



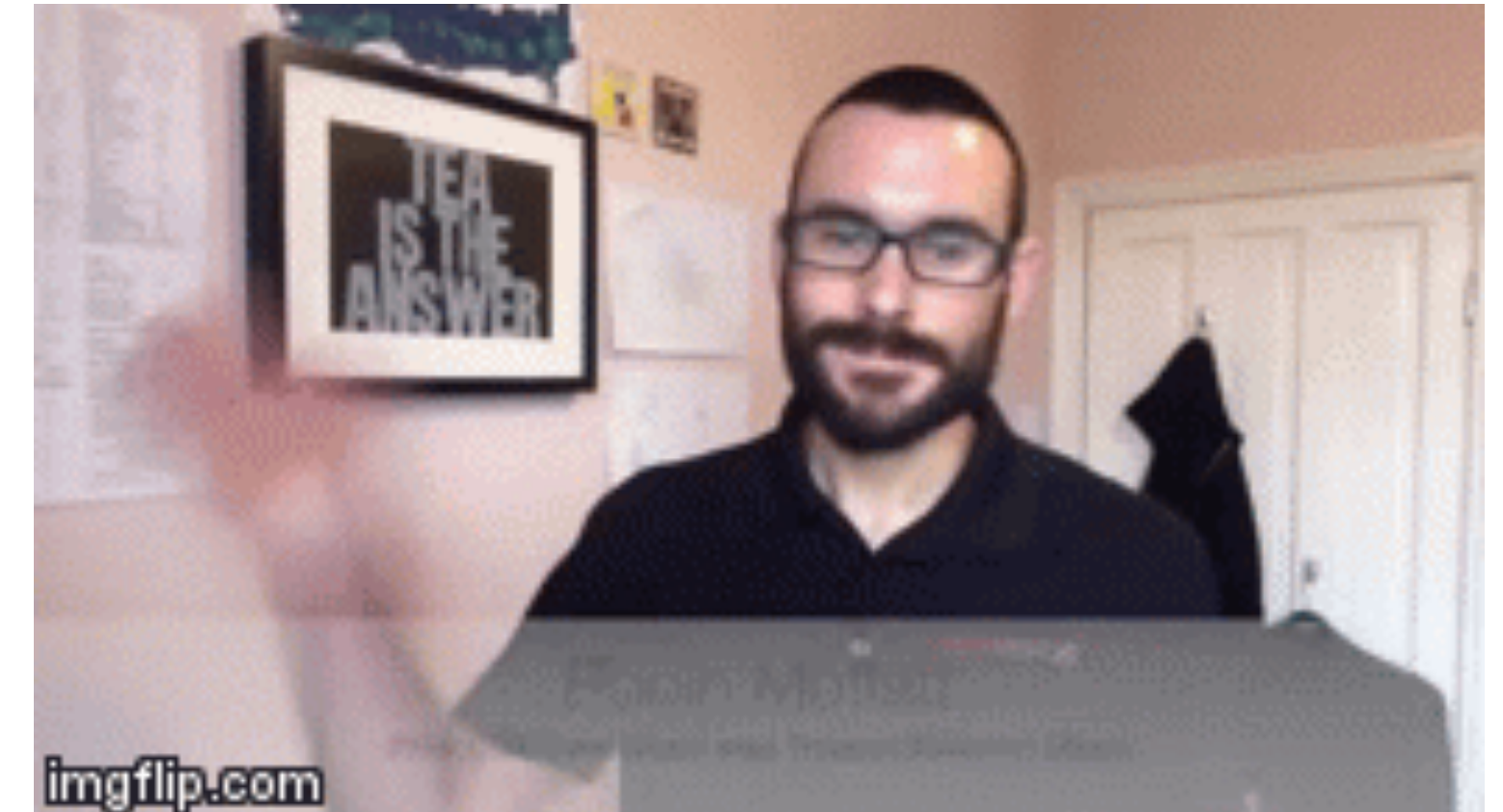
(Still) No Silver Bullets: OBIEE 12c Performance in the Real World

ITOUG Tech Day 2017

Federico Venturin, Rittman Mead

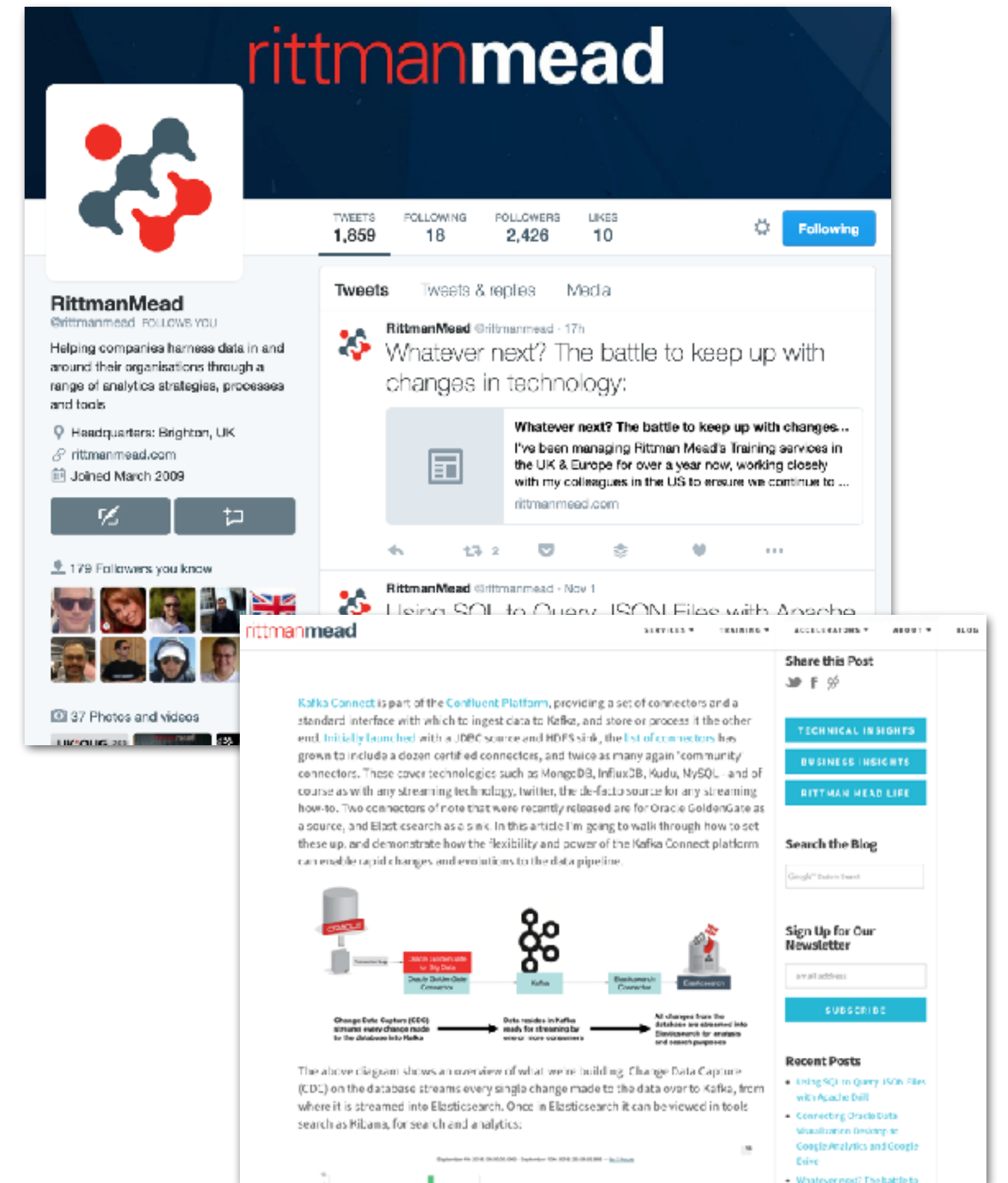
Federico Venturin

- Consultant with Rittman Mead
- 7+ years experience with OBIEE
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- Twitter: @barretbse
- IRC: barretbse / #obihackers / freenode



Rittman Mead

- Oracle Gold Partner with offices in the UK and USA
- 70+ staff delivering Oracle BI, DW, Big Data and Advanced Analytics projects
- Significant web presence with the Rittman Mead Blog (<http://www.rittmanmead.com>)



Why Am I Talking to You About This?

I was raised by my parents to believe that you had a moral obligation to try and help save the world.

