

Hyperion Focus 2015

Rules Profiling at Dentsply International: A Case Study

Jonathan Berry
Accelatis

Today's Agenda

- Introduction and overview
- Review recent consolidation performance issues and corrective actions taken
- Summarize lessons learned

About DENTSPLY International

Leading professional dental consumables company

- \$3 billion revenue base
- 90+% value-added consumables portfolio

Global infrastructure

- Sales in more than 120 countries
- Large sales force in both distributed and direct channels
- Operations in more than 40 countries

Innovation & education

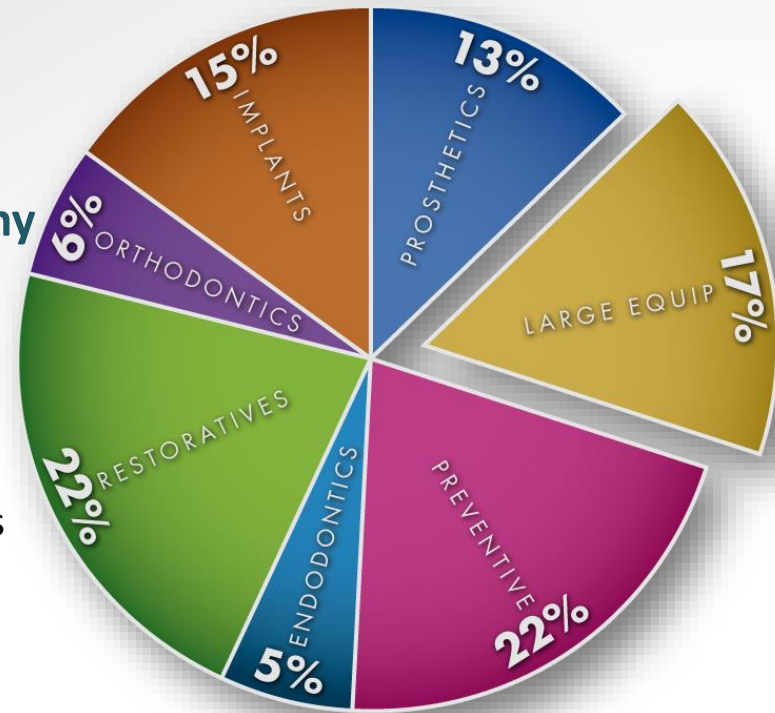
- R&D: over 50 clinical studies
- 30+ significant new products annually
- Clinical educator: train ~250,000 each year

