

The following is an analysis of the mathematical rules that are used to both describe expected mathematical relations and verify the consistency between reported facts and with expected mathematical relations.

**Accounting equation:**

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=5000 = (\$Liabilities=1000 + \$Equity=4000)

The accounting equation representation has one mathematical rule that is used to verify the consistency between three facts of a report.

**SFAC 6 Very Basic example: (Hypercubes not used)**

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
Arithmetic_BS01 (evaluation 2)	satisfied	\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)
Arithmetic_IS01 (evaluation 1)	satisfied	\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)
RollForward_SHE01 (evaluation 1)	satisfied	\$Equity_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity_BalanceEnd=3500

The SFAC 6 very basic representation has three rules (BS01, IS01, SHE01). There are effectively two categories of rules: (1) Roll Forward and (2) other mathematical consistency rules.

Note that the three rules are effectively interrelated with one another making it literally impossible to change one fact value without changing some other fact value:

Balance Sheet [Line Items]	Period [Axis]	
	2020-12-31	2019-12-31
<b>Balance Sheet [Arithmetic Expression]</b>		
Assets	3,500	0
Liabilities	0	0
Equity	3,500	0

Comprehensive Income Statement [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
<b>Comprehensive Income [Roll Up]</b>	
Revenues	7,000
(Expenses)	(3,000)
Gains	1,000
(Losses)	(2,000)
Comprehensive Income	3,000

Changes in Equity [Line Items]	Period [Axis]
	2020-01-01 - 2020-12-31
<b>Changes in Equity [Roll Forward]</b>	
Equity, Beginning Balance	0
Comprehensive Income	3,000
Investments by Owners	1,000
(Distributions to Owners)	(500)
Equity, Ending Balance	3,500

Diagram description: Red arrows show the flow of information. An arrow points from the 'Equity, Ending Balance' (3,500) in the Changes in Equity table to the 'Equity' row in the Balance Sheet table. Another arrow points from the 'Comprehensive Income' (3,000) in the Comprehensive Income Statement table to the 'Comprehensive Income' row in the Changes in Equity table. A third arrow points from the 'Equity, Beginning Balance' (0) in the Changes in Equity table to the 'Equity' row in the Balance Sheet table.

**SFAC 6 example:** (Hypercubes are used to define balance sheet, income statement, and changes in equity structures)

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	$\$Assets=0 = (\$Liabilities=0 + \$Equity=0)$
Arithmetic_BS01 (evaluation 2)	satisfied	$\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)$
Arithmetic_IS01 (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)$
RollForward_SHE01 (evaluation 1)	satisfied	$\$Equity\_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity\_BalanceEnd=3500$

There is no change in rules just because a hypercube is leveraged to represent a structure.

**SFAC 6 PLUS example:** (Hypercubes are used to define structures; multiple different models are provided for certain structures)

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	$\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)$
Arithmetic_BS01 (evaluation 2)	satisfied	$\$Assets=0 = (\$Liabilities=0 + \$Equity=0)$
Arithmetic_CNA01 (evaluation 1)	satisfied	$\$ChangeInNetAssets=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)$
Arithmetic_IS01 (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)$
Arithmetic_NP01 (evaluation 1)	satisfied	$\$NetAssets=3500 = (\$Assets=3500 - \$Liabilities=0)$
Arithmetic_NP01 (evaluation 2)	satisfied	$\$NetAssets=0 = (\$Assets=0 - \$Liabilities=0)$
RollForward_CNP01 (evaluation 1)	satisfied	$\$FundBalance\_BalanceStart=0 + \$ChangeInNetAssets=3000 + \$OtherIncreasesDecreasesInFundBalance=500 = \$FundBalance\_BalanceEnd=3500$
RollForward_SHE01 (evaluation 1)	satisfied	$\$Equity\_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity\_BalanceEnd=3500$
CONSISTENCY_AccountingEquation (evaluation 1)	satisfied	$\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)$
CONSISTENCY_AccountingEquation (evaluation 2)	satisfied	$\$Assets=0 = (\$Liabilities=0 + \$Equity=0)$

No new categories or rules

## Common elements of financial report:

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	$\$Assets=0 = (\$Liabilities=0 + \$Equity=0)$
Arithmetic_BS01 (evaluation 2)	satisfied	$\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)$
Arithmetic_BS02 (evaluation 1)	satisfied	$\$Assets=0 = (\$CurrentAssets=0 + \$NoncurrentAssets=0)$
Arithmetic_BS02 (evaluation 2)	satisfied	$\$Assets=3500 = (\$CurrentAssets=500 + \$NoncurrentAssets=3000)$
Arithmetic_BS03 (evaluation 1)	satisfied	$\$Liabilities=0 = (\$CurrentLiabilities=0 + \$NoncurrentLiabilities=0)$
Arithmetic_BS03 (evaluation 2)	satisfied	$\$Liabilities=0 = (\$CurrentLiabilities=0 + \$NoncurrentLiabilities=0)$
Arithmetic_BS04 (evaluation 1)	satisfied	$\$Equity=0 = (\$EquityAttributableToControllingInterests=0 + \$EquityAttributableToNoncontrollingInterests=0)$
Arithmetic_BS04 (evaluation 2)	satisfied	$\$Equity=3500 = (\$EquityAttributableToControllingInterests=3000 + \$EquityAttributableToNoncontrollingInterests=500)$
Arithmetic_CF01 (evaluation 1)	satisfied	$\$NetCashFlow=3500 = (\$NetCashFlowOperatingActivities=1500 + \$NetCashFlowFinancingActivities=1000 + \$NetCashFlowInvestingActivities=1000)$
Arithmetic_IS01 (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)$
Arithmetic_IS02 (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$IncomeFromNormalActivitiesOfEntity=2000 + \$IncomeFromPeripheralOrIncidentalTransactionsOfEntity=1000)$
Arithmetic_IS03 (evaluation 1)	satisfied	$\$ComprehensiveIncome=3000 = (\$NetIncome=3000 + \$OtherComprehensiveIncome=0)$
Arithmetic_NA01 (evaluation 1)	satisfied	$\$NetAssets=3500 = (\$Assets=3500 - \$Liabilities=0)$
Arithmetic_NA01 (evaluation 2)	satisfied	$\$NetAssets=0 = (\$Assets=0 - \$Liabilities=0)$
RollForward_CF01 (evaluation 1)	satisfied	$\$Assets\_BalanceStart=0 + \$NetCashFlow=3500 = \$Assets\_BalanceEnd=3500$
RollForward_SHE01 (evaluation 1)	satisfied	$\$Equity\_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity\_BalanceEnd=3500$
CONSISTENCY_AccountingEquation (evaluation 1)	satisfied	$\$Assets=0 = (\$Liabilities=0 + \$Equity=0)$
CONSISTENCY_AccountingEquation (evaluation 2)	satisfied	$\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)$
CONSISTENCY_SFAC6_ElementsOfFinancialStatement (evaluation 1)	satisfied	$0 = ((\$Equity\_BalanceStart=0 + ((\$Revenues=7000 - \$Expenses=3000) + (\$Gains=1000 - \$Losses=2000))) + (\$InvestmentsByOwners=1000 - \$DistributionsToOwners=500)) + (\$Liabilities\_BalanceEnd=0 - \$Assets\_BalanceEnd=3500)$

