

# Rules and Results for Verification of Financial Reports from Five Reporting Profiles

By

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This document provides XBRL-based financial report validation results for five different financial report application profiles and all of the rules that were used to achieve the automated validation result. Financial reports were verified using the one software application. A second software application is capable of performing 100% of these same validation tests but currently only supports two of five profiles.

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This document summarizes the results of validating five different XBRL-based financial reports from five different application profiles<sup>1</sup> and four different financial reporting schemes<sup>2</sup>. Each of the reports were validated twice. Validation was performed using the Pesseract working proof of concept software application<sup>3</sup>.

First, reports were verified using an approach where all validation rules were physically connected to the XBRL instance. 100% of all rules are expressed using the XBRL technical syntax. All the rules are provided and available.

Second, reports were verified using an approach where the XBRL instance is probed, the profile of the report is automatically determined using software algorithms, the correct validation rules sets were selected, and the validation processes were run. Again, 100% of the rules were expressed using the XBRL technical syntax. All the rules are available, however which are used are not clearly indicated because they are not directly connected to the XBRL instance.

A second software vendor, XBRL Cloud<sup>4</sup>, can duplicate the validation results for the XASB profile, the US GAAP as submitted to the SEC profile, and the IFRS as submitted to the SEC profile. The other profiles are not supported by the second software vendor. The second software vendor does not support dynamically linked rules, only profile based validation. The second software vendor only provides an API level validation process which results in human-readable output being generated. The second software vendor uses an earlier version of some rules that are not 100% XBRL.

A third test using a command line batch process to run these same validation tests is currently being perfected.

The details of the automated validation processes that were performed are explained in detail in the *Method of Implementing a Standard Digital Financial Report Using the XBRL Syntax*<sup>5</sup>. Examples of the details of validation performed are provided for the Microsoft 2017 10-K report and are available online complements of XBRL Cloud. The following reports are available for review:

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<sup>1</sup> *XBRL-based Digital Financial Reporting Profiles and General Business Reporting Profile*, <http://xbrl.azurewebsites.net/2018/Library/Profiles-2018-10-22.pdf>

<sup>2</sup> *Comparison of Financial Reporting Schemes High Level Concepts*, <http://xbrl.azurewebsites.net/2018/Library/ReportingSchemes-2018-12-30.pdf>

<sup>3</sup> Pesseract, <http://pesseract.azurewebsites.net/> (Note that the currently available version will only validate three of the XBRL-based reports, the newer version which verifies all will be available in about a month.)

