

Deploying Extreme Performance and Large-Scale BI

Emiel van Bockel / Berry van den Heuvel

Oracle Open World 2014



Introduction



Berry van den Heuvel



@obiee247



Emiel van Bockel



@bifacts



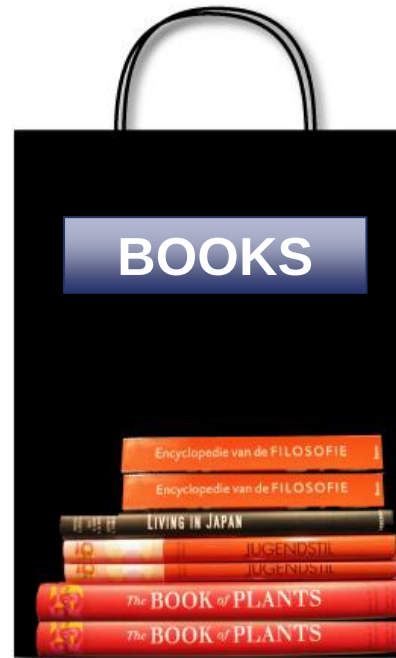
ORACLE
ACE



CB > Logistic Fulfillment > The Netherlands



Diversifaction strategy



Exalytics goals



3000 Users



120 M Rows



< 2 seconds

High performance



Great visuals



Mobile usage



This is no fairy tail



Tough road



We made it!



Team



ahead with
smart logistics

Information Services

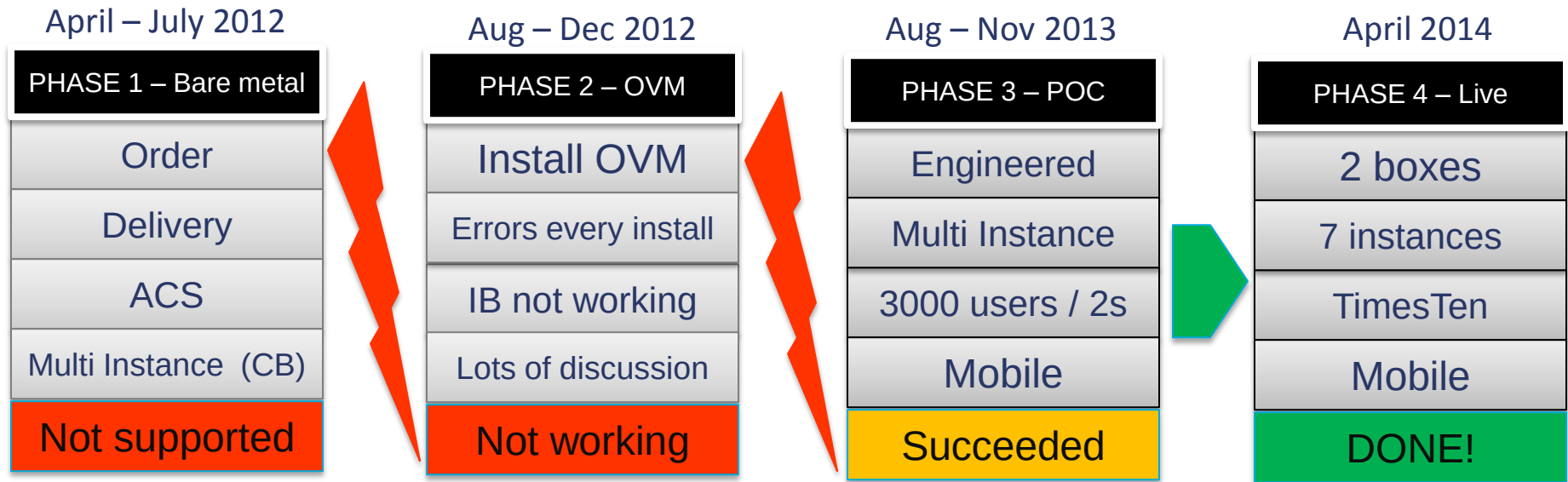
ORACLE®

Oracle Development

*Customer Engineering
(CEAL team)*



2 years ...