Balance Sheet [Line Items]		Period [Axis]	
		2020-12-31	2019-12-31
<b>Assets [Roll Up]</b>			
Current Assets		500	0
Noncurrent Assets		3,000	0
	Assets	3,500	0
<b>Liabilities and Equity [Roll Up]</b>			
<b>Liabilities [Roll Up]</b>			
Current Liabilities		0	0
Noncurrent Liabilities		0	0
	Liabilities	0	0
<b>Equity [Roll Up]</b>			
Equity Attributable To Controlling Interests		3,000	0
Equity Attributable to Noncontrolling Interests		500	0
	Equity	3,500	0
	Liabilities and Equity	3,500	0

Cash Flow [Line Items]		Period [Axis]	
		2020-01-01 - 2020-12-31	
<b>Net Cash Flow [Roll Up]</b>			
Net Cash Flow Operating Activities		1,500	
Net Cash Flow Investing Activities		1,000	
Net Cash Flow Financing Activities		1,000	
	Net Cash Flow	3,500	

Changes in Equity [Line Items]		Period [Axis]	
		2020-01-01 - 2020-12-31	
<b>Changes in Equity [Roll Forward]</b>			
Equity, Beginning Balance		0	
Comprehensive Income		3,000	
Investments by Owners		1,000	
(Distributions to Owners)		(500)	
	Equity, Ending Balance	3,500	

Comprehensive Income Statement [Line Items]		Period [Axis]	
		2020-01-01 - 2020-12-31	
<b>Comprehensive Income [Roll Up]</b>			
Revenues		7,000	
(Expenses)		(3,000)	
Gains		1,000	
(Losses)		(2,000)	
	Comprehensive Income	3,000	

Note that rules are interrelated with one another connecting all four structures into one interconnected system.

