CA-1404459

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Control Description

Monthly, a secondary pricing analyst, independent from the preparer, reviews the FX Variance Reports that identify daily variances greater than 5%. These variances are verified and explained by the preparer in an email sent to secondary pricing analysis..

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Report Name: FX Variance Report

Usage: Ensure that interest rates are updated accurately and timely for calculation and report of accrued interest.

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Application: FX

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Walk Through: 11/15/2017

Attendees: (Business) Tom McGrath (IT) Ray Licata (PWC) Priyanka Tope (AARM) John Vinas (FCU) James Hanrahan, Allen Lum, Hoang Nguyen

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TS-A : Determine the type of the report: a) standard b) customized c) query (with ITGC) d) ad-hoc query (without ITGC) e) other

Pg. 2

TS-B : Determine the completeness of the report

Pg. 5

TS-C : Determine the accuracy of the report

Pg. 5

TS-D : Determine the controls designed to assess the reliability of the key report (i.e., accuracy, completeness and reliability)

Pg. 2

No relevant exceptions noted.

TS-A : Determine the type of the report: a) standard b) customized c) query (with ITGC) d) ad-hoc query (without ITGC) e) other ===> b) This is a customized report

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TS-A.01: Get IT team to show the location in TFS of the source code of TITAN - the application that creates "FX Rate Variance Report"

TS-A.02: FCU observed that the code of TITAN is in TFS (Pg. 3) and that the routine that created the report is called "GetRatesVariance" (Pg. 4)

TS-A.03: FCU concluded that "FX Rate Variance Report" is subject to TFS Change Management control

TS-D : Determine the controls designed to assess the reliability of the key report (i.e., accuracy, completeness and reliability).

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TS-D.01: Determine whether there is an initial user acceptance testing.

FCU was not able to obtain the initial user acceptance testing, since this report was built before 2017.

TS-D.02: Determine whether there is an ongoing user acceptance testing

Yes. Since the report is subject to TFS change management (TS-A.03), all changes to the report must go through the user acceptance testing phase.

Source Control Explorer - Microsoft Visual Studio

CA-1404459-S01.3

Source Location: $/CBIT/Treasury/Titan/Main/Libraries/Titan.ServiceLayer/Services

Workspace: PW7AM1XDPC22929

Local Path: Not mapped

Name	Pending Change	User	Latest	Last Check-in
FxDataTransformationServic...			Not ...	8/9/2016 9:30:4...
FxService.cs			Not ...	7/13/2017 6:55:...
MercuryPaymentService.cs			Not ...	9/30/2016 10:4...
MercuryService.cs			Not ...	8/1/2016 3:35:3...
OLEService.cs			Not ...	8/1/2016 3:35:3...

TS-A.02: FCU observed that the code of TITAN is in TFS

```
Find all "ratesvariance", Subfolders, Find Results 1, Entire Solution, ""
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(5):@model RatesVarianceViewModel
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(26):    var exportUrl = '@System.Configuration.ConfigurationManager.AppSettings["TitanApiUrl"]/fx/rate
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(30):        url: '@System.Configuration.ConfigurationManager.AppSettings["TitanApiUrl"]/fx/ratesvariar
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(43):            grid.dataSource.data(data.RatesVariance);
  Matching lines: 4    Matching files: 1    Total files searched: 1
```

C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\504053\FxService(C300432).cs [Read Only] - Microsoft Visual Studio

CA-1404459-S01.4

File Edit View Project Debug Team Tools Test Analyze Window Help

C:\Users\rlicata\Ap...Service(C300432).cs | C:\tfs.AIGApps\CBIT...rvices\FxService.cs | C:\Users\rlicata\A...nce(C302448).cshtml | Source Control Explorer

Miscellaneous Files | Titan.ServiceLayer.Services.FxService | GetRatesVariance(FxRatesVarianceSearchCriteria criteria)

```
1406            return null;
1407        }
1408
1409        /// <summary>
1410        /// Gets Rates Variance based on provided criteria.
1411        /// </summary>
1412        /// <param name="criteria"></param>
1413        /// <returns></returns>
1414        public async Task<FxRatesVarianceResult> GetRatesVariance(FxRatesVarianceSearchCriteria criteria)
1415        {
1416            string msg = null;
1417
1418            // retrieve rates
1419            FxRateResult AsOfDateRateData = await GetFxRates(new FxRateSearchCriteria
1420            {
1421                RateDate = criteria.AsOfDate,
1422                RateType = FxRateSearchType.Daily,
1423                IncludeUnclosedRates = criteria.IncludeUnclosedRates
1424
1425            });
1426
1427            FxRateResult PrevDateRateData = await GetFxRates(new FxRateSearchCriteria
1428            {
1429                RateDate = criteria.PrevDate,
1430                RateType = FxRateSearchType.Daily,
1431                IncludeUnclosedRates = criteria.IncludeUnclosedRates
1432            });
1433            if (AsOfDateRateData.Data.Count() == 0)
1434                msg = string.Format("Rates not found on As of Date ({0:MM/dd/yyyy})", criteria.AsOfDate);
1435            else if (PrevDateRateData.Data.Count() == 0)
1436                msg = string.Format("Rates not found on Previous Date ({0:MM/dd/yyyy})", criteria.PrevDate);
1437
1438            if (msg != null)
1439                return new FxRatesVarianceResult { Criteria = criteria, Success = false, Message = msg };
1440
```

TS-A.02: FCU observed that the routine that created the report is called "GetRatesVariance"

Find Results 1

```
Find all "ratesvariance", Subfolders, Find Results 1, Entire Solution, ""
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(5):@model RatesVarianceViewModel
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(26):    var exportUrl = '@System.Configuration.ConfigurationManager.AppSettings["TitanApiUrl"]/fx/rate
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(30):        url: '@System.Configuration.ConfigurationManager.AppSettings["TitanApiUrl"]/fx/ratesvariar
  C:\Users\rlicata\AppData\Local\Temp\TFSTemp\v95E9F.tmp\1699372\RatesVariance(C302448).cshtml(43):            grid.dataSource.data(data.RatesVariance);
  Matching lines: 4    Matching files: 1    Total files searched: 1
```

Team Explorer - Home

Home | CBIT

Team Foundation Server
CBIT
http://tfs.ebp.aig.net:8080/tfs/aigapps/CBIT/CBIT...

Project
Web Portal | Task Board | Team Room

My Work | Pending Changes | Source Control Explorer | Work Items | Builds | Reports | Settings

Solutions
Workspace: PW7AM1XDPC22929 | New... | Open...
Titan.sln
DotNet.sln | DotNet
Encryption.sln | EncryptDLL

Solution Explorer | Team Explorer | Class View

Ready | Ln 1438 | Col 29 | Ch 29 | INS

TS-B : Determine the completeness of the report

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TS-B.01: FCU watched Business execute the report with attributes:
'As of Date' = 11/14/2017; 'Previous Date' = 11/13/2017, 'Rate Type' = USD, 'Factor' = 5% and 'All Currencies' (pg. 6)

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TS-B.02: FCU watched Business retrieve the report showing the result of the query:
CCY = QAR; 11/14 rate = 0.274650; on 11/13/ rate = 0.259740; % Difference = 5.74% (Pg. 7)

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TS-B.03: FCU watched IT extract the rates on 11/14/2017 and 11/13/2017 for all the 159 currencies. FCU imported the rates in the lead sheet in 2 tabs "Nov14" and "Nov13". FCU performed a VLOOKUP to match the rates per currency in Tab "Nov14". FCU performed the calculation "Difference" and "%Difference" (pp. 11-12).

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TS-B.04: FCU verified that between 11/14 and 11/13 only QAR has a difference > 5% (Pg. 13)

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The report is complete.

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TS-C : Determine the accuracy of the report

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Steps TS-B.01, TS-B.02

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TS-C.01: FCU watched IT queried from source table TRSYS.VFX_RATES. FCU verified that on 11/14/2017, the rate of QAR = 0.274650; on 11/13/2017, the rate of QAR = 0.259740 (Pg. 8)

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TS-C.02: FCU watched IT verify in Excel that the difference = 5.74% between the 11/14/2017 rate (0.274650) and the 11/13/2017 rate (0.259740) (Pg. 9).

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The report is accurate.

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TS-C.03: FCU obtained from IT the source code (pp. 14-20). FCU verified that the table TRSYS.VFX_RATES is the source of the rates in the FX Rate Variance report (pg. 18).

AIG Titan

Currency Notes
Active Currencies
Currency Rates
Historical Rates
Cross Currency Rates
Euro Rates
Special Purpose Rates
Admin
Copy/Close Rates
Export
Parameters
Rates Variance
View Published Rates
FAQ

Rates Variance

1)AMD, BTN, CVE, KMF, ERN, LRD, MVR, SSP and TJS are added on 8/10/2017.
2) FX spot rates is rounded to 5 significant decimals on 11/30/16.
3) KGS is added on 10/27/2016 and 4) BYN is added on 10/11/2016.