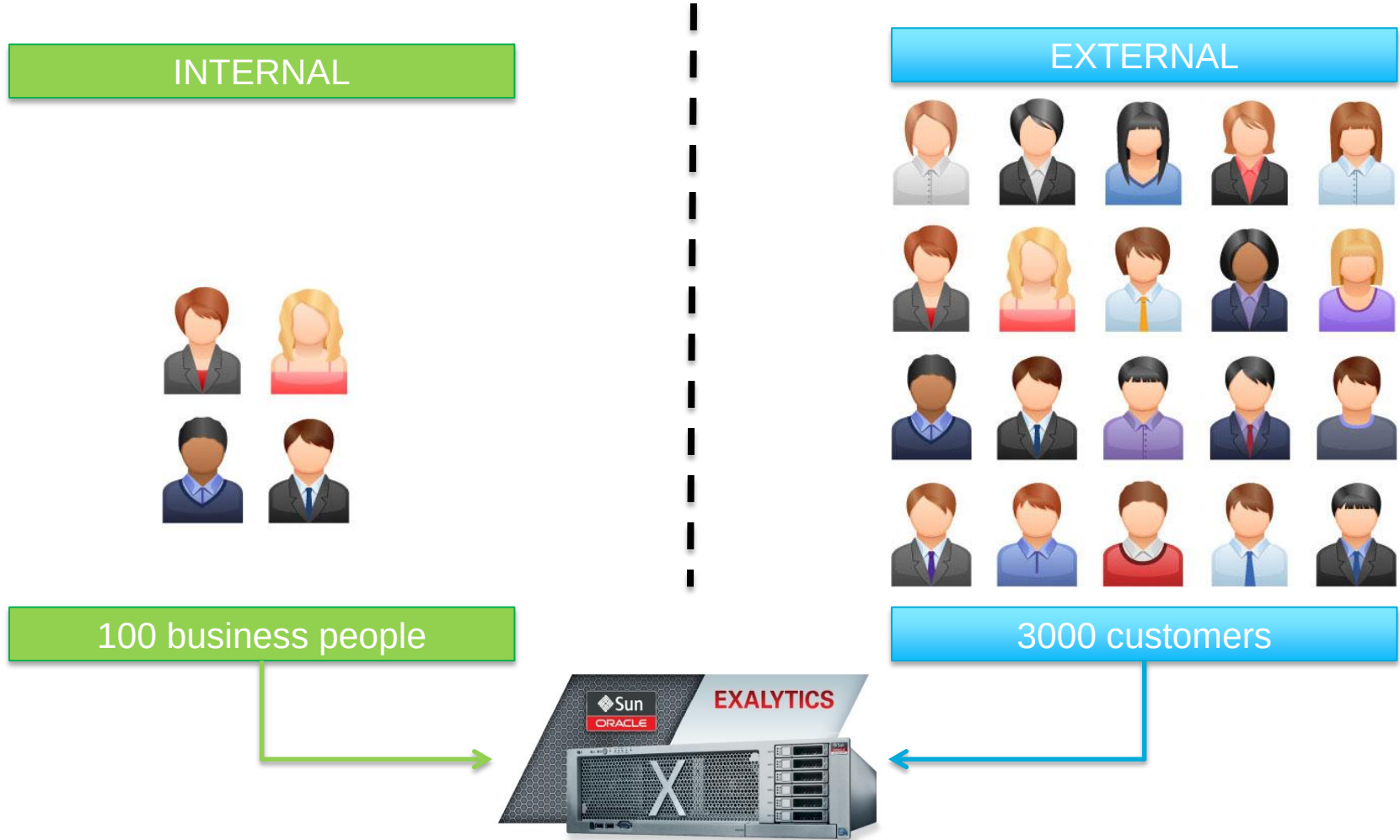


Proof of concept: Goal

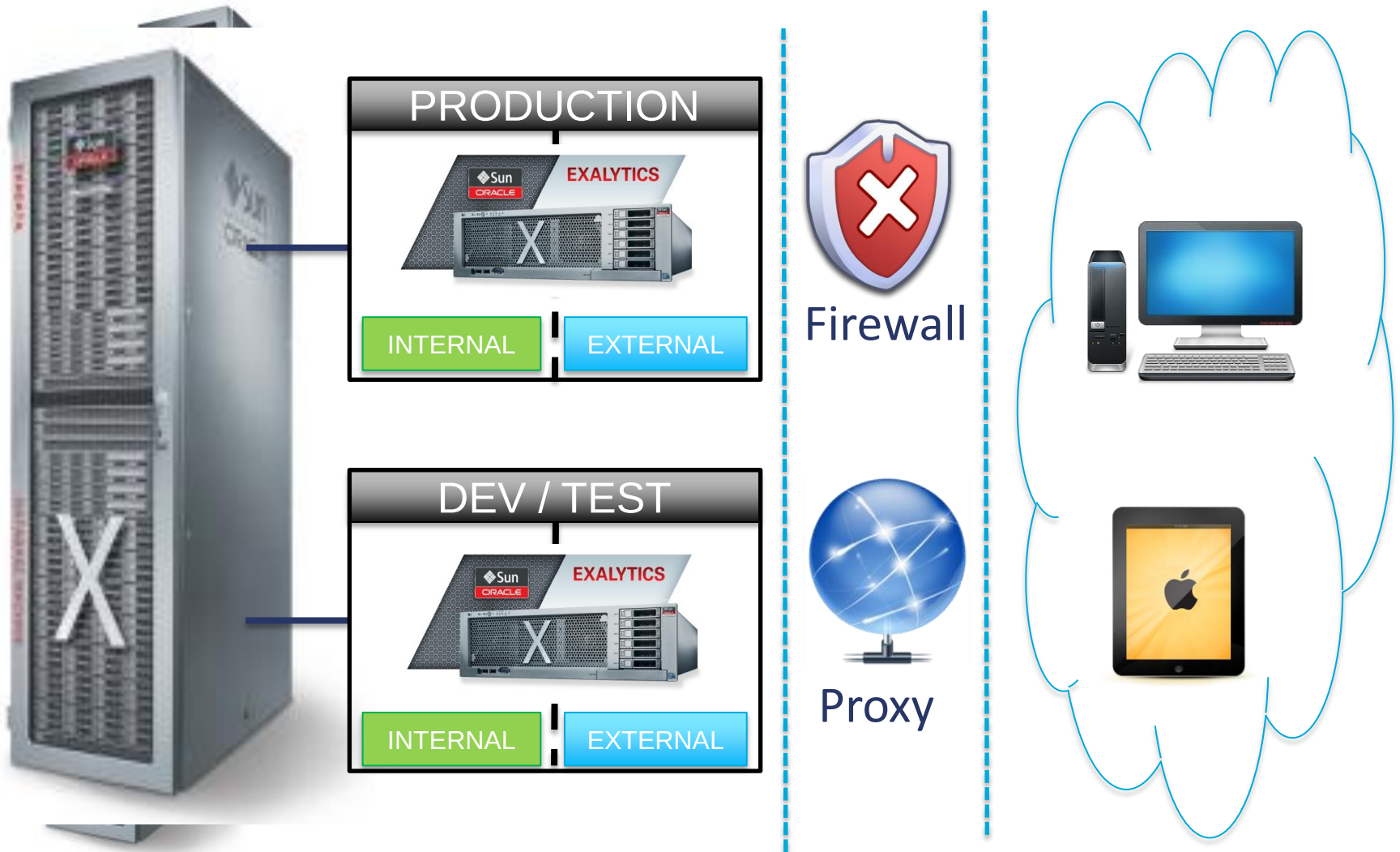
- **Engineered systems**
 - OBIEE / TimesTen / Infiniband integrated
- **Multiple Instance**
 - Internal / External
 - Flexible design (loosely coupled)
 - Dev / Test / Production environments
- **Speed of thought analyses**
 - 3000 concurrent users
 - Dashboard click every 5-15 seconds
 - Dashboard page contains ~ 5 reports*
 - ~ 2000 queries a second*
 - Based on a 120 million records fact table
 - 90% queries < 2 seconds
 - Mobile usage