Consolidator in a fragmented market

- Selective; reinvest for growth

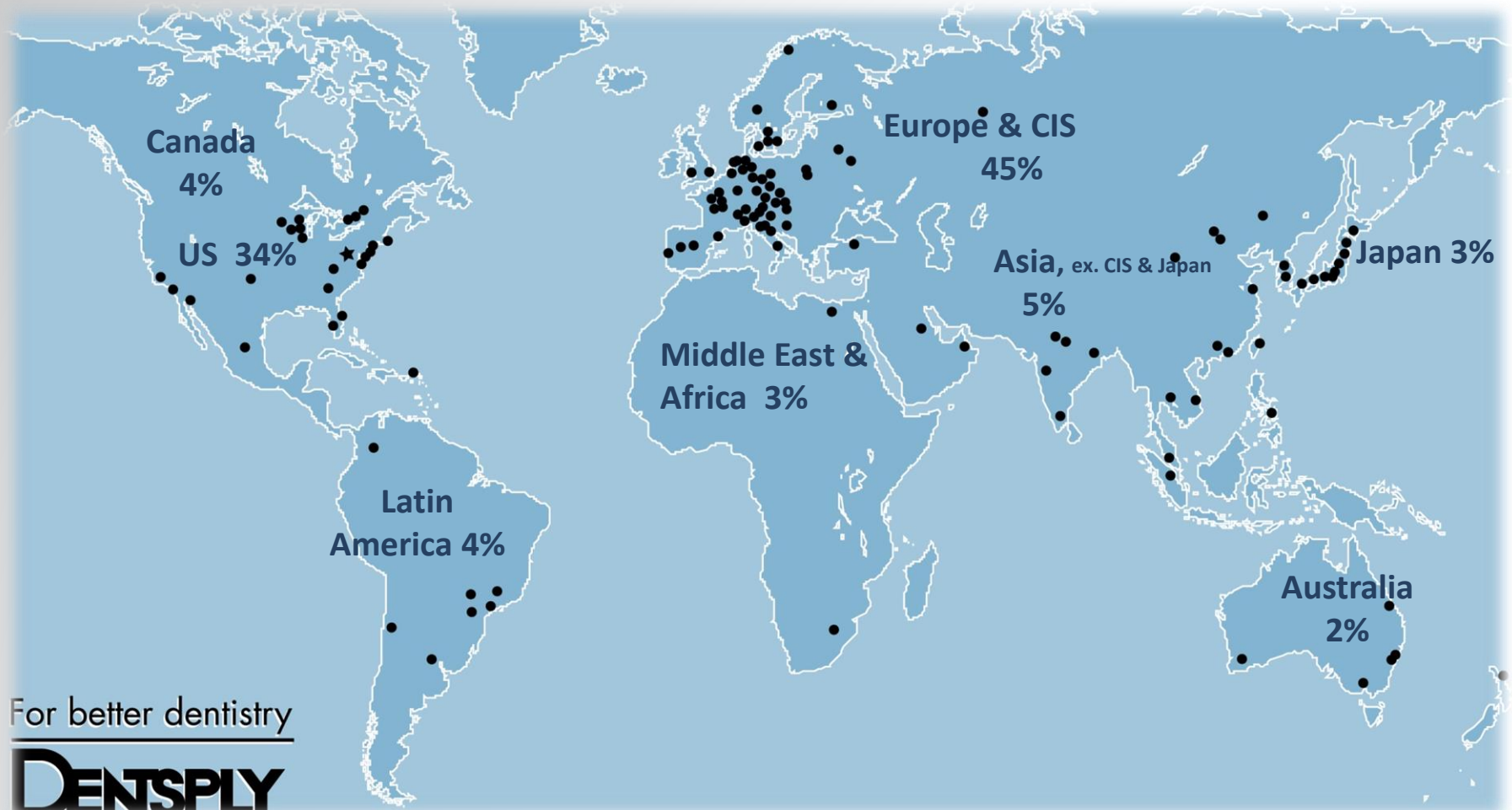
Financially strong

- Deploying free cash flow: repurchases, dividends, M&A
- \$7 billion market cap



DENTSPLY's **GLOBAL** footprint

2013 sales ex-precious metals content



For better dentistry

DENTSPLY

Innovation & LEADING brands

CONSUMABLES			SPECIALTIES			MEDICAL
PREVENTIVE	RESTORATIVE	PROSTHETICS	ENDODONTIC	IMPLANTS	ORTHODONTIC	UROLOGY
NEW PRODUCTS						
 <p>NUPRO Rapid fluoride release Two patient-friendly flavors Pioneers in Protection™</p>	 <p>TPH SPECTRA UNIVERSAL COMPOSITE RESTORATIVE</p> <p>Digit power handpiece</p>	 <p>brain CAM</p>	 <p>TRUshape 3D CONFORMING FILES</p>		 <p>NEW mtm clear-aligner service center</p>	 <p>Lofric</p>
LEADING BRANDS						
<p>NUPRO®</p> <p>Cavitron®</p> <p>slimLINE FITGRIP</p>	<p>SureFil SDR flow</p> <p>POSTERIOR BULK FILL FLOWABLE BASE</p> <p>Palodent Plus</p> <p>Sectional Matrix System</p> <p>Aquasil Ultra</p> <p>SMART WETTING IMPRESSION MATERIAL</p>	<p>CELTRA™ DUO</p> <p>cercon® ht</p> <p>Full Contour Zirconia</p> <p>Portrait® IPN®</p> <p>Denture Teeth</p>	<p>PROGLIDER™</p> <p>ROTARY GLIDE PATH FILES</p> <p>DENTSPLY MAILLEFER</p> <p>PROTAPER Gold ROTARY FILES</p> <p>PROTAPER NEXT™</p>	<p>XiVE®</p> <p>ATLANTIS™</p> <p>ANKYLOS®</p> <p>ASTRA TECH IMPLANT SYSTEM</p>	<p>In-Ovation®</p> <p>Sentalloy®</p> <p>A leader in superelastic wires</p> <p>mtm no•trace™</p> <p>MinorToothMovement.com</p>	<p>Lofric origo™</p> <p>Lofric Sense</p> <p>wellspect HEALTHCARE</p>

