Strive for Performance

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Key Words

Appliance, Performance, Oracle Hyperion Essbase, Organizational Impact, Infrastructure, Exalytics, ROI, TCO

Introduction

Performance is one of the driving forces between management reporting platforms.

During a release change, Deutsche Telekom decided to migrate their management reporting platform based on Oracle Hyperion planning to an Oracle Exalytics appliance. This decision was concluded after a long process of performance reviews and tests, TCO calculations, definition of an IT operating model as well as business case evaluations. This process of evaluation, selection and migration as well as typical traps will be discussed during the presentation. One major focus will be the discussion of classical IT operating models vs. necessary changes when moving to an appliance solution.

Topics covered during the presentation:

1. Project setup as well as timeline
2. Results from the Exalytics performance evaluation
3. Problems in TCO calculation and comparison for appliances
4. Focal points when moving from classical server infrastructure to appliances
5. Some tips and tricks from migration

DTMIP is the central steering system of Deutsche Telekom

The roots of the DTMIP system range long back. It was initially built as the main management information system of T-Mobile. And subsequently became the major MIS for all regional entities within Deutsche Telekom group after reintegration of T-Mobile into Deutsche Telekom.

It addresses information on all functional areas for the all group members and provides aggregated information to the group management.

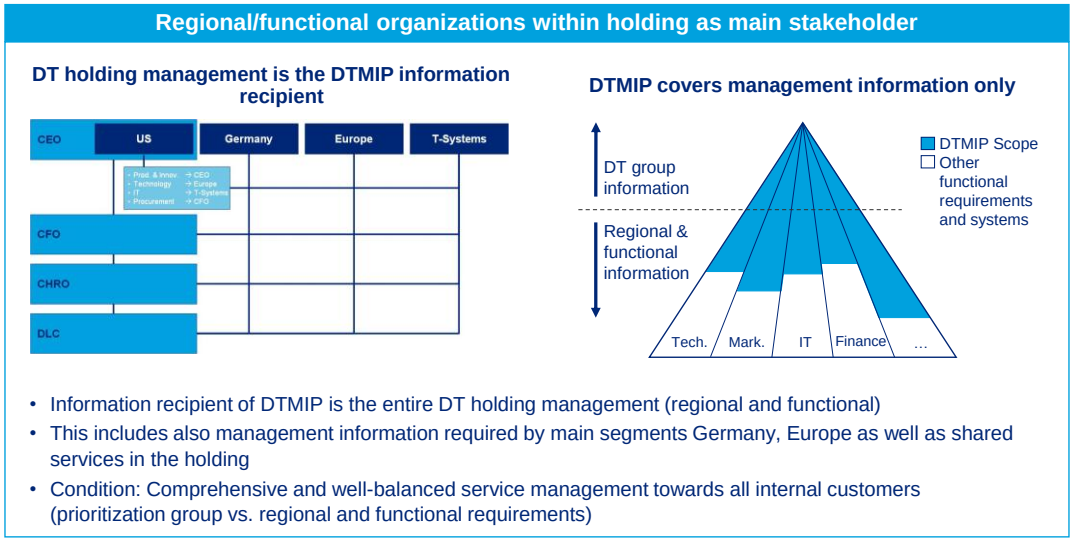


Abb. 1: Scope of DTMIP System

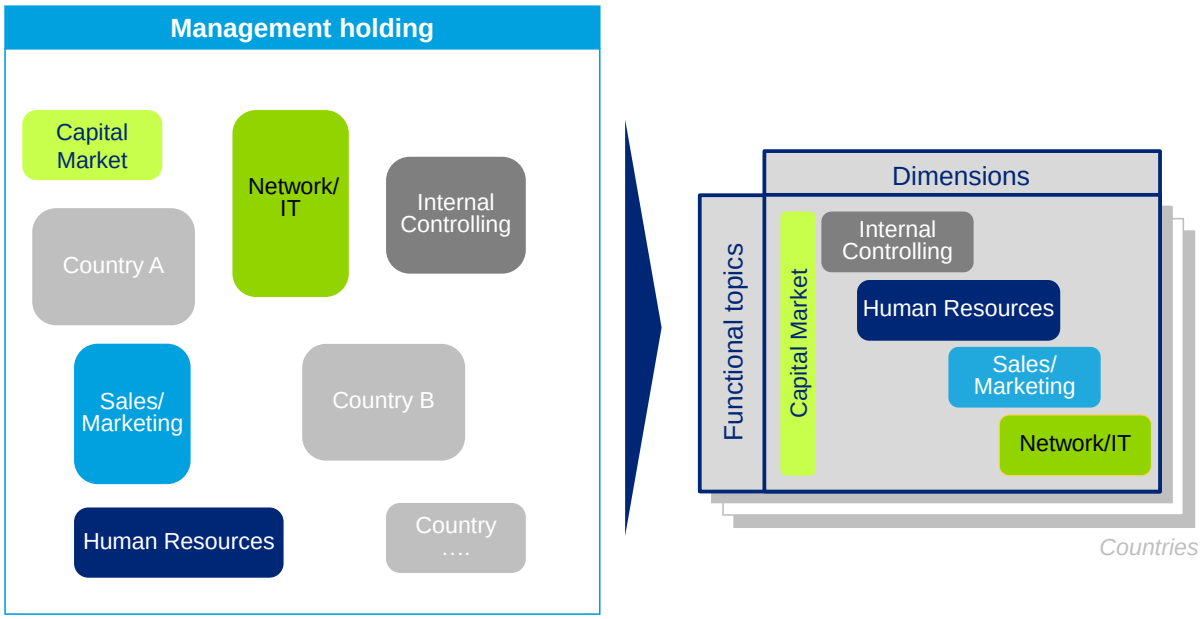


Abb. 2: Derivation of Dimensionality of the scope

From these group requirements an extensive dimensionality has been derived resulting in a larger landscape of Hyperion Planning/ Essbase cubes.