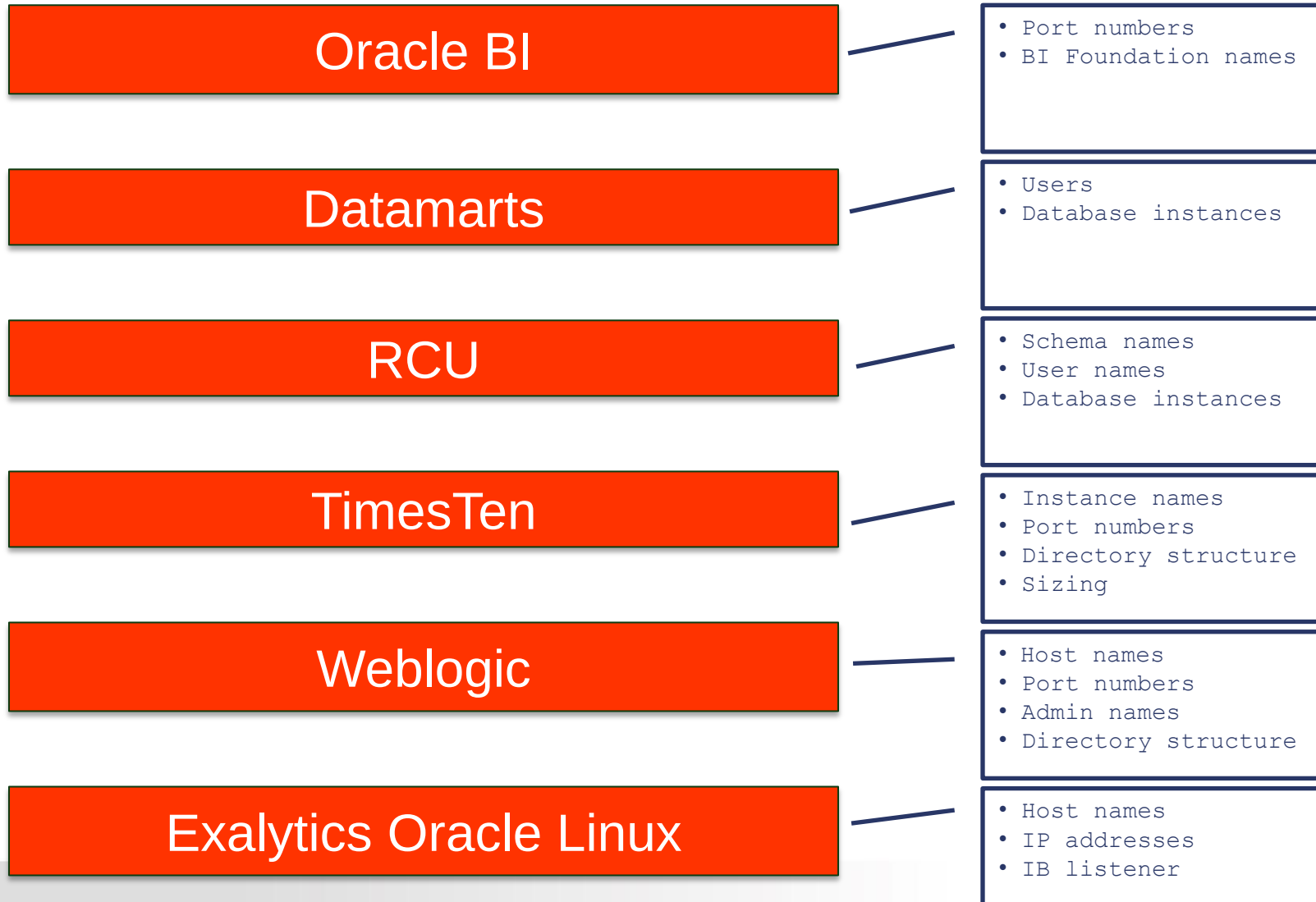
Internal & External BI



Overall architecture



Exalytics Component Stack



Configuration Design - Template

		POC	IDEV	ITST	IPRD	EDEV	ETST	EPRD
	Port ID	1	2	3	4	5	6	7
SERVER	Server IP address							
	Management IP address							
FMW	Host							
	Port							
	Adminname							
	MW home							
OBIEE	Managed serverport							
	Domain Port No							
	Oracle WLS BIEE Managed Server Port No							
	Oracle WLS BIEE Managed Server SSL Port No							
	Oracle Process Manager Local Port No							
	Oracle Process Manager Remote Port No							
	Oracle Process Manager Request Port No							
	Oracle BI Server Port No							
	Oracle BI Server Monitor Port No							
	Oracle BI Presentation Services Port No							
	Oracle BI Scheduler Port No							
	Oracle BI Scheduler Monitor Port No							
	Oracle BI Scheduler Script RPC Port No							
	Oracle BI ClusterController Port No							
	Oracle BI ClusterController Monitor Port No							
	Oracle BI JavaHost Port No							
	Essbase Agent Port No							
	Essbase Studio Port No							
	Oracle Home							
	BIfoundation Name							
TT	TT instancename							
	TT daemonport							
	TT serverport							
	TT home							
	TT size							
	Data store name							
RCU	Biplatform schema							
	Biplatform user							
	MDS schema							
	MDS user							
	Select user							
	RCU DB instance							
	Exadata listener TCP port							
IB	Exadata listener IB port							

3 Best Practices to avoid mistakes



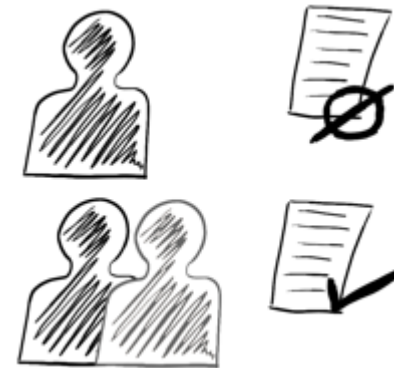
Knowledge

- ✓ Linux
- ✓ Network
- ✓ Databases
- ✓ Architecture
- ✓ Usage Tracking
- ✓ OBIEE



Architecture

- ✓ Naming
- ✓ Ports
- ✓ Users
- ✓ Database Design

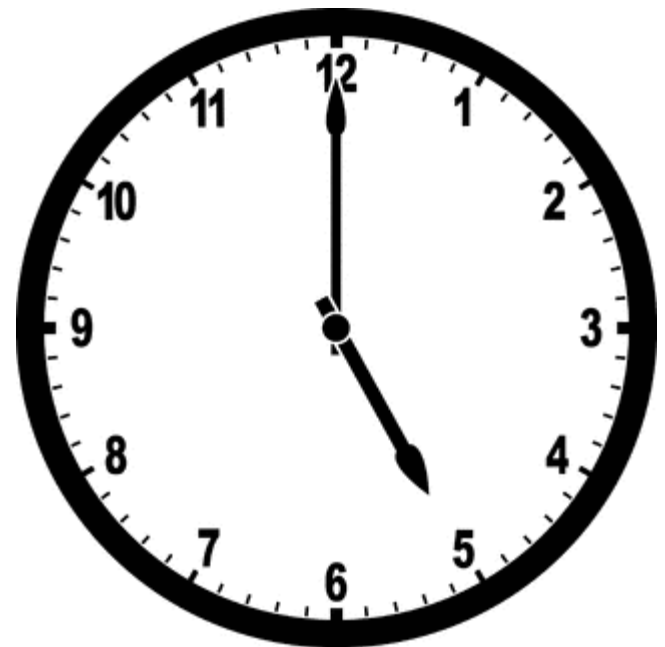
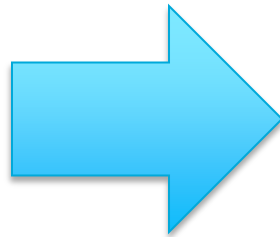
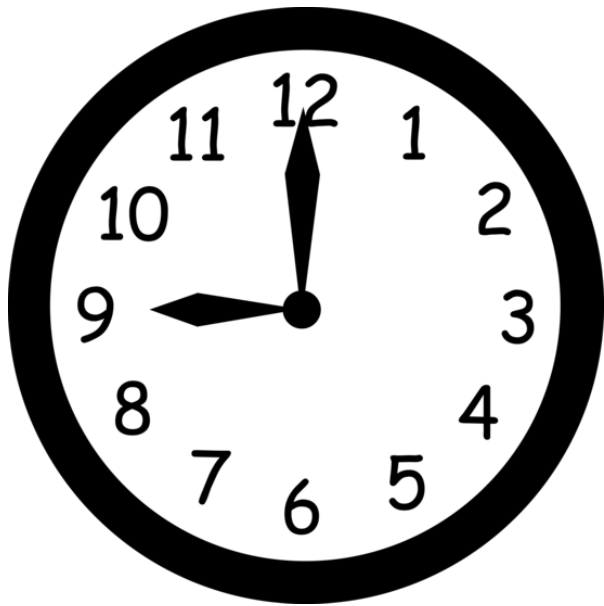