**Proof:**

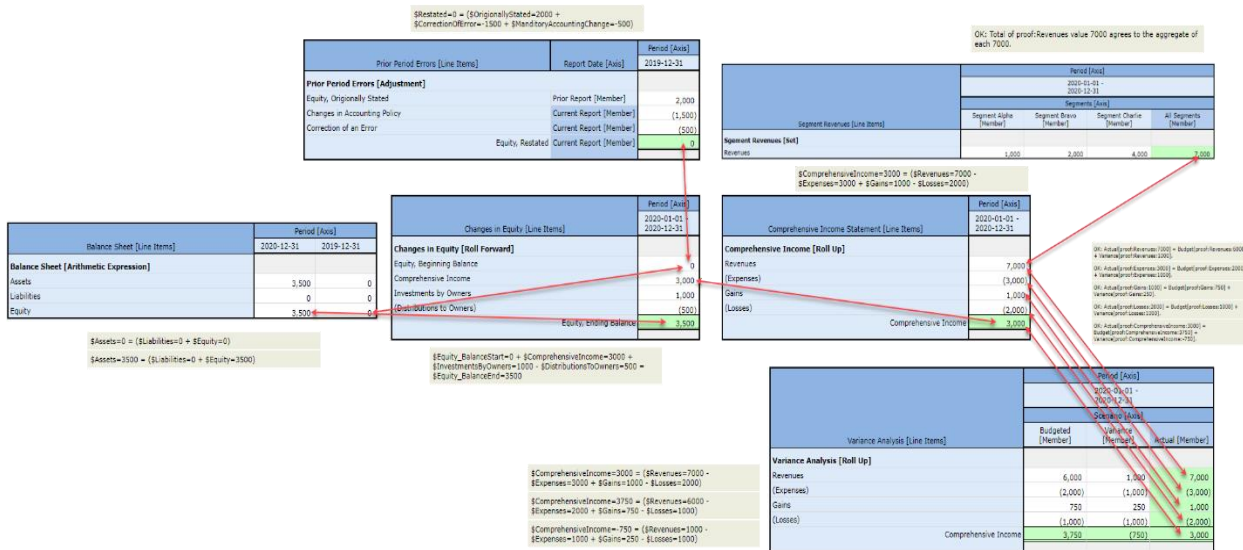
**Summary**

Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	12	16	16	0

**Assertion Report**

**Value Assertions**

id	satisfied	message
Adjustment_ADJ01 (evaluation 1)	satisfied	\$Restated=0 = (\$OriginallyStated=2000 + \$CorrectionOfAnError=-500 + \$ChangesInAccountingPolicy=-1500)
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)
Arithmetic_BS01 (evaluation 2)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
Arithmetic_IS01 (evaluation 1)	satisfied	\$ComprehensiveIncome=3750 = (\$Revenues=6000 - \$Expenses=2000 + \$Gains=750 - \$Losses=1000)
Arithmetic_IS01 (evaluation 2)	satisfied	\$ComprehensiveIncome=3000 = (\$Revenues=7000 - \$Expenses=3000 + \$Gains=1000 - \$Losses=2000)
Arithmetic_IS01 (evaluation 3)	satisfied	\$ComprehensiveIncome=-750 = (\$Revenues=1000 - \$Expenses=1000 + \$Gains=250 - \$Losses=1000)
MemberAggregation_MA1 (evaluation 1)	satisfied	\$Total=7000 eq sum(\$Each=[2000 4000 1000 ])
RollForward_SHE01 (evaluation 1)	satisfied	\$Equity_BalanceStart=0 + \$ComprehensiveIncome=3000 + \$InvestmentsByOwners=1000 - \$DistributionsToOwners=500 = \$Equity_BalanceEnd=3500
Variance_VAR01 (evaluation 1)	satisfied	\$Actual=7000 = (\$Budget=6000 + \$Variance=1000)
Variance_VAR02 (evaluation 1)	satisfied	\$Actual=3000 = (\$Budget=2000 + \$Variance=1000)
Variance_VAR03 (evaluation 1)	satisfied	\$Actual=1000 = (\$Budget=750 + \$Variance=250)
Variance_VAR04 (evaluation 1)	satisfied	\$Actual=2000 = (\$Budget=1000 + \$Variance=1000)
Variance_VAR05 (evaluation 1)	satisfied	\$Actual=3000 = (\$Budget=3750 + \$Variance=-750)
CONSISTENCY_AccountingEquation (evaluation 1)	satisfied	\$Assets=3500 = (\$Liabilities=0 + \$Equity=3500)
CONSISTENCY_AccountingEquation (evaluation 2)	satisfied	\$Assets=0 = (\$Liabilities=0 + \$Equity=0)
CONSISTENCY_SFAC6_ElementsOfFinancialStatement (evaluation 1)	satisfied	0 = ((\$Equity_BalanceStart=0 + ((\$Revenues=7000 - \$Expenses=3000) + (\$Gains=1000 - \$Losses=2000)) + (\$InvestmentsByOwners=1000 - \$DistributionsToOwners=500)) + (\$Liabilities_BalanceEnd=0 - \$Assets_BalanceEnd=3500))



Note that rules are again interconnected. Note that three additional categories of rules are added (Adjustment, Variance, Member aggregation) in order to round out all rule patterns that exist in financial reports.

## Trial balance:

XBRL Formula: [http://xbrlsite.azurewebsites.net/2020/master/tb/ XPE\\_instance.xml Formula.html](http://xbrlsite.azurewebsites.net/2020/master/tb/ XPE_instance.xml Formula.html)

### Summary

Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	15	18	18	0

### Assertion Report

#### Value Assertions

id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=13000 = (\$Liabilities=7000 + \$Equity=6000)
Arithmetic_BS01 (evaluation 2)	satisfied	\$Assets=6000 = (\$Liabilities=2000 + \$Equity=4000)
Arithmetic_BS02 (evaluation 1)	satisfied	\$Assets=13000 = (\$CurrentAssets=7000 + \$NoncurrentAssets=6000)
Arithmetic_BS02 (evaluation 2)	satisfied	\$Assets=6000 = (\$CurrentAssets=5000 + \$NoncurrentAssets=1000)
Arithmetic_BS03 (evaluation 1)	satisfied	\$Liabilities=7000 = (\$CurrentLiabilities=1000 + \$NoncurrentLiabilities=6000)
Arithmetic_BS03 (evaluation 2)	satisfied	\$Liabilities=2000 = (\$CurrentLiabilities=1000 + \$NoncurrentLiabilities=1000)
Arithmetic_CF01 (evaluation 1)	satisfied	\$NetCashFlow=1000 = (\$NetCashFlowOperatingActivities=1000 + \$NetCashFlowFinancingActivities=5000 + \$NetCashFlowInvestingActivities=-5000)
Arithmetic_IS01 (evaluation 1)	satisfied	\$GrossProfit=2000 = (\$Sales=4000 - \$CostOfSales=2000)
Arithmetic_IS02 (evaluation 1)	satisfied	\$OperatingIncomeLoss=2000 = (\$GrossProfit=2000 - \$OperatingExpenses=0)
RollForward_RF1 (evaluation 1)	satisfied	\$CashAndCashEquivalents_BalanceStart=3000 + \$NetCashFlow=1000 = \$CashAndCashEquivalents_BalanceEnd=4000
RollForward_RF2 (evaluation 1)	satisfied	\$Equity_BalanceStart=4000 + \$NetIncomeLoss=2000 = \$Equity_BalanceEnd=6000
RollForward_RF3 (evaluation 1)	satisfied	\$CashAndCashEquivalents_BalanceStart=3000 + \$CollectionReceivables=3000 - \$PaymentOfAccountsPayable=2000 + \$AdditionalLongtermBorrowings=6000 - \$RepaymentLongtermBorrowings=1000 - \$CapitalAdditionsPropertyPlantAndEquipment=5000 = \$CashAndCashEquivalents_BalanceEnd=4000
RollForward_RF4 (evaluation 1)	satisfied	\$Receivables_BalanceStart=1000 + \$Sales=4000 - \$CollectionReceivables=3000 - \$AdditionsToAllowanceForBadDebts=0 - \$BadDebtsWrittenOff=0 = \$Receivables_BalanceEnd=2000
RollForward_RF5 (evaluation 1)	satisfied	\$Inventories_BalanceStart=1000 + \$PurchasesOfInventoryForSale=2000 - \$CostsOfSales=2000 - \$InventoryWrittenOff=0 = \$Inventories_BalanceEnd=1000
RollForward_RF6 (evaluation 1)	satisfied	\$PropertyPlantAndEquipment_BalanceStart=1000 + \$CapitalAdditionsPropertyPlantAndEquipment=5000 - \$DepreciationAndAmortization=0 - \$PropertyPlantAndEquipmentWrittenOff=0 = \$PropertyPlantAndEquipment_BalanceEnd=6000
RollForward_RF7 (evaluation 1)	satisfied	\$AccountsPayable_BalanceStart=1000 + \$PurchasesOfInventoryForSale=2000 - \$PaymentOfAccountsPayable=2000 = \$AccountsPayable_BalanceEnd=1000
RollForward_RF8 (evaluation 1)	satisfied	\$LongtermDebt_BalanceStart=1000 + \$AdditionalLongtermBorrowings=6000 - \$RepaymentLongtermBorrowings=1000 = \$LongtermDebt_BalanceEnd=6000
RollForward_RF9 (evaluation 1)	satisfied	\$RetainedEarnings_BalanceStart=4000 + \$NetIncomeLoss=2000 = \$RetainedEarnings_BalanceEnd=6000