—Anne Lamott

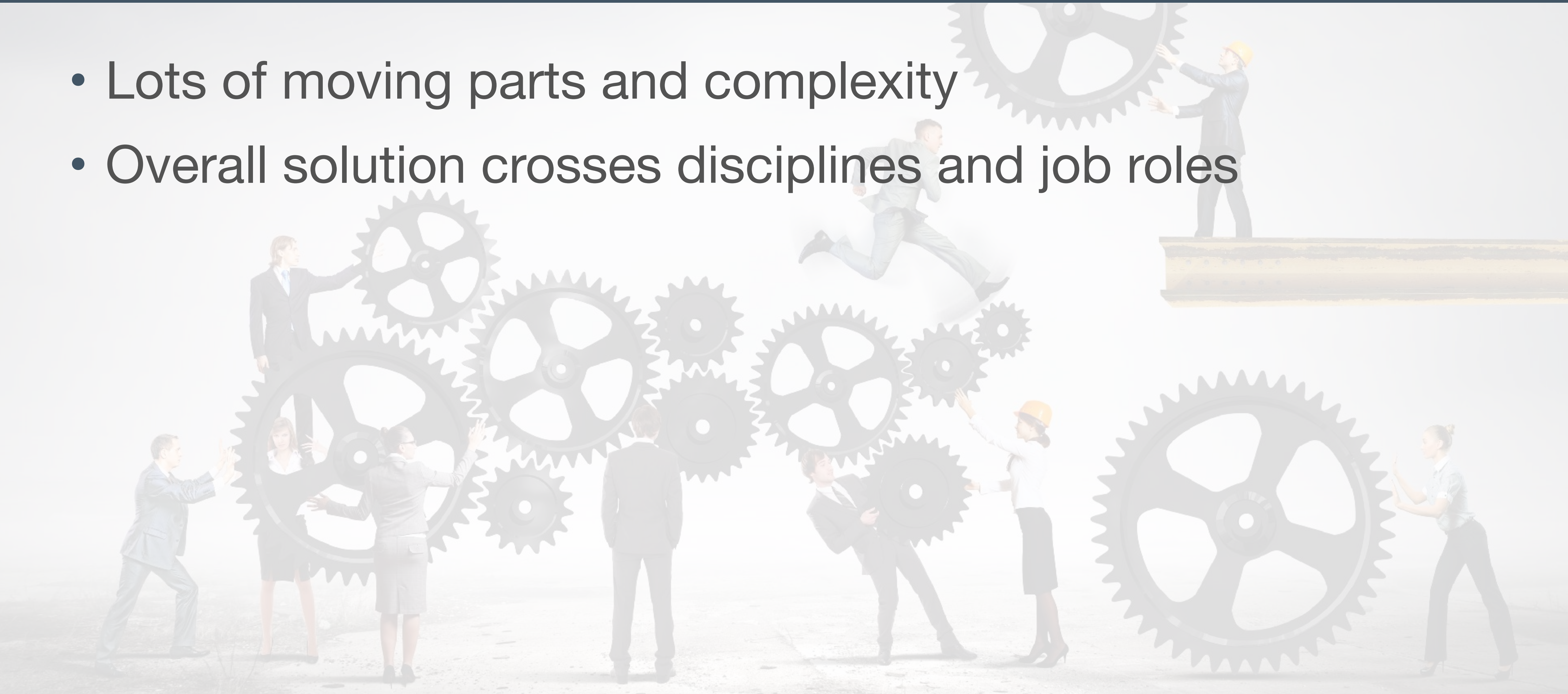


The Requirement



The Bad

- Lots of moving parts and complexity
- Overall solution crosses disciplines and job roles



The Worse



obiee performance best practices

CAUTION

**MASS
CONFUSION**

Steps to improve the performance.

1. implement
2. use aggregation
3. use aggregation
4. limit the
5. turn off
6. carry out
7. use material
8. use data
9. Deselect Cache enabled. Caching is typically not used during development. Disabling cache improves query performance.

Performance Options

Use this page to tune the performance of this BI Instance.

Enable BI Server Cache

Enabling the server cache can greatly improve performance by providing visibility to retrieve row sets from queries that have already been processed, instead of seeing stale data.

Cache enabled

Maximum cache entry size

Maximum cache entries



Christian Berg
@Nephentur



Following

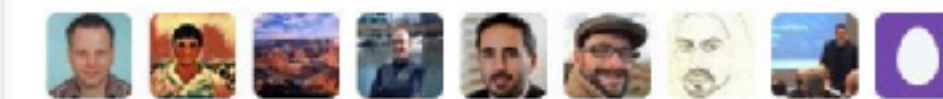
A must-read for any #OBIEE consultant and/or interested party: Oracle OBIEE Tuning Guide
[blogs.oracle.com/pa/resource/Or ...](https://blogs.oracle.com/pa/resource/Oracle-OBIEE-Tuning-Guide)

RETWEETS

6

LIKES

7



9:04 AM - 12 Dec 2012



6



7



The Worse

'He said sex with a virgin could cure HIV'

Crime & Courts | 25 April 2013, 07:48am

LEBOGANG SEALE

Johannesburg - A Soweto man allegedly raped his two-year-old daughter, believing it would cure him of HIV.



DIRTY SOCKS CURE SORE THROATS!!!

Chinese doctors remove live eel from constipated man's stomach after folk remedy fails him

Patient nearly dies after inserting 50cm burrowing fish in himself 'as a folk remedy for constipation'

Mick Jagger Allegedly Used Bee Stings To Boost His Pecker Size

Mick Jagger is a man ahead of his time. Long before penis enhancement ads started spamming email inboxes, the Rolling Stones singer is said to have tried an interesting method of lengthening his wang: with bees.

The Ugly

EVERYBODY

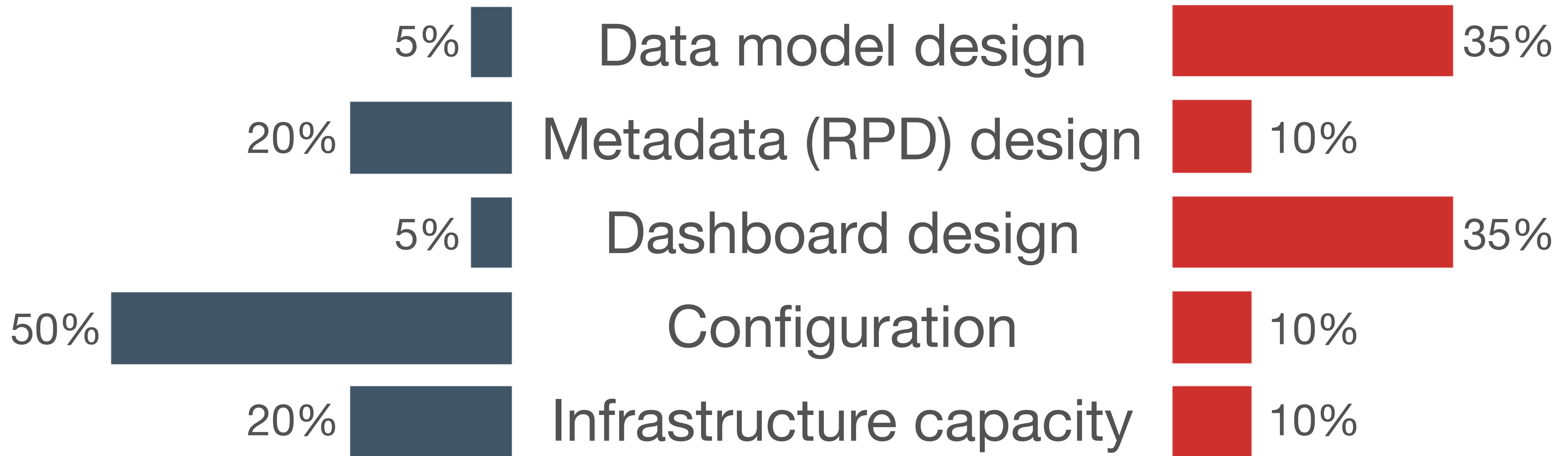
LIES



What Causes Performance Issues?

Expectation

Reality



Performance Tuning Myths Demystified

Myth #1

By changing configuration settings you can fix any OBIEE performance issue

Truth

The defaults are generally good and unnecessary fiddling without good reason should be avoided

Performance Tuning Myths Demystified

Myth #2

By adding capacity you can fix any OBIEE performance issue

Truth

Adding capacity alone is generally not sensible

Fix performance at root cause and you might offset the need to add any additional capacity at all

Evidence-Based Design and Diagnostics

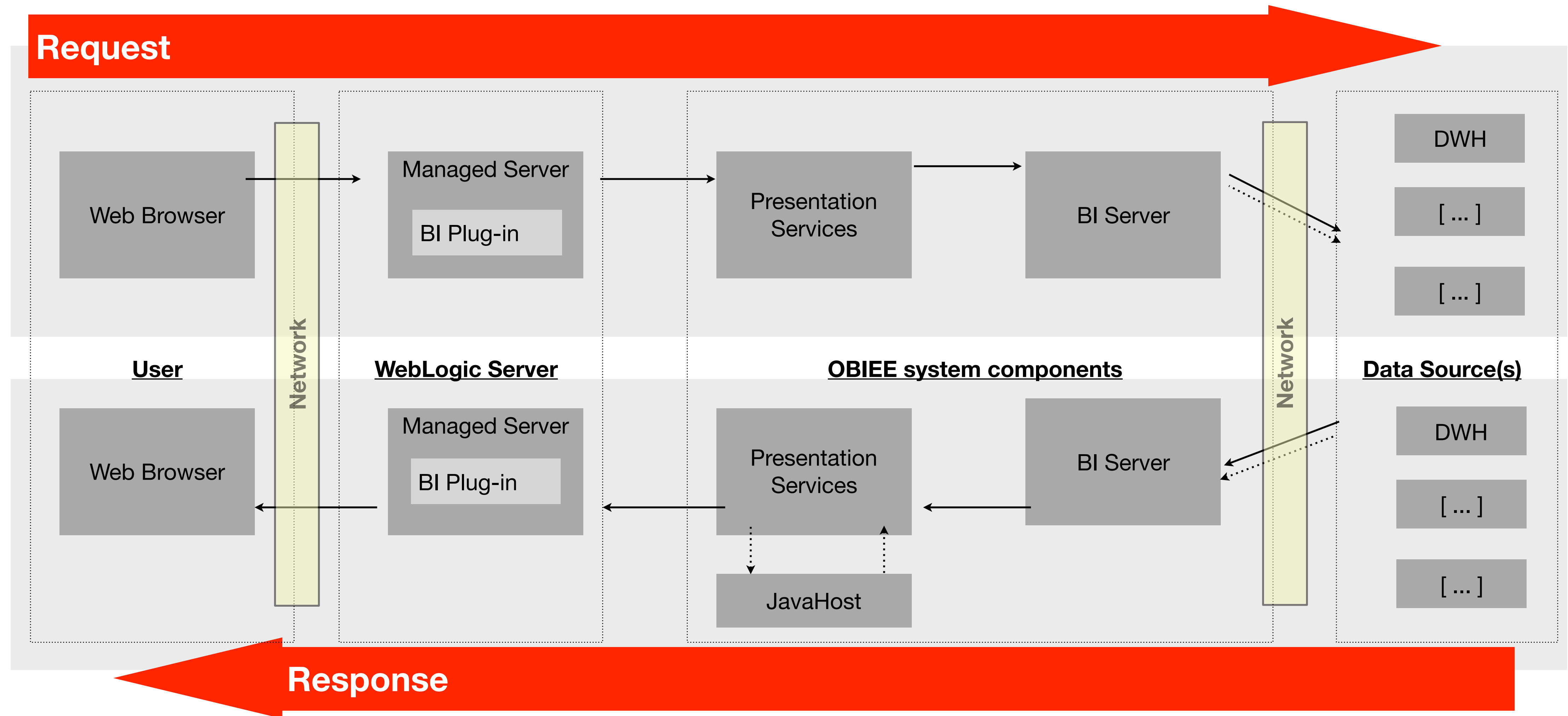
- Do it right, first time
 - Treat performance as a **feature** to be **designed** from the start, not an afterthought to worry about if things are slow
- Methodical analysis - “nose to tail”
 - Build a time profile
 - Examine capacity metrics over time
 - Correlate with reported problems



