.55%

Similarly (shown below), the company seemingly forgot to add 3 zeroes to its cost of revenues for its Food Processing segment. We suspect it meant to report $348,896,000 (versus $348,896, which would give the segment an impressive 99.94% gross margin):

- We are short Tingo Group Inc (NASDAQ:TIO) because we believe the company is an exceptionally obvious scam with completely fabricated financials.

@xbrlint

xBRL

Why are signatures needed in XBRL?

- Guarantees that the document was created by the claimed author - and not modified since
- Guarantees that the document was **audited by the stated auditor** - and **not modified since**
- Non-repudiation - signatories cannot later deny that they created/reviewed document

?

Digital signatures would allow us to trivially check these details

XBRL/iXBRL-specific challenges

- Dependencies
  - Taxonomies (extension and base)
  - Styling (CSS)
  - Images
- Where to place the signatures
- Partial signatures
  - Ability to create a signature that only relates to part of a report

- Many of these issues also relate to HTML reports
- Solutions applicable even if XBRL tags are out-of-scope for signatory purpose

Embedded vs detached signature

- In a paper + ink world, signature forms part of the document
- Adding a signature to a document is a modification
- In a digital world, naïvely inserting a signature into a document would invalidate the signature
- Option 1: detach - keep the signature separate (inconvenient for recipient)
- Option 2: embed - set aside a location to insert the signature and carefully exclude it from the signature process

xBRL

Embed in XML?

An XML-based solution may seem like a natural choice for XBRL/iXBRL but...

- Requires XML canonicalisation, to ensure that insignificant syntax changes (e.g. attribute order) don't affect signature
- Requires specific XML elements to be excluded
- Requires XML to be modified - a problem for carefully crafted HTML-compatible iXBRL
- Signature covers multiple files, so why embed in a one specific file?
- Not all signed files will be XML, so requires a mix of approaches.

Embed in a container

Put the signature inside another file (e.g. a ZIP file) along with the report, and other signed files.

- Complete files can be signed
  - Simple
  - Works with all file types
- Specific directory can be excluded for placing signatures in.
- We have an existing container - Report Packages!

xBRL

Report Packages 1.0

A brief diversion

Why?

- XBRL reports are often not a single file:
    - Extension taxonomies
    - Images, CSS & fonts for Inline XBRL
    - xBRL-CSV tables + metadata
- Report packages combine report dependencies in a ZIP file
- XBRL tools increasingly take a Report Package as input, making loading reports simpler for users
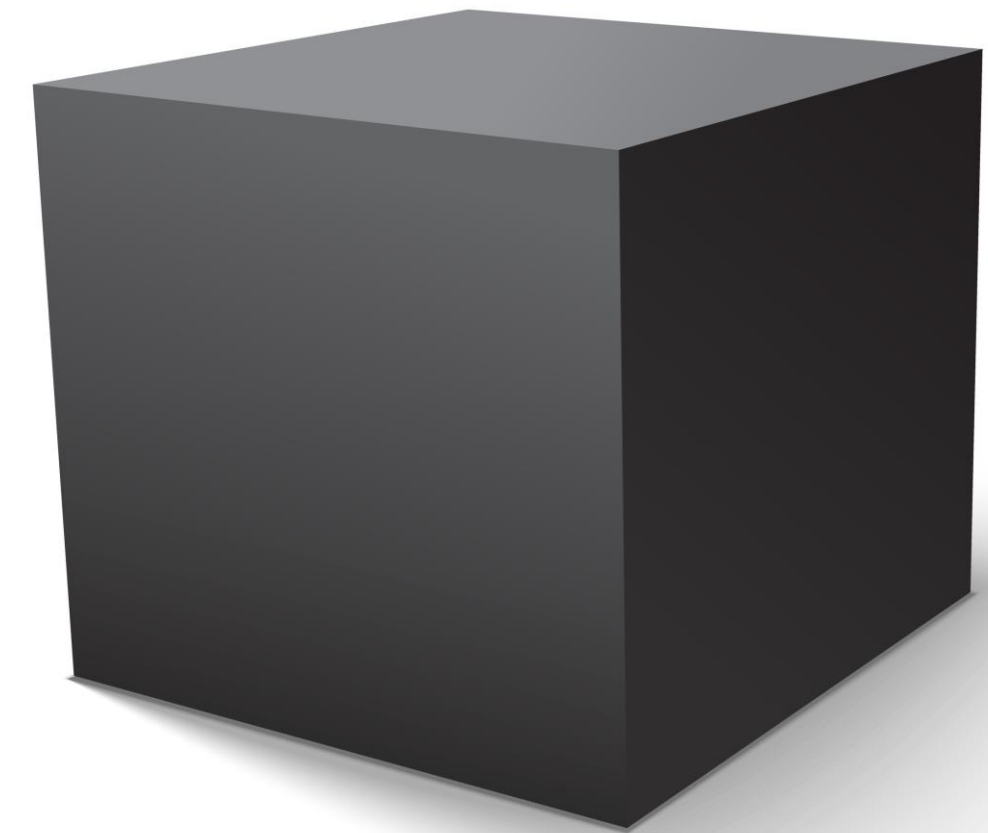
xBRL