<sup>4</sup> XBRL Cloud, <https://www.xbrlcloud.com/>

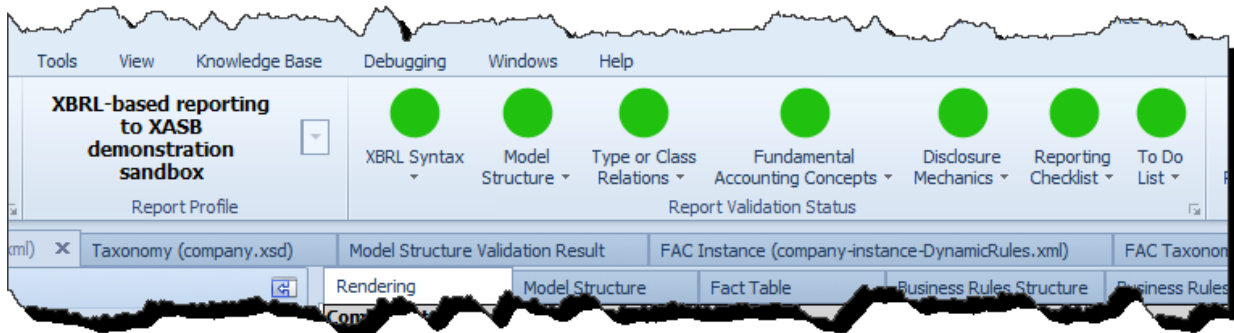
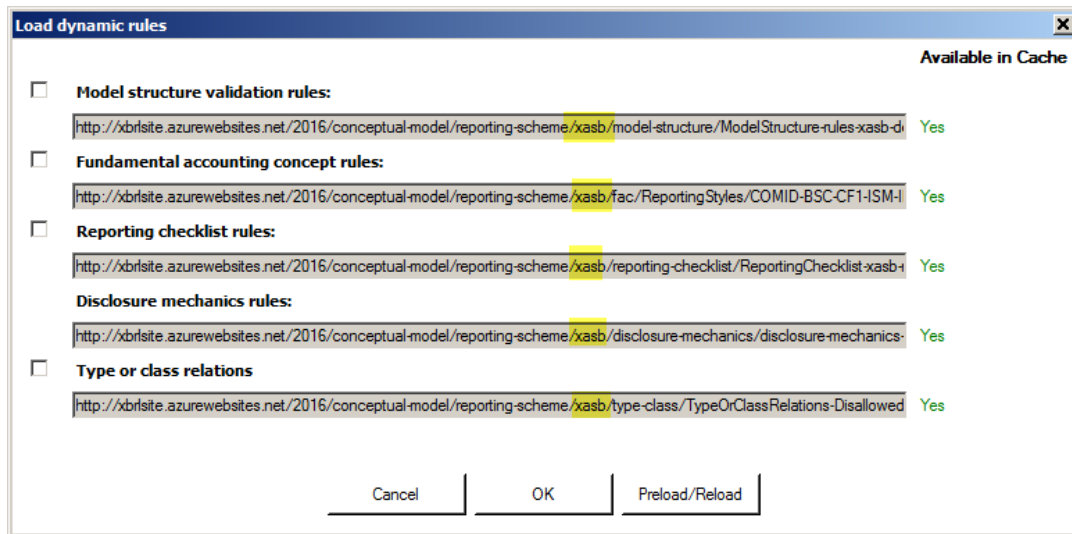
<sup>5</sup> *Method of Implementing a Standard Digital Financial Report Using the XBRL Syntax*, <http://xbrl.squarespace.com/journal/2019/1/11/method-of-implementing-a-standard-digital-financial-report-u.html>



## XASB<sup>11</sup> (Reporting scheme created for testing purposes)

(Connected rules) <http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/taxonomy/company-instance-DynamicRules.xml>

```
<?xml version="1.0" encoding="UTF-8" ...>
<!-- Created by Charles Hoffman, CPA, UBmatrix: 2019-04-18 -->
<xbrl xsi:schemaLocation="http://xbrl.org/2006/xbrldi http://www.xbrl.org/2006/xbrldi-2006.xsd" xmlns:company="http://www.ABCCompany.com/company2" xmlns:gaap="http://xasb.org/gaap"
xmlns:frm="http://www.xbrl.org/2005/frm" xmlns:brn="http://www.xbrl.org/2005/brn" xmlns:iso4217="http://www.xbrl.org/2003/iso4217" xmlns:xbrldi="http://xbrl.org/2006/xbrldi"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:xbrli="http://www.xbrl.org/2003/instance"
xmlns="http://www.xbrl.org/2003/instance">
  <link:schemaRef xlink:href="company.xsd" xlink:type="simple"/>
  <link:linkbaseRef xlink:title="Model structure rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/model-structure/ModelStructure-rules-xasb-def.xml" xlink:type="simple"
  xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
  <link:schemaRef xlink:title="Fundamental accounting concept relations rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/fac/ReportingStyles/COMID-BSC-CF1-ISM-1EMID-OILY-
SPEC6_schema.xsd" xlink:type="simple"/>
  <link:schemaRef xlink:title="Disclosure mechanics rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/disclosure-mechanics/disclosure-mechanics-xasb.xsd" xlink:type="simple"/>
  <link:linkbaseRef xlink:title="Universal rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/reporting-checklist/ReportingChecklist-xasb-rules-def.xml" xlink:type="simple"
  xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
  <link:schemaRef xlink:title="Type or class relations rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/type-class/TypeOrClassRelations-xasb.xsd" xlink:type="simple"/>
  <link:linkbaseRef xlink:title="Reporting style rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/taxonomy/gaap-formula-fundamental-accounting-concepts-reporting-style-BSC-SPEC6-CF1.xml"
  xlink:type="simple" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
  <link:linkbaseRef xlink:title="Economic entity specific rules" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/taxonomy/company-formula.xml" xlink:type="simple"
  xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
  <!-- General Context -->
  <context id="1-2010">
    <!-- Consolidated Group, Current Period, As of -->
    <entity
      identifier="company" http://regulator.gov/id/1234567890 </entity>
  </context>
</xbrl>
```