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HYPERION

DENTSPLY INTERNATIONAL

About the Presenter

- Over 7 years Hyperion administration experience
- 10 + year VB/VB Script/VBA experience
- Certified Public Accountant

Hyperion Footprint

- HFM – 300 users
- FDM – 200 users
- Support staff of 2 (Manager and Administrator)
- 8 year old Hyperion Implementation
- Third Party Software: Accelatis Rules Profiler and EPM Maestro

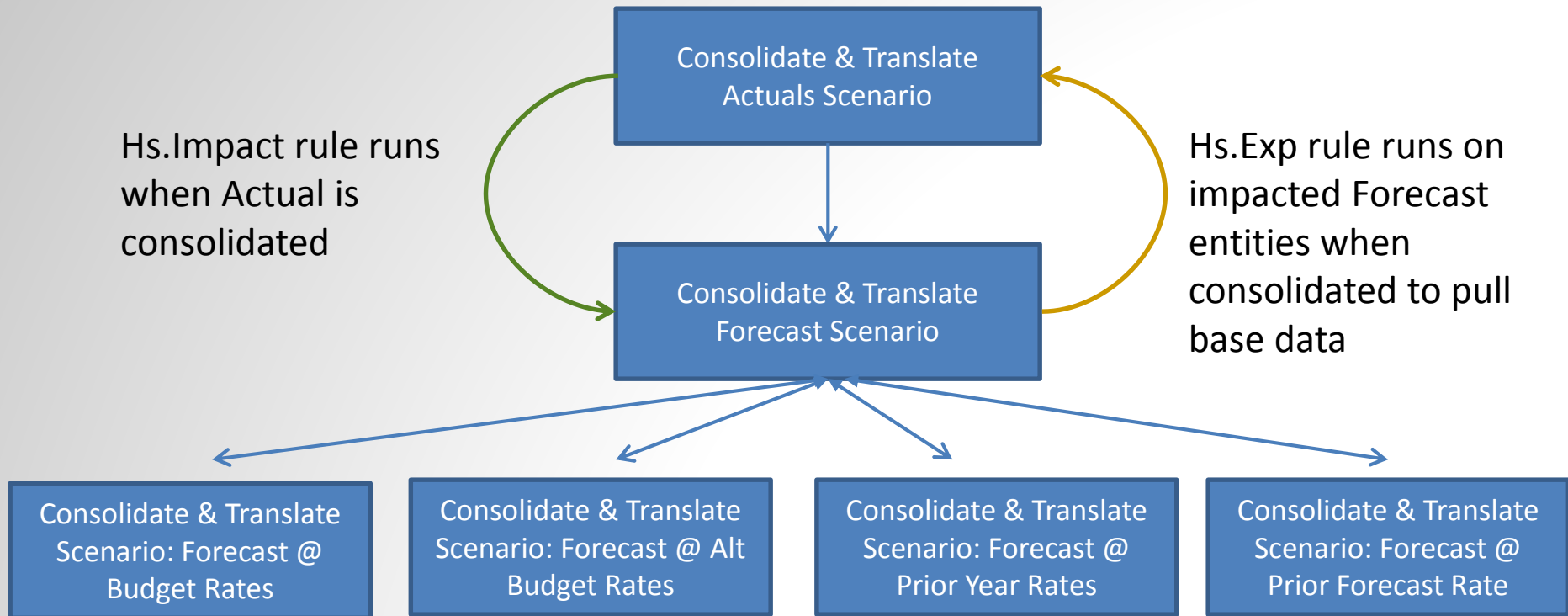
Our Rules Journey

	<i>Implementation</i> <u>2007</u>		<u>2012</u>		<u>2014</u>		<u>2015</u>
Size (lines):	2,660	➔	3,500	➔	3,600	➔	3,900
Consolidation Time (minutes) ¹ :	????	➔	45	➔	75	➔	25
DB Size (GB):	10 (est)	➔	120	➔	250	➔	58