Background

- Report Packages currently described by a 2018 Working Group Note
- *WGN is not a formal specification*
- Report Packages in production use in ESEF (based on WGN)
- Specified for use in EBA xBRL-CSV reporting
- Report Packages re-use Taxonomy Package format
- Need to convert to formal specification

xBRL

"Black box" report packages

- Report Packages are specially structured ZIP files
- Report Packages inherited the ".zip" extension from Taxonomy Packages
- Many ESEF reports are invalid because users don't realise the format is important, and modify the files or file structure
- Report Packages should be a "black box" - end users should neither know nor care what is inside them, just like .docx, .xlsx, .jar, etc.
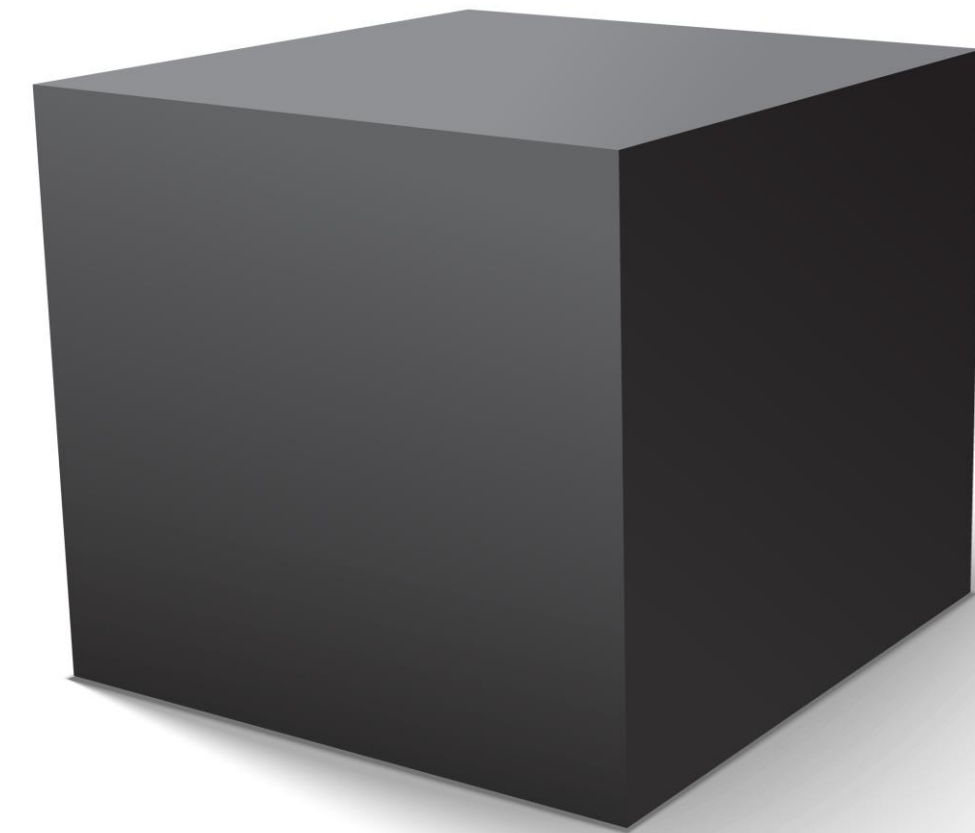
"Black box" report packages

Goal is a change in thinking from:

Report Package contains an XBRL report

to:

*Report Package **is** the XBRL report*

XBRL

Report Packages 1.0

- Formalises Working Group Note
- Removes the requirement for a Report Package to be a Taxonomy Package (useful for xBRL-CSV)
- Introduces new file extensions:
  - **.xbri** - a Report Package containing a single Inline XBRL Report
  - **.xbr** - a Report Package containing a single non-Inline XBRL Report (xBRL-XML, xBRL-CSV, etc)
- **.zip** can still be used for compatibility with existing Working Group Note
- Candidate Recommendation of Report Packages 1.0 ~~imminent~~ published
- Provides an (almost) perfect way to embed signatures in XBRL/iXBRL reports

xBRL

Back to D6

Open issues

Open issues – base taxonomies

- Signature *will* include the extension taxonomy
- Signature *will* include URLs to base taxonomy
- Should signature include *content* of the base taxonomy

Yes - a change to the base taxonomy could invalidate or change the meaning of a report that depends on it, so the any change to the base taxonomy should invalidate the report signature.

No - base taxonomies are managed by trusted authorities who will ensure that any changes do not invalidate or change the meaning of a report. Including the content in the signature would make it unnecessarily difficult to correct errors in a base taxonomy.

xBRL

Open issues – partial signatures

- Do partial signatures need to allow other parts of the document to be modified after signature?
- If not, we can take a much simpler approach of whole-file signatures.

Auditor signs this

Do we need to be able to change this after signing?

xBRL

D6WG Status

- Requirements document published
  - Feedback needed on these and other issues
- Working group starting to look at solutions
- Get involved!
  - Provide feedback on published requirements (specifications.xbrl.org)
  - Join the working group and contribute directly