Search Filters

As of Date	11/14/2017	Previous Date	11/13/2017	Rate Type	(•) USD ( ) Spot	Factor (%)	5	Currencies	(•) All ( ) Variance_CCY_List_1 ( ) Variance_CCY_List_2

Search

NOTE: Variance_CCY_List details are in Parameters screen

Export to Excel Export to PDF

ISO Code	Currency Name	As of Date Rate	Previous Date Rate	Difference	% Differenence
QAR	QATAR RIYAL	0.274650	0.259740	0.014910	5.74

COMPLETENESS TS-B.01 Business users executed the report with attributes:
'As of Date' = 11/14/2017; 'Previous Date' = 11/13/2017, 'Rate Type' = USD, 'Factor' = 5% and 'All Currencies

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https://titanservices.awap.aig.net/fx/ratesvarianceReport?Criteria.AsOfDate=11%2F14%2F2017&Criteria.PrevDate=11%2F13%2F2017&Criteria.SearchRateTyp
AIG: Rates Variance
titanservices.awap.aig.net
CA-1404459-S01.7
File Edit Go to Favorites Help
Share Browser WebEx
Pages - AIG Contact Home (2) Pages - AIG Contact Home Web Slice Gallery AIG Contact Default Login Suggested Sites

AIG

Titan FX Variance Report

As Of Date	11/14/2017	Prev As Of Date	11/13/2017	Factor	5	Rate Type	USD
Currencies	All						

CCY	CCY Name	As Of Date 11/14/2017 US$ per Orig. Ccy: 1	Prev. Spot 11/13/2017 US$ per Orig. Ccy: 1	Difference	% Difference
QAR	QATAR RIYAL	0.274650	0.259740	0.014910	5.74

COMPLETENESS TS-B.02 Result of query: CCY = QAR, % Difference (between 11/14 and 11/13) = 5.74%

4:54 PM
11/15/2017

Oracle SQL Developer : ord_ordprod_trsyp_rlicata

File Edit View Navigate Run Source Team Tools Window Help

CA-1404459-S01.8

Connections

PR_FX_COMPANY_EXP_BY_CCY
PR_FX_COMPANY_EXPOSURE
PR_FX_CONVERT_CCY_ADJ
PR_FX_CUR_EXP_BY_CATEGORY
PR_FX_CURRENCY_CATEGORY_EXP
PR_FX_CURRENCY_CATEGORY_ROLLUP
PR_FX_CURRENCY_CROSS_BORDER
PR_FX_CURRENCY_EXP_BY_CATEGORY
PR_FX_CURRENCY_EXP_BY_REGION
PR_FX_CURRENCY_FUNC_SUMMARY
PR_FX_CURRENCY_REGION_EXP
PR_FX_CURRENCY_REGION_ROLLUP
PR_FX_CURRENCY_SUMMARY_ROLLUP
PR_FX_ENTITY_CCY_ROLLUP
PR_FX_ENTITY_DATA_INPUT
PR_FX_ENTITY_SUMMARY_SIGROUP
PR_FX_EXCH_RATES_COMP
PR_FX_FOREIGN_CURRENT_POSITION
PR_FX_FOREIGN_EXCH_MAINT
PR_FX_FOREIGN_EXCH_POSITION
PR_FX_FOREIGN_EXCH_RATES
PR_FX_FOREX_CURRENT_POSITION
PR_FX_FOREX_EXCH_BREAKUPS
PR_FX_FOREX_MONTH_RATES
PR_FX_FW_LOCAL_CURR
PR_FX_FW_TRAN_CURR
PR_FX_GETFINALCLOSE
PR_FX_HYPERINFLATIONARY_CCY
PR_FX_MONTHEND_COA_UPDATE

Reports

All Reports
Data Dictionary Reports
Data Modeler Reports
OLAP Reports
TimesTen Reports
User Defined Reports

Start Page | ol_stg3_plutusu_olf_ext | ord_ordprod_trsyp_rlicata | VFX_RATES

ord_ordprod_trsyp_rlicata

Worksheet | Query Builder

```
select * from TRSYS.VFX_RATES where wss_fwr_date = to_date('11/14/2017', 'mm/dd/yyyy') and ccy_code = 'QAR';
select * from TRSYS.VFX_RATES where wss_fwr_date = to_date('11/13/2017', 'mm/dd/yyyy') and ccy_code = 'QAR';
```

Script Output | Query Result

All Rows Fetched: 1 in 0.002 seconds

	AIG_CODE	WSS_FWR_DATE	CCY_CODE	CCY_NAME	RATE_TYPE	ACTIVE	DEACTIVATE_DATE	ACTIVATE_DATE	DIRECTRATE	INDIRECTRATE	WSS_FWR_SPOTRATE
1	81	14-NOV-17	QAR	QATAR RIYAL	Y	Y	(null)	01-JUN-07	3.641000	0.274650	3.641

ACCURACY TS-C.01 - IT queried from source table.
Verified on 11/14/2017, rate of QAR = 0.274650

Messages - Log

Line 1 Column 54 | Insert | Modified | Windows: Cl

5:05 PM
11/15/2017

Oracle SQL Developer : ord_ordprod_trsyp_rlicata

File Edit View Navigate Run Source Team Tools Window Help

CA-1404459-S01.9

Connections

PR_FX_COMPANY_EXP_BY_CCY
PR_FX_COMPANY_EXPOSURE
PR_FX_CONVERT_CCY_ADJ
PR_FX_CUR_EXP_BY_CATEGORY
PR_FX_CURRENCY_CATEGORY_EXP
PR_FX_CURRENCY_CATEGORY_ROLLUP
PR_FX_CURRENCY_CROSS_BORDER
PR_FX_CURRENCY_EXP_BY_CATEGORY
PR_FX_CURRENCY_EXP_BY_REGION
PR_FX_CURRENCY_FUNC_SUMMARY
PR_FX_CURRENCY_REGION_EXP
PR_FX_CURRENCY_REGION_ROLLUP
PR_FX_CURRENCY_SUMMARY_ROLLUP
PR_FX_ENTITY_CCY_ROLLUP
PR_FX_ENTITY_DATA_INPUT
PR_FX_ENTITY_SUMMARY_SIGROUP
PR_FX_EXCH_RATES_COMP
PR_FX_FOREIGN_CURRENT_POSITION
PR_FX_FOREIGN_EXCH_MAINT
PR_FX_FOREIGN_EXCH_POSITION
PR_FX_FOREIGN_EXCH_RATES
PR_FX_FOREX_CURRENT_POSITION
PR_FX_FOREX_EXCH_BREAKUPS
PR_FX_FOREX_MONTH_RATES
PR_FX_FW_LOCAL_CURR
PR_FX_FW_TRAN_CURR
PR_FX_GETFINALCLOSE
PR_FX_HYPERINFLATIONARY_CCY
PR_FX_MONTHEND_COA_UPDATE

Reports

All Reports
Data Dictionary Reports
Data Modeler Reports
OLAP Reports
TimesTen Reports
User Defined Reports

Start Page | al_stg3_plutusu_alf_ext | ord_ordprod_trsyp_rlicata | VFX_RATES

ord_ordprod_trsyp_rlicata

Worksheet | Query Builder

```
select * from TRSYS.VFX_RATES where wss_fwr_date = to_date('11/14/2017', 'mm/dd/yyyy') and ccy_code = 'QAR';
select * from TRSYS.VFX_RATES where wss_fwr_date = to_date('11/13/2017', 'mm/dd/yyyy') and ccy_code = 'QAR';
```

Script Output | Query Result

All Rows Fetched: 1 in 0.003 seconds

	AIG_CODE	WSS_FWR_DATE	CCY_CODE	CCY_NAME	RATE_TYPE	ACTIVE	DEACTIVATE_DATE	ACTIVATE_DATE	DIRECTRATE	INDIRECTRATE	WSS_FWR_SPOTRATE
1	81	13-NOV-17	QAR	QATAR RIYAL	Y	Y	(null)	01-JUN-07	3.850000	0.259740	3.85

ACCURACY TS-C.01 - IT queried from source table.
Verified on 11/13/2017, rate of QAR = 0.259740

Messages - Log

Line 2 Column 109 | Insert | Modified | Windows: C

5:05 PM
11/15/2017

rates_variance.xlsx - Excel

CA-1404459-S01.10

C2 =ABS((1-(A2/B2)))

	A	B	C
1	14-Nov	3-Oct	%
2	0.27465	0.25974	5.74%

ACCURACY TS-C.02 - IT verified in Excel that the difference = 5.74% between the 11/14/2017 rate (0.274650) and the 11/13/2017 rate (0.259740)

Rates as of 11/14/17

Rates as of 11/13/17 (fetched from Nov 13 tab)