Time Profile

- Generic performance diagnosis tool that shows the time for each step within an action
- To understand **why** is it slow, we first must understand **where** is it slow
- Approach championed by Cary Millsap / Method-R
 - *“Thinking Clearly About Performance” (2010)*

The OBIEE Stack



Time Profile in Action - Example

Performance improvement is proportional to how much a program uses the thing you improved –Amdahl's Law

- End-user reports a response time of 40 seconds
 - Where did the time get spent?
- Time profile shows clearly:
 1. Improve performance of Query 2
 2. Push work into single query

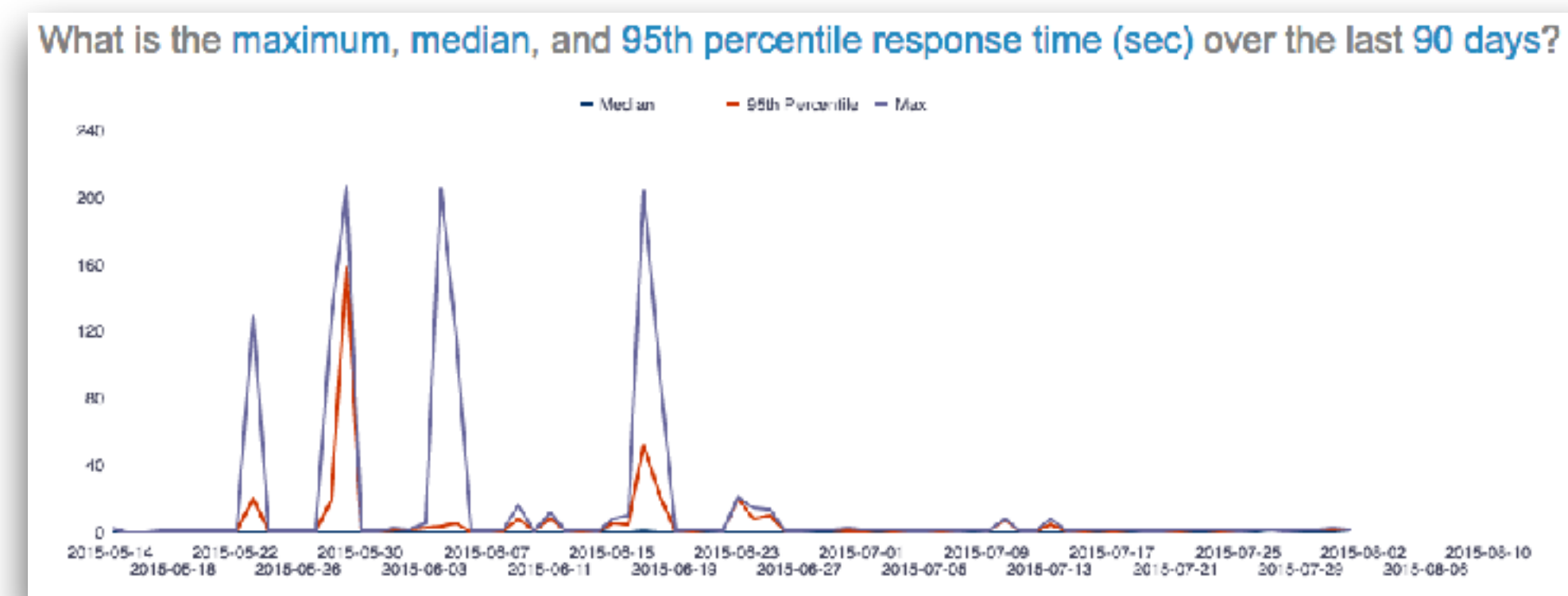
Step	Action	Response Time (s)	%
1	Physical SQL 1 execute on DB	5.00	12.5
2	Physical SQL 2 execute on DB	25.00	62.5
3	BI Server combines dataset from DB results	10.00	25.0
4	Chart engine creates graph object	5.00	12.5
	Total	40.00	100.0

Performance Diagnostic Exams



Usage Tracking

- Allows to records the **usage** and **behaviour** of analyses and dashboards by users of your system
 - Number of rows returned from the database
 - Execution time
 - SQL statement executed on the database
 - Cache hits
- SampleApp includes a pre-built RPD and dashboards for analysing the data

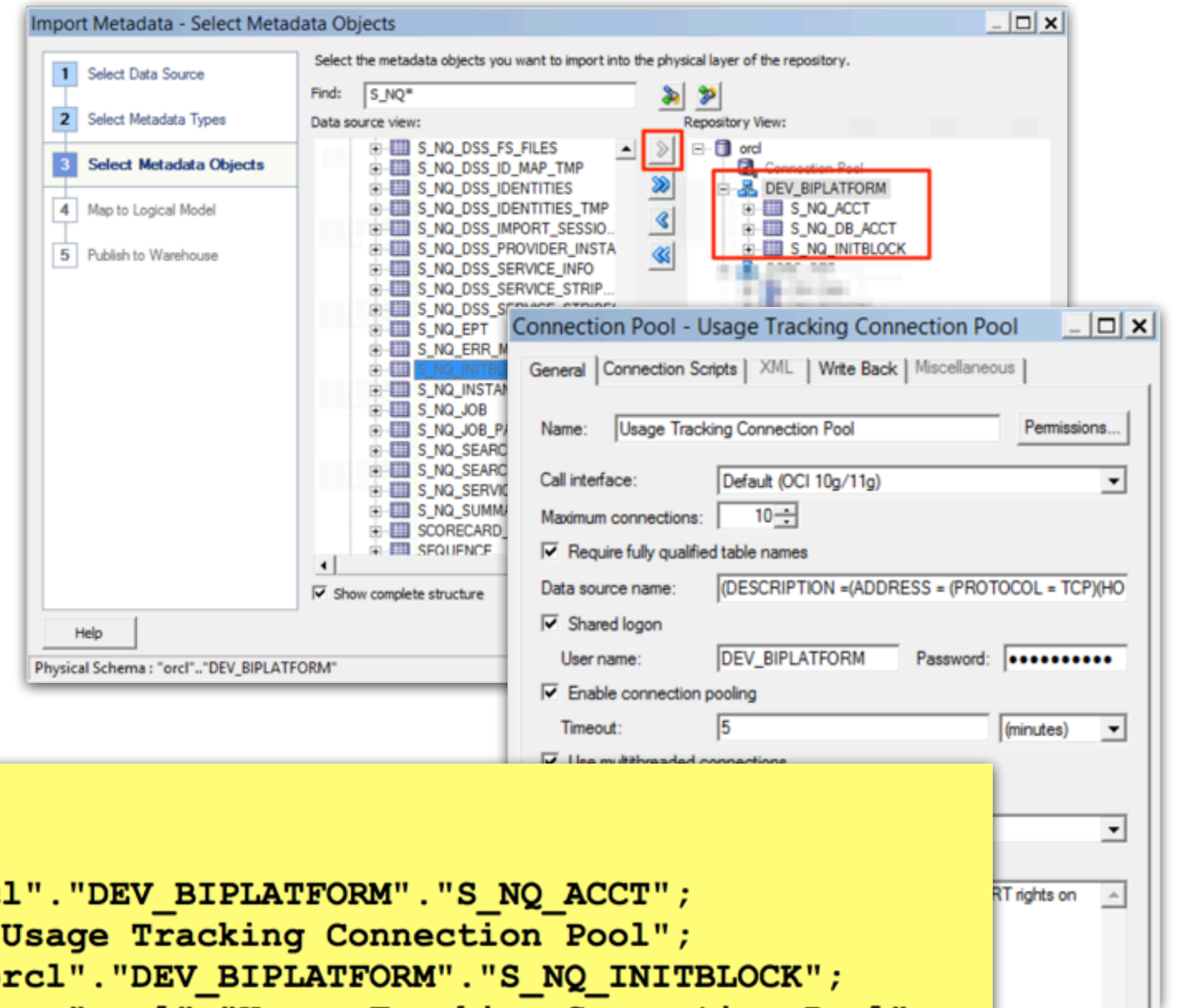


Enabling Usage Tracking

- Usage tracking is **not** enabled by default

- To enable usage tracking:

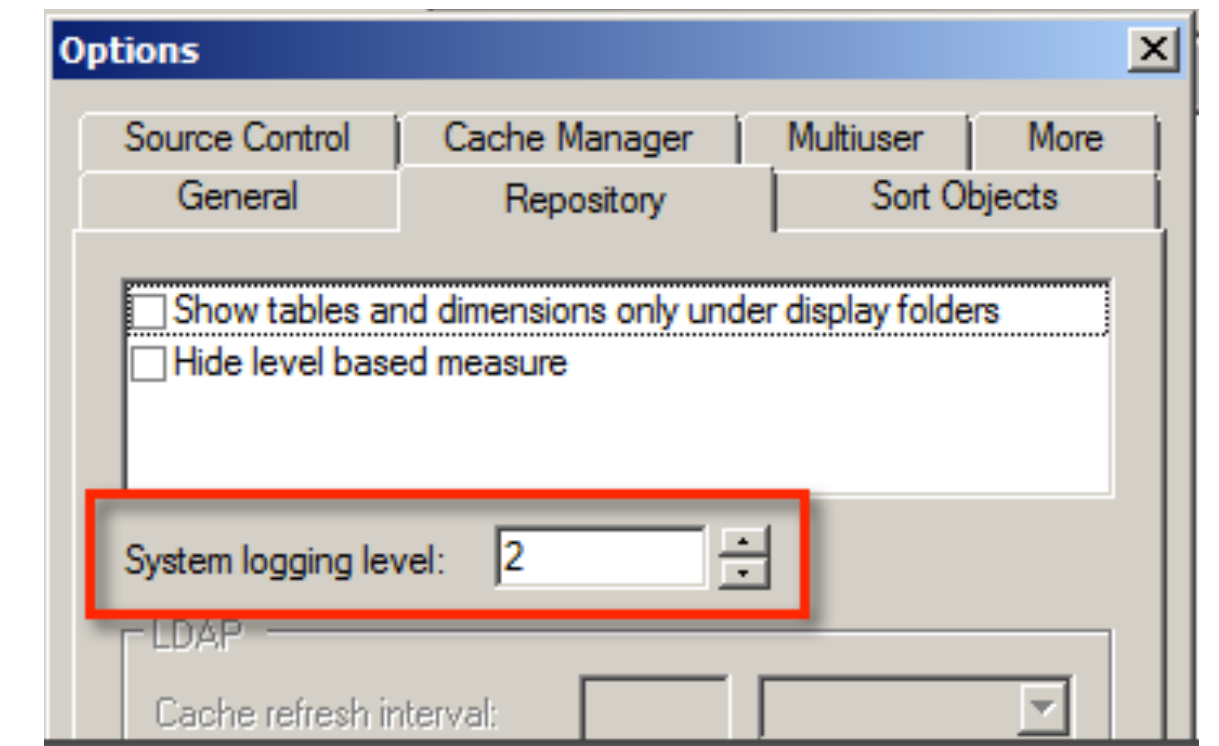
1. Import the usage tracking tables into the RPD
2. Add an appropriate Connection Pool
3. Update NQSConfig.INI configuration file
4. Restart the BI Server



```
ENABLED=YES
DIRECT_INSERT=YES
PHYSICAL_TABLE_NAME = "orcl"."DEV_BIPLATFORM"."S_NQ_ACCT";
CONNECTION_POOL = "orcl"."Usage Tracking Connection Pool";
INIT_BLOCK_TABLE_NAME = "orcl"."DEV_BIPLATFORM"."S_NQ_INITBLOCK";
INIT_BLOCK_CONNECTION_POOL = "orcl"."Usage Tracking Connection Pool";
```

BI Server Query Logging

- Facility for logging query activity at the individual user level
 - Log is written to `<DOMAIN_HOME>/servers/obis1/logs/obis1-query.log`
- BI Server query logging is **not** enabled by default
 - Requires LOGLEVEL to be greater than 0 (2 is recommended)
- Gives more information than Usage Tracking
 - Time spent by Presentation Services, DB connect time, bytes retrieved from database, etc.



Performance Tuning Myths Demystified

Myth #3

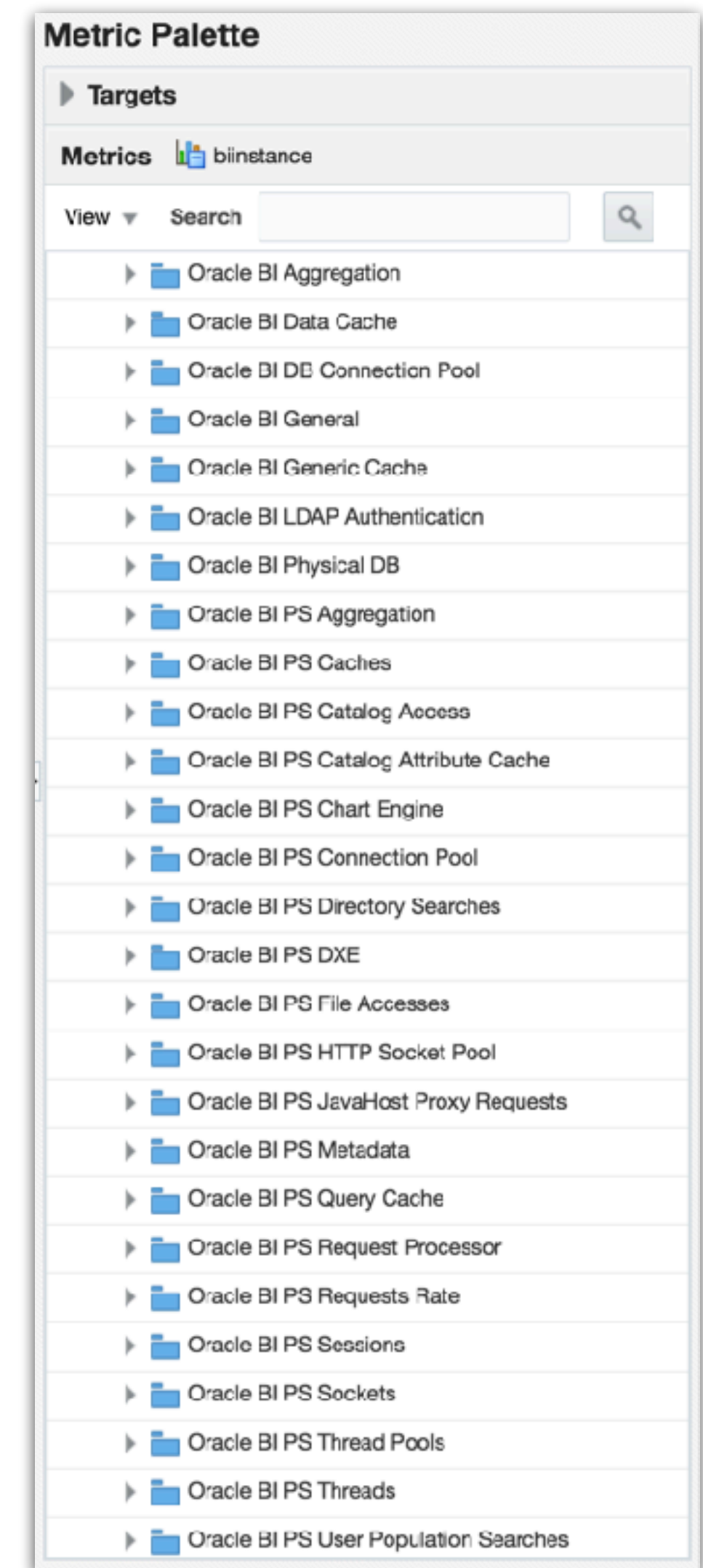
If you are having performance problems in OBIEE, you should switch off BI Server query logging

Truth

If you have performance problems in OBIEE, then you need logging in place to be able to trace and diagnose them