## XBRL Calculations:

[http://xbrlsite.azurewebsites.net/2020/master/tb/ XPE\\_instance.xml Calculations.html](http://xbrlsite.azurewebsites.net/2020/master/tb/ XPE_instance.xml Calculations.html)

Line	Concept	Weight	Balance	Decimals	Precision	Reported	Calculated	Source	Message
1	Extended Link [ http://www.xbrlsite.com/tb/role/BalanceSheet ]								
2	Context 1-2017 [ 2017-12-31 - ]								
	c=equal								
3	Unit U-U-Monetary								
	u=equal								
	Assets		debit	INF	INF	6000	6,000	Instance	OK
	Current Assets	1.0	debit	INF	INF	5000	5,000	Instance	OK
	Cash and Cash Equivalents	1.0	debit	INF		3000	3,000	Instance	
	Receivables	1.0	debit	INF		1000	1,000	Instance	
	Inventories	1.0	debit	INF		1000	1,000	Instance	
	Noncurrent Assets	1.0	debit	INF	INF	1000	1,000	Instance	OK
	Propertv. Plant and Equipment	1.0	debit	INF		1000	1,000	Instance	
	Liabilities and Equity		credit	INF	INF	6000	6,000	Instance	OK
	Liabilities	1.0	credit	INF	INF	2000	2,000	Instance	OK

## MINI financial reporting scheme:

XBRL Formula: [http://xbrlsite.azurewebsites.net/2020/master/mini/reference-implementation/XPE\\_FormulaTrace.html](http://xbrlsite.azurewebsites.net/2020/master/mini/reference-implementation/XPE_FormulaTrace.html)

### Summary

Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	19	24	24	0

### Assertion Report

#### Value Assertions

id	satisfied	message
REPORT_Balances_BalanceSheet (evaluation 1)	satisfied	\$Total_Assets=13000 = \$Total_LiabilitiesAndEquity=13000
REPORT_Balances_BalanceSheet (evaluation 2)	satisfied	\$Total_Assets=6000 = \$Total_LiabilitiesAndEquity=6000
REPORT_RollForwardReconciles_CashFlowStatement (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=3000 + \$NetCashFlow=1000 = \$VARIABLE_BalanceEnd=4000
REPORT_RollForwardReconciles_StatementOfChangesInEquity (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=4000 + \$VARIABLE_Change1=2000 = \$VARIABLE_BalanceEnd=6000
REPORT_RollForwardReconciles_CashAndCashEquivalents (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=3000 + \$CollectionReceivables=3000 - \$PaymentOfAccountsPayable=2000 + \$AdditionalLongtermBorrowings=6000 - \$RepaymentLongtermBorrowings=1000 - \$CapitalAdditionsPropertyPlantAndEquipment=5000 = \$VARIABLE_BalanceEnd=4000
REPORT_RollForwardReconciles_Receivables (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=1000 + \$Sales=4000 - \$CollectionReceivables=3000 - \$AdditionsToAllowanceForBadDebts=0 - \$BadDebtsWrittenOff=0 = \$VARIABLE_BalanceEnd=2000
REPORT_RollForwardReconciles_Inventories (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=1000 + \$PurchasesOfInventoryForSale=2000 - \$CostsOfSales=2000 - \$InventoryWrittenOff=0 = \$VARIABLE_BalanceEnd=1000
REPORT_RollForwardReconciles_PropertyPlantAndEquipment (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=1000 + \$CapitalAdditionsPropertyPlantAndEquipment=5000 - \$DepreciationAndAmortization=0 - \$PropertyPlantAndEquipmentWrittenOff=0 = \$VARIABLE_BalanceEnd=6000
REPORT_RollForwardReconciles_AccountsPayable (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=1000 + \$PurchasesOfInventoryForSale=2000 - \$PaymentOfAccountsPayable=2000 = \$VARIABLE_BalanceEnd=1000
REPORT_RollForwardReconciles_LongTermDebt (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=1000 + \$AdditionalLongtermBorrowings=6000 - \$RepaymentLongtermBorrowings=1000 = \$VARIABLE_BalanceEnd=6000
REPORT_RollForwardReconciles_RetainedEarnings (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=4000 + \$VARIABLE_Change1=2000 = \$VARIABLE_BalanceEnd=6000
FAC_BS1_BalanceSheetBalances (evaluation 1)	satisfied	\$Assets=13000 = \$LiabilitiesAndEquity=13000
FAC_BS1_BalanceSheetBalances (evaluation 2)	satisfied	\$Assets=6000 = \$LiabilitiesAndEquity=6000
FAC_BS2_AssetsEqualsCurrentPlusNoncurrentAssets (evaluation 1)	satisfied	\$Assets=13000 = \$AssetsCurrent=7000 + \$AssetsNoncurrent=6000
FAC_BS2_AssetsEqualsCurrentPlusNoncurrentAssets (evaluation 2)	satisfied	\$Assets=6000 = \$AssetsCurrent=5000 + \$AssetsNoncurrent=1000
FAC_BS3_LiabilitiesEqualsCurrentPlusNoncurrentLiabilities (evaluation 1)	satisfied	\$Liabilities=7000 = \$LiabilitiesCurrent=1000 + \$LiabilitiesNoncurrent=6000
FAC_BS3_LiabilitiesEqualsCurrentPlusNoncurrentLiabilities (evaluation 2)	satisfied	\$Liabilities=2000 = \$LiabilitiesCurrent=1000 + \$LiabilitiesNoncurrent=1000
FAC_BS4_LiabilitiesAndEquityEqualsLiabilitiesPlusEquity (evaluation 1)	satisfied	\$LiabilitiesAndEquity=13000 = \$Liabilities=7000 + \$Equity=6000
FAC_BS4_LiabilitiesAndEquityEqualsLiabilitiesPlusEquity (evaluation 2)	satisfied	\$LiabilitiesAndEquity=6000 = \$Liabilities=2000 + \$Equity=4000
FAC_IS1_GrossProfitFoots (evaluation 1)	satisfied	\$GrossProfitLoss=2000 = (\$RevenuesNet=4000 - \$CostOfSales=2000)
FAC_IS2_OperatingIncomeFoots (evaluation 1)	satisfied	\$OperatingIncomeLoss=2000 = (\$GrossProfitLoss=2000 - \$OperatingExpenses=0)
FAC_IS3_IncomeLossFromContinuingOperationsBeforeTaxFoots (evaluation 1)	satisfied	\$IncomeLossFromContinuingOperationsBeforeTax=2000 = (\$OperatingIncomeLoss=2000 - \$NonoperatingIncomeExpenses=0)
FAC_IS4_NetIncomeLossFoots (evaluation 1)	satisfied	\$NetIncomeLoss=2000 = (\$IncomeLossFromContinuingOperationsBeforeTax=2000 - \$IncomeTaxExpenseBenefit=0)
FAC_CFI_NetCashFlowEqualsOperatingInvestingAndFinancing (evaluation 1)	satisfied	\$CashFlowNet=1000 = \$CashFlowProvidedByUsedInOperatingActivitiesNet=1000 + \$CashFlowsProvidedByUsedInInvestingActivitiesNet=5000 + \$CashFlowsProvidedByUsedInFinancingActivitiesNet=-5000