DTMIPs technological basis has been and remained the Oracle Hyperion EPM stack. From an early Hyperion Planning 4.0 it has been migrated to Hyperion Planning 9.2.2 in 2008/2009. Whilst being highly customized the support for the underlying System Oracle Hyperion Planning System 9 ceased in 2012.

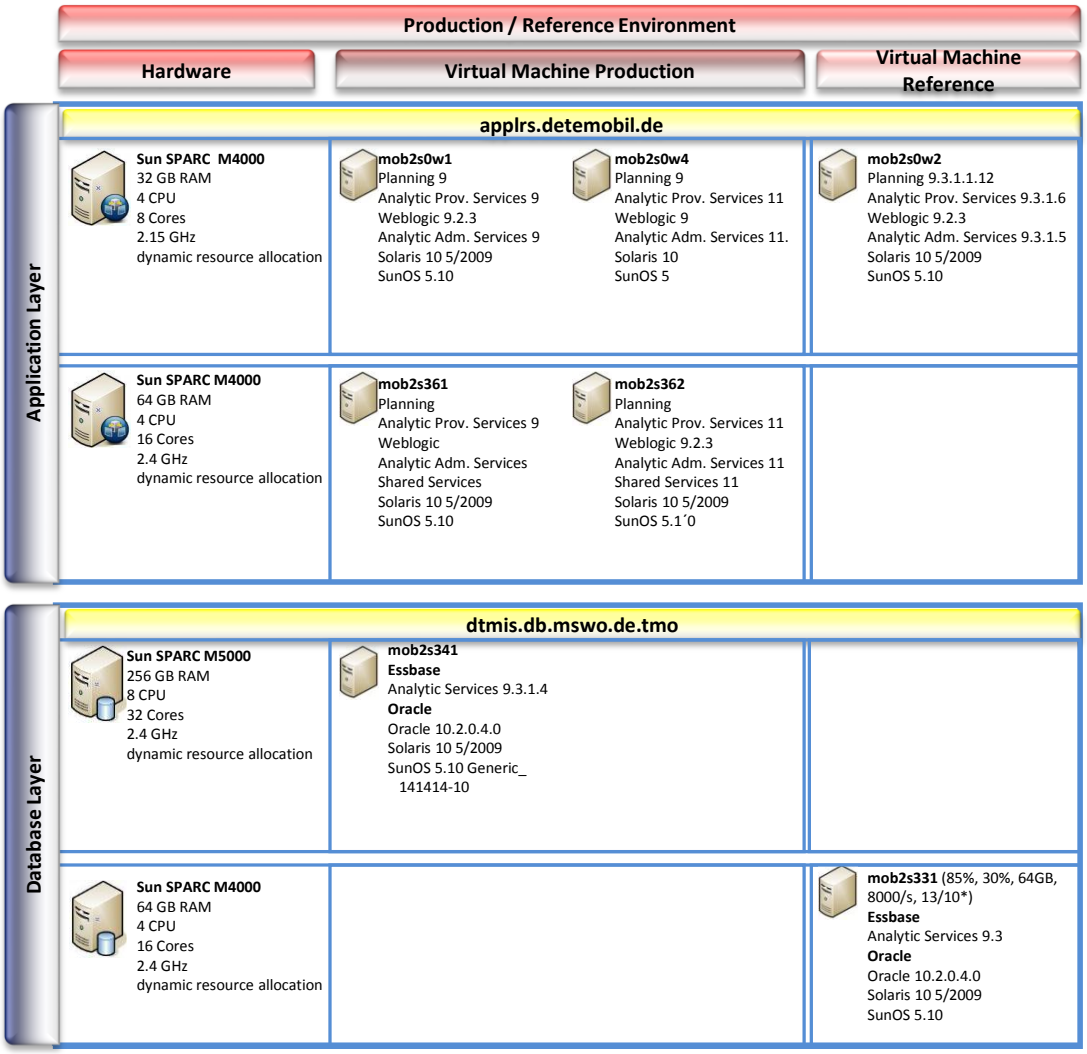


Abb. 3: Infrastructure landscape

DTMIP in 2012 was still istalled on a fairly large server landscape consisting mainly of Sun Solaris Servers. When initial bought in 2009 this landscape was one of the biggest landscapes to run Essbase. The Sun plattform was chosen after intensive tests and proved to be superior especially in handling the high data volumes on the Essbase BSO cubes.

Just to name a few highlights of the system:

- 16 cubes with total 3 Terrabyte of data(as of 2012)
- Largest Cube with ~ 1TB of Data
- ~1000 users of which in normal times up to 50 real parallel or in planning times up to 150 in parallel
- Independently developed “intelligent” calculation engine running calculations in parallel (intelligent calc script starter)

- Management Cockpit on Ipad delivered to C-Level of Telekom

As System 9 was running out of support Telekom it was destined for an upgrade both of the Software as well as the underlying infrastructure. Whilst the latest release for the software upgrade was chosen, the upgrade path for the server was unclear.