1 – Defined using one off-quarter period of the Actual scenario and Consolidate All with Data on main legal hierarchy.

Our Consolidation Sequence



How did we do it?

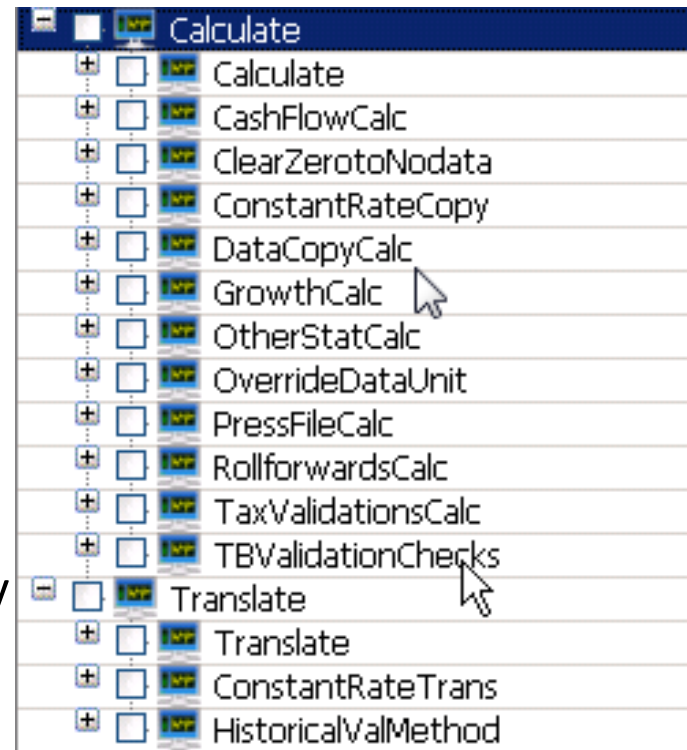
- **Step 1:** Cleaned up and reorganized rules file
- **Step 2:** Reviewed rules with Accelatis Rules Profiler
- **Step 3:** Reviewed rules for writing of zeros

Step 1: Clean up and Reorganize Rules File

- Current State
 - All rules were under either Sub Calculate or Sub Translate
 - Rules were not logically grouped in most cases

- Changes

- Group together rules into logical sub routines
- Ensured a variable populated via the database was only executed once and then passed to subs using a variable
- Added comments in the code where context and further explanation of a rule was necessary