(Used for profile based validation)

<http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/taxonomy/company-instance.xml>

<sup>11</sup> XASB metadata, [http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/XASB\\_Machine.pdf](http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/xasb/XASB_Machine.pdf)

# IPSAS<sup>12</sup> (International Public Sector Accounting Standards Prototype)

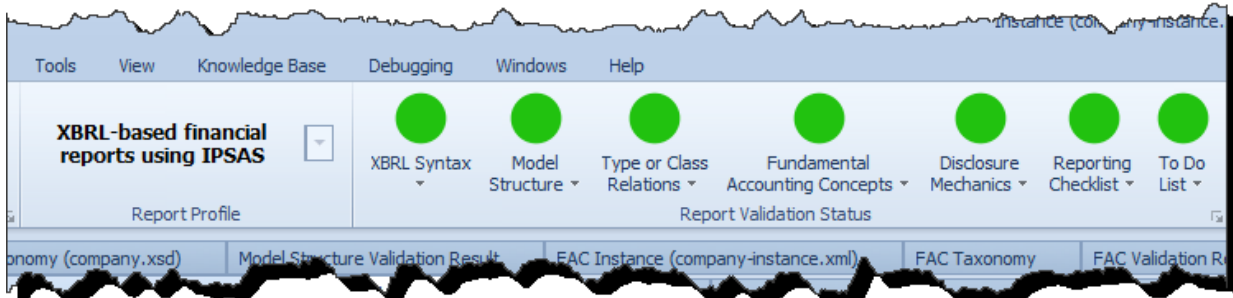
(Connected rules) <http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/taxonomy/company-instance-TestDynamic.xml>