CA-1404459

Difference and Difference%

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	AIG_CODE	WSS_FWR_DATE	CCY_CODE	CCY_NAME	RATE_TYPE	ACTIVE	DEACTIVATE_DATE	ACTIVATE_DATE	DIRECTRATE	INDIRECTRATE	WSS_FWR_SPOTRATE	x	Nov 13 CCY	Nov 13 Indirect	Difference	%Difference
2	131	14-NOV-17	AED	UNITED ARAB EMIRATES DIRHAM	Y	Y		01-JUN-07	3.6729	0.27226	3.6729		AED	0.27226	0.000000	0.00%
3	219	14-NOV-17	AFN	AFGHANISTAN AFGHANI	Y	Y		01-JUN-07	68.45	0.01461	68.45		AFN	0.01461	0.000000	0.00%
4	240	14-NOV-17	ALL	ALBANIA LEK	Y	Y		20-JAN-11	113.565	0.00881	113.565		ALL	0.00874	0.000070	0.80%
5	250	14-NOV-17	AMD	ARMENIA DRAM	Y	Y		10-AUG-17	489	0.00204	489		AMD	0.00205	-0.000010	-0.49%
6	58	14-NOV-17	ANG	NETHERLANDS ANTILLES GUILDER	Y	Y		01-JUN-07	1.79	0.55866	1.79		ANG	0.55866	0.000000	0.00%
7	214	14-NOV-17	AOA	ANGOLA KWANZA	Y	Y		01-JUN-07	165.772	0.00603	165.772		AOA	0.00603	0.000000	0.00%
8	177	14-NOV-17	ARS	ARGENTINA PESO	Y	Y		01-JUN-07	17.48	0.05721	17.48		ARS	0.05702	0.000190	0.33%
9	80	14-NOV-17	AUD	AUSTRALIA DOLLAR	N	Y		01-JUN-07	1.30993	0.7634	0.7634		AUD	0.76255	0.000850	0.11%
10	231	14-NOV-17	AWG	ARUBA GUILDER	Y	Y		01-JUN-07	1.785	0.56022	1.785		AWG	0.56022	0.000000	0.00%
11	226	14-NOV-17	AZN	AZERBAIJAN MANAT (NEW)	Y	Y		01-JUN-07	1.6985	0.58875	1.6985		AZN	0.58875	0.000000	0.00%
12	239	14-NOV-17	BAM	BOSNIA-HERZEGOVINAN MARK	Y	Y		09-SEP-10	1.6825	0.59435	1.6825		BAM	0.5914	0.002950	0.50%
13	111	14-NOV-17	BBD	BARBADOS DOLLAR	Y	Y		01-JUN-07	1.9981	0.50048	1.9981		BBD	0.50048	0.000000	0.00%
14	133	14-NOV-17	BDT	BANGLADESH TAKA	Y	Y		01-JUN-07	83.4	0.01199	83.4		BDT	0.012	-0.000010	-0.08%
15	212	14-NOV-17	BGN	BULGARIA LEV	Y	Y		01-JUN-07	1.66255	0.60149	1.66255		BGN	0.59593	0.005560	0.93%
16	114	14-NOV-17	BHD	BAHRAIN DINAR	Y	Y		01-JUN-07	0.3777	2.6476	0.3777		BHD	2.6455	0.002100	0.08%
17	57	14-NOV-17	BIF	BURUNDI FRANC	Y	Y		01-JUN-07	1752.945	0.00057	1752.945		BIF	0.00057	0.000000	0.00%
18	118	14-NOV-17	BMD	BERMUDA DOLLAR	N	Y		01-JUN-07	1	1	1		BMD	1	0.000000	0.00%
19	91	14-NOV-17	BND	BRUNEI DOLLAR	Y	Y		01-JUN-07	1.35925	0.7357	1.35925		BND	0.73438	0.001320	0.18%
20	167	14-NOV-17	BOB	BOLIVIA BOLIVIANO	Y	Y		01-JUN-07	6.97	0.14347	6.97		BOB	0.14347	0.000000	0.00%
21	190	14-NOV-17	BRL	BRAZIL REAL	Y	Y		01-JUN-07	3.281	0.30479	3.281		BRL	0.30364	0.001150	0.38%
22	104	14-NOV-17	BSD	BAHAMAS DOLLAR	N	Y		01-JUN-07	1	1	1		BSD	1	0.000000	0.00%
23	251	14-NOV-17	BTN	BHUTAN NGULTRUM	Y	Y		10-AUG-17	65.415	0.01529	65.415		BTN	0.01528	0.000010	0.07%
24	152	14-NOV-17	BWP	BOTSWANA PULA	N	Y		01-JUN-07	10.61571	0.0942	0.0942		BWP	0.0938	0.000400	0.43%
25	248	14-NOV-17	BYN	BELARUSIAN RUBLE	Y	Y		01-JUL-16	2.007	0.49826	2.007		BYN	0.50163	-0.003370	-0.67%
26	21	14-NOV-17	BZD	BELIZE DOLLAR	Y	Y		01-JUN-07	2	0.5	2		BZD	0.5	0.000000	0.00%
27	11	14-NOV-17	CAD	CANADA DOLLAR	Y	Y		01-JUN-07	1.2733	0.78536	1.2733		CAD	0.78846	-0.003100	-0.39%
28	213	14-NOV-17	CDF	CONGOLESE FRANC	Y	Y		01-JUN-07	1562.5	0.00064	1562.5		CDF	0.00064	0.000000	0.00%
29	24	14-NOV-17	CHF	SWITZERLAND FRANC	Y	Y		01-JUN-07	0.9896	1.01051	0.9896		CHF	1.00392	0.006590	0.66%
30	163	14-NOV-17	CLF	CHILE UNIDAD DE FOMENTO	N	Y		01-JUN-07	0.02373	42.14075	42.14075		CLF	42.24757	-0.106820	-0.25%
31	145	14-NOV-17	CLP	CHILE PESO	Y	Y		01-JUN-07	632.225	0.00158	632.225		CLP	0.00159	-0.000010	-0.63%
32	241	14-NOV-17	CNH	CHINA R YUAN (HONG KONG DELIVERED RATE)	Y	Y		06-JUN-11	6.64115	0.15058	6.64115		CNH	0.1502	0.000380	0.25%
33	86	14-NOV-17	CNY	CHINA YUAN RENMINBI	Y	Y		01-JUN-07	6.6399	0.1506	6.6399		CNY	0.15072	-0.000120	-0.08%
34	4	14-NOV-17	COP	COLOMBIA PESO	Y	Y		01-JUN-07	3015.4	0.00033	3015.4		COP	0.00033	0.000000	0.00%
35	43	14-NOV-17	CRC	COSTA RICA COLON	Y	Y		01-JUN-07	569.385	0.00176	569.385		CRC	0.00176	0.000000	0.00%
36	2	14-NOV-17	CUP	CUBA PESO	Y	Y		01-JUN-07	24	0.04167	24		CUP	0.04167	0.000000	0.00%
37	252	14-NOV-17	CVE	CAPE VERDE ESCUDO	Y	Y		10-AUG-17	95.18	0.01051	95.18		CVE	0.01047	0.000040	0.38%
38	0	14-NOV-17	CVE	CAPE VERDE ESCUDO (OLD)	Y	N		10-AUG-17	95.18	0.01051	95.18		CVE	0.01047	0.000040	0.38%
39	137	14-NOV-17	CZK	CZECH REPUBLIC KORUNA	Y	Y		01-JUN-07	21.743	0.04599	21.743		CZK	0.04564	0.000350	0.77%
40	88	14-NOV-17	DJF	DJIBOUTI FRANC	Y	Y		01-JUN-07	176.83	0.00566	176.83		DJF	0.00566	0.000000	0.00%
41	67	14-NOV-17	DKK	DENMARK KRONE	Y	Y		01-JUN-07	6.3082	0.15852	6.3082		DKK	0.15683	0.001690	1.08%
42	20	14-NOV-17	DOP	DOMINICAN REPUBLIC PESO	Y	Y		01-JUN-07	48.07	0.0208	48.07		DOP	0.02082	-0.000020	-0.10%