Double Eye's Principle

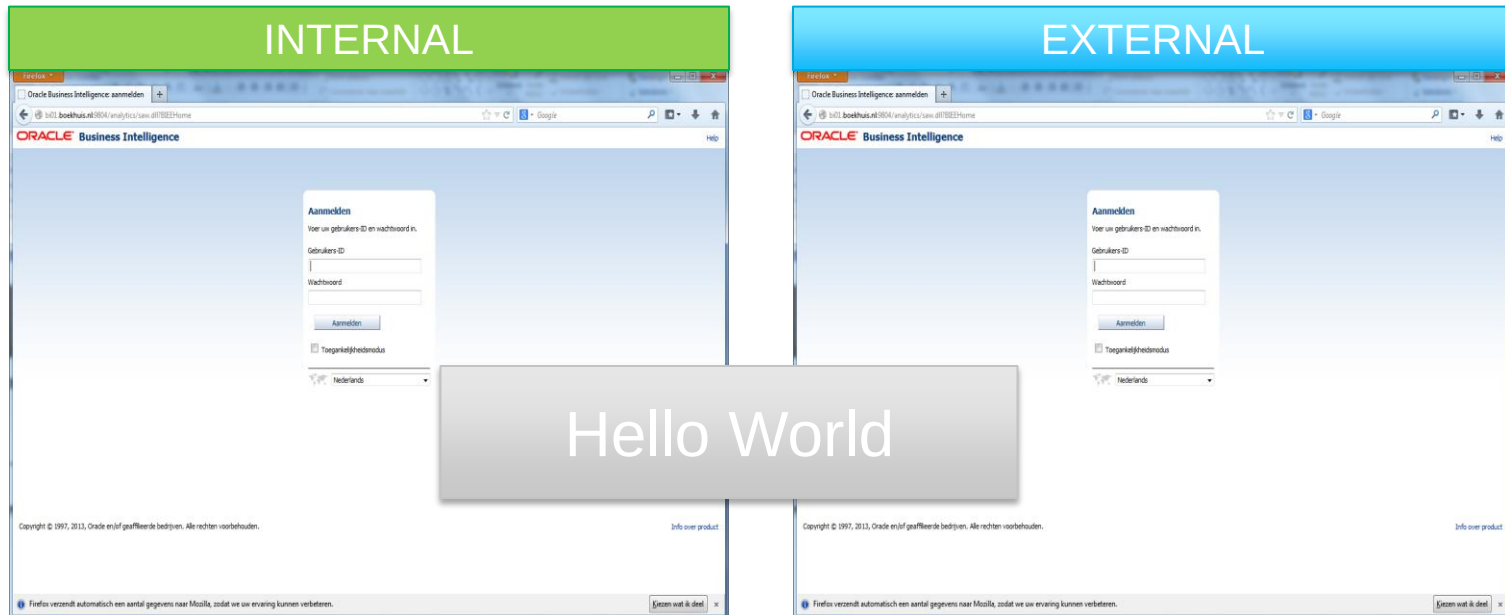
- ✓ Avoid typo's
- ✓ Check every step

Installation

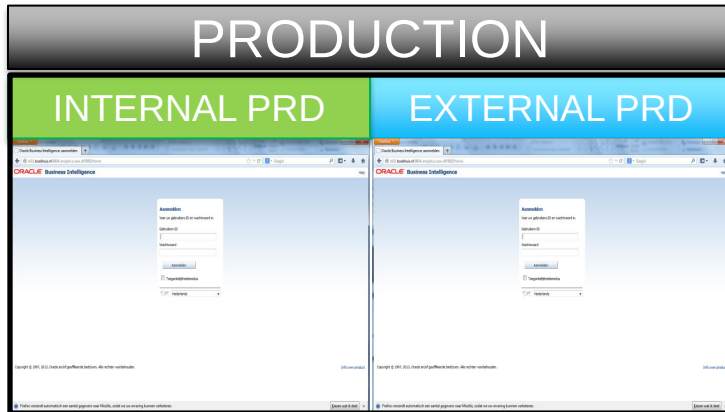
- Do it right once
- Predefined configuration sheet



Result ...



And another few hours



1 ready, 1 to go



This is only the beginning



Extreme engineering





Extreme Engineering – Golden Gate Bridge



Extreme Engineering - Exalytics

- **Design before implement**

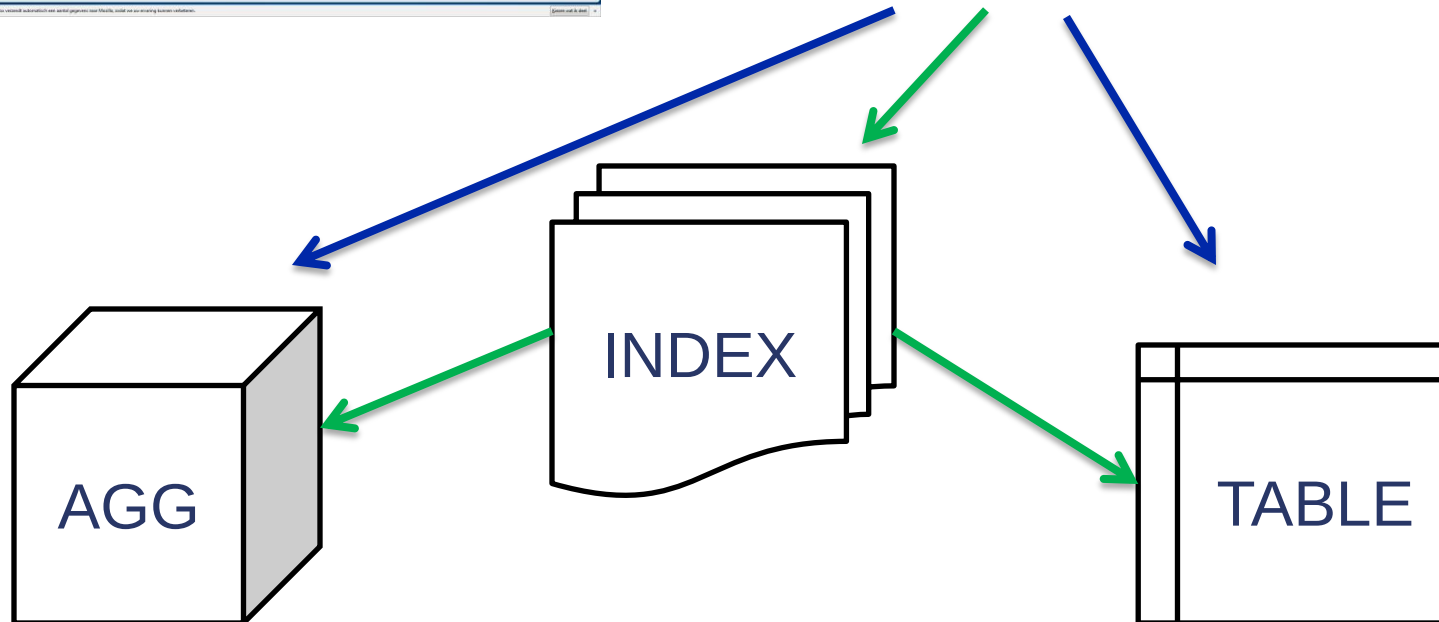
- Dimensional data model
- Dashboard functionality
- Queries
- Joins
- Indexes
- Ask yourself
 - How would I write the query?
 - What aggregate would I use?
 - What indexes are needed?