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Created by Charles Hoffman, CPA, UMatrix: 2019-01-30 -->
<xbrl xsi:schemaLocation="http://xbrl.org/2006/xbrldi http://www.xbrl.org/2006/xbrldi-2006.xsd" xmlns:company="http://www.ABCCompany.com/company2" xmlns:ipsas="http://xbrlsite.azurewebsites.net/2019/ipsas"
xmlns:frm="http://www.xbrlsite.com/schemas/frm" xmlns:iso2117="http://www.xbrl.org/2003/iso2117" xmlns:xbrldi="http://xbrl.org/2006/xbrldi" xmlns:xsd="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:stdf="http://www.xbrl.org/2003/instance" xmlns="http://www.xbrl.org/2003/instance">
<link:schemaRef xlink:title="Entity Extension Taxonomy" xlink:href="company.xsd" xlink:type="simple"/>
<link:schemaRef xlink:title="Reporting Styles/IPSAS-BSC-ISFUNC6-SCI1-CF1_schema.xsd" xlink:type="simple"/>
<link:schemaRef xlink:title="Consistency Checks (FAC)" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/fac/ReportingStyles/IPSAS-BSC-ISFUNC6-SCI1-CF1_schema.xsd" xlink:type="simple"/>
<link:schemaRef xlink:title="Disclosure Mechanics" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/disclosure-mechanics-ipsas.xsd" xlink:type="simple"/>
<link:schemaRef xlink:title="Type/Class Relations" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/type-class/TypeOrClassRelations-ipsas.xsd" xlink:type="simple"/>
<link:linkbaseRef xlink:title="Base Taxonomy Rules" xlink:href="ipsas-formula.xml" xlink:type="simple" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Consistency Checks" xlink:href="ipsas-formula-fundamental-accounting-concepts.xml" xlink:type="simple" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Reporting Entity Specific Rules" xlink:href="company-formula.xml" xlink:type="simple" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Model Structure Rules" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/model-structure/ModelStructure-rules-ipsas-def.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Reporting Checklist Rules" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/ReportingChecklist-ipsas-rules-def.xml" xlink:type="simple"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<!-- General Contexts -->
<context id="T-2010">
<!-- Consolidated Group, Current Period, As of -->
<entity>
<identifier scheme="http://regulator.gov/id">1234567890</identifier>
</entity>
</context>
</pre>
```

**Load dynamic rules**

	Available in Cache
<input checked="" type="checkbox"/> <b>Model structure validation rules:</b> <a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/model-structure/ModelStructure-rules-ipsas-c">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/model-structure/ModelStructure-rules-ipsas-c</a>	Yes
<input checked="" type="checkbox"/> <b>Fundamental accounting concept rules:</b> <a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/fac/ReportingStyles/IPSAS-BSC-ISFUNC6-">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/fac/ReportingStyles/IPSAS-BSC-ISFUNC6-</a>	Yes
<input checked="" type="checkbox"/> <b>Reporting checklist rules:</b> <a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/ReportingChecklist-">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/ReportingChecklist-</a>	Yes
<b>Disclosure mechanics rules:</b> <a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/disclosure-mechanics">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/disclosure-mechanics/disclosure-mechanics</a>	Yes
<input checked="" type="checkbox"/> <b>Type or class relations</b> <a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/type-class/TypeOrClassRelations-Disallowec">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/type-class/TypeOrClassRelations-Disallowec</a>	Yes

Cancel    OK    Preload/Reload



(Used for profile based validation)

<http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/taxonomy/company-instance.xml>

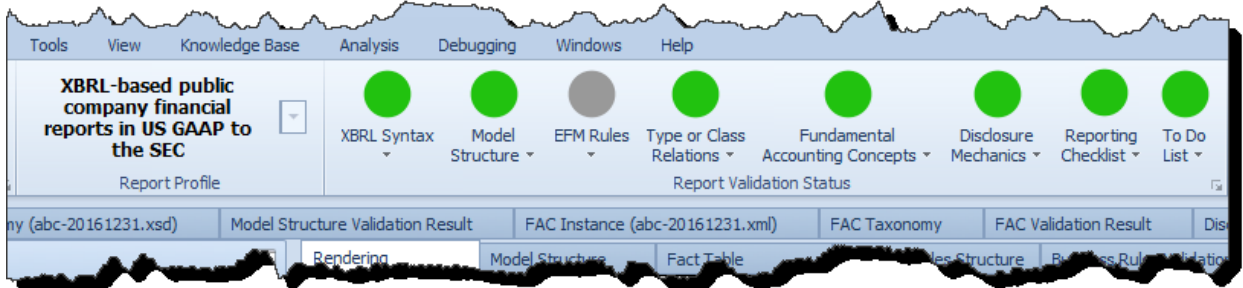
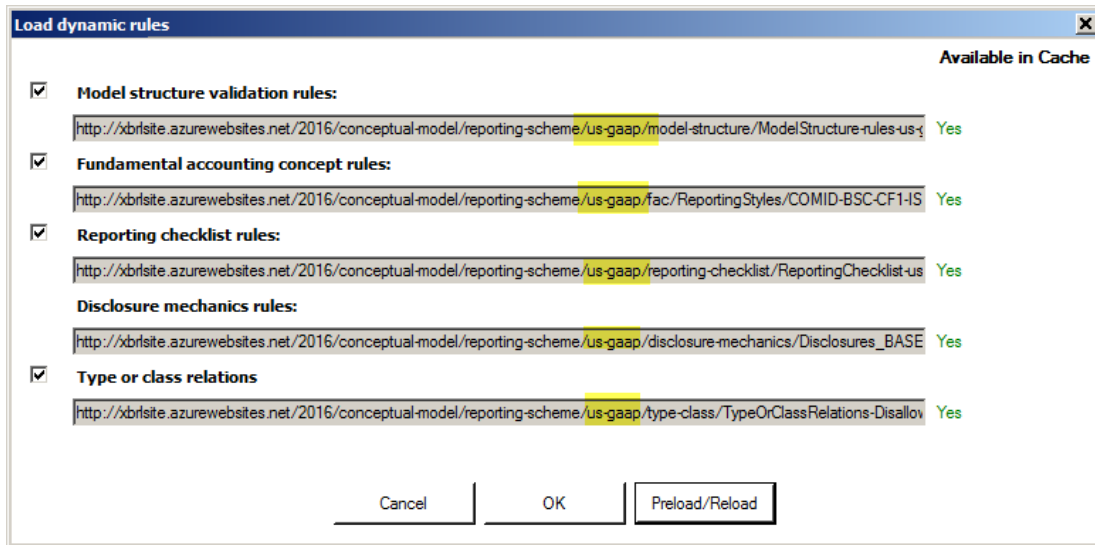
<sup>12</sup> IPSAS metadata, [http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/IPSAS\\_Machine.pdf](http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ipsas/IPSAS_Machine.pdf)

## US GAAP<sup>13</sup> (as submitted to SEC)

(Connected rules)

[http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/ReferenceImplementation/us-gaap/2017-05-07/abc-20161231\\_ExplicitLinksDynamic.xml](http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/ReferenceImplementation/us-gaap/2017-05-07/abc-20161231_ExplicitLinksDynamic.xml)