43	73	14-NOV-17	DZD	ALGERIA DINAR	Y	Y		01-JUN-07	114.7531	0.00871	114.7531		DZD	0.00869	0.000020	0.23%
44	52	14-NOV-17	ECS	ECUADOR SUCRE	Y	Y		01-JUN-07	25000	0.00004	25000		ECS	0.00004	0.000000	0.00%
45	54	14-NOV-17	EGP	EGYPT POUND	Y	Y		01-JUN-07	17.66	0.05663	17.66		EGP	0.05669	-0.000060	-0.11%
46	254	14-NOV-17	ERN	ERITREA NAKFA	Y	Y		10-AUG-17	15.075	0.06633	15.075		ERN	0.06633	0.000000	0.00%
47	46	14-NOV-17	ETB	ETHIOPIA BIRR	Y	Y		01-JUN-07	27.3413	0.03657	27.3413		ETB	0.03657	0.000000	0.00%
48	207	14-NOV-17	EUR	EURO	N	Y		01-JUN-07	0.84789	1.1794	1.1794		EUR	1.16675	0.012650	1.08%
49	151	14-NOV-17	FJD	FIJI DOLLAR	N	Y		01-JUN-07	2.07469	0.482	0.482		FJD	0.48535	-0.003350	-0.69%
50	3	14-NOV-17	GBP	GREAT BRITAIN POUND	N	Y		01-JUN-07	0.75959	1.3165	1.3165		GBP	1.3118	0.004700	0.36%
51	225	14-NOV-17	GEL	GEORGIA LARI	Y	Y		01-JUN-07	2.68	0.37313	2.68		GEL	0.37594	-0.002810	-0.75%
52	233	14-NOV-17	GHS	GHANA CEDI (NEW)	Y	Y		01-JUL-07	4.485	0.22297	4.485		GHS	0.22453	-0.001560	-0.69%
53	123	14-NOV-17	GIP	GIBRALTAR POUND	N	Y		01-JUN-07	0.75959	1.3165	1.3165		GIP	1.3118	0.004700	0.36%
54	66	14-NOV-17	GMD	GAMBIA DALASI	Y	Y		01-JUN-07	47.85	0.0209	47.85		GMD	0.0209	0.000000	0.00%
55	65	14-NOV-17	GNF	GUINEA FRANC	Y	Y		01-JUN-07	9025	0.00011	9025		GNF	0.00011	0.000000	0.00%
56	56	14-NOV-17	GTQ	GUATEMALA QUETZAL	Y	Y		01-JUN-07	7.34	0.13624	7.34		GTQ	0.13624	0.000000	0.00%
57	106	14-NOV-17	GYD	GUYANA DOLLAR	Y	Y		01-JUN-07	207.08	0.00483	207.08		GYD	0.00485	-0.000020	-0.41%
58	48	14-NOV-17	HKD	HONG KONG DOLLAR	Y	Y		01-JUN-07	7.8027	0.12816	7.8027		HKD	0.12817	-0.000010	-0.01%
59	64	14-NOV-17	HNL	HONDURAS LEMPIRA	Y	Y		01-JUN-07	23.5083	0.04254	23.5083		HNL	0.04255	-0.000010	-0.02%
60	204	14-NOV-17	HRK	CROATIA KUNA	Y	Y		01-JUN-07	6.4214	0.15573	6.4214		HRK	0.15438	0.001350	0.87%
61	51	14-NOV-17	HTG	HAITI GOURDE	Y	Y		01-JUN-07	61.6491	0.01622	61.6491		HTG	0.01614	0.000080	0.50%
62	134	14-NOV-17	HUF	HUNGARY FORINT	Y	Y		01-JUN-07	265.275	0.00377	265.275		HUF	0.00374	0.000030	0.80%
63	101	14-NOV-17	IDR	INDONESIA RUPIAH	Y	Y		01-JUN-07	13553.5	0.00007378	13553.5		IDR	7.38E-05	0.000000	-0.01%
64	165	14-NOV-17	ILS	ISRAEL SHEKEL	Y	Y		01-JUN-07	3.5365	0.28277	3.5365		ILS	0.28187	0.000900	0.32%
65	26	14-NOV-17	INR	INDIA RUPEE	Y	Y		01-JUN-07	65.465	0.01528	65.465		INR	0.01527	0.000010	0.07%
66	31	14-NOV-17	IQD	IRAQ DINAR	Y	Y		01-JUN-07	1166	0.00086	1166		IQD	0.00086	0.000000	0.00%
67	41	14-NOV-17	IRR	IRAN RIAL	Y	Y		01-JUN-07	31636	0.00003161	31636		IRR	3.16E-05	0.000000	0.00%
68	156	14-NOV-17	ISK	ICELAND KRONA	Y	Y		01-JUN-07	103.065	0.0097	103.065		ISK	0.00964	0.000060	0.62%
69	116	14-NOV-17	JMD	JAMAICA DOLLAR	Y	Y		01-JUN-07	125.9	0.00794	125.9		JMD	0.00789	0.000050	0.63%
70	92	14-NOV-17	JOD	JORDAN DINAR	Y	Y		01-JUN-07	0.709	1.41044	0.709		JOD	1.41044	0.000000	0.00%
71	77	14-NOV-17	JPY	JAPAN YEN	Y	Y		01-JUN-07	113.415	0.00882	113.415		JPY	0.0088	0.000020	0.23%
72	122	14-NOV-17	KES	KENYA SHILLING	Y	Y		01-JUN-07	103.7	0.00964	103.7		KES	0.00964	0.000000	0.00%
73	249	14-NOV-17	KGS	KYRGYZSTAN SOM	Y	Y		27-OCT-16	69.73	0.01434	69.73		KGS	0.01434	0.000000	0.00%
74	95	14-NOV-17	KHR	CAMBODIA RIEL	Y	Y		01-JUN-07	4050.5	0.00025	4050.5		KHR	0.00025	0.000000	0.00%
75	253	14-NOV-17	KMF	COMOROS FRANC	Y	Y		10-AUG-17	424.02	0.00236	424.02		KMF	0.00236	0.000000	0.00%
76	42	14-NOV-17	KRW	KOREA (SOUTH) WON	Y	Y		01-JUN-07	1118.1	0.00089	1118.1		KRW	0.00089	0.000000	0.00%
77	37	14-NOV-17	KWD	KUWAIT DINAR	Y	Y		01-JUN-07	0.30265	3.30415	0.30265		KWD	3.30743	-0.003280	-0.10%
78	141	14-NOV-17	KYD	CAYMAN ISLANDS DOLLAR	Y	Y		01-JUN-07	0.82	1.21951	0.82		KYD	1.21951	0.000000	0.00%
79	209	14-NOV-17	KZT	KAZAKHSTAN TENGE	Y	Y		01-JUN-07	332.475	0.00301	332.475		KZT	0.003	0.000010	0.33%
80	149	14-NOV-17	LAK	LAOS KIP	Y	Y		01-JUN-07	8326	0.00012	8326		LAK	0.00012	0.000000	0.00%
81	89	14-NOV-17	LBP	LEBANON POUND	Y	Y		01-JUN-07	1516	0.00066	1516		LBP	0.00066	0.000000	0.00%
82	76	14-NOV-17	LKR	SRI LANKA RUPEE	Y	Y		01-JUN-07	153.6	0.00651	153.6		LKR	0.00651	0.000000	0.00%
83	255	14-NOV-17	LRD	LIBERIA DOLLAR	Y	Y		10-AUG-17	125.34	0.00798	125.34		LRD	0.00798	0.000000	0.00%
84	158	14-NOV-17	LSL	LESOTHO LOTI	Y	Y		01-JUN-07	14.3905	0.06949	14.3905		LSL	0.06894	0.000550	0.80%
85	72	14-NOV-17	LYD	LIBYA DINAR	Y	Y		01-JUN-07	1.3678	0.7311	1.3678		LYD	0.73099	0.000110	0.02%
86	44	14-NOV-17	MAD	MOROCCO DIRHAM	Y	Y		01-JUN-07	9.4394	0.10594	9.4394		MAD	0.10537	0.000570	0.54%
87	234	14-NOV-17	MDL	MOLDOVA LEU	Y	Y		30-NOV-07	17.63	0.05672	17.63		MDL	0.0566	0.000120	0.21%

