TM1 and Planning Analytics for Administrators

COMPONENTS

- **Perspectives**: Legacy Excel add-ins
- **Architect**: Legacy developer tool.
- **PAx**: Planning Analytics for Excel, New Excel add-ins
- **PAW**: Planning Analytics Workspace
- **PAL**: Planning Analytics Local

WHAT IMPACT CPU USAGE

- Are you using **Process parallelisation** and **MTQ?**
- **Number of Users**.
- The **number of waiting users' events External applications on the server**. **TM1web** verses no TM1Web. Do you add a core or two for TM1Web.
- **Number of Intra-day load threads**.
- Check **PVU** (Processor Value Unit)

PAW

- **PAW** requires Docker to be installed.
- **Docker** is a software containerization platform.
- **PAW** Installation Guide

INSTALLATION TIPS

- Find TM1/Planning Analytics version
- Upgrade to Planning Analytics
- Make sure anti-virus is disabled.
- Anti-virus should skip TM1 installation folder and data folder.
- Run as administrator.
- Uninstall components by components
- Restart server when uninstallation is done.
- Pax Cubeviewer and Subset Editor requires PAW to be installed.
- Adjusting Server Configuration for PAL

CONFIGURATION

- **tm1s.cfg**: Instance Config file
- **tm1server.log**: Process Errors
- **tm1s.log**: Data logs
- **Configuring logging output**
- **Optimization**: ParallelInteraction, MTQ…

TM1 SECURITY

- **Mode 1**: TM1 Security
- **Mode 2**: TM1 + Integrated Login
- **Mode 3**: Only Integrated Login
- **Mode 4**: Only CAM Security
- **Mode 5**: TM1 Security + CAM Security

CONNECT TO LDAP

- Windows Integrated Login (Mode 3)
- CAM Security
- OKTA, Open ID

CAM SECURITY

- Requires **Cognos Analytics** as security provider which allows integration with AD.
- Default Cognos database for content store or SQL Server.
- Supports Single Sign On.

INTEGRATED LOGIN (MODE 3)

In **}ClientsProperties** cube – Define **UniqueID** per user: **username@userdomain**

PORT NUMBER

- **5495**: Admin host, **5898**: Admin Host REST API SSL port , **5498**: TM1 SSL, **9510**: TM1 Web
- **8099**: Pulse, **8080**: Canvas,**7070**: Arc

SESSION TIMEOUT

- **TM1** server disconnects idle client connections after 900 seconds (tm1s.cfg): IdleConnectionTimeOutSeconds
- **TM1 Web timeout:** webapps\tm1web\WEB-INF\web.xml
- **IIS timeout:** Idle Time-out (minutest): IIS Manager

RECOMMENDATIONS

- Restart TM1 servers on weekly basis (help removing temporary files)
- Run SaveDataAll() or CubeSaveData() regularly to save the data to disk.
- Monitor CPU and disk space
- Being more pro-active

SQL SERVER EXPRESS LIMITATIONS

- Maximum Compute Capacity Used by a Single Instance: Limited to lesser of 1 Socket or 4 cores
- Maximum memory utilized is 1GB
- Maximum relational Database size is 10 GB

SQL BASICS

- Most popular DB Engines: Oracle, MySQL, Microsoft SQL Server, DB2, Microsoft Access, Cassandra, SQL Lite.

SELECT column1, column2, …
FROM table_name
WHERE condition1 AND condition2 OR conditio n3

ORDER BY column1, column2, … **ASC|DESC;**

WINDOWS COMMAND LINE

- **ping**: test server connection.
- **ipconfig**: get the list of IP on the server.
- **echo %username%**: Get the user name.
- **echo %userdomain%**: Get the user domain

EXAMPLE OF WINDOWS SCRIPT

Copying one folder to another:

SET SOURCEFOLDER=TM1\Tm1data

SET TARGETFOLDER=E:\Temp\temp

rem XCOPY "%SOURCEFOLDER%*.cub" **%TARGETFOLDER%** /H /Y /E /I /C /D:02-08-2013 **/EXCLUDE:%SCRIPTFOLDER%**exceptions.txt >> %SCRIPTFOLDER%\AR_Process_log.txt

RUN TM1 PROCESSES FROM OUTSIDE

- TM1RUNTI
- IBM Cognos Command Centre.
- BMC Control

TM1RUNTI

"C:\Program Files\Cognos\TM1\bin\tm1runti.exe" -process Cub.Flight **-adminhost** CW111 **-server** flightstats **-user** TI01 **-pwd** "" pYear=2000 pMonth=01

TM1 REST API

- It is enabled by default on v11.
- 5001 default port with Planning Analytics.
- Download the Postman collection for the TM1 REST API

CAN'T SEE A TM1 INSTANCE

- Check if TM1 service is starting
- Check HTTPPortNumber has to be unique
- Check if **SupportPreTLSv12Clients**=T

CAN'T CONNECT TO TM1 INSTANCE

- Check Adminhost
- If CAM Security, try to connect to Cognos BI/Analytics

EXCEL ADD-INS DOES NOT SHOW

- Add folder path as trusted folder location.
- Check if correct 32 or 64 bits version.
- Check if not conflicts with others add-ins.

Learn More

The functional Model

The Information Warehouse

IBM Developer Works

TM1 Forum (tm1forum.com).

Blog:

- cubewise.com/blog/
- code.cubewise.com/blog-summary/)

Training: (cubewise.com/edu/)

TM1 and Planning Analytics for Developers

HIERARCHIES

- Hierarchies are what dimensions were, they have **their own attributes values**, **their own subsets**, and **their own elements**.
- Dimension has the list of attributes but the value is stored in the hierarchies
- As leaf elements are independently duplicated once you are looking at an alternate hierarchy, you are technically looking at different leaf elements

CONSOLIDATIONS

- Each consolidation has an internal list of every leaf element that rolls up to it.
- Consolidation is by the leaf element, any consolidations between the leaf elements are NOT calculated.
- Only cells with values are consolidated by TM1 when SKIPCHECK is enabled.
- SKIPCHECK should always be on!
- TM1 is fast because it only calculates what is requested.

ORDERING DIMENSIONS

- The recommended optimal ordering of smallest sparse to largest sparse, followed by smallest dense to largest dense dimensions.
- 90% of the memory gain is from correctly positioning the last dimension.
- You can customise the cube order for specific queries but it won't work for all queries.
- Best performance by placing dimensions that are title elements, especially leaf title elements, as first dimensions in the cube.

LOCKING

- Locking ensures users see correct data and is also important for server stability
- Avoid metadata update during working hours
- Use SecurityRefresh in a separate TI
- Avoid dynamic subsets at all costs

RULES

- Use Rules until you can't use it.
- Don't overuse ConsolidateChildren, Max, AVG
- Feederless rules can improve your performance
- Can't apply rules to numeric attributes
- Use **consolidations weights** instead of rules.
- Resolving Circular Reference

RULES WITH HIERARCHIES

- Syntax for addressing hierarchies: ['dimension' : 'hierarchy' : 'element']
- Concatenate the hierarchy name with the pipe "|" does not work
- Consolidated element should be unique per hierarchies to avoid ambiguous name errors
- Hierarchies must be individually specified by name.

FEEDERS

- Apply to N level elements only
- Consolidation feeds all leaf element and therefore can cause overfed cells…
- Overfeeding is less dangerous than underfeeding.
- Check Overfeeding

PERSISTENT FEEDERS

- Shortens server start up time
- Feeders are evaluated at start-up
- Fed cells saved to disk (just like data)
- Cube.feeder file in data directory
- Created on start-up (if non-existent or invalid).
- Size of feeder file (relative to memory size) could impact backups.