Being under tremendous cost pressure the MIP system needed to cut cost and at the same time provide increased functionality as plattform for the integration of further reporting systems. By this the requirements especially with regards to data volume, processing time but also dimensionality will increase dramatically, the infrastructure needed to grow significantely.

Project setting and description

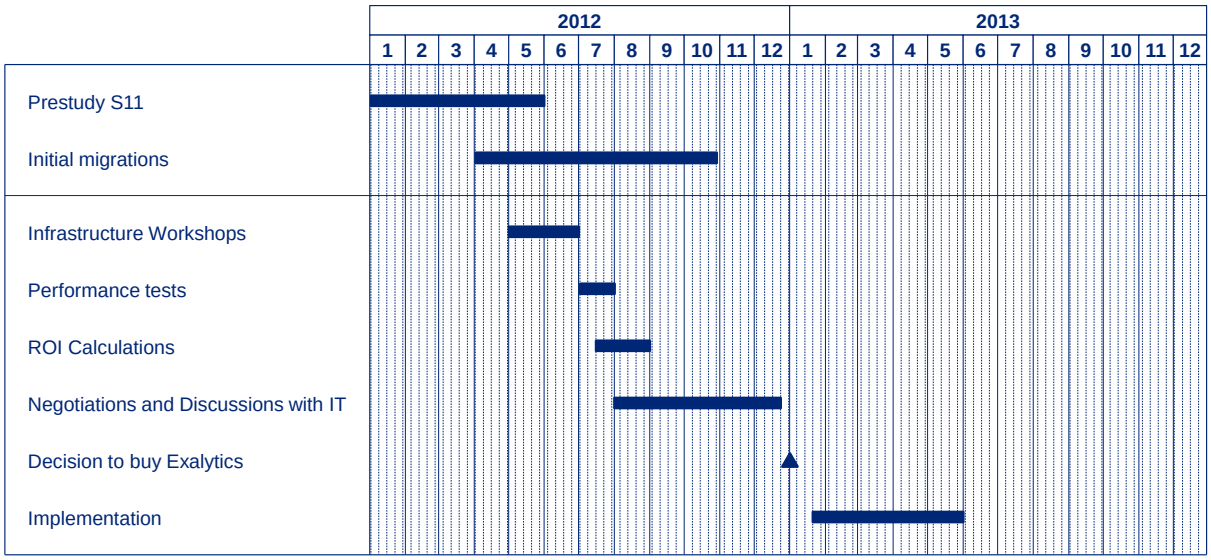


Abb. 4: Rough project plan

The project of the System 11 migration (which was the wrapper project and included the migration to System 11 and Exalytics. The initial goal was a go live in early 2013 (which didn't manifest). The procurement of the infrastructure was on the critical path for it as only on a new infrastructure the developments could have been performed.

During the initial phase roughly one person was involved (project wise) in the preparatory tasks.One of the major issues which arose was: how to make sure that the performance of the system will be sufficient to meet current and future tasks?

So first question: what is performance?

System as defined by Webster can be defined as: "The accomplishment of a given system measured against preset known standards of completeness and speed." However the definition is not sufficient to select or scope an infrastructure for an EPM system. Or can one easily say which of the following vehicles is going to win in the following quartet game?