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	AIG_CODE	WSS_FWR_DATE	CCY_CODE	CCY_NAME	RATE_TYPE	ACTIVE	DEACTIVATE_DATE	ACTIVATE_DATE	DIRECTRATE	INDIRECTRATE	WSS_FWR_SPOTRATE	x	Nov 13 CCY	Nov 13 Indirect	Difference	%Difference
88	227	14-NOV-17	MGA	MADAGASCAR ARIARY	Y	Y		01-JUN-07	3175	0.00031	3175		MGA	0.00031	0.000000	0.00%
89	245	14-NOV-17	MKD	MACEDONIAN DENAR	Y	Y		03-OCT-14	52.315	0.01911	52.315		MKD	0.01893	0.000180	0.95%
90	75	14-NOV-17	MMK	MYANMAR (BURMA) KYAT	Y	Y		01-JUN-07	1364	0.00073	1364		MMK	0.00073	0.000000	0.00%
91	246	14-NOV-17	MNT	MONGOLIAN TUGRIK	Y	Y		14-APR-15	2478.5	0.0004	2478.5		MNT	0.0004	0.000000	0.00%
92	49	14-NOV-17	MOP	MACAO (MACAU) PATACA	Y	Y		01-JUN-07	8.0505	0.12422	8.0505		MOP	0.12432	-0.000100	-0.08%
93	139	14-NOV-17	MRO	MAURITANIA OUGUIYA	Y	Y		01-JUN-07	355.16	0.00282	355.16		MRO	0.00282	0.000000	0.00%
94	84	14-NOV-17	MUR	MAURITIUS RUPEE	Y	Y		01-JUN-07	34.2	0.02924	34.2		MUR	0.02909	0.000150	0.52%
95	256	14-NOV-17	MVR	MALDIVES RUFIYAA	Y	Y		10-AUG-17	15.46	0.06468	15.46		MVR	0.06468	0.000000	0.00%
96	10	14-NOV-17	MWK	MALAWI KWACHA	Y	Y		01-JUN-07	723.95	0.00138	723.95		MWK	0.00139	-0.000010	-0.72%
97	184	14-NOV-17	MXN	MEXICO PESO	Y	Y		01-JUN-07	19.14875	0.05222	19.14875		MXN	0.05228	-0.000060	-0.11%
98	25	14-NOV-17	MYR	MALAYSIA RINGGIT	Y	Y		01-JUN-07	4.194	0.23844	4.194		MYR	0.23858	-0.000140	-0.06%
99	229	14-NOV-17	MZN	MOZAMBIQUE METICAL (NEW)	Y	Y		01-JUN-07	61.25	0.01633	61.25		MZN	0.01633	0.000000	0.00%
100	224	14-NOV-17	NAD	NAMIBIA DOLLAR	Y	Y		01-JUN-07	14.3905	0.06949	14.3905		NAD	0.06894	0.000550	0.80%
101	125	14-NOV-17	NGN	NIGERIA NAIRA	Y	Y		01-JUN-07	306.05	0.00327	306.05		NGN	0.00318	0.000090	2.83%
102	176	14-NOV-17	NIO	NICARAGUA GOLD CORDOBA	Y	Y		01-JUN-07	30.5981	0.03268	30.5981		NIO	0.03269	-0.000010	-0.03%
103	32	14-NOV-17	NOK	NORWAY KRONE	Y	Y		01-JUN-07	8.1783	0.12227	8.1783		NOK	0.12251	-0.000240	-0.20%
104	36	14-NOV-17	NPR	NEPAL RUPEE	Y	Y		01-JUN-07	104.67	0.00955	104.67		NPR	0.00955	0.000000	0.00%
105	108	14-NOV-17	NZD	NEW ZEALAND DOLLAR	N	Y		01-JUN-07	1.45296	0.68825	0.68825		NZD	0.6902	-0.001950	-0.28%
106	124	14-NOV-17	OMR	OMAN RIAL OMANI	Y	Y		01-JUN-07	0.38498	2.59754	0.38498		OMR	2.5974	0.000140	0.01%
107	30	14-NOV-17	PAB	PANAMA BALBOA	Y	Y		01-JUN-07	1	1	1		PAB	1	0.000000	0.00%
108	175	14-NOV-17	PEN	PERU NEW SOL	Y	Y		01-JUN-07	3.2425	0.3084	3.2425		PEN	0.3085	-0.000100	-0.03%
109	143	14-NOV-17	PGK	PAPUA NEW GUINEA KINA	N	Y		01-JUN-07	3.21027	0.3115	0.3115		PGK	0.31225	-0.000750	-0.24%
110	15	14-NOV-17	PHP	PHILIPPINES PESO	Y	Y		01-JUN-07	51.1375	0.01956	51.1375		PHP	0.01953	0.000030	0.15%
111	69	14-NOV-17	PKR	PAKISTAN RUPEE	Y	Y		01-JUN-07	105.3	0.0095	105.3		PKR	0.00949	0.000010	0.11%
112	192	14-NOV-17	PLN	POLAND ZLOTY	Y	Y		01-JUN-07	3.6126	0.27681	3.6126		PLN	0.27486	0.001950	0.71%
113	96	14-NOV-17	PYG	PARAGUAY GUARANI	Y	Y		01-JUN-07	5648.485	0.00018	5648.485		PYG	0.00018	0.000000	0.00%
114	81	14-NOV-17	QAR	QATAR RIYAL	Y	Y		01-JUN-07	3.641	0.27465	3.641		QAR	0.25974	0.014910	5.74%
115	223	14-NOV-17	RON	ROMANIA LEU (NEW)	Y	Y		01-JUN-07	3.94565	0.25344	3.94565		RON	0.25053	0.002910	1.16%
116	232	14-NOV-17	RSD	SERBIA DINAR	Y	Y		30-JUN-07	100.77	0.00992	100.77		RSD	0.00983	0.000090	0.92%
117	206	14-NOV-17	RUB	RUSSIA ROUBLE	Y	Y		01-JUN-07	60.12375	0.01663	60.12375		RUB	0.01682	-0.000190	-1.13%
118	16	14-NOV-17	RWF	RWANDA FRANC	Y	Y		01-JUN-07	854.605	0.00117	854.605		RWF	0.00117	0.000000	0.00%
119	100	14-NOV-17	SAA	SAMOA (AMERICAN) U.S. DOLLAR	Y	Y		01-JUN-07	1	1	1		SAA	1	0.000000	0.00%
120	97	14-NOV-17	SAR	SAUDI ARABIA RIYAL	Y	Y		01-JUN-07	3.7502	0.26665	3.7502		SAR	0.26665	0.000000	0.00%
121	228	14-NOV-17	SBD	SOLOMON ISLANDS DOLLAR	N	Y		01-JUN-07	7.87712	0.12695	0.12695		SBD	0.12875	-0.001800	-1.40%
122	147	14-NOV-17	SCR	SEYCHELLES RUPEE	Y	Y		01-JUN-07	13.405	0.0746	13.405		SCR	0.0746	0.000000	0.00%
123	238	14-NOV-17	SDG	SUDAN POUND	Y	Y		31-JUL-09	6.6767	0.14977	6.6767		SDG	0.14977	0.000000	0.00%
124	35	14-NOV-17	SEK	SWEDEN KRONA	Y	Y		01-JUN-07	8.391	0.11918	8.391		SEK	0.1193	-0.000120	-0.10%
125	99	14-NOV-17	SGD	SINGAPORE DOLLAR	Y	Y		01-JUN-07	1.35925	0.7357	1.35925		SGD	0.73438	0.001320	0.18%
126	102	14-NOV-17	SLL	SIERRA LEONE LEONE	Y	Y		01-JUN-07	7665	0.00013	7665		SLL	0.00013	0.000000	0.00%
127	94	14-NOV-17	SOS	SOMALIA SHILLING	Y	Y		01-JUN-07	578.5	0.00173	578.5		SOS	0.00173	0.000000	0.00%
128	221	14-NOV-17	SRD	SURINAM DOLLAR	Y	Y		01-JUN-07	7.47	0.13387	7.47		SRD	0.13387	0.000000	0.00%
129	257	14-NOV-17	SSP	SOUTH SUDAN POUND	Y	Y		10-AUG-17	130.285	0.00768	130.285		SSP	0.00768	0.000000	0.00%
130	157	14-NOV-17	STD	SAO TOME & PRINCIPE DOBRA	Y	Y		01-JUN-07	20866	0.00004792	20866		STD	4.75E-05	0.000000	0.84%
131	55	14-NOV-17	SVC	EL SALVADOR COLON	Y	Y		01-JUN-07	8.727	0.11459	8.727		SVC	0.11459	0.000000	0.00%
132	90	14-NOV-17	SYP	SYRIA POUND	Y	Y		01-JUN-07	515.3	0.00194	515.3		SYP	0.00194	0.000000	0.00%
133	154	14-NOV-17	SZL	SWAZILAND LILANGENI	Y	Y		01-JUN-07	14.3905	0.06949	14.3905		SZL	0.06894	0.000550	0.80%
134	50	14-NOV-17	THB	THAILAND BAHT	Y	Y		01-JUN-07	33.08	0.03023	33.08		THB	0.03024	-0.000010	-0.03%
135	258	14-NOV-17	TJS	TAJIKISTAN SOMONI	Y	Y		10-AUG-17	8.8093	0.11352	8.8093		TJS	0.11359	-0.000070	-0.06%
136	22	14-NOV-17	TND	TUNISIA DINAR	Y	Y		01-JUN-07	2.48935	0.40171	2.48935		TND	0.39993	0.001780	0.45%
137	247	14-NOV-17	TOP	TONGAN PAANGA	Y	Y		14-APR-15	0.4549	2.19829	0.4549		TOP	2.19539	0.002900	0.13%
138	222	14-NOV-17	TRY	TURKEY LIRA (NEW)	Y	Y		01-JUN-07	3.876	0.258	3.876		TRY	0.25727	0.000730	0.28%
139	13	14-NOV-17	TTD	TRINIDAD AND TOBAGO DOLLAR	Y	Y		01-JUN-07	6.73	0.14859	6.73		TTD	0.14797	0.000620	0.42%
140	74	14-NOV-17	TWD	TAIWAN N.T. DOLLAR	Y	Y		01-JUN-07	30.1425	0.03318	30.1425		TWD	0.03313	0.000050	0.15%
141	33	14-NOV-17	TZS	TANZANIA SHILLING	Y	Y		01-JUN-07	2242	0.00045	2242		TZS	0.00045	0.000000	0.00%
142	216	14-NOV-17	UAH	UKRAINE HRYVNIA	Y	Y		01-JUN-07	26.515	0.03771	26.515		UAH	0.03774	-0.000030	-0.08%
143	215	14-NOV-17	UDX	CHILE UNI DE DOLAR	Y	Y		01-JUN-07	1	1	1		UDX	1	0.000000	0.00%
144	168	14-NOV-17	UGX	UGANDA SHILLING	Y	Y		01-JUN-07	3635	0.00028	3635		UGX	0.00027	0.000010	3.70%
145	1	14-NOV-17	USD	UNITED STATES U.S. DOLLAR	N	Y		01-JUN-07	1	1	1		USD	1	0.000000	0.00%
146	185	14-NOV-17	UYU	URUGUAY PESO URUGUAYO	Y	Y		01-JUN-07	29.335	0.03409	29.335		UYU	0.03418	-0.000090	-0.26%
147	193	14-NOV-17	UZS	UZBEKISTAN SUM	Y	Y		01-JUN-07	8064.29	0.00012	8064.29		UZS	0.00012	0.000000	0.00%
148	235	14-NOV-17	VEF	VENEZUELA BOLIVAR FUERTE	Y	Y		01-JAN-08	3336.6375	0.0003	3336.6375		VEF	0.0003	0.000000	0.00%
149	150	14-NOV-17	VND	VIETNAM DONG	Y	Y		01-JUN-07	22714	0.00004403	22714		VND	4.4E-05	0.000000	0.00%
150	202	14-NOV-17	VUV	VANUATU VATU	Y	Y		01-JUN-07	109.115	0.00916	109.115		VUV	0.00918	-0.000020	-0.22%
151	115	14-NOV-17	WST	SAMOA (WESTERN) TALA	N	Y		01-JUN-07	2.54777	0.3925	0.3925		WST	0.3948	-0.002300	-0.58%
152	87	14-NOV-17	XAF	CENTRAL AFRICAN CFA (BEAC) FRANC	Y	Y		01-JUN-07	578.81	0.00173	578.81		XAF	0.0017	0.000030	1.76%
153	140	14-NOV-17	XCD	ANTIGUA E.C. DOLLAR	Y	Y		01-JUN-07	2.71	0.369	2.71		XCD	0.369	0.000000	0.00%
154	242	14-NOV-17	XDR	SDR - IMF SPECIAL DRAWING RIGHTS	Y	Y		21-SEP-11	1.40643	0.71102	1.40643		XDR	0.71247	-0.001450	-0.20%
155	148	14-NOV-17	XOF	WEST AFRICAN CFA (BCEAO) FRANC	Y	Y		01-JUN-07	562	0.00178	562		XOF	0.00177	0.000010	0.56%
156	82	14-NOV-17	XPF	TAHITI C.F.P. FRANC	Y	Y		01-JUN-07	101.66	0.00984	101.66		XPF	0.00978	0.000060	0.61%
157	132	14-NOV-17	YER	YEMEN RIAL	Y	Y		01-JUN-07	250.1	0.004	250.1		YER	0.004	0.000000	0.00%
158	39	14-NOV-17	ZAR	SOUTH AFRICA RAND	Y	Y		01-JUN-07	14.39025	0.06949	14.39025		ZAR	0.0687	0.000790	1.15%
159	244	14-NOV-17	ZMW	ZAMBIA KWACHA (NEW)	Y	Y		02-JAN-13	10.035	0.09965	10.035		ZMW	0.10076	-0.001110	-1.10%
160	243	14-NOV-17	ZWL	ZIMBABWE DOLLAR	Y	Y		03-JUL-12	7575760000	1E-10	7575760000		ZWL	1E-10	0.000000	0.00%

