Extreme Intelligence

Emiel van Bockel

RittmanMead BI Brighton – 8 May 2014

ahead with
smart logistics

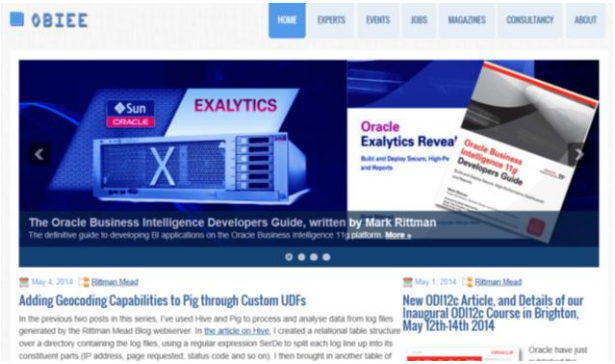
Introduction

Emiel van Bockel

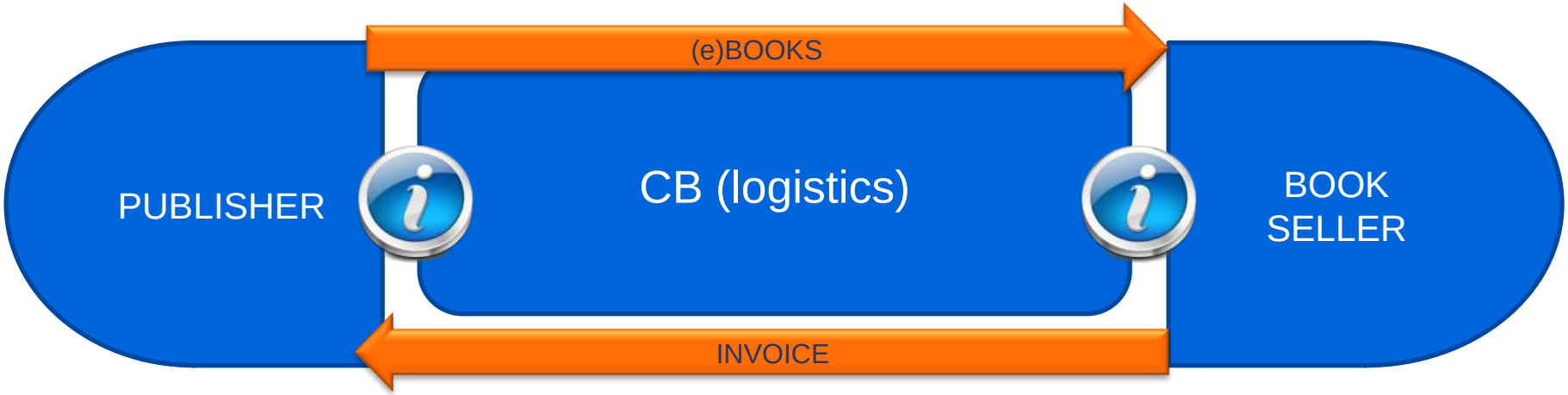
Manager IS ('00)

DWH/BI ('97)

@bifacts

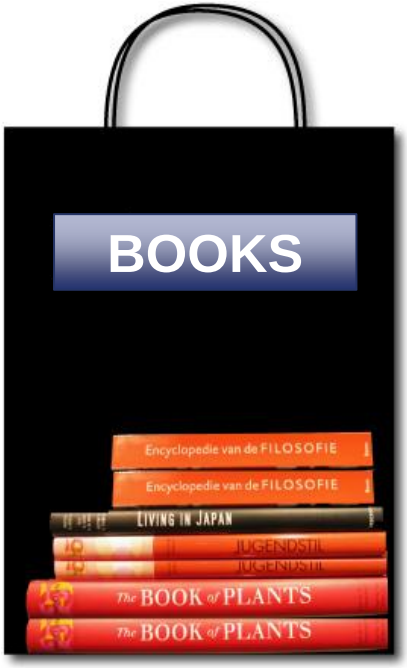


CB



70 million books
1 billion €
600 publishers
1800 booksellers

Diversifaction strategy



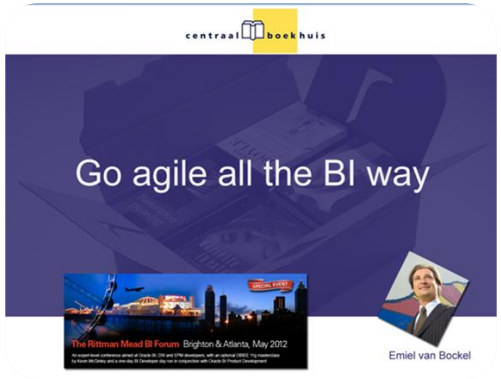
Anniversary

2009

2010

2011

2012



2014

This is no fairy tail

Tough road ….