Testing Performance

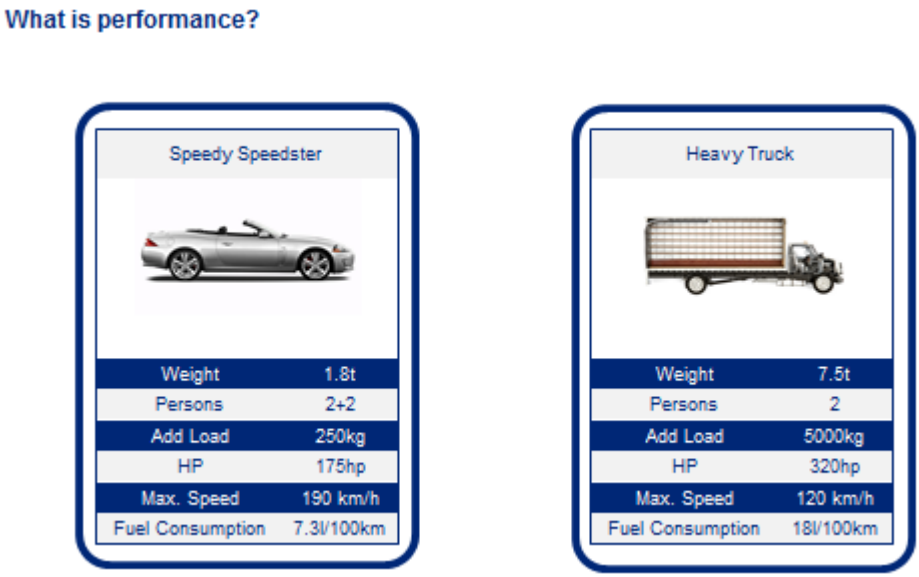


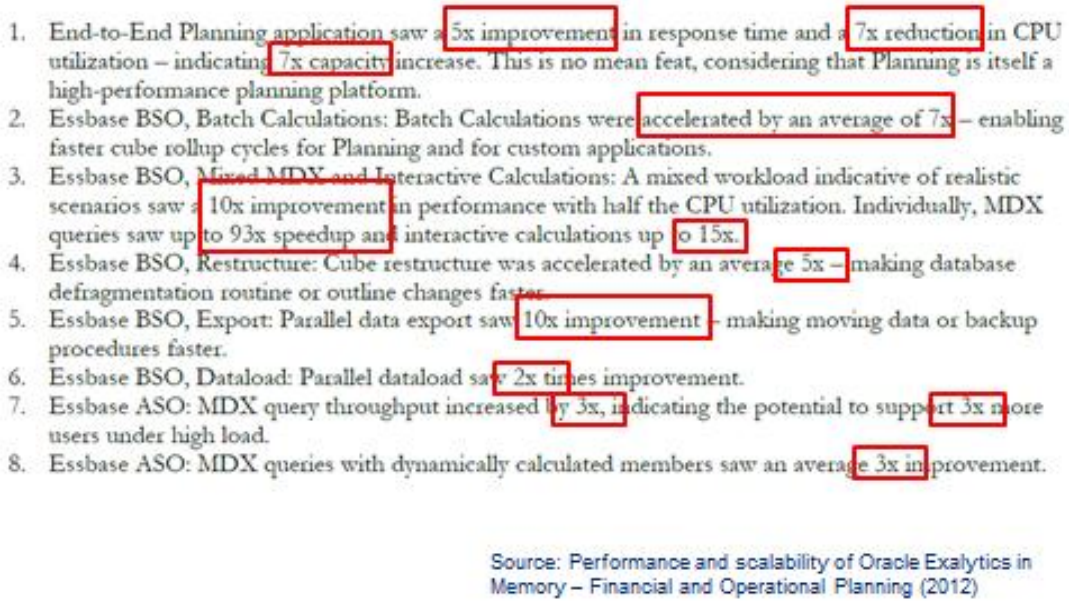
Abb. 5: Comparing the performance of infrastructure is like comparing performance of vehicles

The analogy is not far away fetched. In 2009 a migration from Hyperion Planning 4.1 took to System 9.2 took place Telekom faced a similar challenge and had to choose (at that time for an application server) between a T5220 with lots of cores and and M5000 with faster single core performance. The decision at that time was made more for robustness and big data volumes than for maximum single thread performance.

In deciding on a core server as the Essbase Server in an EPM environment one first needs to define the key criteria in evaluation of the server need to be set.

Is the max speed more important than the payload delivered?
Or in our case is the calculation performance on large cubes more important than the retrieval performance?
Is the parallel execution of calculations more important?

One of the tasks to be accomplished was to put into perspective the claims Oracle did with regards to the performance of Exalytics. A test with the special data model and the customized calculation engine was performed.



1. End-to-End Planning application saw a 5x improvement in response time and a 7x reduction in CPU utilization – indicating 7x capacity increase. This is no mean feat, considering that Planning is itself a high-performance planning platform.
2. Essbase BSO, Batch Calculations: Batch Calculations were accelerated by an average of 7x – enabling faster cube rollup cycles for Planning and for custom applications.
3. Essbase BSO, Mixed MDX and Interactive Calculations: A mixed workload indicative of realistic scenarios saw a 10x improvement in performance with half the CPU utilization. Individually, MDX queries saw up to 93x speedup and interactive calculations up to 15x.
4. Essbase BSO, Restructure: Cube restructure was accelerated by an average 5x – making database defragmentation routine or outline changes faster.
5. Essbase BSO, Export: Parallel data export saw 10x improvement – making moving data or backup procedures faster.
6. Essbase BSO, Dataload: Parallel dataload saw 2x times improvement.
7. Essbase ASO: MDX query throughput increased by 3x, indicating the potential to support 3x more users under high load.
8. Essbase ASO: MDX queries with dynamically calculated members saw an average 3x improvement.

Source: Performance and scalability of Oracle Exalytics in Memory – Financial and Operational Planning (2012)

Abb. 6: Oracle Claims on Exalytics Performance

With performance improvements between 2x to 93x the claims were pretty lofty; but even this kind of marketing material needed to be tested before an order.

It was concluded that the tests should be twofold:

A) A synthetic benchmark over various customers ranging from: Dataload, different calculations, restructure till MDX queries

This Benchmark was initially developed Deloitte internally to judge the performance of installations on Hyperion Essbase or Planning Projects and to point to potential bottlenecks to improve the overall performance of an EPM landscape. The test is scripted and a collection of comparable results exist.

B) A set of calculations and a set of reporting queries specific to MIP with the MIP data model

The MIP Calc Engine was compiled as stand-alone model and installed on a PC. A set of Calculation Execution plans was exported and used.

Additionally some MDX Queries generated for the frontend was created and the Data for 50% of the cubes was exported and scrambled to mimic the data positions but delete the meaning of the data.

The results from the synthetic benchmark were promising (performed versus a variety of different installations)