ACCURACY TS-C.01, TS-C.02 - For QAR, the difference is 5.74% between the 11/14/2017 rate (0.274650) and the 11/13/2017 rate (0.259740).

CA-1404459 FX Rate Variance Report.xlsx - Excel

CA-1404459-S01.13

Nguyen, Hoangvinh

M138

=IFNA(VLOOKUP($C138,'Nov13'!$C$1:$J$160,1,FALSE),"Not Found")

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	AIG_CODE	WSS_FWR_DATE	CCY_CODE	CCY_NAME	RATE_TYPE	ACTIVE	DEACTIVATE_DATE	ACTIVATE_DATE	DIRECTRATE	INDIRECTRATE	WSS_FWR_SPOTRATE	x	Nov 13 CCY	Nov 13 Indirect	Difference	%Difference	
114	81	14-NOV-1	QAR	QATAR RIYAL	Y	Y		01-JUN-07	3.641	0.27465	3.641		QAR	0.25974	0.014910	5.74%	
161																	
162																	
163																	
164																	
165																	
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168																	
169																	
170																	

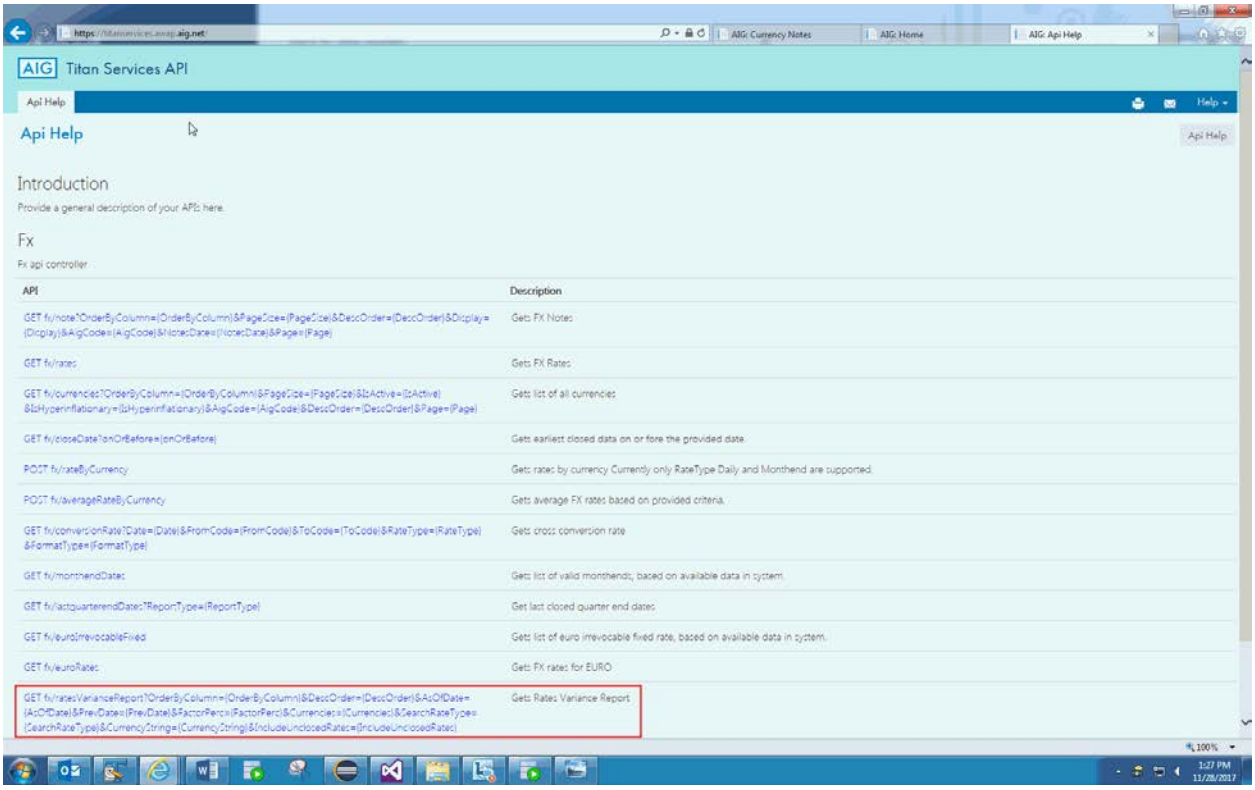
COMPLETENESS TS-B.04: FCU verified that between 11/14 and 11/13 only QAR has a difference > 5%

CA-1404676 Key Report | Nov14 | Nov13

READY 1 OF 159 RECORDS FOUND

1:57 PM 11/28/2017

The report calls this web service (API):



AIG Titan Services API

Api Help

Help

Api Help

Api Help

Introduction

Provide a general description of your APIs here.

Fx

Fx api controller

API	Description
GET fx/note?OrderByColumn={OrderByColumn}&PageSize={PageSize}&DescOrder={DescOrder}&Display={Display}&AigCode={AigCode}&NotesDate={NotesDate}&Page={Page}	Gets FX Notes
GET fx/rates	Gets FX Rates
GET fx/currencies?OrderByColumn={OrderByColumn}&PageSize={PageSize}&IsActive={IsActive}&IsHyperinflationary={IsHyperinflationary}&AigCode={AigCode}&DescOrder={DescOrder}&Page={Page}	Gets list of all currencies
GET fx/closeDate?onOrBefore={onOrBefore}	Gets earliest closed data on or fore the provided date.
POST fx/rateByCurrency	Gets rates by currency Currently only RateType Daily and Monthend are supported.
POST fx/averageRateByCurrency	Gets average FX rates based on provided criteria.
GET fx/conversionRate?Date={Date}&FromCode={FromCode}&ToCode={ToCode}&RateType={RateType}&FormatType={FormatType}	Gets cross conversion rate
GET fx/monthendDates	Gets list of valid monthends, based on available data in system.
GET fx/lastquarterendDates?ReportType={ReportType}	Get last closed quarter end dates
GET fx/euroIrrevocableFixed	Gets list of euro irrevocable fixed rate, based on available data in system.
GET fx/euroRates	Gets FX rates for EURO
GET fx/ratesVarianceReport?OrderByColumn={OrderByColumn}&DescOrder={DescOrder}&AsOfDate={AsOfDate}&PrevDate={PrevDate}&FactorPerc={FactorPerc}&Currencies={Currencies}&SearchRateType={SearchRateType}&CurrencyString={CurrencyString}&IncludeUnclosedRates={IncludeUnclosedRates}	Gets Rates Variance Report