```
<?xml version="1.0" encoding="utf-8" standalone="no" ?>
<!-- Created by Charles Hoffman, CPE# 2017-04-30 -->
<xbrl xmlns:abc="http://www.abc.com/20161231" xmlns:iso4217="http://www.xbrl.org/2003/iso4217" xmlns:country="http://xbrl.sec.gov/country/2016-01-31" xmlns:del="http://xbrl.sec.gov/del/2014-01-31" xmlns:us-gaap="http://fasb.org/us-gaap/2016-01-31" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xbrldi="http://xbrl.org/2006/xbrldi" xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns="http://www.xbrl.org/2003/instance">
<link:schemaRef xlink:type="simple" xlink:href="abc-20161231.xsd"/>
<link:schemaRef xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/fac/ReportingStyles/COMID-BSC-CF1-ISM-ITEMB-OILY-SPEC_schema.xsd"/>
<link:schemaRef xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/disclosure-mechanics/Disclosures_BASE2.xsd"/>
<link:schemaRef xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/type-class/TypeOrClassRelations-us-gaap.xsd"/>
<link:linkbaseRef xlink:title="FILER Reporting entity specific business rules" xlink:type="simple" xlink:href="abc-20161231_formulas.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="US GAAP Domain level business rules" xlink:type="simple" xlink:href="US-GAAP-CoreFinancialReportsSemantics-V2016.1.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="US GAAP Industry level business rules" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/fac/ReportingStyles/COMID-BSC-CF1-ISM-ITEMB-OILY-SPEC_schema.xsd" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="US GAAP Reportability business rules" xlink:type="simple" xlink:href="US-GAAP-ReportabilitySemantics-V2016.1.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="US GAAP Consistency check business rules" xlink:type="simple" xlink:href="US-GAAP-ConsistencyChecks-V2016.1.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Model structure rules" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/model-structure/ModelStructure-rules-us-gaap-def.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Reporting checklist" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/reporting-checklist/ReportingChecklist-us-gaap-strict-rules-def.xml" xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<context id="1-2013">
<entity>
<identifier scheme="http://www.sec.gov/CIK" 000000001</identifier>
</entity>
</context>
</xbrl>
```



(Used for profile based validation)

<http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/ReferenceImplementation/us-gaap/2017-05-07/abc-20161231.xml>

<sup>13</sup> US GAAP metadata, [http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/US-GAAP\\_Machine.pdf](http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/US-GAAP_Machine.pdf)

## IFRS<sup>14</sup> (as submitted to SEC)

(Connected rules)

[http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/ReferenceImplementation/ifrs/sec/abev-20181231\\_DynamicRules.xml](http://xbrlsite.azurewebsites.net/DigitalFinancialReporting/ReferenceImplementation/ifrs/sec/abev-20181231_DynamicRules.xml)