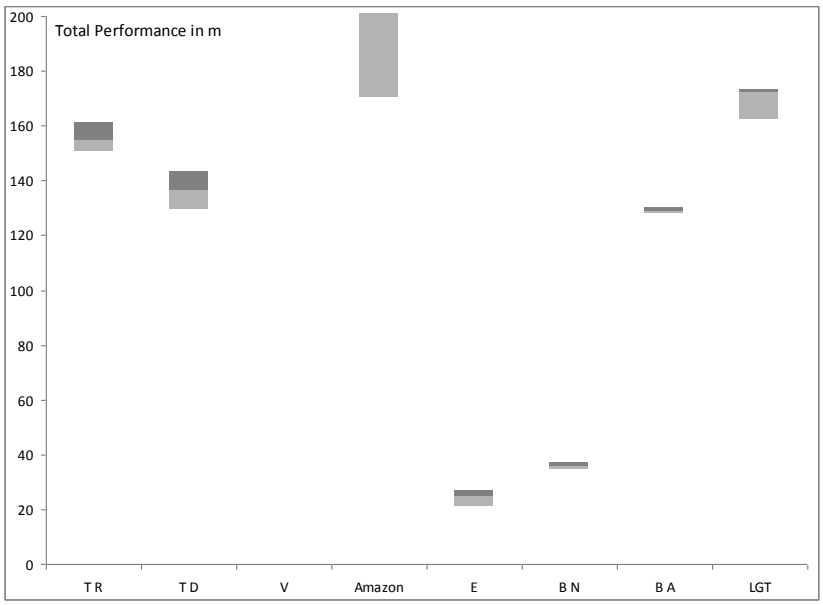


Abb. 7: Overall synthetic benchmark results

Over several tasks the benchmarking suite ran in about 22 minutes median with low deviation, minimum 50% faster than the 2nd fastest environment.

Over the course of the whole benchmarking Exalytics was 7-8x faster than the current Telekom Environment. However when looking at specific tasks, the performance advantages where not evenly distributed:

Main advantages could be achieved in the restructuring and aggregation performance:

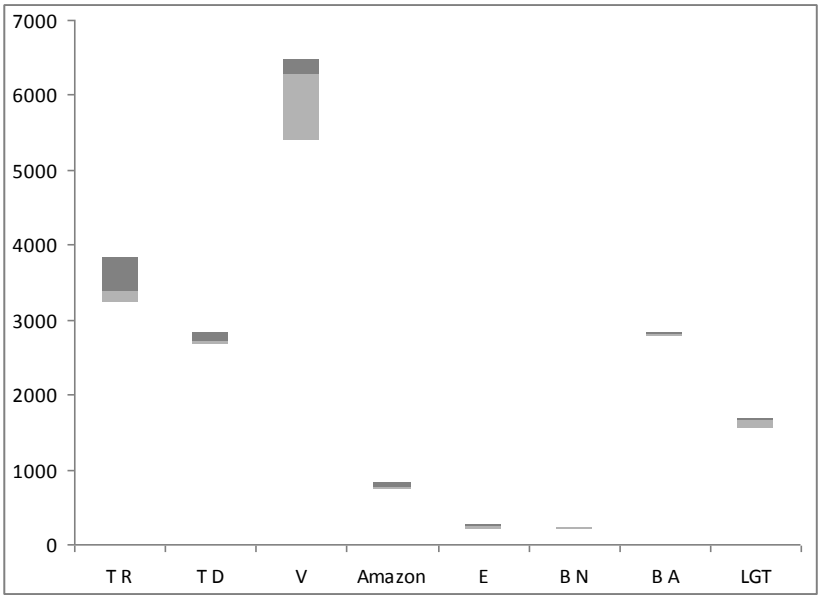


Abb. 8: Restructuring performance

Whereas e.g. the performance for dataloads as well as the simple summation and copy performance was only slightly better. In case of the restructuring a non-Exalytics system even beat the performance by around 5%.

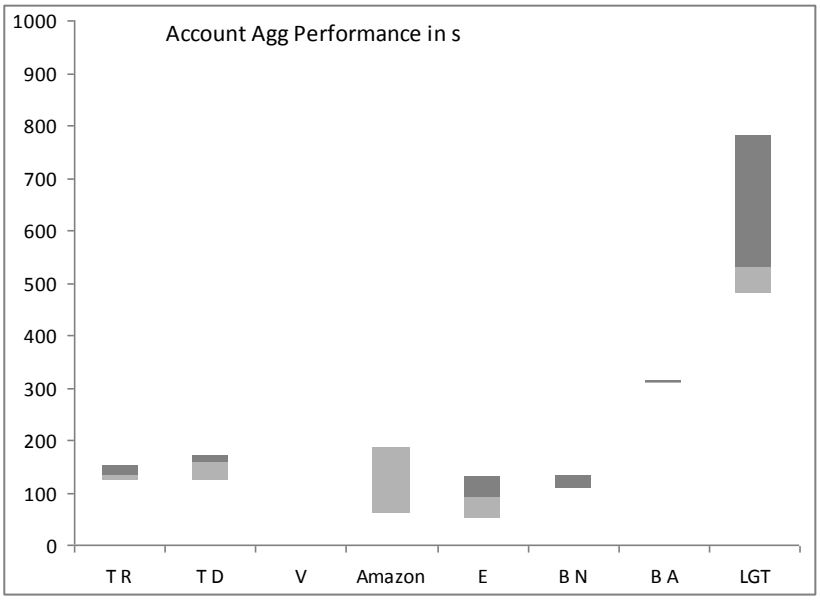


Abb. 9: Account Aggregation performance

The account aggregation performance e.g. was only around 50% faster and the Exalytics system displayed a great variability and standard deviation in the results.

As a background the benchmark uses a standard a synthetic data model derived from a planning application. The suite is scripted and was used on different environments for comparison purposes. Usually it is used with clients to uncover bottlenecks in their Essbase infrastructure.