Dynamic Monitoring System (DMS) Metrics

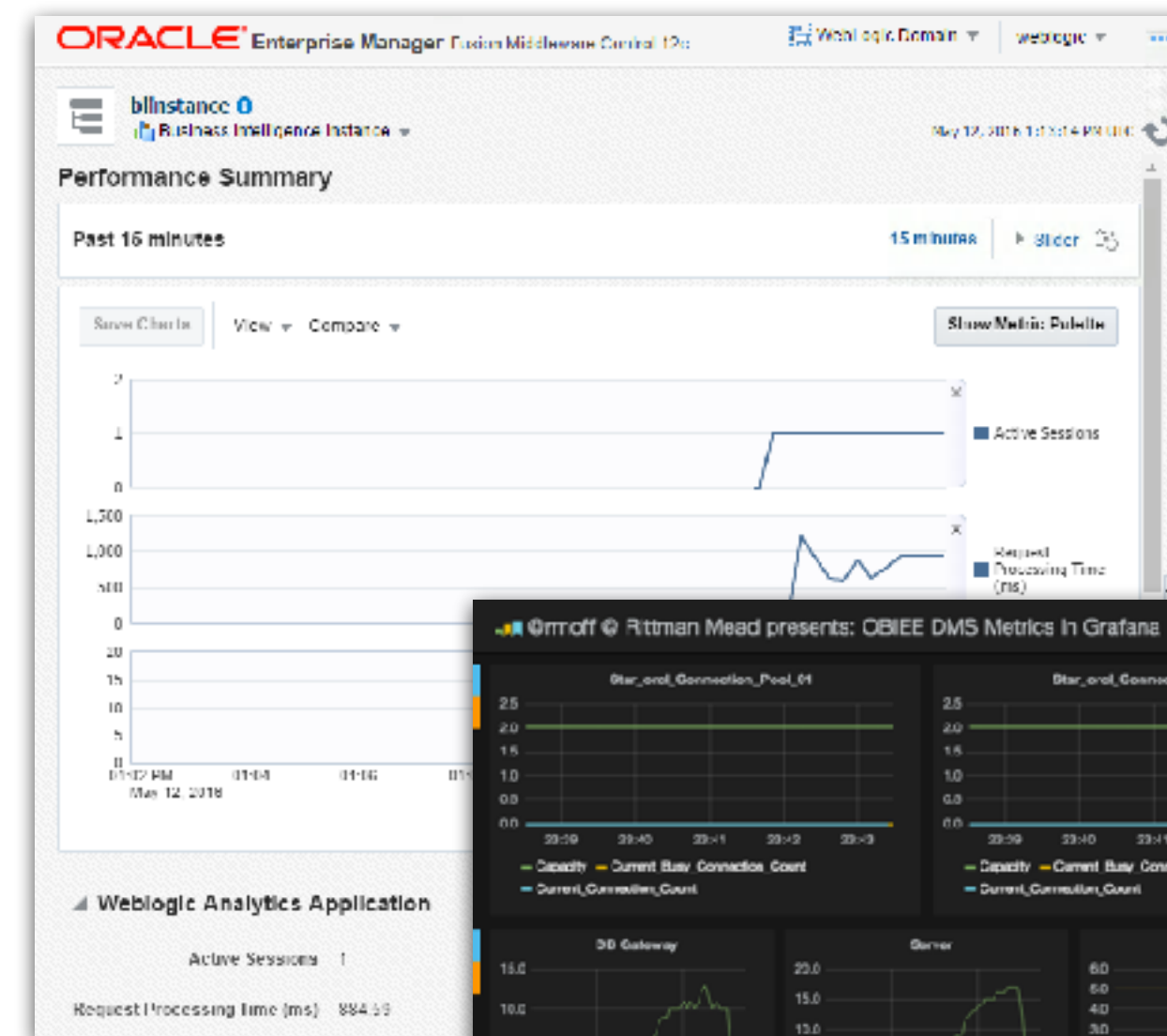
- Provide information about FMW components' performance, state, and on-going behaviour
- Once we have found **WHERE** the time has gone, DMS metrics help us find out **WHY**



Dynamic Monitoring System (DMS) Metrics

- Accessing DMS Metrics:

- DMS Spy
- WLST
- EM FMC
- EM 12c
- obi-metrics-agent [<http://ritt.md/oma-intro>]



- **Warning:** Not available for OBIEE 12.2.1.2.0 and later on Windows [**Doc ID 2261226.1**]

Dynamic Performance Views

- Helpful in monitoring the database from where data is returned for real time performance
 - Oracle : v\$
 - SQL Server : dm_exec_query_stats
- Consider CP Instrumentation [<http://ritt.md/obi-cp>]
 - Correlates recent database activity with OBIEE Dashboards and Users

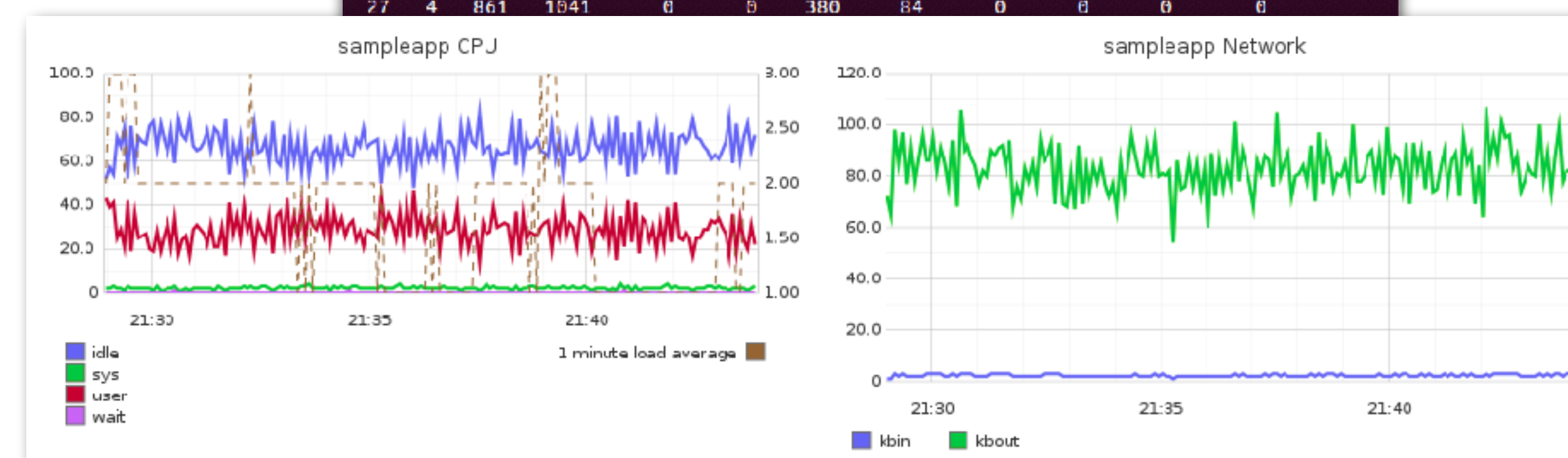
Operating System Metrics

- What?
 - CPU, memory, disk throughput, IO, network, etc.

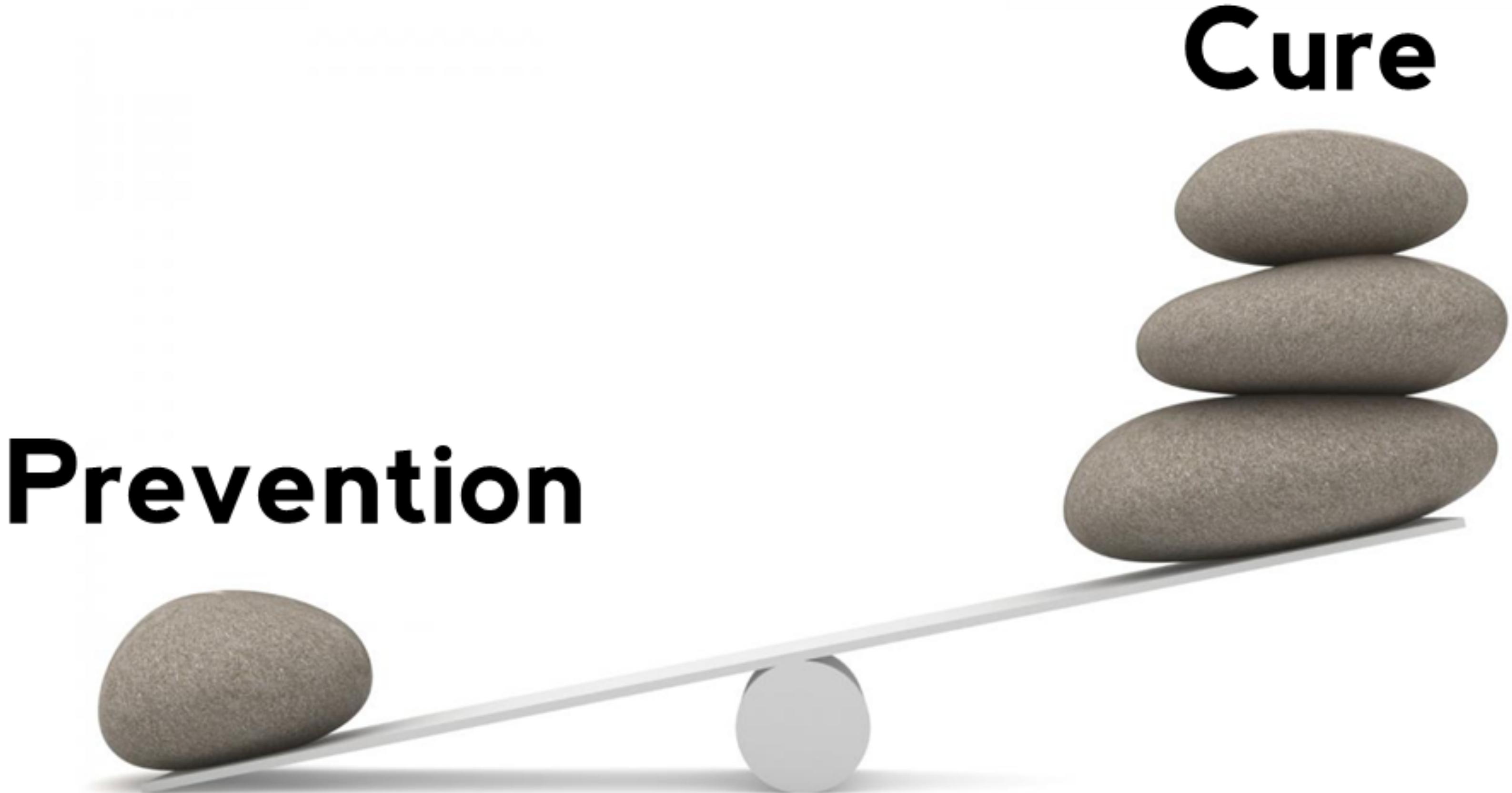
- Where?
 - Both OBIEE and Database server