Data Driven Design Principle

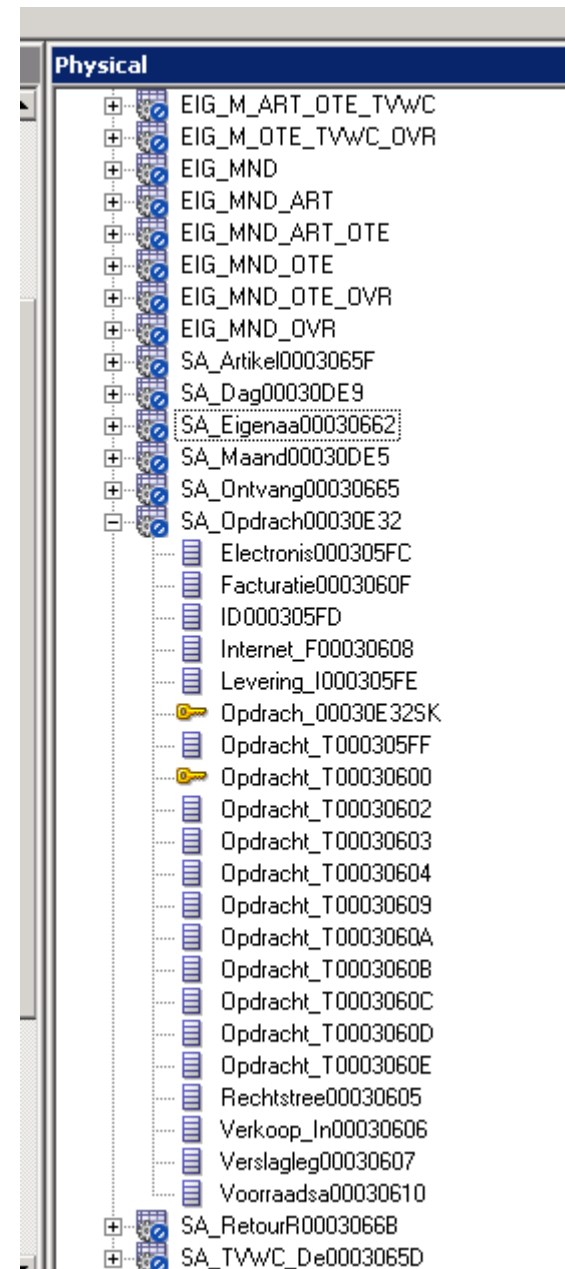
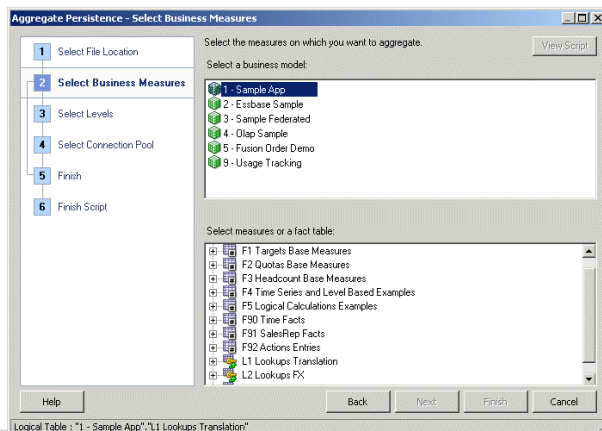


```
select sum(T198666.EXEMP_AANT) as c1,
       T198827.MAAND_NR as c2
from
  CB_DIM.OPDRACHT_TYPE T198801,
  CB_HDIM.MISO_GOEDEREN_STROOM T198878,
  CB_DIM.DAG T198863,
  CB_DIM.JAAR T198816,
  CB_DIM.KWARTAAL T198821,
  CB_DIM.MAAND T198827,
  MISO.MISO UITGEVOERDE_OPDRACHT T198666 /* MISO.MISO UITGEV
where ( T198666.DAG_NR = T198863.DAG_VORIGE_JAAR and T198666.O
group by T198827.MAAND_NR
order by c2
```



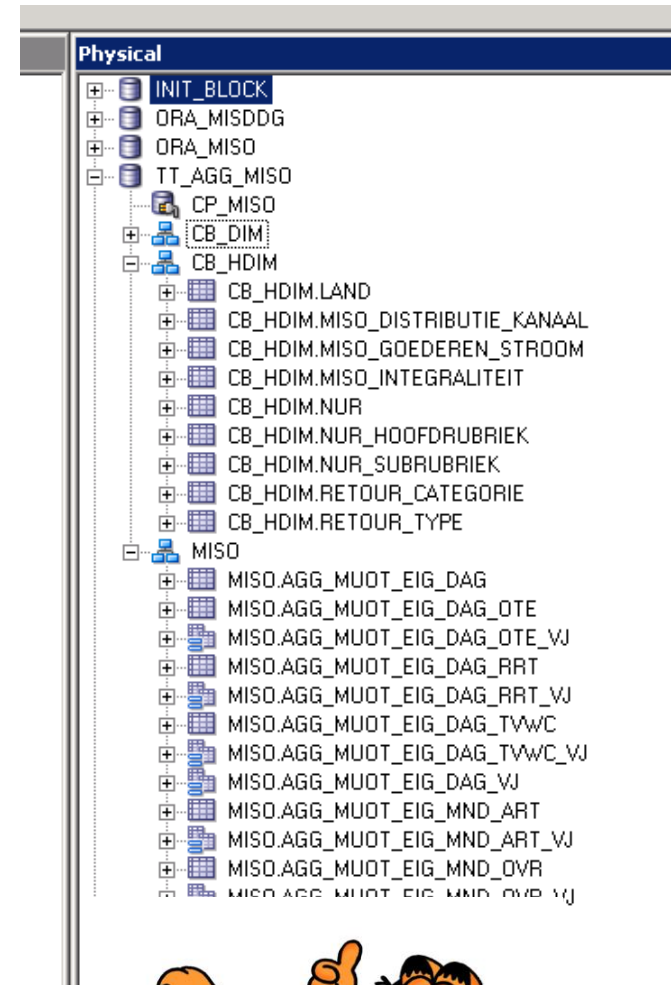
Tool: Aggregation Wizard

- Easy to create scripts
- Execute scripts using nqcmd
- When errors occur hard & time consuming to solve
- Roll back scenario fragile
- Can't handle Row Level Security
- Creates a complex data structure
- *Be aware of open connections (rpd & tt)*



Model yourself

- Better understanding of your design
 - Keep meaningful attributes
- Reuse of all dimensions
- You are in total control
- Loosely coupled design
 - TimesTen & Exadata
- Only minutes of additional work
 - *Aggregate creation time is equal in both scenario's*
- Can save hours troubleshooting if an error occurs
- We saved additional costs on memory
 - 1 TB upgrade costs 100K €
 - By lean aggregate and index design we went from 400 Gb usage to 100 Gb usage
 - You need 2 x 1TB (DEV/TEST + PROD)
 - saved 2 x 30.000 = 60.000€ !
 - Lack of intelligence in advisory tools (summary advisor, index advisor)