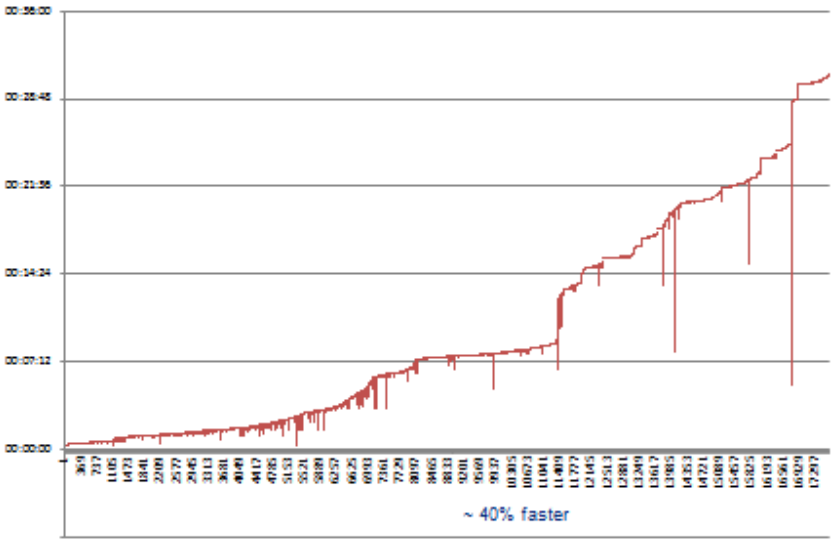


Abb. 10: Results of a typical MP Calc System Run

When testing the Exalytics system with the specialist MIP calc engine, the results were less dramatic. Only a 40-50% performance gain could be achieved. It was apparent, that the atomized tasks of the Calc Engine where posing to much of an overhead to significantly reap further benefits. The individual calculations however ran significantly faster.

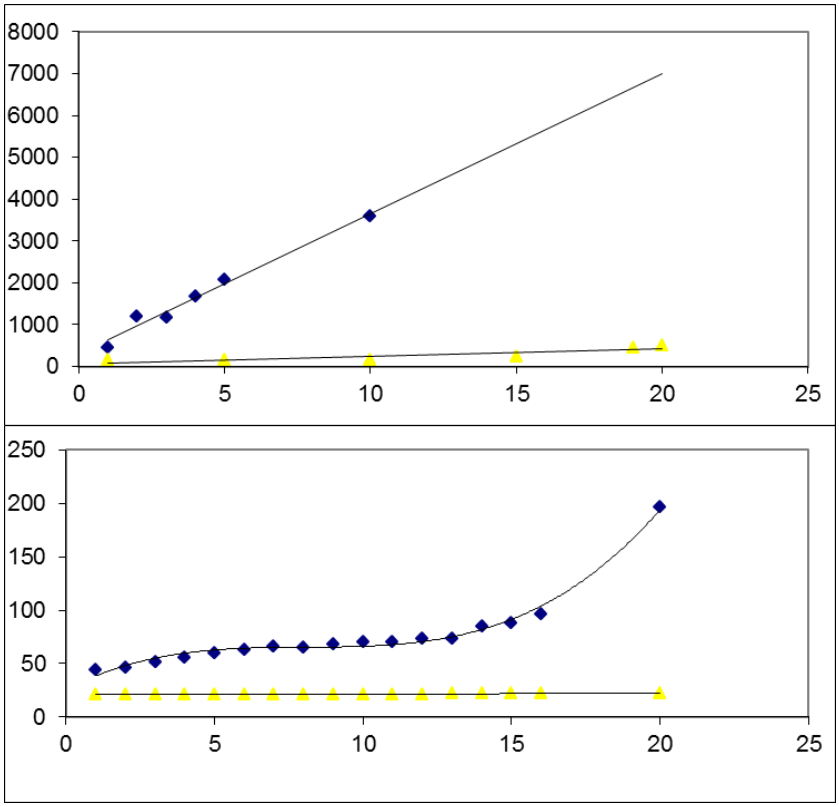


Abb. 11: Results from the MDX Query comparison

Lastly two queries have been tested for performance. Picture one shows a complex MDX query and its scalability. Picture two a simple MDX query and its speed. In both cases the Exalytics system (yellow) was superior to the "standard" system. Especially daunting was that the scalability. Whereas the current system saw a significant drop in performance between 10-15 concurrent requests, the same drop could not be found on Exalytics even trying up to 100 concurrent requests. The performance decreased slightly but in a linear fashion.

We draw the conclusion that with the successful tests (albeit they were not as successful as the upfront claims from Oracle) that the Exalytics system was well capable of fulfilling Deutsche Telekoms needs for a performing Essbase Server.

Justifying the business need – an approach to TCO calculation

An Exalytics system is expensive. The initial money outflow is worth several big servers, however the question is whether a justification of the investment is possible or not. The TCO calculation has been performed in short 3 day intensive project conducted together with Oracle Insight Sales.