- How?
 - *nix: collectl, vmstat, iostat, etc.
 - Windows: PerfMon, Telegraf, etc.

```
qpc@qpc1:~$ collectl
waiting for 1 second sample...
#<----- CPU -----><----- Disks -----><----- Network ----->
#cpu sys inter ctksw KBRead Reads KBWrit Writes KBin PktIn KOut PktOut
1 1 596 1178 0 0 0 0 0 0 0 0
2 2 629 1181 32 4 4 1 0 0 0 0
1 1 605 1150 0 0 32 2 0 0 0 0
2 1 526 1091 0 0 0 0 0 0 0 2
1 1 534 1006 0 0 0 0 0 0 0 0
2 1 593 1117 0 0 0 0 0 0 0 0
2 2 529 982 0 0 12 3 0 0 0 0
3 2 598 1084 0 0 32 2 0 0 0 0
6 3 905 1630 779 44 0 0 0 0 0 2
2 1 545 1010 0 0 0 0 0 0 0 0
2 2 566 1070 0 0 0 0 0 0 0 0
21 6 1159 1538 408 18 448 9 0 0 0 0
27 5 884 1142 0 0 76 2 0 0 0 2
27 4 851 1063 0 0 0 0 0 0 0 2
28 4 901 1146 0 0 0 0 0 0 0 0
27 3 833 1067 0 0 0 0 0 0 0 0
27 4 861 1041 0 0 380 84 0 0 0 0
```

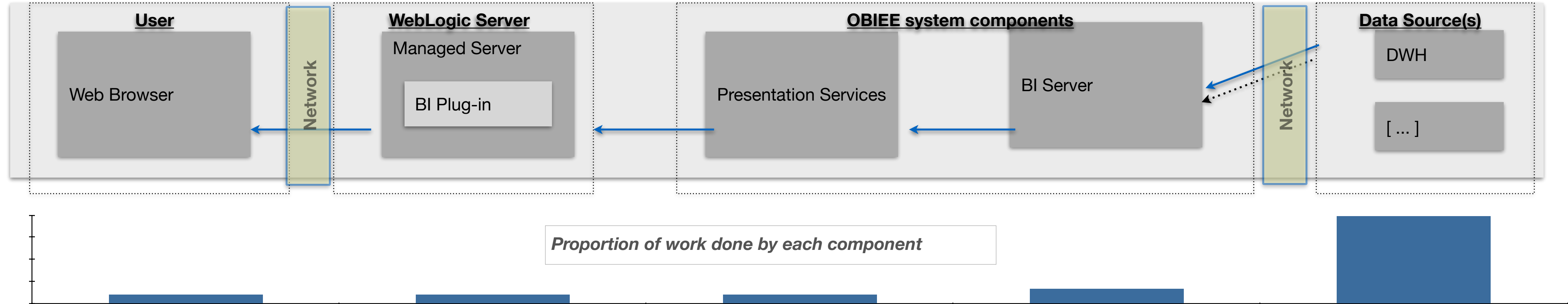


Designing OBIEE for Performance



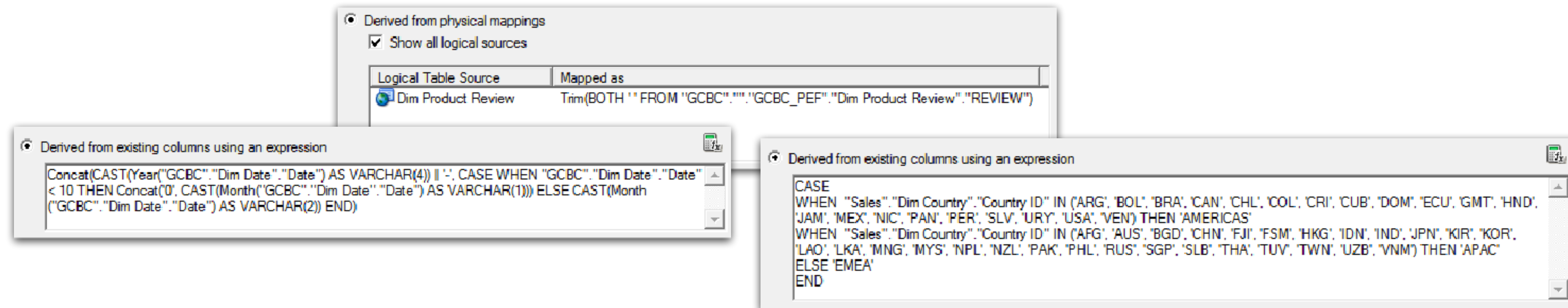
Database Pushdown

- Ideally, the work in filtering out the data we need, and summarising it if required, should be done on the **database**
- Reduce the amount of work/data handled further up the stack



Data Transformation

- Data transformation in-flight at query time is one of the most useful functionality of OBIEE, but...
 - Widespread use is indicative of suboptimal design, it's difficult to maintain, and results in less efficient and complex SQL



- Data transformation should be done **once** at ETL time

Aggregate Tables

- Reports that require summarised data will perform better if the summary has been calculated in advance, in an **aggregate table**
 - OBIEE will choose the most appropriate table using **vertical federation**
 - **Aggregate Persistence** wizard automates the creation and initial population of aggregates

Column Source Type

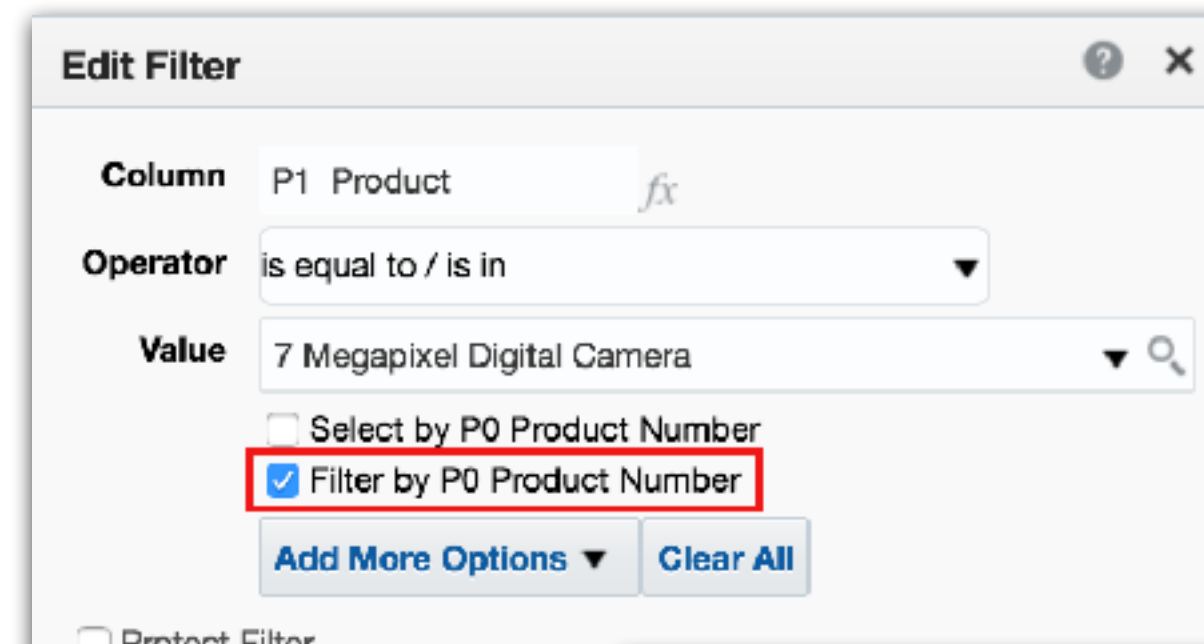
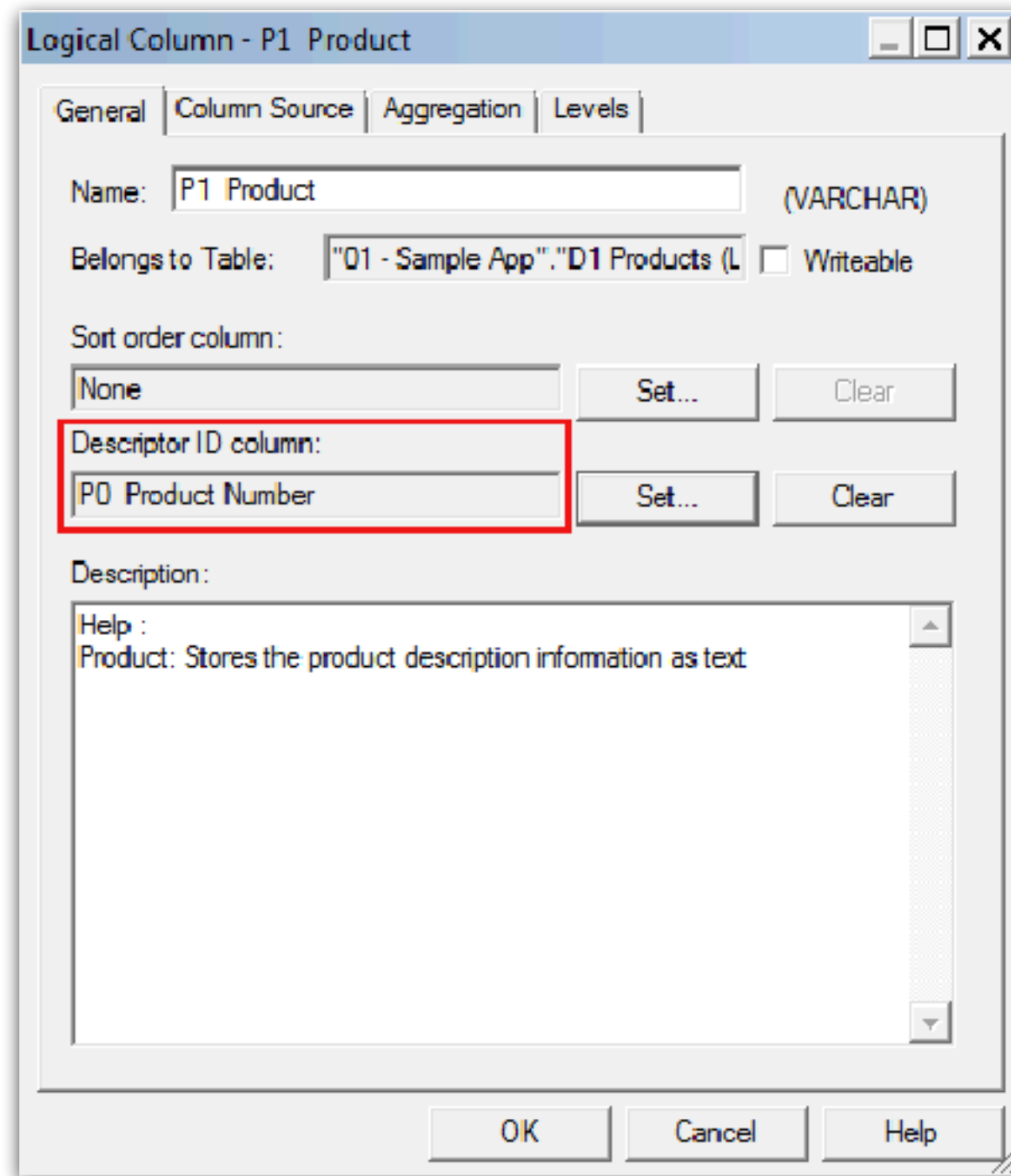
Derived from physical mappings