XBRL Calculations: [http://xbrlsite.azurewebsites.net/2020/master/mini/reference-implementation/XPE\\_Calctrace.html](http://xbrlsite.azurewebsites.net/2020/master/mini/reference-implementation/XPE_Calctrace.html)

Line	Concept	Weight	Balance	Decimals	Precision	Reported	Calculated	Source	Message
1	Extended Link [ <a href="http://www.company1.com/company1/role/level4/AccountsPayableDetail">http://www.company1.com/company1/role/level4/AccountsPayableDetail</a> ]								
2	Context I-2018 [ 2018-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	Accounts Payable		credit	INF	INF	1000	1,000	Instance	OK
	Trade Payables	1.0	credit	INF		700	700	Instance	
	Other Payables	1.0	credit	INF		300	300	Instance	
2	Context I-2017 [ 2017-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	Accounts Payable		credit	INF	INF	1000	1,000	Instance	OK
	Trade Payables	1.0	credit	INF		700	700	Instance	
	Other Payables	1.0	credit	INF		300	300	Instance	
1	Extended Link [ <a href="http://www.company1.com/company1/role/level4/BalanceSheet">http://www.company1.com/company1/role/level4/BalanceSheet</a> ]								
2	Context I-2018 [ 2018-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	Assets		debit	INF	INF	13000	13,000	Instance	OK
	Current Assets	1.0	debit	INF	INF	7000	7,000	Instance	OK
	Cash and Cash Equivalents	1.0	debit	INF		4000	4,000	Instance	
	Receivables	1.0	debit	INF		2000	2,000	Instance	
	Inventories	1.0	debit	INF		1000	1,000	Instance	
	Noncurrent Assets	1.0	debit	INF	INF	6000	6,000	Instance	OK
	Property, Plant and Equipment	1.0	debit	INF		6000	6,000	Instance	
	Liabilities and Equity		credit	INF	INF	13000	13,000	Instance	OK

**XASB financial reporting scheme:**

XBRL Formula: [http://xbrl.azurewebsites.net/2020/reporting-scheme/xasb/reference-implementation/FormulaTrace\\_XPE.html](http://xbrl.azurewebsites.net/2020/reporting-scheme/xasb/reference-implementation/FormulaTrace_XPE.html)