We made it!

Team

Information Services

ORACLE®

Oracle Development

Customer Engineering
(CEAL team)

2 years …


April – July 2012
PHASE 1 – Bare metal
Order
Delivery
ACS
Multi Instance (CB)
Not supported
Aug – Dec 2012
PHASE 2 – OVM
Install OVM
Errors every install
IB not working
Lots of discussion
Not working
Aug – Nov 2013
PHASE 3 – POC
Engineered
Multi Instance
3000 users / 2s
Mobile
Succeeded
April 2014
PHASE 4 – Live
2 boxes
7 instances
Times Ten
Mobile
DONE!

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
  - Mobile usage
  - 90% queries < 2 seconds
  - Based on a 120 million records fact table

Internal & External BI

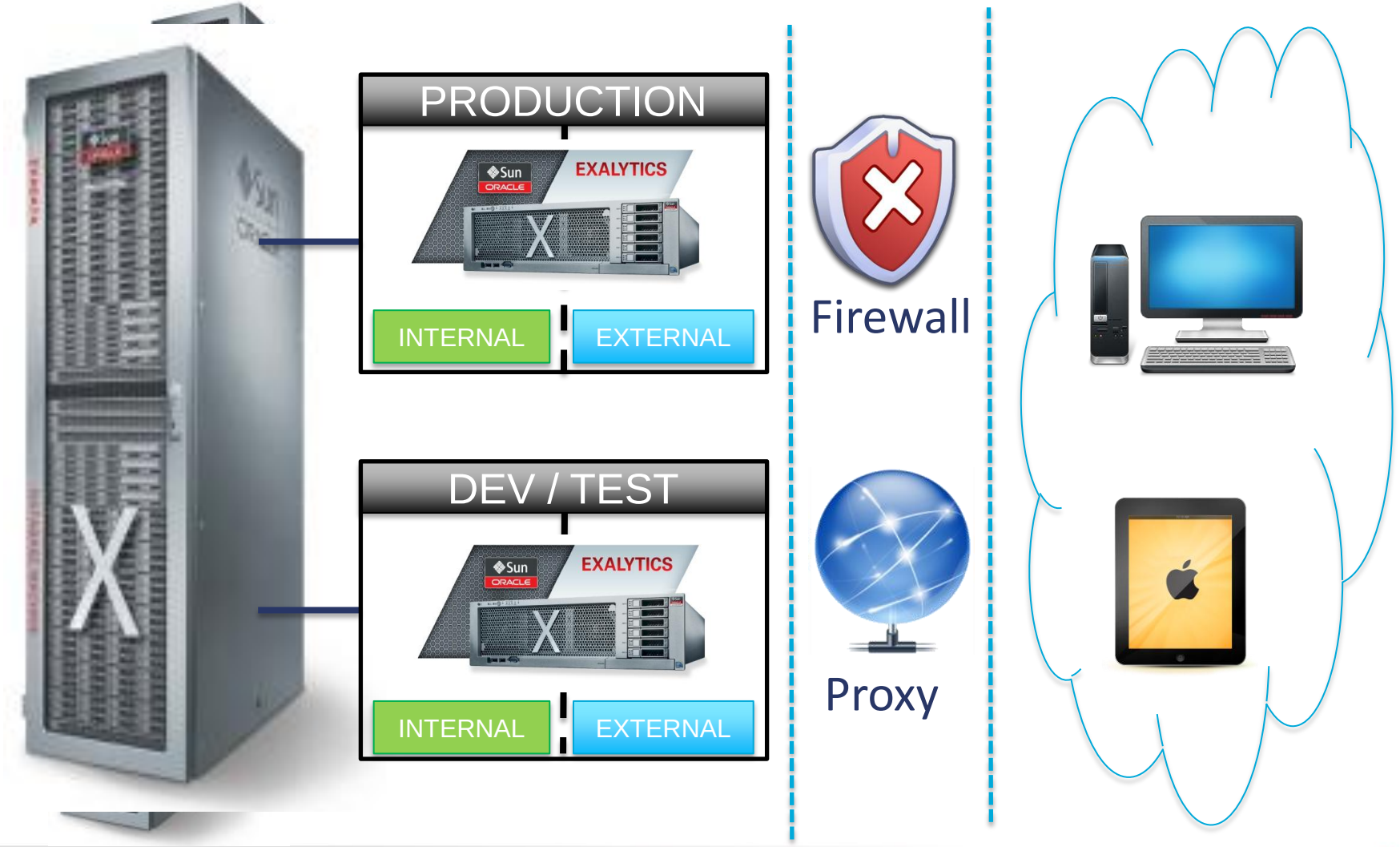
INTERNAL

EXTERNAL

100 business people