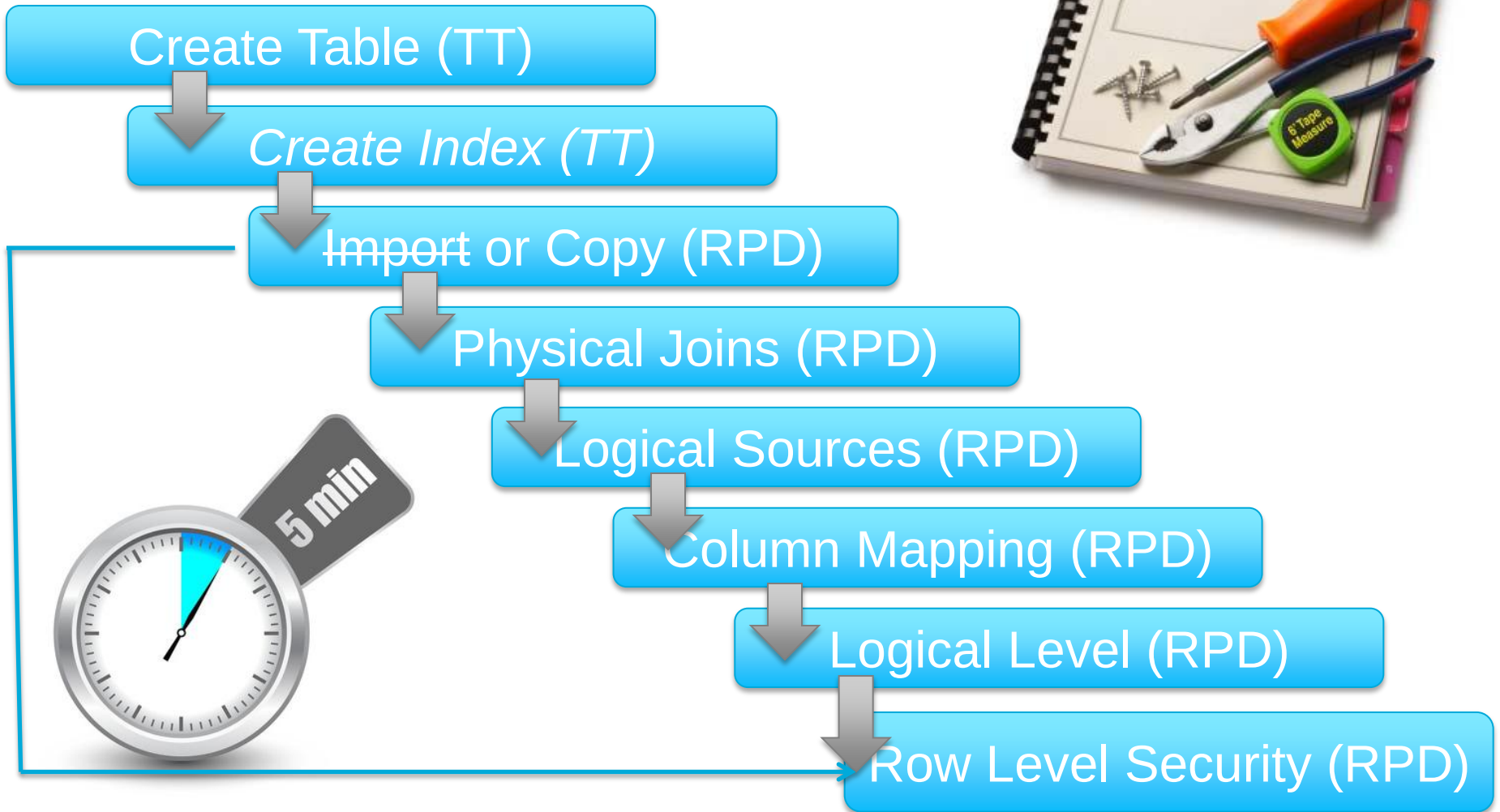


Loading data / creating aggregates into TimesTen

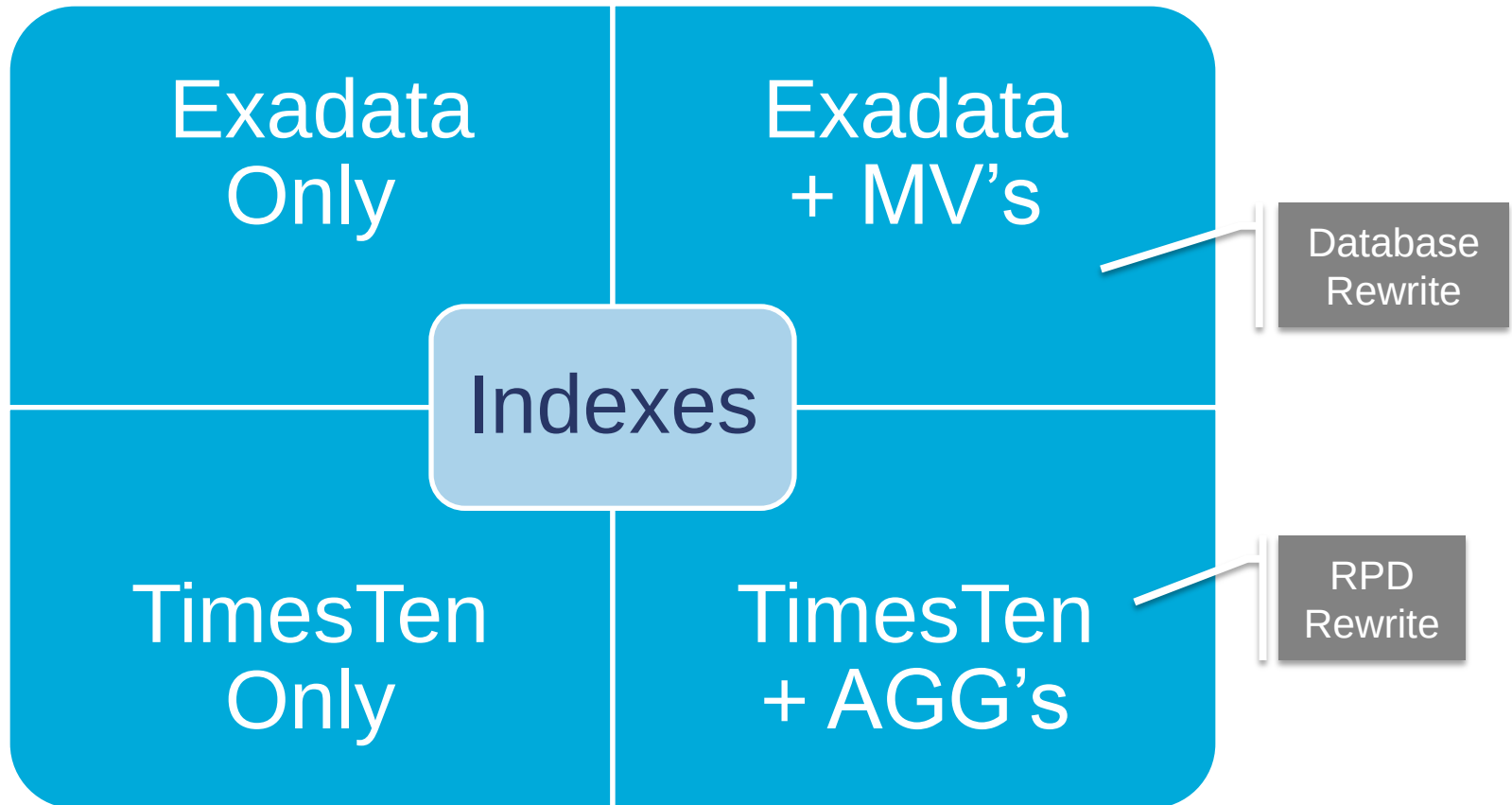
- Options to load data into TT store:
 - ttlsqll .. *(load within timesten, agg creation)*
 - ttBulkCp .. *(load a file)*
 - ttLoadFromOracle ... *(load from exadata, through Infiniband)*
- Use “insert into table” instead of “create table as select ...”
 - Will lock a row in system tables
- Don't use CTRL C
- No open sessions
 - Risk of locks
- Count records before create
 - Prevents expensive memory consumption
 - Aggregation creation time awareness
 - **Hint:** Use your Exadata machine to calculate
- Be aware of the data types (Oracle DB vs TimesTen)
- Do it right once *(changes afterwards are difficult to make)*
 - (e.g.) rename table or column not possible (TimesTen)