That API calls the GetFxRates web service (API) – and it calls it twice, once for each date

```
1400                return string.Format(FiscalChartis2Month, cfqtr.Data.Year, cfqtr.Data.Quarter);
1401
1402            default:
1403                break;
1404        }
1405
1406        return null;
1407    }
1408
1409    /// <summary>
1410    /// Gets Rates Variance based on provided criteria.
1411    /// </summary>
1412    /// <param name="criteria"></param>
1413    /// <returns></returns>
1414    public async Task<FxRatesVarianceResult> GetRatesVariance(FxRatesVarianceSearchCriteria criteria)
1415    {
1416        string msg = null;
1417
1418        // retrieve rates
1419        FxRateResult AsOfDateRateData = await GetFxRates(new FxRateSearchCriteria
1420        {
1421            RateDate = criteria.AsOfDate,
1422            RateType = FxRateSearchType.Daily,
1423            IncludeUnclosedRates = criteria.IncludeUnclosedRates
1424
1425        });
1426
1427        FxRateResult PrevDateRateData = await GetFxRates(new FxRateSearchCriteria
1428        {
1429            RateDate = criteria.PrevDate,
1430            RateType = FxRateSearchType.Daily,
1431            IncludeUnclosedRates = criteria.IncludeUnclosedRates
1432        });
1433        if (AsOfDateRateData.Data.Count() == 0)
1434            msg = string.Format("Rates not found on As of Date ({0:MM/dd/yyyy})", criteria.AsOfDate);
1435        else if (PrevDateRateData.Data.Count() == 0)
1436            msg = string.Format("Rates not found on Previous Date ({0:MM/dd/yyyy})", criteria.PrevDate);
1437
1438        if (msg != null)
1439            return new FxRatesVarianceResult { Criteria = criteria, Success = false, Message = msg };
1440
1441        var RatesVarianceData = from AsofDate in AsOfDateRateData.Data.AsQueryable()
1442                                join PrevDate in PrevDateRateData.Data.AsQueryable()
1443                                on AsofDate.CurrencyCode equals PrevDate.CurrencyCode
1444                                select new
1445                                {
1446                                    CurrencyCode = AsofDate.CurrencyCode,
1447                                    CurrencyName = AsofDate.CurrencyName,
1448                                    AsOfDateRate = (criteria.SearchRateType == RateVarianceRateType.USD) ? AsofDate.IndirectRate : Convert.ToString(AsofDate.SpotRat
1449                                    PrevDateRate = (criteria.SearchRateType == RateVarianceRateType.USD) ? PrevDate.IndirectRate : Convert.ToString(PrevDate.SpotRat
1450                                    AsOfDateRateDec = (criteria.SearchRateType == RateVarianceRateType.USD) ? Convert.ToDecimal(AsofDate.IndirectRate) : AsofDate.Sp
1451                                    PrevDateRateDec = (criteria.SearchRateType == RateVarianceRateType.USD) ? Convert.ToDecimal(PrevDate.IndirectRate) : PrevDate.Sp
```

GetFxRates calls FxRates

```
C:\tfs.AIGApps\CBIT\Treasury\Titan\Main\Libraries\Titan.ServiceLayer\Services\FxService.cs [Read Only] - Microsoft Visual Studio
File Edit View Project Debug Team Tools Test Analyze Window Help
C:\tfs.AIGApps\CBIT...rvices\FxService.cs   Source Control Explorer
Miscellaneous Files   Titan.ServiceLayer.Services.FxService   GetFxRates(FxRateSearchCriteria criteria)

                rVal.Data = currency;
            }
        }

        return rVal;
    }

    /// <summary>
    /// Gets FX rates
    /// </summary>
    /// <param name="criteria"></param>
    /// <returns></returns>
    public async Task<FxRateResult> GetFxRates(FxRateSearchCriteria criteria)
    {
        if (criteria.RateType == FxRateSearchType.Daily)
        {
            if (criteria.RateDate != null && !ValidateCutoffDates(criteria.RateType,criteria.RateDate))
                return new FxRateResult
                {
                    //Data = query.GetPagedData(criteria.OrderByColumn, criteria.DescOrder, 1, int.MaxValue).Data,
                    Data = new List<FxRate>(),
                    Message = string.Format("{0} Rates are not available prior to {1}, access Old FX website from website menu items.", criteria.RateType, CutOffDat
                    Criteria = criteria
                };

            var date = criteria.RateDate;
            var lastCloseDate = await GetLastCloseDate();

            var query = _fxDbContext.FxRates.AsNoTracking().Where(r => r.ForwardDate == date
              && (r.Isactive == "Y" || (r.Isactive == "N" && r.Termination > r.ForwardDate)));

            if (criteria.Currencies != null)
            {
                query = query.Where(r => criteria.Currencies.Contains(r.CurrencyCode));
            }

            if (criteria.IncludeUnclosedRates == false) {
                query = query.Where(r => r.ForwardDate <= lastCloseDate);
            }

            PagedData<FxRate> pagedDataFxRate = await query.GetPagedDataAsync(criteria.OrderByColumn, criteria.DescOrder, 1, int.MaxValue);

            return new FxRateResult
            {
                //Data = query.GetPagedData(criteria.OrderByColumn, criteria.DescOrder, 1, int.MaxValue).Data,
                Data = pagedDataFxRate.Data,
                Criteria = criteria
            };

        }else if(criteria.RateType == FxRateSearchType.MonthEnd)
        {
            if (!ValidateCutoffDates(criteria.RateType, criteria.RateDate))

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CBIT
http://tfs.abp.aig.net:8080/tfs/aigapps/CBIT/CBIT...
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Web Portal | Task Board | Team Room
My Work
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Source Control Explorer
Work Items
Builds
Reports
Settings
Solutions
Workspace: PW7AM1XDPC22929 | New... | Open...
Titan.sln
Titan.sln
DotNet.sln | DotNet
Encryption.sln | EncryptDLL
Solution Explorer   Team Explorer   Class View
Ready   Ln 291   Col 17   Ch 17   INS   Publish
```
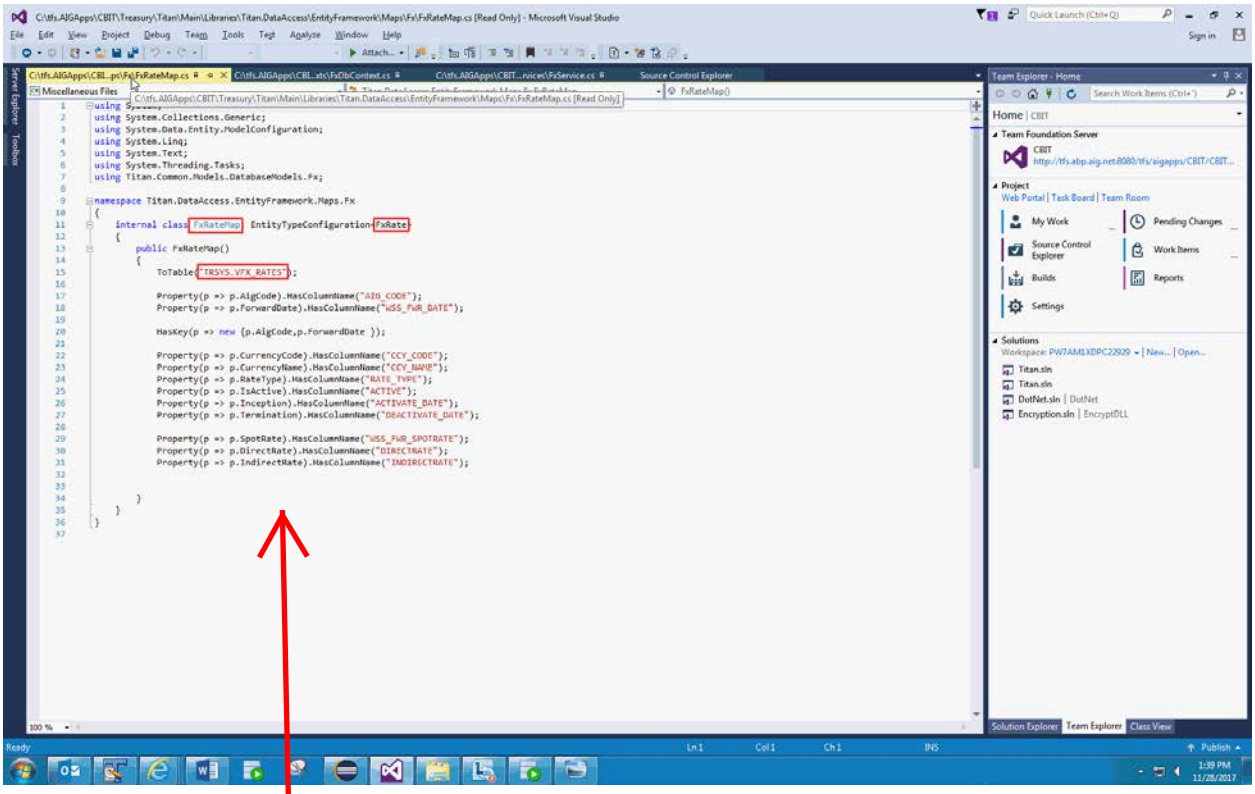
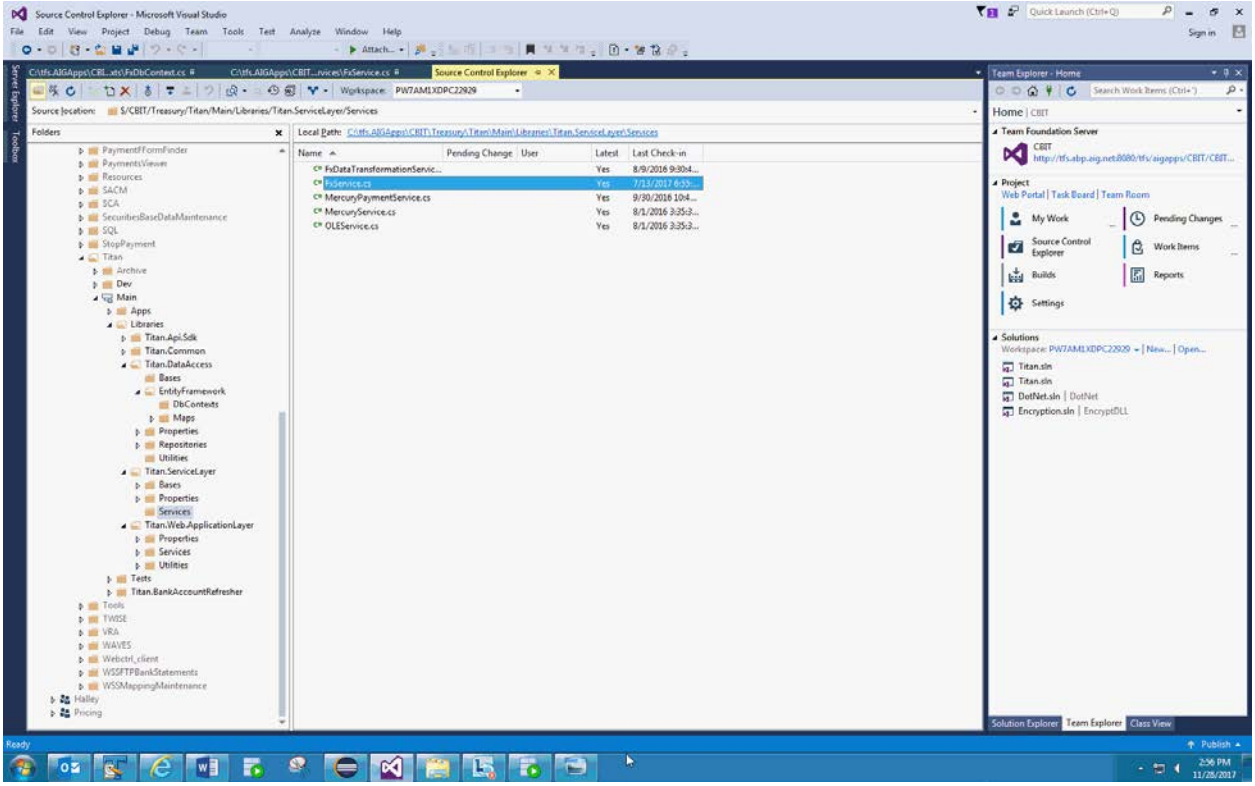