```
<?xml version="1.0" encoding="UTF-8" instance="http://www.xbrl.org/2003/instance" >
<link:schemaRef xlink:type="simple" xlink:href="abev-20181231.xsd"/>
<link:schemaRef xlink:type="simple" xlink:href="http://www.xbrlsite.com/2018/Prototype/ReportingStylesIFRS2/ReportingStyles/IFRS-BSC-ISFUNC6-SCI1-CF2_schema.xsd"/>
<link:schemaRef xlink:title="Fundamental accounting concept relations rules" xlink:type="simple" xlink:href="http://www.xbrlsite.com/2018/Prototype/ReportingStylesIFRS2/ReportingStyles/IFRS-BSC-ISFUNC6-SCI1-CF2_schema.xsd"/>
<link:schemaRef xlink:title="Disclosure mechanics rules" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/disclosure-mechanics/disclosure-mechanics-ifrs.xsd"/>
<link:schemaRef xlink:title="Type or class relation rules" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/type-class/TypeOrClassRelations-IFRS.xsd"/>
<link:linkbaseRef xlink:title="Model structure rules" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/model-structure/rules-us-gaap-def.xml" >
  <xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Reporting checklist" xlink:type="simple" xlink:href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/reporting-checklist/ReportingChecklist-ifrs-rules-def.xml" >
  <xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
</pre>
```

**Load dynamic rules** [X]

Available in Cache

<input type="checkbox"/>	<b>Model structure validation rules:</b>	
	<a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/model-structure/ModelStructure-rules-us-gaap-def.xml">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/us-gaap/model-structure/ModelStructure-rules-us-gaap-def.xml</a>	Yes
<input checked="" type="checkbox"/>	<b>Fundamental accounting concept rules:</b>	
	<a href="http://www.xbrlsite.com/2018/Prototype/ReportingStylesIFRS2/ReportingStyles/IFRS-BSC-ISFUNC6-SCI1-CF2_schema.xsd">http://www.xbrlsite.com/2018/Prototype/ReportingStylesIFRS2/ReportingStyles/IFRS-BSC-ISFUNC6-SCI1-CF2_schema.xsd</a>	Yes