Summary					
Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	46	91	91	0

Assertion Report		
Value Assertions		
id	satisfied	message
ASSERTION_GAAP_Equality_BA-Part-1_BalanceSheetFoots (evaluation 1)	satisfied	\$VARIABLE_A=12000000 = \$VARIABLE_B=12000000
ASSERTION_GAAP_Equality_BA-Part-1_BalanceSheetFoots (evaluation 2)	satisfied	\$VARIABLE_A=10000000 = \$VARIABLE_B=10000000
FAC_BS1_BalanceSheetBalances (evaluation 1)	satisfied	\$Assets=12000000 = \$LiabilitiesAndEquity=12000000
FAC_BS1_BalanceSheetBalances (evaluation 2)	satisfied	\$Assets=10000000 = \$LiabilitiesAndEquity=10000000
FAC_BS2_AssetsEqualsCurrentPlusNoncurrentAssets (evaluation 1)	satisfied	\$Assets=12000000 = \$AssetsCurrent=5000000 + \$AssetsNoncurrent=7000000
FAC_BS2_AssetsEqualsCurrentPlusNoncurrentAssets (evaluation 2)	satisfied	\$Assets=10000000 = \$AssetsCurrent=5000000 + \$AssetsNoncurrent=5000000
FAC_BS3_LiabilitiesEqualsCurrentPlusNoncurrentLiabilities (evaluation 1)	satisfied	\$Liabilities=6000000 = \$LiabilitiesCurrent=5000000 + \$LiabilitiesNoncurrent=1000000
FAC_BS3_LiabilitiesEqualsCurrentPlusNoncurrentLiabilities (evaluation 2)	satisfied	\$Liabilities=6000000 = \$LiabilitiesCurrent=5000000 + \$LiabilitiesNoncurrent=1000000
FAC_BS4_LiabilitiesAndEquityEqualsLiabilitiesPlusEquity (evaluation 1)	satisfied	\$LiabilitiesAndEquity=12000000 = \$Liabilities=6000000 + \$Equity=6000000
FAC_BS4_LiabilitiesAndEquityEqualsLiabilitiesPlusEquity (evaluation 2)	satisfied	\$LiabilitiesAndEquity=10000000 = \$Liabilities=6000000 + \$Equity=4000000
FAC_IS1_GrossProfitFoots (evaluation 1)	satisfied	\$GrossProfitLoss=3000000 = (\$RevenuesNet=4000000 - \$CostOfSales=1000000)
FAC_IS1_GrossProfitFoots (evaluation 2)	satisfied	\$GrossProfitLoss=-1000000 = (\$RevenuesNet=5000000 - \$CostOfSales=6000000)
FAC_IS1_GrossProfitFoots (evaluation 3)	satisfied	\$GrossProfitLoss=3006000 = (\$RevenuesNet=4005000 - \$CostOfSales=999000)
FAC_IS1_GrossProfitFoots (evaluation 4)	satisfied	\$GrossProfitLoss=6000 = (\$RevenuesNet=5000 - \$CostOfSales=-1000)
FAC_IS2_OperatingIncomeLossFoots (evaluation 1)	satisfied	\$OperatingIncomeLoss=3000000 = (\$GrossProfitLoss=3000000 - \$OperatingExpenses=1000000 + \$OtherOperatingIncome=1000000)
FAC_IS2_OperatingIncomeLossFoots (evaluation 2)	satisfied	\$OperatingIncomeLoss=-1000000 = (\$GrossProfitLoss=-1000000 - \$OperatingExpenses=1000000 + \$OtherOperatingIncome=1000000)
FAC_IS3_IncomeLossFromContinuingOperationsBeforeTaxFoots (evaluation 1)	satisfied	\$IncomeLossFromContinuingOperationsBeforeIncomeTaxes=1000000 = (\$OperatingIncomeLoss=3000000 + \$NonoperatingIncomeLoss=-2000000)
FAC_IS3_IncomeLossFromContinuingOperationsBeforeTaxFoots (evaluation 2)	satisfied	\$IncomeLossFromContinuingOperationsBeforeIncomeTaxes=-3000000 = (\$OperatingIncomeLoss=-1000000 + \$NonoperatingIncomeLoss=-2000000)
FAC_IS4_IncomeLossFromContinuingOperationsAfterTaxFoots (evaluation 1)	satisfied	\$IncomeLossFromContinuingOperations=500000 = (\$IncomeLossFromContinuingOperationsBeforeIncomeTaxes=1000000 - \$IncomeTaxExpenseBenefit=500000)

XBRL Calculation: [http://xbrl.azurewebsites.net/2020/reporting-scheme/xasb/reference-implementation/Calctrace\\_XPE.html](http://xbrl.azurewebsites.net/2020/reporting-scheme/xasb/reference-implementation/Calctrace_XPE.html)

Line	Concept	Weight	Balance	Decimals	Precision	Reported	Calculated	Source	Message
1	Extended Link [ http://www.ABCCompany.com/company/role/level4/BalanceSheetSchedule ]								
2	Context I-2020 [ 2020-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	<b>Assets</b>		debit	INF	INF	12000000	12,000,000	Instance	OK
	<b>Assets, Current</b>	1.0	debit	INF	INF	5000000	5,000,000	Instance	OK
	Cash and Cash Equivalents	1.0	debit	INF		1000000	1,000,000	Instance	
	Receivables, Net, Current	1.0	debit	INF		1000000	1,000,000	Instance	
	Inventory	1.0	debit	INF		1000000	1,000,000	Instance	
	Prepaid Expenses	1.0	debit	INF		500000	500,000	Instance	
	Investments, at Cost	1.0	debit	INF		500000	500,000	Instance	
	Other Assets, Current	1.0	debit	INF		1000000	1,000,000	Instance	
	<b>Assets, Noncurrent</b>	1.0	debit	INF	INF	7000000	7,000,000	Instance	OK
	<b>Property, Plant and Equipment, Net</b>	1.0	debit	INF	INF	4000000	4,000,000	Instance	OK
	Land	1.0	debit	INF		1000000	1,000,000	Instance	
	Buildings, Net	1.0	debit	INF		1000000	1,000,000	Instance	
	Furniture and Fixtures, Net	1.0	debit	INF		1000000	1,000,000	Instance	
	Other Property, Plant, and Equipment, Net	1.0	debit	INF		1000000	1,000,000	Instance	
	Investment in Affiliates	1.0	debit	INF		0	0	Instance	
	Receivables, Net, Noncurrent	1.0	debit	INF		0	0	Instance	
	Other Assets, Noncurrent	1.0	debit	INF		3000000	3,000,000	Instance	
	<b>Liabilities and Equity</b>		credit	INF	INF	12000000	12,000,000	Instance	OK

**Not-for-profit prototype financial reporting scheme:**

XBRL Formula: [http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/XPE\\_FormulaTrace.html](http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/XPE_FormulaTrace.html)