Step 2: Review with Accelatis Rules Profiler

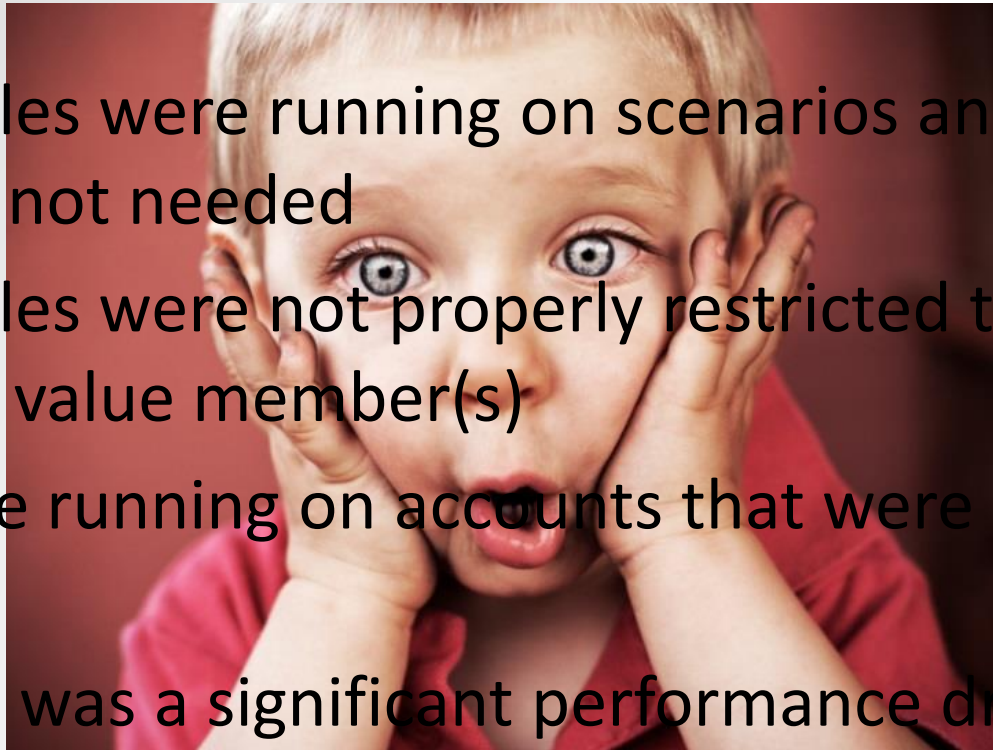
- “What are our rules doing?”
- “Are rules running unnecessarily?”
- “What is the effect of the process of impacting and then moving data to constant currency scenarios?”



Step 2: Review with Accelatis Rules Profiler

What did we find out?

- Certain rules were running on scenarios and periods that were not needed
- Certain rules were not properly restricted to only the necessary value member(s)
- Rules were running on accounts that were no longer used
- Hs.Impact was a significant performance drain!



Step 2: Review with Accelatis Rules Profiler

Unnecessary Calculations: Example #1

By Function	By Timing Block	By Iterator	By Entity	By Data	Timeline
Function	Inc Time	Inc%	Exc Time	Exc %	
[-] <input type="checkbox"/> Calculate	62893...	89%	0ms	0%	
+ <input type="checkbox"/> Calculate	0ms	0%	28706ms	5%	
+ <input type="checkbox"/> CashFlowCalc	10184ms	2%	0ms	0%	
+ <input type="checkbox"/> ClearZeroToNodata	48716ms	8%	0ms	0%	
+ <input type="checkbox"/> ConstantRateCopy	10818ms	2%	0ms	0%	
+ <input type="checkbox"/> DataCopyCalc	41110...	65%	0ms	0%	
+ <input type="checkbox"/> GrowthCalc	47391ms	8%	0ms	0%	
+ <input type="checkbox"/> OtherStatCalc	33808ms	5%	0ms	0%	
+ <input type="checkbox"/> OverrideDataUnit	235ms	0%	0ms	0%	
+ <input type="checkbox"/> PressFileCalc	10864ms	2%	0ms	0%	
+ <input type="checkbox"/> RollforwardsCalc	26686ms	4%	0ms	0%	
+ <input type="checkbox"/> TaxValidationsCalc	16ms	0%	0ms	0%	
+ <input type="checkbox"/> TBValidationChecks	408ms	0%	0ms	0%	
[-] <input type="checkbox"/> Translate	75135ms	11%	0ms	0%	
+ <input type="checkbox"/> Translate	0ms	0%	12955ms	17%	
+ <input type="checkbox"/> ConstantRateTrans	39668ms	53%	0ms	0%	
+ <input type="checkbox"/> HistoricalValMethod	22512ms	30%	0ms	0%	



Not

Needed

20% of Consolidation Time!