FxRates is mapped to FxRate

```
using System;
using System.Collections.Generic;
using System.Data.Entity;
using System.Data.Entity.ModelConfiguration;
using System.Linq;
using System.Reflection;
using System.Threading.Tasks;
using Titan.Common.Models.DatabaseModels.Fx;
using Titan.Common.Models.DatabaseModels.Mercury;
using Titan.Common.Utilities.ConfigManagers;
using AWAP.EntityFramework.Oracle;
using AWAP.Core.Helpers;

namespace Titan.DataAccess.EntityFramework.DbContexts
{
    public interface IFxDbContext : IDisposable
    {
        DbSet<FxNote> FxNotes { get; set; }

        DbSet<FxCurrencyReference> FxCurrencyReferences { get; set; }

        DbSet<FxCategory> FxCategories { get; set; }

        DbSet<FxRegion> FxRegions { get; set; }

        DbSet<FxRateType> FxRateTypes { get; set; }

        DbSet<FxRate> FxRates { get; set; }

        DbSet<FxCloseDate> FxCloseDates { get; set; }

        DbSet<MonthCloseDate> MonthCloseDates { get; set; }

        DbSet<FxParam> FxParams { get; set; }

        Task<IList<FxAverageRate>> GetAverageRates(DateTime startDate, DateTime endDate, string[] currencies);

        Task<int> SaveChangesAsync();

        Database Database { get; }

        Task<DateTime> GetLastBusinessDayOfMonth(DateTime date);

        Task<DateTime> GetLastClosedDate(DateTime date);

    }

    /// <summary>
    /// EntityFramework context for fx resources
    /// Class is internal so it can only be used the DataAccess library
    /// </summary>
    public class FxDbContext : DbContext, IFxDbContext
```

FxRate is mapped to FxRateMap which points to TRSYS.VFX_RATES



ACCURACY TS-C.03: FCU obtained from IT the source code (pp. 14-20). FCU verified that the table TRSYS.VFX_RATES is the source of the rates in the FX Rate Variance report.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Workspace: PW7AM1XDPC22929
Source location: $/CBIT/Treasury/Titan/Main/Libraries/Titan.ServiceLayer/Services
Folders
Local Path: C:\tfs.AIGApps\CBIT\Treasury\Titan\Main\Libraries\Titan.ServiceLayer\Services
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FxService.cs
MercuryPaymentService.cs
MercuryService.cs
OLEService.cs
Titan.Api.Sdk
Titan.Common
Titan.DataAccess
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Bases
Properties
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Titan.Web.ApplicationLayer
Properties
Services
Utilities
Tests
Titan.BankAccountRefresher
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WSSFTPBankStatements
WSSMappingMaintenance
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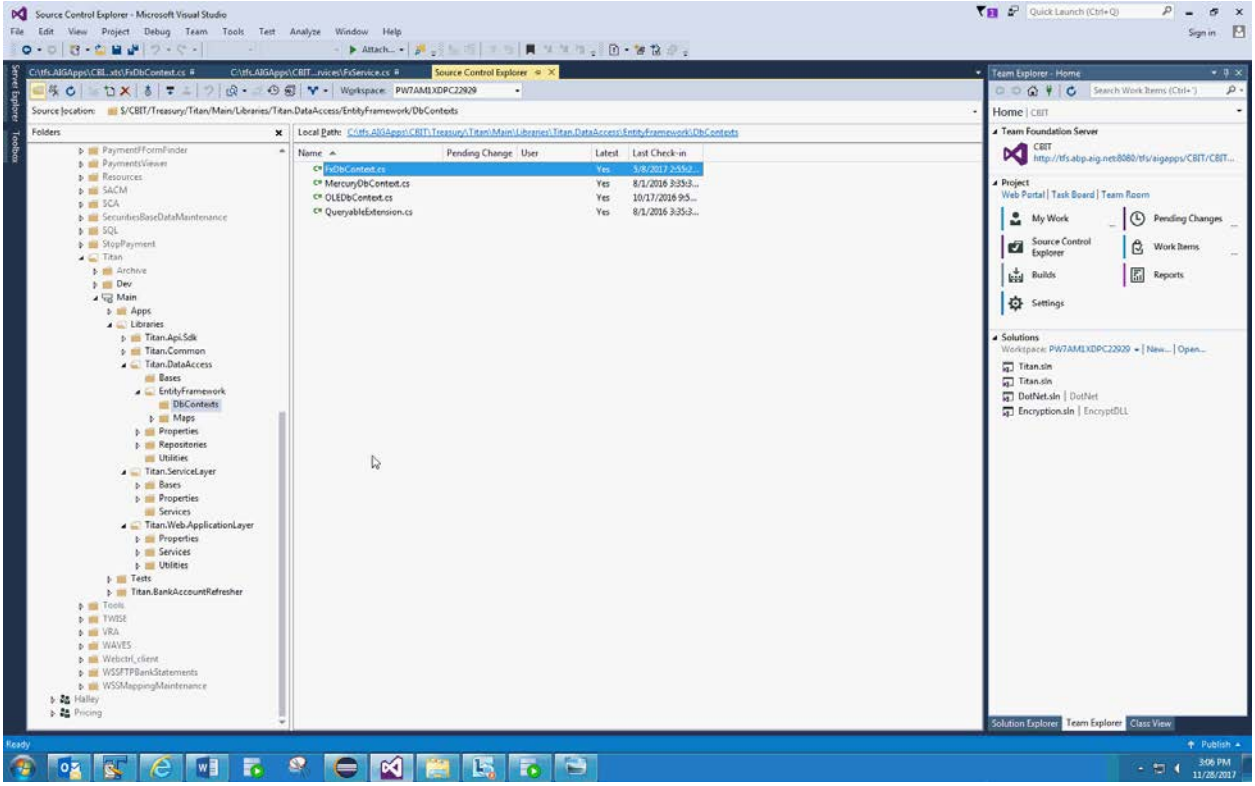
Source Control Explorer - Microsoft Visual Studio
File Edit View Project Debug Team Tools Test Analyze Window Help
Source Control Explorer
Workspace: PW7AM1XDPC22929
Source location: $/CBIT/Treasury/Titan/Main/Libraries/Titan.DataAccess/EntityFramework/DbContexts
Folders
Local Path: C:\tfs.AIGApps\CBIT\Treasury\Titan\Main\Libraries\Titan.DataAccess\EntityFramework\DbContexts
Name
Pending Change
User
Latest
Last Check-in
FxDbContext.cs
MercuryDbContext.cs
OLEDbContext.cs
QueryableExtension.cs
Yes
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Titan.Api.Sdk
Titan.Common
Titan.DataAccess
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