TM1 PROCESS

- **Prolog:** Run once at the beginning
- Always uses process specific views and subsets instead of generic views.
- **Metadata:** Run for every row in data source, should only update metadata
- **Data:** Run for every row in data source, should only update data
- **Epilog:** Run once at the end. Delete temporary subsets and views.

TM1 PROCESS TIPS

- Use **SecurityRefresh**; in a separate TI
- Don't reinvent the wheel with Bedrock
- ExecuteCommand(CommandLine, Wait);
- Deactivate the loggging when updating a cube

CUBE LOGGING

- **Turn On**: CellPutS(YES, '}CubeProperties', 'cubename', 'LOGGING')
- **Turn Off**: CellPutS('NO', '}CubeProperties', 'cubename', 'LOGGING')
- TI processes run fastest when cube logging is turned off. Turn it back on, once the TI finishes.

MANAGE PROCESS ERRORS

- **ProcessBreak** stops processing source data and proceeds to the Epilog portion of a process.
- **ProcessError** causes an immediate termination of a process without commit and flagged with an error status.
- **ProcessQuit** terminates a TI process.

USE HUSTLE PARALLEL PROCESSING

- Run in // one TM1 process per CPU
- Use Hustle to manage threads
- // TIs with REST API = RushTI

RULES & PROCESSES OPERATORS

- AND: **&**
- OR: **%**
- CONCATENATE: **|**

MDX

- MDX as a Definition Language for **Member Sets**:

```
{TM1FILTERBYLEVEL( {TM1SUBSETALL( [Account] )}, 1)}
```

- MDX as a Query Language for **Cube Data**:

```
SELECT NON EMPTY {[Measure].[Revenue], [Measure].[EBIT]} ON COLUMNS , NON EMPTY { [Year].[2016] } * { [Month].[01] : [Month].[12] } ON ROWS FROM [PnL Cube] WHERE ( [Version].[ACT], [Currency].[EUR], [BU].[UK] )
```

IMPROVE PERFORMANCE

- Improve TM1 rules
- Use MTQ (Multi-Threaded Query)
- Use MaximumCubeLoadThreads in TM1s.cfg for a quick start of the server
- Run processes in parallel with Hustle
- Avoid User locking
- Restart TM1 servers on Weekly basis
- Clean dimensions, Snapshot old data
- Train your users
- Tune VMM/VMT
- Disable anti-virus on TM1 data folder

TM1 OBJECTS SECURITY

- Each object can have Admin, Lock, Read, Reserve, Write, None.
- Set a user has **ReadOnlyUser** field in the **}ClientProperties** to get Read access to all cubes.
- Hold, lock objects

Toolbox

Notepad++, Arc, Winmerge, Bedrock for TM1, Hustle, ODBC Connect, Postman, TM1py

Learn More

Bedrock for TM1 whitepapers

TM1 developers credentials

TM1 Forum (tm1forum.com).

Blog (code.cubewise.com/blog-summary/)

TM1 and Planning Analytics for End Users

BASICS

- What is TM1
- The definitive history of TM1

OBJECTS

- **Cube**: A multidimensional representation of data, structured by dimensions.
- **Dimension**: Constitute the 'what' and the 'how' of the data that is being analysed. Contains hierarchies.
- **Hierarchy**: Contains a collection of elements (Numeric, Consolidated or String).
- **Element**: Elements tend to describe the type of data (Numeric or String).
- **Consolidation/RollUps**: Aggregations of elements in a Hierarchy
- **Attribute**: Properties of an element.
- **Subset**: A set of elements
- **Process**: extract, transform and load data into TM1.
- **Chore**: Used to schedule processes.

SUBSET

- Only 1 item can be selected if the subset is not in the ROWs or COLUMNs
- Filters only work on the existing elements in the current subset, if the filter returns nothing, try to use the **All** button and try again.
- Roll Ups are consolidations are not persistent between different sessions
- Avoid clicking on a consolidation with a lot of children when the property window is open.