Scenario: Forecast ; Year: Current; Period: Current close month

Step 2: Review with Accelatis Rules Profiler

Unnecessary Calculations: Example #2

By Function	By Timing Block	By Iterator	By Entity	By Data	Timeline	
Function	Inc Time	Inc%	Exc Time	Exc	#	# %
Calculate	597289ms	88%	0ms	0%	2515	93%
+ Calculate	0ms	0%	28797ms	5%	0	0%
+ CashFlowCalc	10098ms	2%	0ms	0%	2515	13%
+ ClearZeroToNodata	47477ms	8%	0ms	0%	774	4%
+ ConstantRateCopy	10369ms	2%	0ms	0%	998	5%
+ DataCopyCalc	372323ms	62%	0ms	0%	2515	13%
+ GrowthCalc	50485ms	8%	0ms	0%	2515	13%
+ OtherStatCalc	39348ms	7%	0ms	0%	2515	13%
+ OverrideDataUnit	111ms	0%	0ms	0%	182	1%
+ PressFileCalc	10289ms	2%	0ms	0%	2515	13%
+ RollforwardsCalc	27466ms	5%	0ms	0%	2515	13%
+ TaxValidationsCalc	0ms	0%	0ms	0%	2515	13%
+ TBValidationChecks	526ms	0%	0ms	0%	102	1%
+ Translate	82886ms	12%	0ms	0%	182	7%

Not needed



Scenario: Forecast ; Year: Current; Period: Forecast month

Step 2: Review with Accelatis Rules Profiler

Example of Value Members not Properly Fixed

Problem: Particular Calculation taking an unusually long time to run

Test Approach: Tag this section of code in the Rules Profiler with an Iteration tag

```
'Calculate Net AR Using 4 Point Rate
IF pov_base = True then
  HS.Clear "A#S_CCAR4P"
  HS.Clear "A#S_CCARADJ"
  HS.Exp "A#S_CCAR4P.C5#[None] = A#TotNetTradeRec.C5#[None]"
  'If acquisition month and no sales remove the AR so the ratio is not skewed
  IF NextAcqMth = 1 Then
    IF Not(HS.GetCell("A#NetSalesTP.W#Periodic") > 0) Then
      HS.Clear "A#S_CCAR4P"
      HS.Exp "A#S_CCARADJ.C5#[None] = -A#TotNetTradeRec.C5#[None]"
    End IF
  End IF
End if 'pov_base = True then
```

By Function	By Timing Block	By Iterator	By
Iterator Name		Num Times Invoked	
4PointNetAR_-_Iterator		9	

[-] Canada
E101000
E101001



Step 2: Review with Accelatis Rules Profiler

Example of Value Members not Properly Fixed

Solution: Restrict the code to only run for values <Entity Currency> and <Entity Curr Adjs>

```
'Calculate Net AR Using 4 Point Rate
If pov_base = True then
  If pov_value = "<Entity Currency>" or pov_value = "<Entity Curr Adjs>" then
    HS.Clear "A#S_CCAR4P"
    HS.Clear "A#S_CCARADJ"
    HS.Exp "A#S_CCAR4P.C5#[None] = A#TotNetTradeRec.C5#[None]"
    'If acquisition month and no sales remove the AR so the ratio is not skewed
    If NextAcqMth = 1 Then
      If Not(HS.GetCell("A#NetSalesTP.W#Periodic") > 0) Then
        HS.Clear "A#S_CCAR4P"
        HS.Exp "A#S_CCARADJ.C5#[None] = -A#TotNetTradeRec.C5#[None]"
      End If
    End If
  End if 'pov_value = "<Entity Currency>" or pov_value = "<Entity Curr Adjs>" then
End if 'pov_base = True then
```

By Function	By Timing Block	By Iterator	B
Iterator Name		Num Times Invoked	
4PointNetAR_-_Iterator		4	

Canada
E101000
E101001

X 2 (EC and ECA)
 X 2 (EC and ECA)
 4 Iterations

Step 2: Review with Accelatis Rules Profiler

Rules running on accounts that were no longer used

“ I can see clearly now!”



Solution: Remove rule entirely or “fix” on historical period/ years where account(s) were used.