Show all logical sources

Logical Table Source	Mapped as
Fact_SALES	"orcl"."GCBC_SALES"."Fact_SALES"."FCAST_REV_AMT"
Fact_A_SALES_AGG	"orcl"."GCBC_AGGS"."Fact_A_SALES_AGG"."FCAST_REV_AMT"

Double Column Feature

- Enables OBIEE to generate more efficient physical SQL
 - The user sees the string version of an attribute whilst OBIEE uses the corresponding numerical ID column when it queries the database



```
select sum(T216.Revenue) as c1,  
       T795.PER_NAME_YEAR as c2  
from  
  BISAMPLE.SAMP_PRODUCTS_D T451 /* D10 Product (Dynamic Table) */,  
  BISAMPLE.SAMP_TIME_QTR_D T795 /* D03 Time Quarter Grain */,  
  BISAMPLE.SAMP_REVENUE_FA2 T216 /* F21 Rev. (Aggregate 2) */  
where ( T216.Prod_Key = T451.Prod_Key  
       and T216.Prod_Key = 7  
       and T216.Bill_Qtr_Key = T795.QTR_KEY  
       and T451.Prod_Key = 7 )  
group by T795.PER_NAME_YEAR
```

Overcrowded Analyses

- Analysis with an awful lot of columns in Criteria tab and several different views with many excluded columns

Line-Bar Graph

Measures Use unified scale

Bars (Vertical Axis 1)

1- Revenue

Lines (Vertical Axis 2)

2- Billed Quantity

Bars and Lines

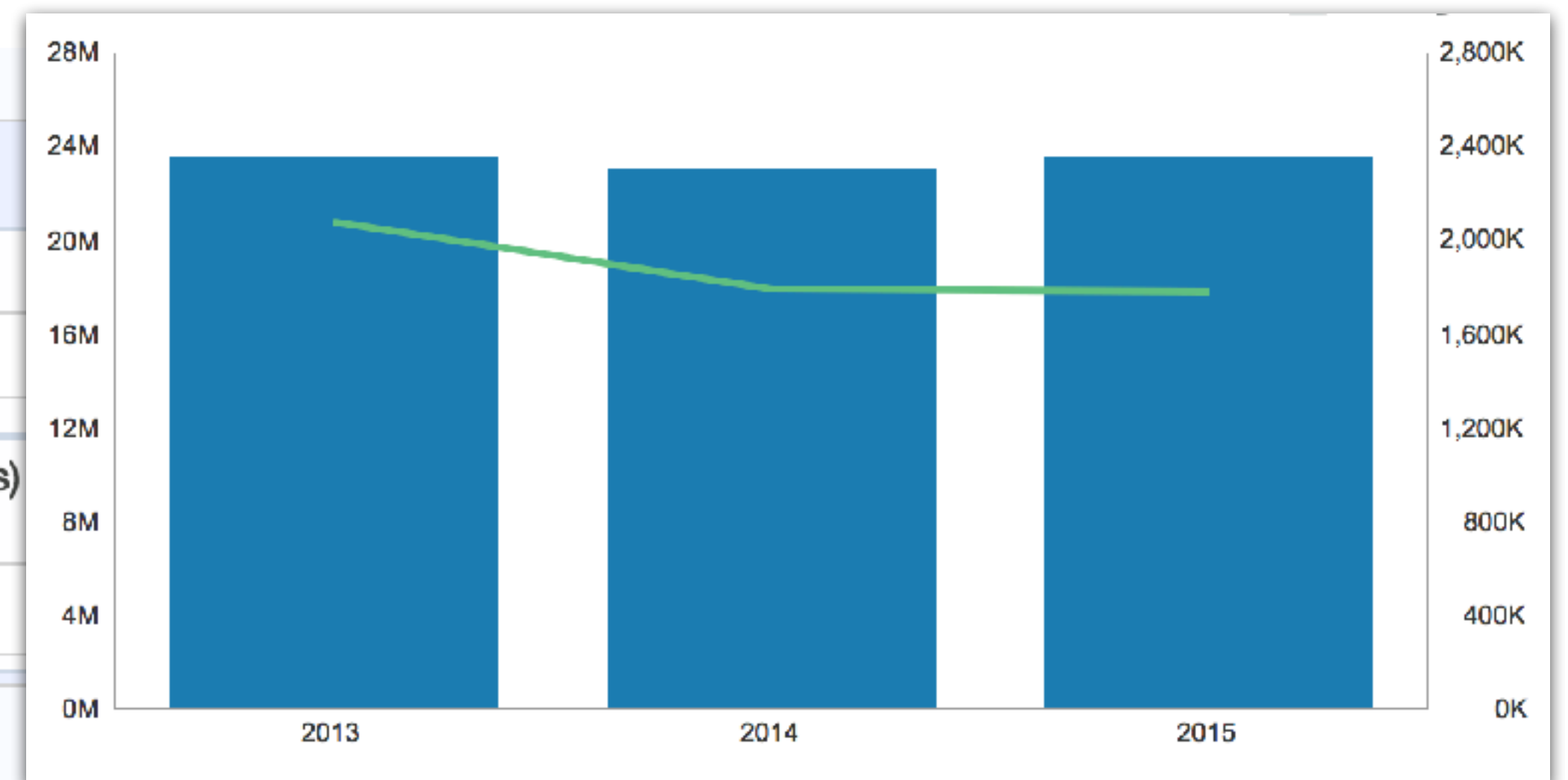
Group By (Horizontal Axis)

T05 Per Name Year

Vary Color By (Horizontal Axis)

Show In Legend

Measure Labels



Excluded

T00 Calendar Date

P1 Product

P4 Brand

D1 Office

D4 Company

E0 Sales Rep Number

C1 Customer Name

R1 Order Status

Overcrowded Analyses

- OBIEE retrieves results for **all** columns listed in Criteria tab

```
select sum(T42433.Units) as c1,
       sum(T42433.Revenue) as c2,
       T42428.Name as c3,
       T42412.Office_Dsc as c4,
       T42412.Company as c5,
       T42433.Order_Status as c6,
       T42409.Prod_Dsc as c7,
       T42409.Brand as c8,
       T42419.Employee_Key as c9,
       T42404.Calendar_Date as c10,
       T42404.Per_Name_Year as c11,
       T42428.Cust_Key as c12,
       T42409.Prod_Key as c13,
       T42412.Office_Key as c14
from
  BISAMPLE.SAMP_OFFICES_D T42412 /* D30 Offices */ ,
  BISAMPLE.SAMP_EMPL_D_VH T42419 /* D50 Sales Rep (Parent Child Hierarchy) */ ,
  BISAMPLE.SAMP_EMPL_PARENT_CHILD_MAP T42420 /* D51 Closure Table Sales Rep Parent Child */ ,
  BISAMPLE.SAMP_PRODUCTS_D T42409 /* D10 Product (Dynamic Table) */ ,
  BISAMPLE.SAMP_CUSTOMERS_D T42428 /* D60 Customers */ ,
  BISAMPLE.SAMP_TIME_DAY_D T42404 /* D01 Time Day Grain */ ,
  BISAMPLE.SAMP_REVENUE_F T42433 /* F10 Billed Rev */
where ( T42412.Office_Key = T42433.Office_Key and T42409.Prod_Key = T42433.Prod_Key and T42419.Employee_Key = T42420.Ancestor_Key and
        T42404.Calendar_Date = T42433.Bill_Day_Dt and T42420.Member_Key = T42433.Empl_Key and T42428.Cust_Key = T42433.Cust_Key )
group by T42404.Calendar_Date, T42404.Per_Name_Year, T42409.Brand, T42409.Prod_Dsc, T42409.Prod_Key, T42412.Office_Dsc, T42412.Office_Key,
        T42412.Company, T42419.Employee_Key, T42428.Cust_Key, T42428.Name, T42433.Order_Status
```

```
Rows 256357, bytes 1626328808 retrieved from database query id: <<75516>>
Physical query response time 4.519 (seconds), id <<75516>>
Physical Query Summary Stats: Number of physical queries 1, Cumulative time 4.519, DB-connect time 0.000 (seconds)
Rows returned to Client 256357
Logical Query Summary Stats: Elapsed time 6.161, Total time in BI Server 4.188, Response time 1.593, Compilation time 0.027 (seconds)
```