<input type="checkbox"/>	<b>Reporting checklist rules:</b>	
	<a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/reporting-checklist/ReportingChecklist-ifrs-rules-def.xml">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/reporting-checklist/ReportingChecklist-ifrs-rules-def.xml</a>	Yes
	<b>Disclosure mechanics rules:</b>	
	<a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/disclosure-mechanics/disclosure-mechanics-ifrs.xsd">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/disclosure-mechanics/disclosure-mechanics-ifrs.xsd</a>	Yes
<input type="checkbox"/>	<b>Type or class relations</b>	
	<a href="http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/type-class/TypeOrClassRelations-DisallowedRules-IFRS.xsd">http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/type-class/TypeOrClassRelations-DisallowedRules-IFRS.xsd</a>	Yes

Cancel | OK | Preload/Reload

Tools View Knowledge Base Debugging Windows Help

XBRL-based public company financial reports in IFRS to the SEC

Report Profile

Report Validation Status

- XBRL Syntax
- Model Structure
- EFM Rules
- Type or Class Relations
- Fundamental Accounting Concepts
- Disclosure Mechanics
- Reporting Checklist
- To Do List

(Used for profile based validation)

<https://www.sec.gov/Archives/edgar/data/1565025/000129281419000845/abev-20181231.xml>

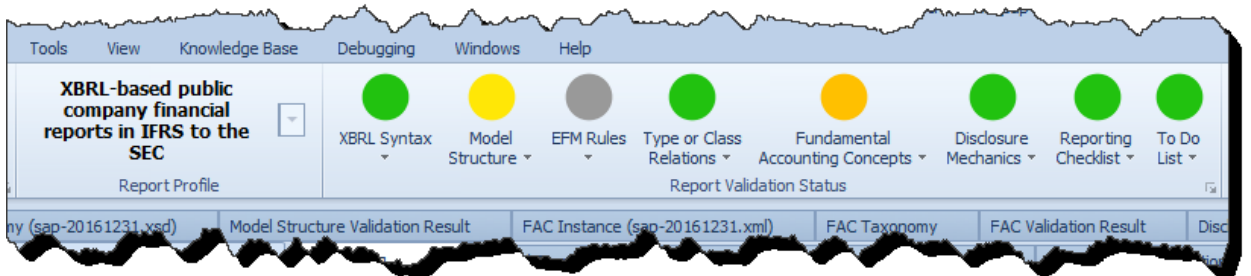
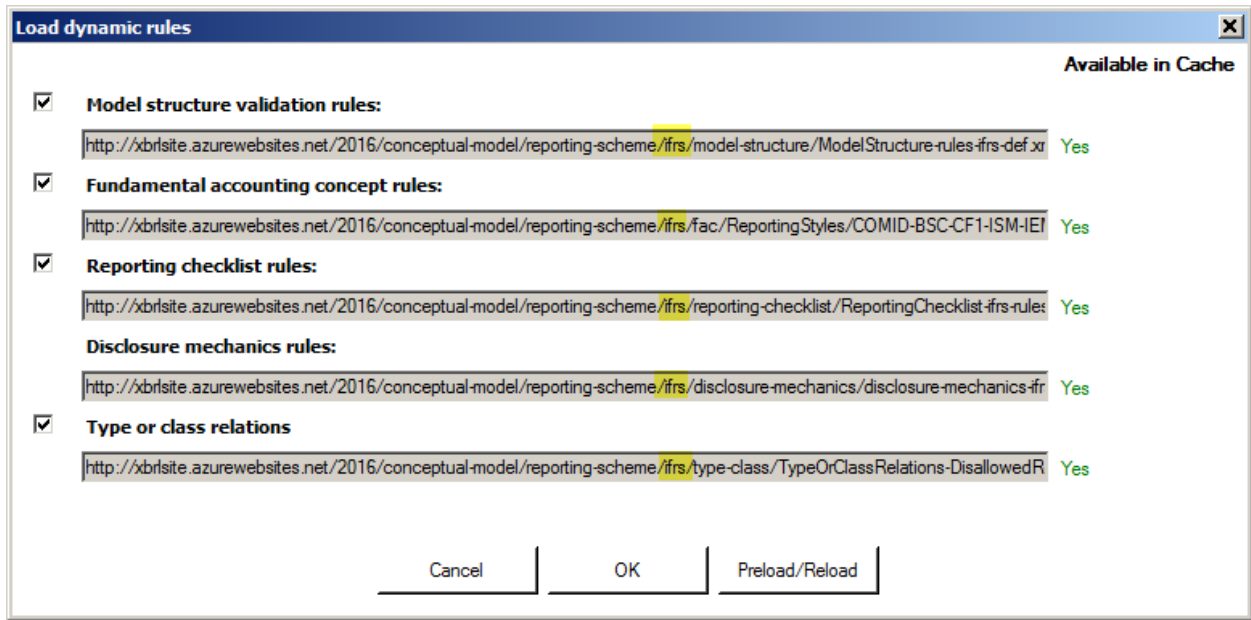
<sup>14</sup> IFRS metadata, [http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/IFRS\\_Machine.pdf](http://xbrlsite.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/IFRS_Machine.pdf)

## IFRS<sup>15</sup> (General)

(Connected rules)

[http://www.xbrl.org/DigitalFinancialReporting/ReferenceImplementationIFRS/2016-12-31/sap/sap-20161231\\_DynamicRules.xml](http://www.xbrl.org/DigitalFinancialReporting/ReferenceImplementationIFRS/2016-12-31/sap/sap-20161231_DynamicRules.xml)