FEATURES

- The **Sandbox** is a layer on top of the Base Data, is your own personal area where you can adjust value that is private.
- The **Drillthrough** provides users the capability to continue their analysis to an external database or to another cube.

DATA SPREAD SHORTCUTS

- P: Proportional Spread
- S: Equal Spread
- R: Repeat (R+>100) add 100 to the right cells
- P%: Percent Change
- C: Clear (C>) Clear all values to the right

TM1 WEB

- Build your TM1 report in Excel, upload into TM1 and then open it in TM1Web.
- Does not support all Excel features.
- Test your report as you go, it will be easier to find what went wrong.
- Avoid advanced conditional formatting
- Remove Undo/Redo button
- Improve TM1 Web performance

PLANNING ANALYTICS WORKSPACE

- Plan, Create and Analyse your content.
- Making use of Snap Commands
- Limit the number of sheet for performance.
- Cube view, if you get too far down the tree and want to get backup press to return up.
- Use the **intent bar** to get quickly access to data using keyword such as cube name.
- Synchronize dimension when multiple objects in same workbook.

PERSPECTIVES

- Large views maybe very fast in Cube viewer but may not be the case in Slice reports or Active forms
- Grey cells are either a consolidation or a calculation, to trace calculation, right click on the cell.
- **Snapshot**: Easy to export data from Cube Viewer for sharing to others without TM1 access
- **Slice**: Rows are static and is a great choice for quick ad-hoc report, dashboard and summary reports
- **Active Form**: Dynamic rows, requires more skill than Slices to build and design

PLANNING ANALYTICS FOR EXCEL

- Customize the themes
- Converting Perspectives reports to PAX
- **Quick Report**: Structured in rows, columns and a context area to display data
- **Dynamic Report**: Retains the ability to expand or collapse the row dimension while being able to retrieve data.
- **Custom report**: Provides the most flexibility, not locked in structure.
- **Exploration View**: Similar as the Cube Viewer but in Excel.

EXCEL TM1 FUNCTIONS

- **DBRW:** Read and Write data from TM1 using a (pre-calculated) view formula
- **DBR:** Read and Write data from TM1 without using a view formula
- **DBSW:** Send a data to TM1 using a (pre-calculated) view formula
- **DBS:** Send a data to TM1 using a (pre-calculated) view formula
- **DBRA:** Read & Write from TM1 for an attribute
- **SUBNM:** Enables a subset selection when double clicking on the cell. Default Alias and Subset can be defined in the formula (Optional)

ACTIVE FORM

- Active form's performance will decrease as the number of rows increase (500 rows+ not recommended).
- Put graphs and static values on top
- or below the Active form area, not the left or right of an Active form
- When formatting the Active form area, always format the area within TM1RPTFMTRNG
- Avoid using complex conditional formatting when it is possible

TROUBLE SHOUTING EXCEL REPORTS

- When a report doesn't calculate, first check to reconnect to TM1 as the session could be disconnected
- If a DBRW cell isn't working, try using a DBR to determine whether it is a problem with the VIEW formula
- Sometimes re-exporting an Active form or Slice can be faster than fixing a simple report
- Use best practices and Name Ranges when possible to simply the maintenance going forward

TROUBLE SHOOTING TM1 FORMULAS

Value!, #NAME?, *Key_ERR, or CALC_xxx

- Use the formula bar or hit F2, also highlight individual sections of the formula and evaluate them individually (F9)
- Make sure Excel has an active connection to TM1. Try logging in (reconnecting) or reload the Perspective (tm1p) client
- Try rebuilding the report and wait for it to finish before clicking or entering another cell. If using DBRW formula, it could be that the DBRW isn't referring a valid VIEW for the report
- Make sure the TM1 Instance name is included
- PAX: If returning #NAME, check if the add-in "IBM Cognos Office Reporting TM1 Admin" is available in Excel add-ins.

Learn More

The functional Model

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