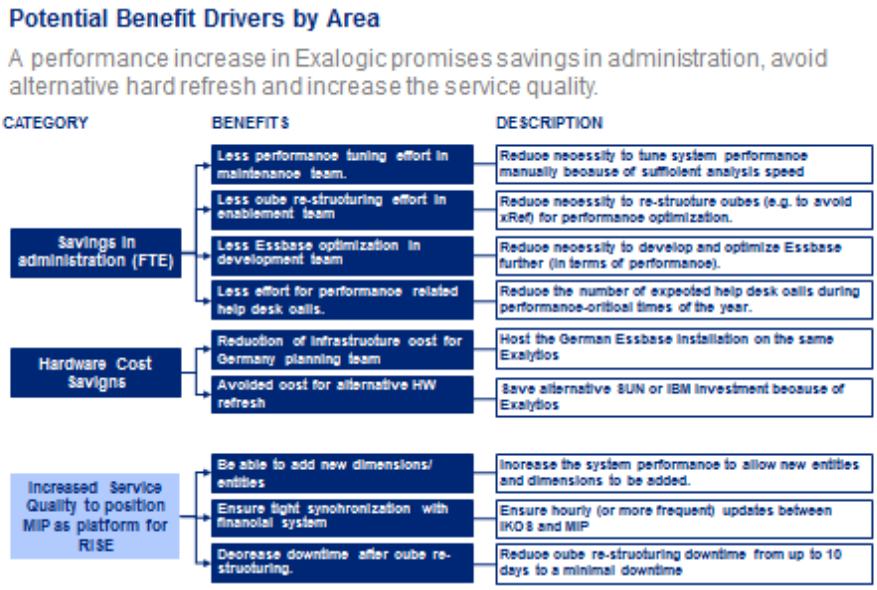


Abb. 13: Business Benefits – part 1

During the workshops different benefits where identified out of which some where quantifiable whereas others where too cumbersome to quantify. It is important to note, that all estimations are rough and “best guesses”. The comparison has been performed against viable alternatives based on Sun Sparc T5 Architecture or IBM AIX or Linux architectures which have been discussed in a separate technical workshop with Telekom, Oracle and Deloitte Experts.

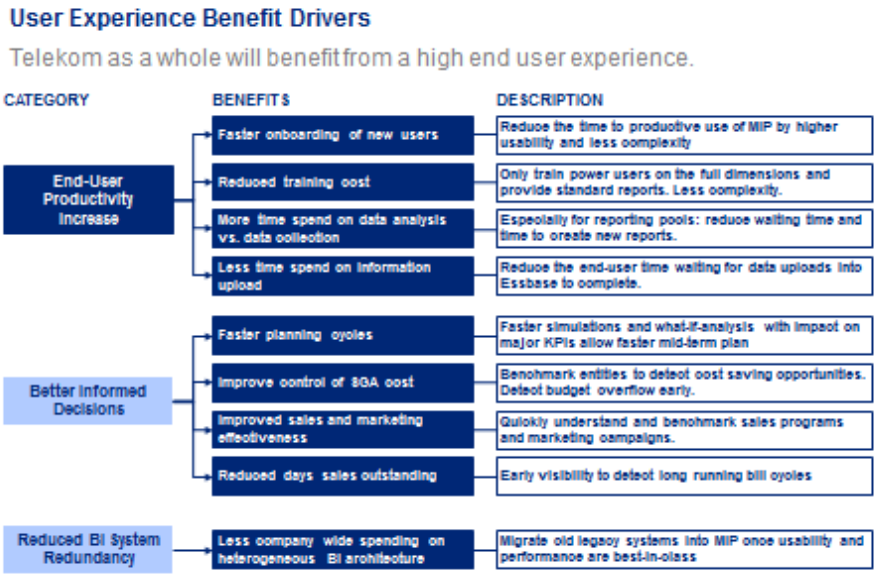


Abb. 13: Business Benefits – part 2

The alternatives considered consisted of standard systems and could not reach the performance potential promised and tested by the Exalytics system. The benefits estimation hence still considered the Exalytics alternative at a similar price to the alternatives to be relatively faster.

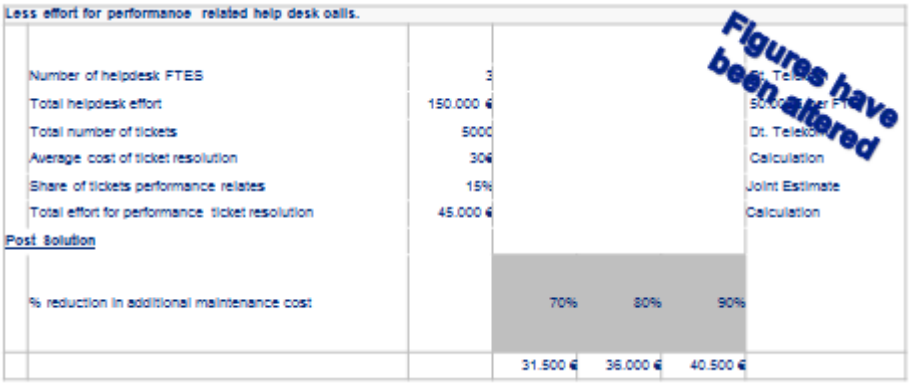


Abb. 14: Quantification of Business Benefits

Having compiled a list of potential benefits, the individual benefits where tried to estimate in a tangible way and aggregated.