Summary					
Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	41	56	56	0

Assertion Report		
Value Assertions		
id	satisfied	message
REPORT_Balances_BalanceSheet (evaluation 1)	satisfied	\$Total_Assets=377420 = \$Total_LiabilitiesAndNetAssets=377420
REPORT_Balances_BalanceSheet (evaluation 2)	satisfied	\$Total_Assets=378032 = \$Total_LiabilitiesAndNetAssets=378032
REPORT_RollForwardReconciles_StatementOfCashFlows (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=29843 + \$NetCashFlow=-4000 = \$VARIABLE_BalanceEnd=25843
REPORT_RollForwardReconciles_StatementOfCashFlows (evaluation 2)	satisfied	\$VARIABLE_BalanceStart=33843 + \$NetCashFlow=-4000 = \$VARIABLE_BalanceEnd=29843
REPORT_RollForwardReconciles_StatementOfChangesInNetAssets (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=316834 + \$VARIABLE_Change1=-15347 = \$VARIABLE_BalanceEnd=301487
REPORT_RollForwardReconciles_StatementOfChangesInNetAssets (evaluation 2)	satisfied	\$VARIABLE_BalanceStart=368104 + \$VARIABLE_Change1=-51270 = \$VARIABLE_BalanceEnd=316834
REPORT_RollForwardReconciles_AllowanceForBadDebts (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=0 + \$AdditionsToAllowanceForBadDebts=0 - \$BadDebtsWrittenOff=0 = \$VARIABLE_BalanceEnd=0
REPORT_RollForwardReconciles_AllowanceForBadDebts (evaluation 2)	satisfied	\$VARIABLE_BalanceStart=0 + \$AdditionsToAllowanceForBadDebts=0 - \$BadDebtsWrittenOff=0 = \$VARIABLE_BalanceEnd=0
REPORT_RollForwardReconciles_NetAssetsWithDonorRestrictions (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=58719 + \$VARIABLE_Change1=-15347 = \$VARIABLE_BalanceEnd=43372
REPORT_RollForwardReconciles_NetAssetsWithDonorRestrictions (evaluation 2)	satisfied	\$VARIABLE_BalanceStart=109989 + \$VARIABLE_Change1=-51270 = \$VARIABLE_BalanceEnd=58719
REPORT_RollForwardReconciles_DefinedBenefitPlansBenefitObligationRollForward (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=2662 + (sum((\$ServiceCost=1000, \$InterestCost=1000, \$ContributionsByPlanParticipants=1000, \$ActuarialGainsLosses=1000))) + sum((\$IncreaseDecreasePerPlanAmendment=1000, \$OtherIncreaseDecreaseInBenefitObligation=2000)) - (sum((\$IncreaseDecreasePerCurtailment=3000, \$BenefitsPaid=4000))) = \$VARIABLE_BalanceEnd=2662
REPORT_RollForwardReconciles_DefinedBenefitPlansBenefitObligationRollForward (evaluation 2)	satisfied	\$VARIABLE_BalanceStart=2662 + (sum((\$ServiceCost=1000, \$InterestCost=1000, \$ContributionsByPlanParticipants=1000, \$ActuarialGainsLosses=1000))) + sum((\$IncreaseDecreasePerPlanAmendment=1000, \$OtherIncreaseDecreaseInBenefitObligation=2000)) - (sum((\$IncreaseDecreasePerCurtailment=3000, \$BenefitsPaid=4000))) = \$VARIABLE_BalanceEnd=2662
REPORT_RollForwardReconciles_DefinedBenefitPlansFairValueOfPlanAssetsRollForward (evaluation 1)	satisfied	\$VARIABLE_BalanceStart=2662 + \$ActuarialReturnLossOnPlanAssets=1000 + \$ContributionsToPlanByEmployer=1000 + \$ContributionsToPlanByPlanParticipants=1000 -

XBRL Calculations: [http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/XPE\\_Calctrace.html](http://xbrlsite.azurewebsites.net/2020/reporting-scheme/nfp/reference-implementation/XPE_Calctrace.html)

Line	Concept	Weight	Balance	Decimals	Precision	Reported	Calculated	Source	Message
<b>1 Extended Link [ http://www.xbrlsite.com/nfp/role/level4/AccountsPayableDetail ]</b>									
2	Context I-2020 [ 2020-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	<b>Accounts Payable and Accrued Expenses</b>		credit	INF	INF	6320	6,320	Instance	OK
	Accounts Payable	1.0	credit	INF		6000	6,000	Instance	
	Accrued Expenses	1.0	credit	INF		320	320	Instance	
<b>2 Context I-2019 [ 2019-12-31 - ]</b>									
	c-equal								
3	Unit U-Monetary								
	u-equal								
	<b>Accounts Payable and Accrued Expenses</b>		credit	INF	INF	5530	5,530	Instance	OK
	Accounts Payable	1.0	credit	INF		5000	5,000	Instance	
	Accrued Expenses	1.0	credit	INF		530	530	Instance	
<b>1 Extended Link [ http://www.xbrlsite.com/nfp/role/level4/CashAndCashEquivalentsDetail ]</b>									
2	Context I-2020 [ 2020-12-31 - ]								
	c-equal								
3	Unit U-Monetary								
	u-equal								
	<b>Cash and Cash Equivalents</b>		debit	INF	INF	25843	25,843	Instance	OK
	Cash	1.0	debit	INF		1000	1,000	Instance	
	Cash Equivalents	1.0	debit	INF		24843	24,843	Instance	



Microsoft 10-K using US GAAP financial reporting scheme:

XBRL Formula: [http://xbrlsite.azurewebsites.net/2020/master/msft/ XPE\\_instance.xml Formula.html](http://xbrlsite.azurewebsites.net/2020/master/msft/ XPE_instance.xml Formula.html)

Summary					
Formulas Compiled	Formula Fired	Assertions Compiled	Assertions Fired	Assertions Satisfied	Assertions Not Satisfied
0	0	49	127	123	4