Manual Aggregation Steps

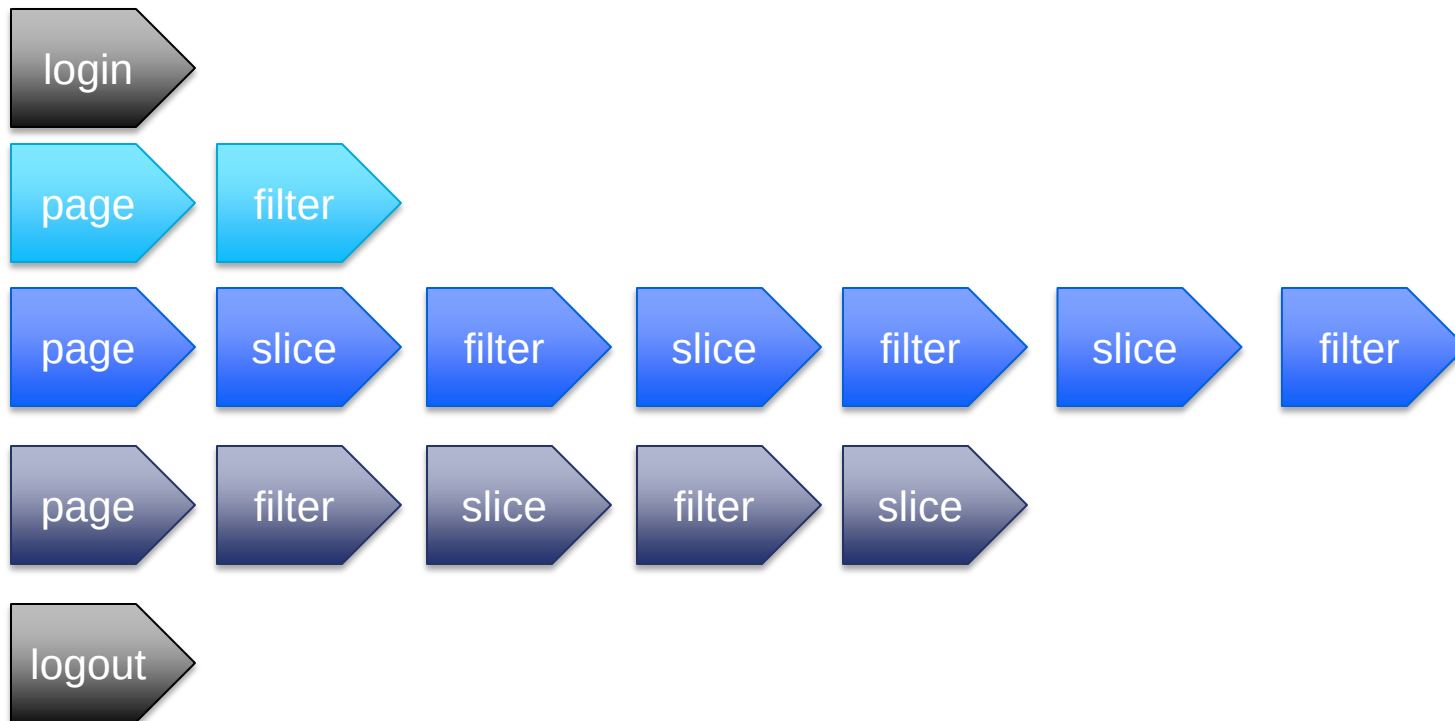


Test Multiple Architectures

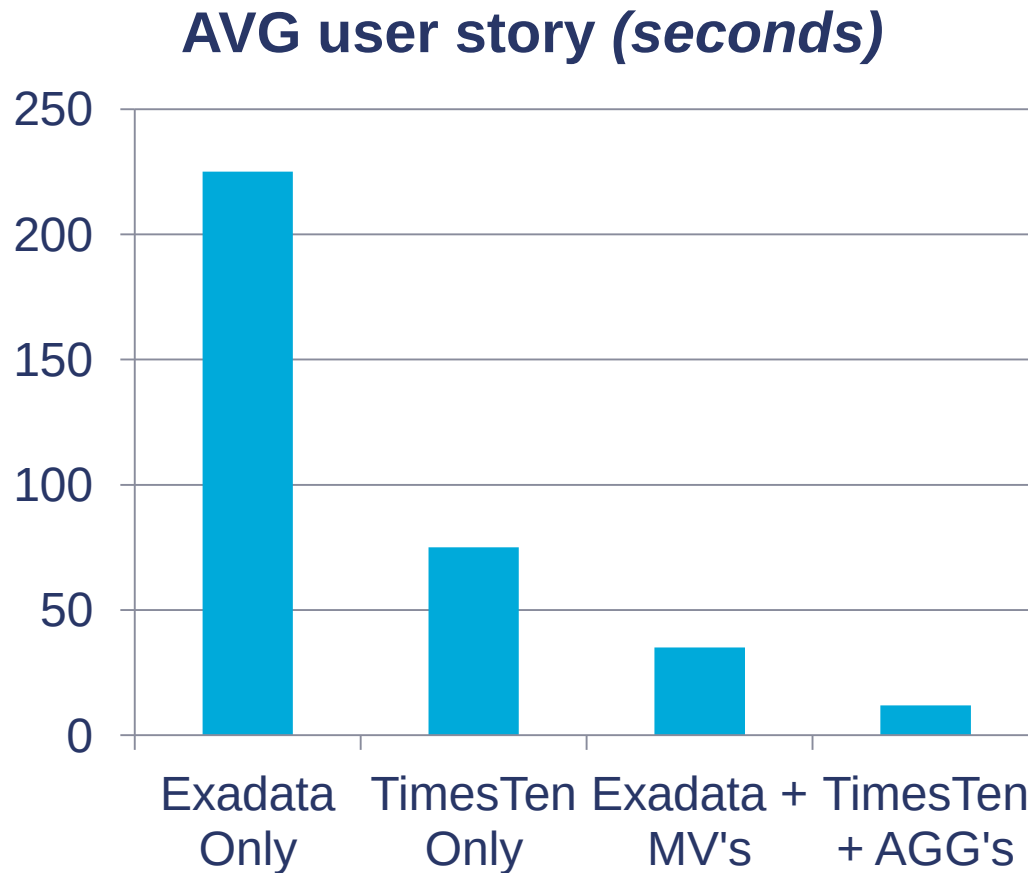


Use case

- 16 steps
- Thinktime random 5-15 seconds



Performance metrics multiple architectures



Metrics TimesTen with Aggregates



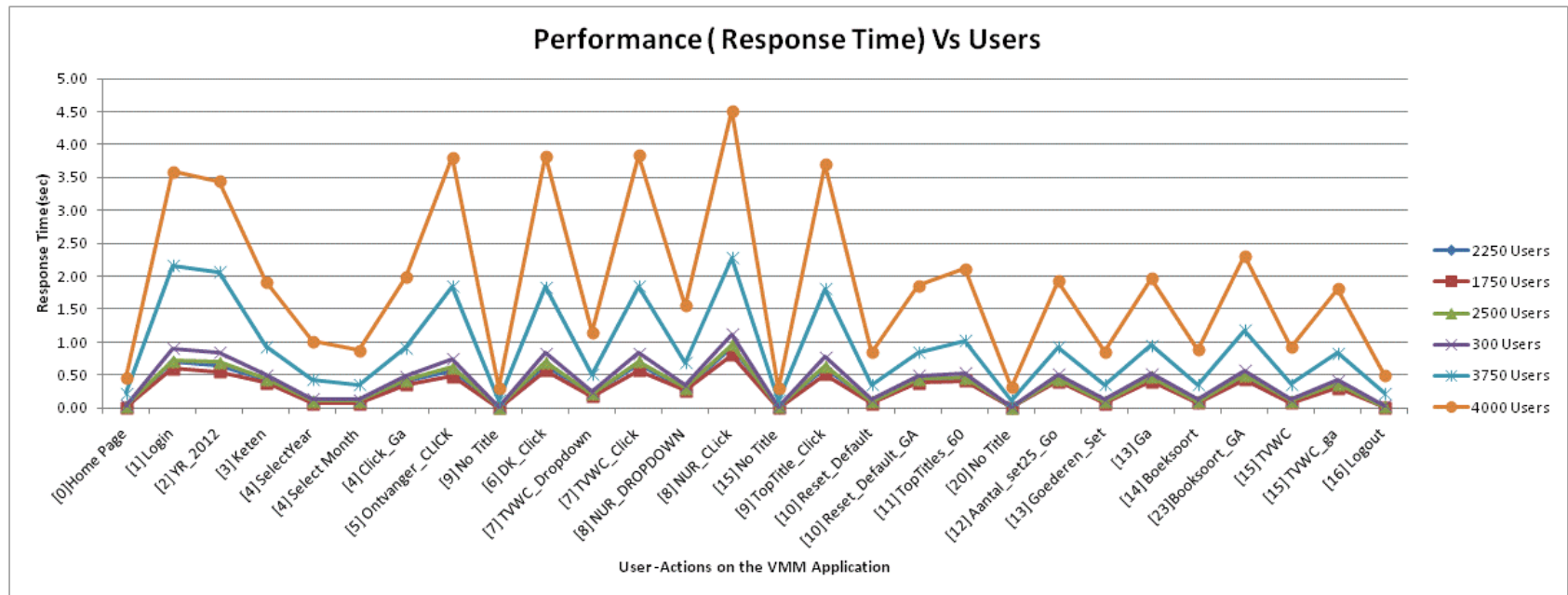
3000 Users



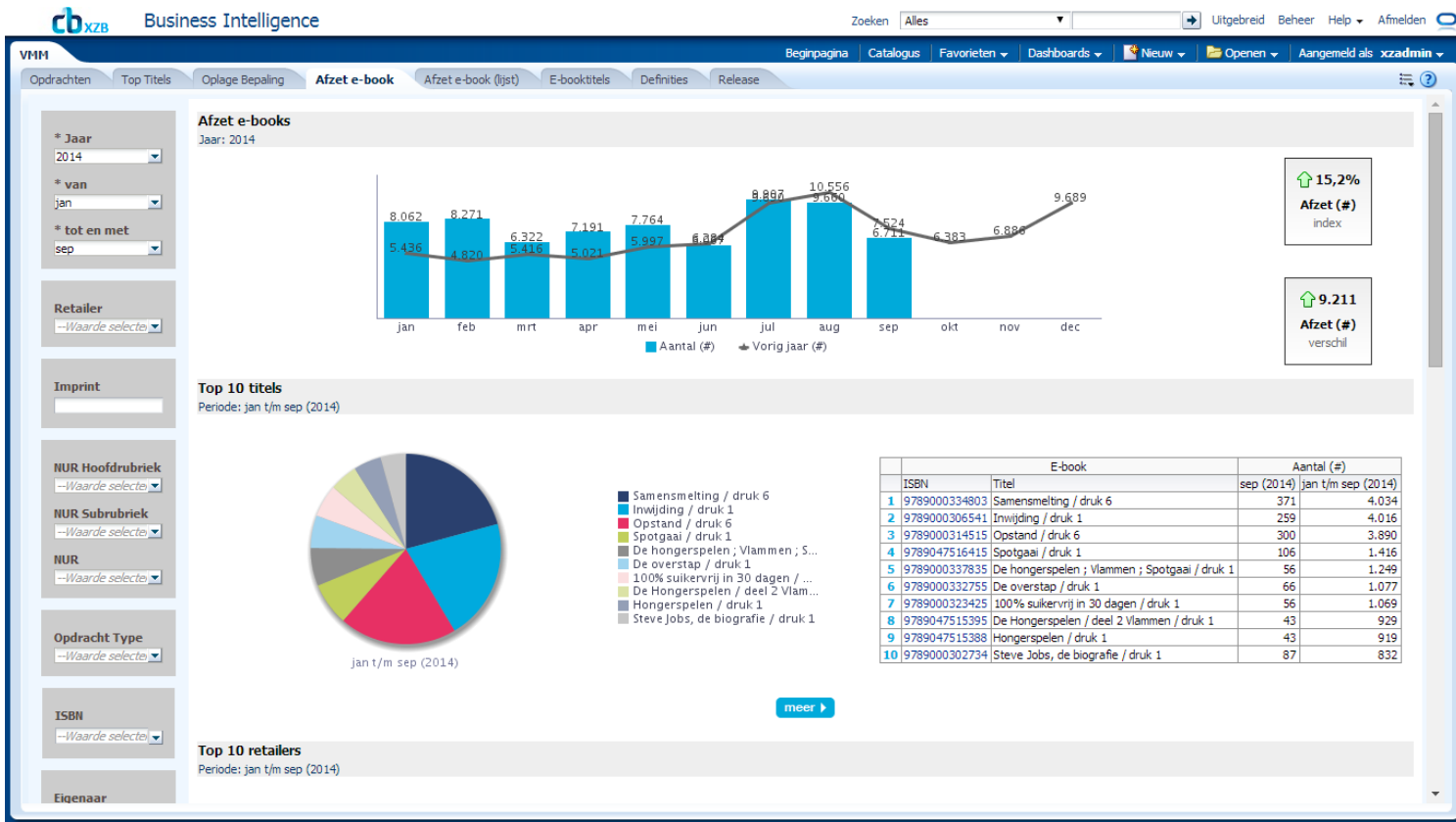
120 M Rows



< 2 seconds



Demo



Watch Demo



Publishers reaction

Looks great

No Excel
needed

Nice
overview

Performs
well



Lessons learned

- Support from Oracle (stovepipe organization)
 - Early adopter: experience & knowledge
 - No engineered organization
 - Default answers to unknown problems
- Oracle CEAL Team
 - Open / focus
 - Good communication
 - Right engineer, right manager -> SPOC
- Tons of documentation
- TimesTen is undiscovered
 - We love the command: `ttdestroy`
- Flash disk
- **Most important:** data architecture & design



Key message

- Understand your data!
 - Save money and time
- Only start engineering if the systems works as engineered
 - OBIEE
 - Infiniband
 - TimesTen
- If and only if you understand:
 - Technology (Dashboard, RPD, Query & TT)
 - Dimensional Modelling
- **Than you can engineer the best BI system of the world!**



Make customers happy!



 analytics
een initiatief van 





ahead with
smart logistics