Step 2: Review with Accelatis Rules Profiler

Performance drain due to use of Hs.Impact: Forecast Example

```
Sub GCImpact(ByVal pov_entity, ByVal pov_scenario)
  If pov_base = True then
    HS.ImpactStatus "S#FCActPrior"
    HS.ImpactStatus "S#FCActBud"
    HS.ImpactStatus "S#FCActPriorMo"
    HS.ImpactStatus "S#FCActBOD"
  End If
End Sub
```

Note: Execute if forecast scenario is in the POV

Step 2: Review with Accelatis Rules Profiler

Performance drain due to use of Hs.Impact

HFM Rules Profiler

Designer | Analysis

Run ID	Package Name	Start Time	End Time	Total Run Time
<input type="checkbox"/> 2015493...	With No CC Forecast Impact...	1/2/2015 12:16:15 PM	1/2/2015 12:16:20 PM	5.647s
<input checked="" type="checkbox"/> 1339857...	With With CC Forecast Impa...	1/2/2015 1:40:05 PM	1/2/2015 1:40:20 PM	14.274s

Scenario: Forecast ; Year: Current; Period: Forecast Month

By Function | By Timing Block | By Iterator | By Entity | By Data | Timeline

Function	Inc Time	Inc%	Exc Time	Exc %	#
Calculate	19126ms	100%	0ms	0%	10
Calculate	0ms	0%	48ms	0%	0
CashFlowCalc	0ms	0%	0ms	0%	10
CCImpact	16754ms	88%	0ms	0%	10
ClearZeroToNodata	1732ms	9%	0ms	0%	3
ConstantRateCopy	250ms	1%	0ms	0%	4
DataCopyCalc	0ms	0%	0ms	0%	10
GrowthCalc	62ms	0%	0ms	0%	10
OtherStatCalc	217ms	1%	0ms	0%	10
PressFileCalc	63ms	0%	0ms	0%	10
RollforwardsCalc	0ms	0%	0ms	0%	10
TaxValidationsCalc	0ms	0%	0ms	0%	10

Viewing: ROOT

Inclusive Function Time

100.0%

Calculate

Exclusive Function Time

Step 2: Review with Accelatis Rules Profiler

Performance drain due to use of Hs.Impact: Forecast Example

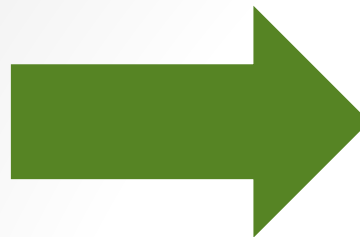
Solution: Move constant currency to custom dimension (Custom 5)

Scenario

Forecast
FCActBud
FCActPrior
FCActPriorCur
FCActBOD

Custom 5

[None]



Scenario

Forecast

Custom 5

[None]
FCActBud
FCActPrior
FCActPriorCur
FCActBOD

Step 2: Review with Accelatis Rules Profiler

Benefits of moving from Scenario to Custom

- Consolidate and translate was only needed on one scenario
- Base data would always be in sync
- All Hs.Impact rules were removed
- Met managements needs to see up-to-date constant currency results
- Faster consolidations end-to-end (i.e. consolidation of all forecast scenarios)

Step 2: Review with Accelatis Rules Profiler

HS.OpenDataUnit

- Used heavily on the new Custom 5 calculations to copy data
- Allowed us to efficiently copy data on only accounts relevant for constant currency analysis by applying an “If” statement to the elements of the opened data unit
- Will only process existing data and eliminate possibility of calculating zeros

Step 3: Review for writing of zeros

- Used EPM Maestro to perform standard as well as filtered extracts (filtered by value, custom, account, etc.)
- Summarized extracted results with a value of zero
- Reviewed the rules and identified the source of the zero and corrected in most cases by applying a conditional statement:

```
'Calculate amounts  
If C4Va1 > 0 or C4Va1 < 0 Then 'Don't want to run calculations on zero or null  
    USD_temp = USD_temp + (C4Va1 * ULGRate)  
End If
```

Recap

Walk of Actual Consolidation Time: Before and After Changes (minutes)