Assertion Report		
Value Assertions		
id	satisfied	message
Arithmetic_BS01 (evaluation 1)	satisfied	\$Assets=241086000000 = (\$Liabilities=168692000000 + \$StockholdersEquity=72394000000)
Arithmetic_BS01 (evaluation 2)	satisfied	\$Assets=193468000000 = (\$Liabilities=121471000000 + \$StockholdersEquity=71997000000)
Arithmetic_BS02 (evaluation 1)	satisfied	\$LiabilitiesAndStockholdersEquity=241086000000 = (\$Liabilities=168692000000 + \$StockholdersEquity=72394000000)
Arithmetic_BS02 (evaluation 2)	satisfied	\$LiabilitiesAndStockholdersEquity=193468000000 = (\$Liabilities=121471000000 + \$StockholdersEquity=71997000000)
Arithmetic_BS03 (evaluation 1)	satisfied	\$Assets=241086000000 = \$LiabilitiesAndStockholdersEquity=241086000000
Arithmetic_BS03 (evaluation 2)	satisfied	\$Assets=193468000000 = \$LiabilitiesAndStockholdersEquity=193468000000
Arithmetic_CF01 (evaluation 1)	satisfied	\$CashAndCashEquivalentsPeriodIncreaseDecrease=1153000000 = (\$NetCashProvidedByUsedInOperatingActivitiesContinuingOperations=39507000000 + \$NetCashProvidedByUsedInFinancingActivitiesContinuingOperations=8408000000 + \$NetCashProvidedByUsedInInvestingActivitiesContinuingOperations=-46781000000 + \$EffectOfExchangeRateOnCashAndCashEquivalents=19000000)
Arithmetic_CF01 (evaluation 2)	satisfied	\$CashAndCashEquivalentsPeriodIncreaseDecrease=915000000 = (\$NetCashProvidedByUsedInOperatingActivitiesContinuingOperations=33325000000 + \$NetCashProvidedByUsedInFinancingActivitiesContinuingOperations=-83930000000 + \$NetCashProvidedByUsedInInvestingActivitiesContinuingOperations=-23950000000 + \$EffectOfExchangeRateOnCashAndCashEquivalents=-67000000)
Arithmetic_CF01 (evaluation 3)	satisfied	\$CashAndCashEquivalentsPeriodIncreaseDecrease=-3074000000 = (\$NetCashProvidedByUsedInOperatingActivitiesContinuingOperations=29668000000 + \$NetCashProvidedByUsedInFinancingActivitiesContinuingOperations=-96680000000 + \$NetCashProvidedByUsedInInvestingActivitiesContinuingOperations=-23001000000 + \$EffectOfExchangeRateOnCashAndCashEquivalents=-73000000)
Arithmetic_CIO1 (evaluation 1)	satisfied	\$ComprehensiveIncomeNetOfTax=20098000000 = (\$NetIncomeLoss=21204000000 + \$OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1106000000)
Arithmetic_CIO1 (evaluation 2)	satisfied	\$ComprehensiveIncomeNetOfTax=15813000000 = (\$NetIncomeLoss=16798000000 + \$OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-985000000)
Arithmetic_CIO1 (evaluation 3)	satisfied	\$ComprehensiveIncomeNetOfTax=11007000000 = (\$NetIncomeLoss=12193000000 + \$OtherComprehensiveIncomeLossNetOfTaxPortionAttributableToParent=-1186000000)
Arithmetic_IS01 (evaluation 1)	satisfied	\$GrossProfit=55689000000 = (\$SalesRevenueNet=89950000000 - \$CostOfRevenue=34261000000)
Arithmetic_IS01 (evaluation 2)	satisfied	\$GrossProfit=52540000000 = (\$SalesRevenueNet=85320000000 - \$CostOfRevenue=32780000000)
Arithmetic_IS01 (evaluation 3)	satisfied	\$GrossProfit=60542000000 = (\$SalesRevenueNet=93580000000 - \$CostOfRevenue=33038000000)

XBRL Calculations:

[http://xbrlsite.azurewebsites.net/2020/master/msft/ XPE\\_instance.xml Calculations.html](http://xbrlsite.azurewebsites.net/2020/master/msft/ XPE_instance.xml Calculations.html)

Line	Concept	Weight	Balance	Decimals	Precision	Reported	Calculated	Source
1	Extended Link [ <a href="http://www.xbrlsite.com/msft/role/DisclosureBasicAndDilutedEarningsPerShareDetail">http://www.xbrlsite.com/msft/role/DisclosureBasicAndDilutedEarningsPerShareDetail</a> ]							
2	Context C_0000789019_20140701_20150630 [ 2014-07-01 - 2015-06-30 ]							
	c-equal							
3	Unit U_shares							
	u-equal							
	base:WeightedAverageNumberOfDilutedSharesOutstanding			-6	0	8254000000	8,254,000,000	Instance OK
	base:WeightedAverageNumberOfSharesOutstandingBasic	1.0		-6		8177000000	8,177,000,000	Instance
	base:IncrementalCommonSharesAttributableToShareBasedPaymentArrangements	1.0		-6		77000000	77,000,000	Instance
2	Context C_0000789019_20150701_20160630 [ 2015-07-01 - 2016-06-30 ]							
	c-equal							
3	Unit U_shares							
	u-equal							
	base:WeightedAverageNumberOfDilutedSharesOutstanding			-6	0	8013000000	8,013,000,000	Instance OK
	base:WeightedAverageNumberOfSharesOutstandingBasic	1.0		-6		7925000000	7,925,000,000	Instance
	base:IncrementalCommonSharesAttributableToShareBasedPaymentArrangements	1.0		-6		88000000	88,000,000	Instance
2	Context C_0000789019_20160701_20170630 [ 2016-07-01 - 2017-06-30 ]							
	c-equal							
3	Unit U_shares							
	u-equal							
	base:WeightedAverageNumberOfDilutedSharesOutstanding			-6	0	7832000000	7,832,000,000	Instance OK
	base:WeightedAverageNumberOfSharesOutstandingBasic	1.0		-6		7746000000	7,746,000,000	Instance
	base:IncrementalCommonSharesAttributableToShareBasedPaymentArrangements	1.0		-6		86000000	86,000,000	Instance