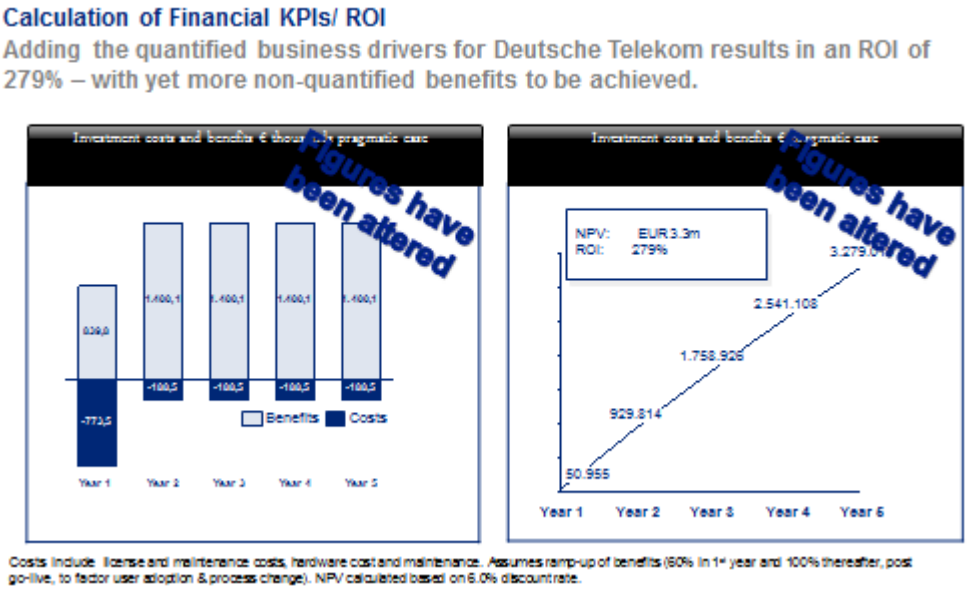


Abb. 15: Summary Business case

The NPV was highly positive when compared to the alternatives. Additionally some “soft” factors where taken into account, when trying to gauge the advantaes of Exalytics over conventional Essbase Servers.

With Deutsche Telekom these where mainly:

- Investment Security
- Option to use OBI EE for Frontend
- Commitment by Oracle

However even with the clear business case and several soft factors working pro Oracle Exalytics one major hurdle was to be taken.

Organisational impact of the introduction of an engineered system

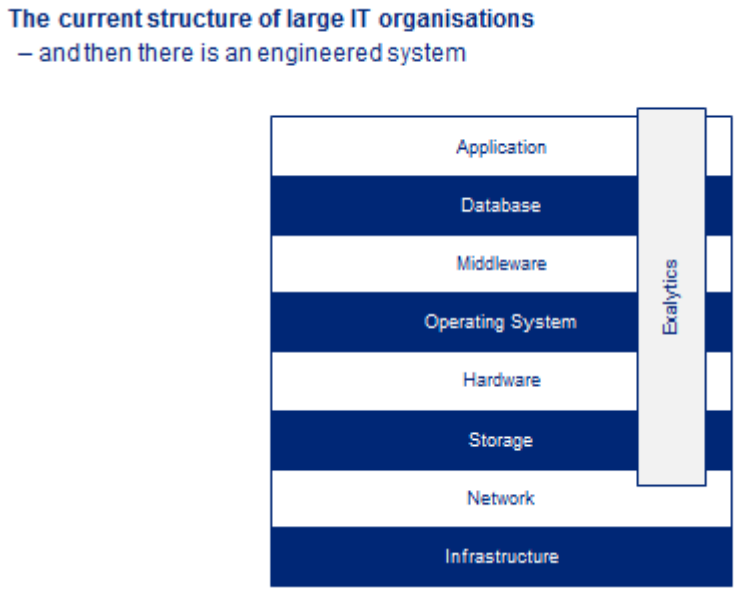


Abb. 16: Illustration of the classical organizational issue

When looking at the typical organizational structure of corporate IT in large companies, structure resembles horizontal stripes with different groups or departments being responsible for the different layers of an IT stack. So there are usually experts in the Network, Storage systems, Hardware (most likely even separated between different architectures), Operating systems (definitely a separation between Windows, Linux etc.) as well as applications.

Engineered systems however touch all of these groups and even worse bring their own requirements to all of the groups. The amount of coordination needed to get one of these machines with its individual requirements aligned with the IT organization is tantamount.

Exactly this issue arose at Telekom as well. The coordination effort with the different IT departments has been huge. Effectively all parties had to agree and where revising the specs and requirements of the Engineered system if those fit into the company standards. This approach was highly inefficient but is probably also part of upfront costs need to be paid when setting up the very first Engineered system in a corporation.

However after this first machine the effort goes down significantly. Knowing that all other machines are equal and behave equal brings in scalability.

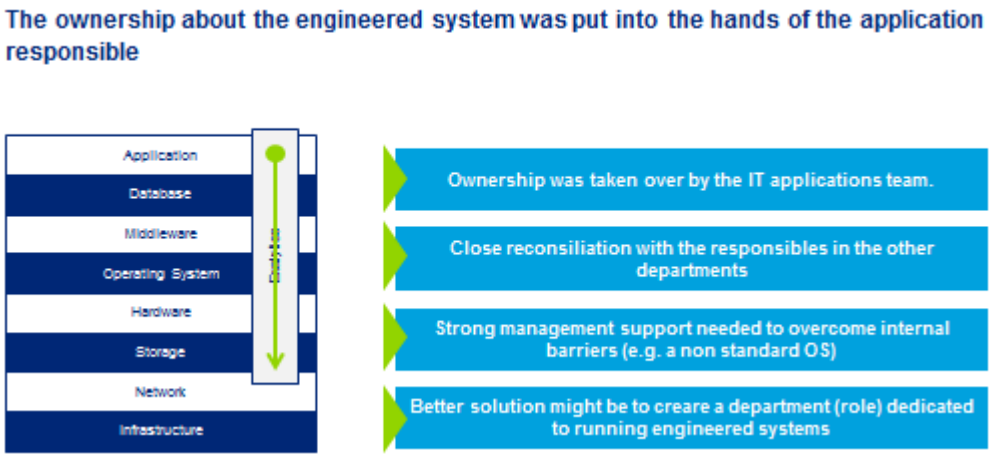


Abb. 16: Embedded solution for Deutsche Telekom

The first Exalytics at DTMIS however where put into the hands of the applications team as the requirements were driven by them.

Learnings from the migration

First and most important the System 11 migration has been successfully finished by beginning of September 2013. In order to provide the latest learnings, this chapter is intentionally not yet formulated.

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