Before Review	75
Subtract:	
Remove Hs.Impact rules	-45
Correct unrestricted calculations on Value members and Scenarios	-10
Remove calculations for unused accounts	-5
Other	-5
Add:	
Custom 5 constant currency rules	15
After Review	25

Lessons Learned

- Restrict as much as possible in the rules
 - Not all rules should run for every scenario, every year and every month
 - Watch what value members are being calculated. Most times it should only be EC and ECA.
- Watch for the writing of zeros
- Keeps your rules clean so your view does not get obscured by the clutter
- When working with variables evaluate whether they can be reused
- When benchmarking use a consistent POV
- Work with an experienced consultant to help with or consult on the more difficult rules issues and changes
- Know your database. Take your DBA out to lunch!

Lessons Learned

Don't Take the First (or Second) Consolidation when Benchmarking

HFM Rules Profiler

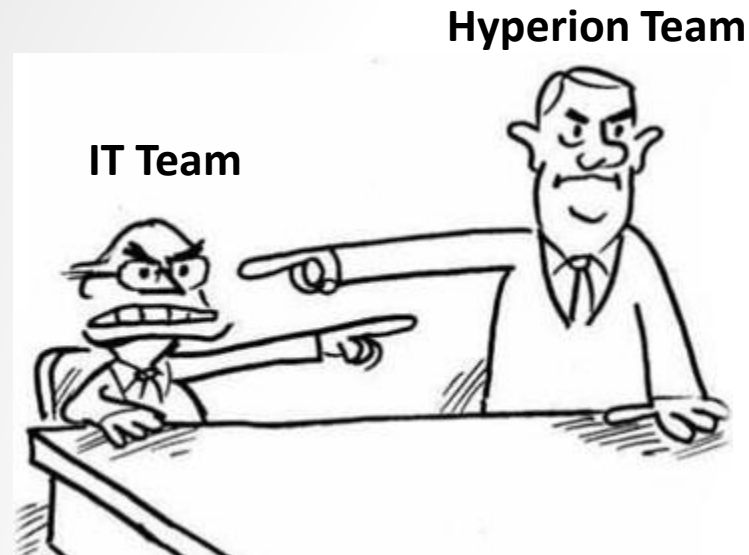
Designer | Analysis

Run ID	Package Name	Start Time	End Time	Total Run Time
<input type="checkbox"/> 919275682	With No CC Forecast Impact...	1/2/2015 12:09:59 PM	1/2/2015 12:10:19 PM	19.5s
<input type="checkbox"/> 983747050	With No CC Forecast Impact...	1/2/2015 12:11:20 PM	1/2/2015 12:11:28 PM	7.831s
<input type="checkbox"/> 126518148	With No CC Forecast Impact...	1/2/2015 12:12:13 PM	1/2/2015 12:12:19 PM	5.444s
<input type="checkbox"/> 1028961...	With No CC Forecast Impact...	1/2/2015 12:13:24 PM	1/2/2015 12:13:30 PM	5.725s
<input type="checkbox"/> 578542428	With No CC Forecast Impact...	1/2/2015 12:14:19 PM	1/2/2015 12:14:25 PM	5.803s
<input type="checkbox"/> 910458022	With No CC Forecast Impact...	1/2/2015 12:15:15 PM	1/2/2015 12:15:21 PM	5.787s
<input type="checkbox"/> 2015493...	With No CC Forecast Impact...	1/2/2015 12:16:15 PM	1/2/2015 12:16:20 PM	5.647s
<input type="checkbox"/> 2055866...	With No CC Forecast Impact...	1/2/2015 12:17:09 PM	1/2/2015 12:17:14 PM	5.538s

* The first time you run consolidation in HFM it needs to load data from the database

New Change Control Process

- Every change to the rules file is tested using the Accelatis Rules profiler on both the Actual and Forecast scenario to ensure there is no unexpected degradation in performance.
- Record also helps to identify when performance may be due to a system/ network issue or a change in the rules



Questions?

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Thank you!