Overcrowded Analyses

- Create several analyses with a single view and remove all the excluded columns

```
select sum(T42442.Units) as c1,  
       sum(T42442.Revenue) as c2,  
       T42406.PER_NAME_YEAR as c3  
from  
  BISAMPLE.SAMP_TIME_QTR_D T42406 /* D03 Time Quarter Grain */ ,  
  BISAMPLE.SAMP_REVENUE_FA2 T42442 /* F21 Rev. (Aggregate 2) */  
where ( T42406.QTR_KEY = T42442.Bill_Qtr_Key )  
group by T42406.PER_NAME_YEAR
```

Rows returned to Client **-100%**

Elapsed time **-99%**

```
Rows 3, bytes 3192 retrieved from database query id: <<140181>>  
Physical query response time 0.032 (seconds), id <<140181>>  
Physical Query Summary Stats: Number of physical queries 1, Cumulative time 0.032, DB-connect time 0.001 (seconds)  
Rows returned to Client 3  
Logical Query Summary Stats: Elapsed time 0.041, Total time in BI Server 0.041, Response time 0.041, Compilation time 0.005 (seconds)
```

Table / Pivot Prompts Vs Dashboard Prompts

- Table / Pivot Prompts provide an interactive result set that enables users to select the data that they want to view
 - Do **not** append any WHERE condition to the query issued by the Oracle BI Server
- Prefer Dashboard Prompts instead to transfer the **least** data possible from the database into OBIEE

Export to Excel?



Feeding the Excel Monster

- What's being done with the data once it's in Excel?
 - Could it be done in OBIEE instead?
- If users **really** do just need the data in Excel:
 - Oracle have specific recommendations [**Doc ID 1558070.1**]
 - Favour CSV export over Excel
 - Favour BI Publisher export over OBIEE Analysis Export
 - Use Logical SQL against BI Server's ODBC/JDBC interface directly
 - Generate the dump direct from the database

BI Server Cache

- Stores the results of all inbound queries, and can be used to avoid sending subsequent queries to the database
 - Caching can be particularly effective when federated data sources are used
- It can be useful, but it **must** be proactively designed and managed
 - BI Server Cache management strategies: <http://ritt.md/bi-cache>

Performance Tuning Myths Demystified

Myth #4

Enable BI Server cache to fix any OBIEE performance issue

Truth

Don't use BI Server cache as a mask for bad design: the actual problem is never addressed and will persist



Not Forgetting ...

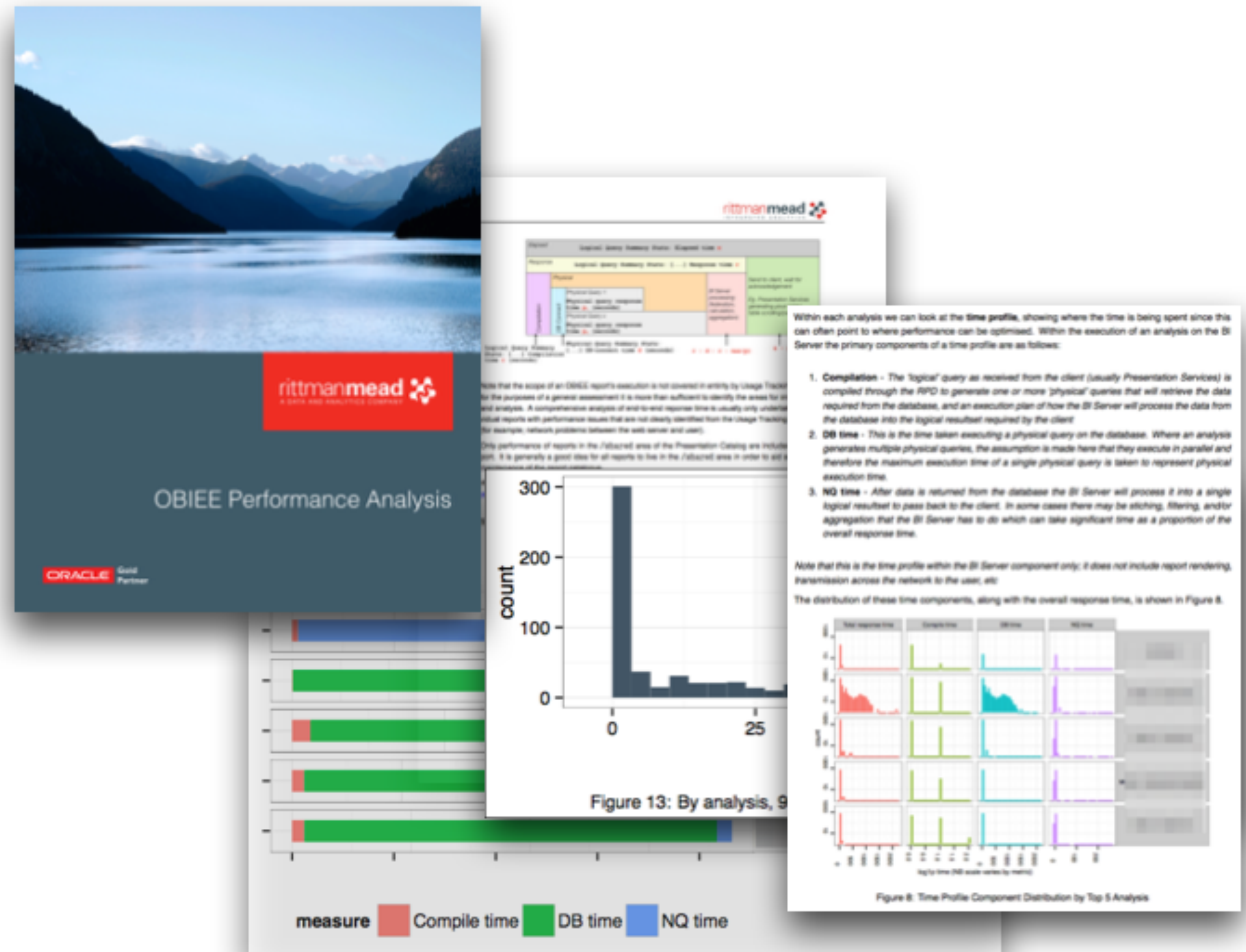
- Make sure dashboards have default / mandatory prompts
 - Select the `Prompt before Opening` box to delay the execution
- Be smart about dashboard and analysis design
 - Less clutter: Better user experience and better performance
- Database optimisation (partitioning, indexing, parallelism, statistics, etc.)
- Balanced Hardware configuration

Rittman Mead OBIEE Performance Analytics Service

- Understand your existing situation
 - Performance Analytics Report
- Fix and monitor performance problems
 - Performance Analytics Bundle
- Learn optimal design and performance troubleshooting
 - Training from the OBIEE performance experts

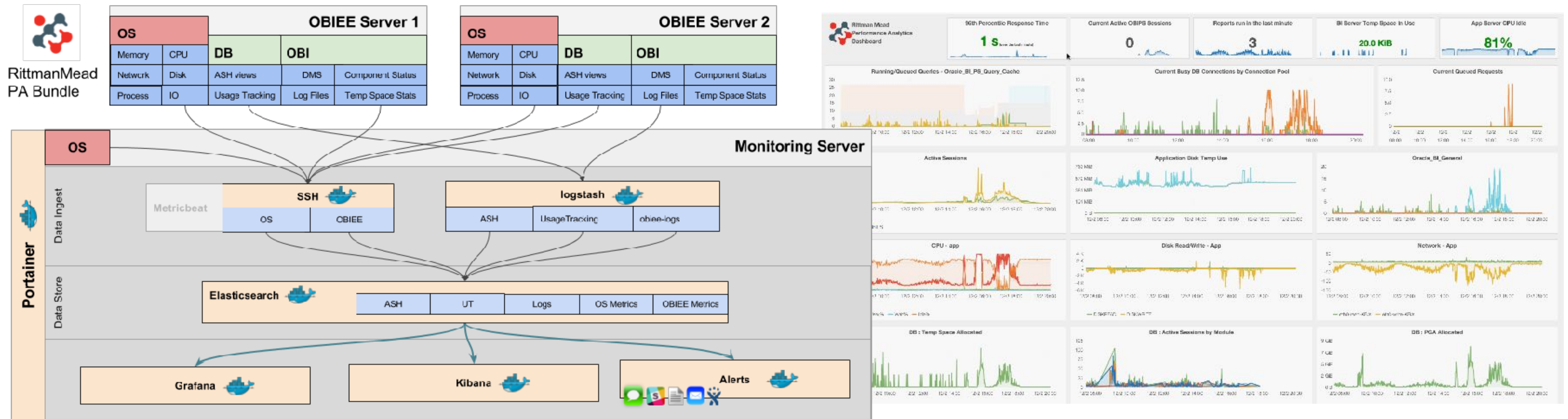
Performance Analytics Report

- Empirical performance assessment based on Usage Tracking data
- Quantify overall performance profile of OBIEE
- Identify key optimisation candidates and efficiency opportunities



Performance Analytics Bundle

- Monitor and troubleshoot performance problems
- Interactive dashboards for rapid analysis
- Holistic view of OBIEE in one place



#EOF

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