```
<?xml version="1.0" encoding="US-ASCII"?>
<!-- Created with SAP Disclosure Management 10.1 http://www.sap.com -->
<!-- Copyright 2016 SAP SE. All Rights Reserved. -->
<xbrl xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xbrl="http://www.xbrl.org/2003/instance" xmlns:xbrldi="http://xbrl.org/2006/xbrldi"
xmlns:sap="http://www.sap.com/20161231" xmlns:link="http://www.xbrl.org/2003/linkbase" xmlns:iso4217="http://www.xbrl.org/2003/iso4217" xmlns:del="http://xbrl.sec.gov/del/2014-01-31" xmlns="http://www.xbrl.org/2003/instance"
xmlns:ifrs-full="http://xbrl.ifrs.org/taxonomy/2016-03-31/ifrs-full" xmlns:negated="http://www.xbrl.org/2009/negated" xmlns:enum="http://www.xbrl.org/dtr/type/numeric" xmlns:xbrldt="http://xbrl.org/2005/xbrldt"
xmlns:reference="http://www.xbrl.org/2009/role/reference" xmlns:ref="http://www.xbrl.org/2006/ref" xmlns:nonnum="http://www.xbrl.org/dtr/type/non-numeric">
<link:schemaRef xlink:type="simple" xlink:href="sap-20161231.xsd"/>
<link:schemaRef xlink:title="Fundamental accounting concept relations rules" xlink:type="simple" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/fac/ReportingStyles/COMID-BSC-CF1-ISM-IEI-MB-
OILY-SPEC6_schema.xsd"/>
<link:schemaRef xlink:title="Disclosure mechanics rules" xlink:type="simple" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/disclosure-mechanics/disclosure-mechanics-ifrs.xsd"/>
<link:schemaRef xlink:title="Type or class relation rules" xlink:type="simple" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/type-class/TypeOrClassRelations-ifrs.xsd"/>
<link:linkbaseRef xlink:title="Model structure rules" xlink:type="simple" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/model-structure/ModelStructure-rules-ifrs-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<link:linkbaseRef xlink:title="Reporting checklist" xlink:type="simple" xlink:href="http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/reporting-checklist/ReportingChecklist-ifrs-rules-def.xml"
xlink:arcrole="http://www.w3.org/1999/xlink/properties/linkbase"/>
<unit id="EUR">
<measure iso4217="EUR" />
</unit>
<unit id="EPS">
<divide />
</unit>
</xbrl>
```



(Used for profile based validation)

<http://www.xbrl.org/DigitalFinancialReporting/ReferenceImplementationIFRS/2016-12-31/sap/sap-20161231.xml>

<sup>15</sup> IFRS metadata, [http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/IFRS\\_Machine.pdf](http://xbrl.azurewebsites.net/2016/conceptual-model/reporting-scheme/ifrs/IFRS_Machine.pdf)