3000 customers

Overall architecture

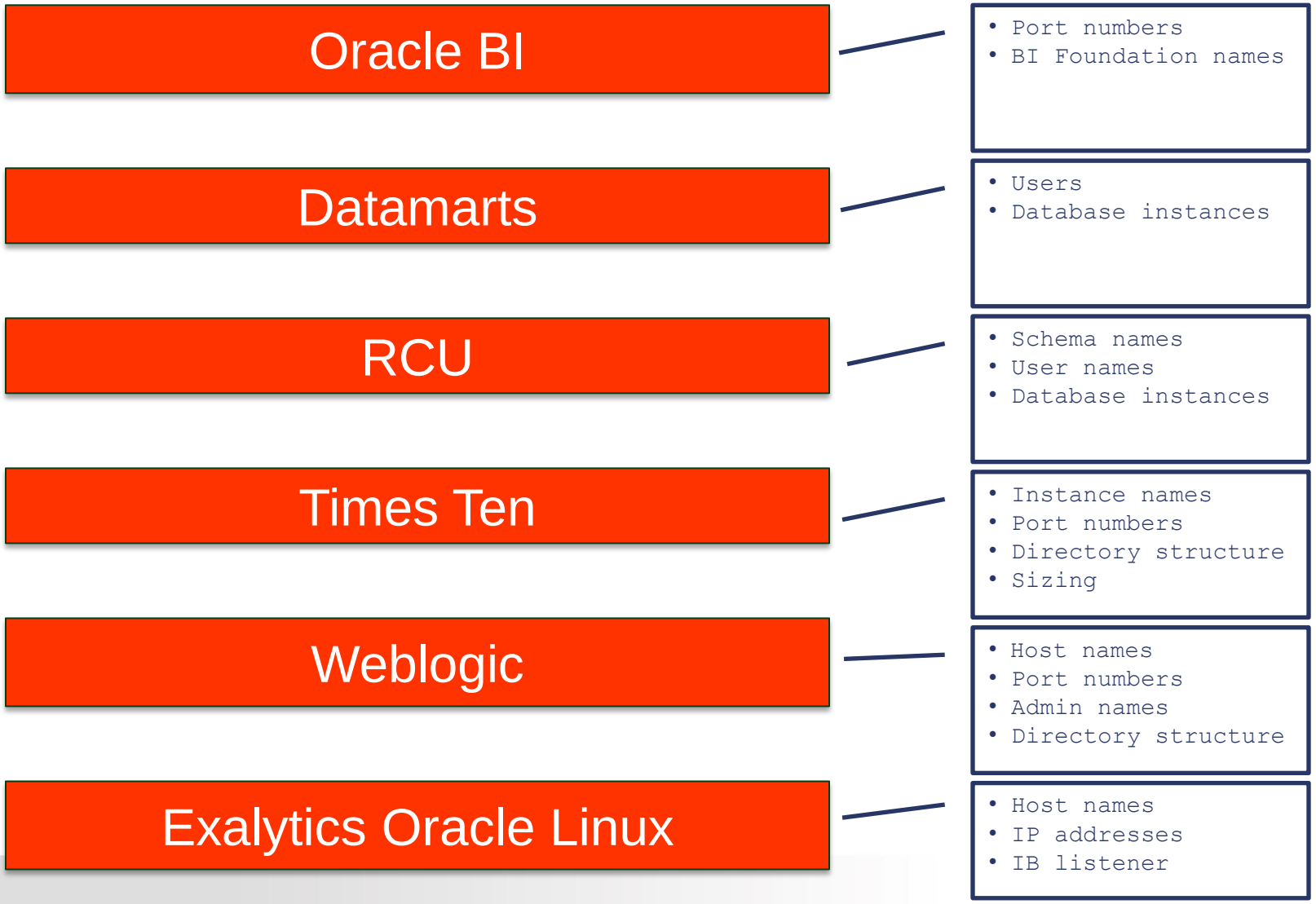


Software Components

- **Exalytics Server Software**
  - ISO 1.0.0.6 *(OS image)*
  - RCU 11.1.1.7 *(usage tracking & bi srv configuration)*
  - TimesTen 11.2.2.6 *(TimesTen)*
  - WLS 10.3.6 *(Weblogic)*
  - OBIEE 11.1.1.6 / 11.1.1.6.2 BP1 / 11.1.1.6.11 / 11.1.1.7.0 / 11.1.1.7.140225

- **Exalytics Client Software**
  - OBIEE Client install 11.1.1.6 / 11.1.1.7 *(BI Administration / Catalog mngr)*
  - MobaXterm V7 *(Terminal connection)*
  - JDK1.5.0.22 *(ILOM installer)*
  - SQL Developer 4.0.1 *(database development)*
  - TT Client Software 11.2.2 *(tt driver)*
  - Win SCP 552 *(ftp software)*

Exalytics Component Stack



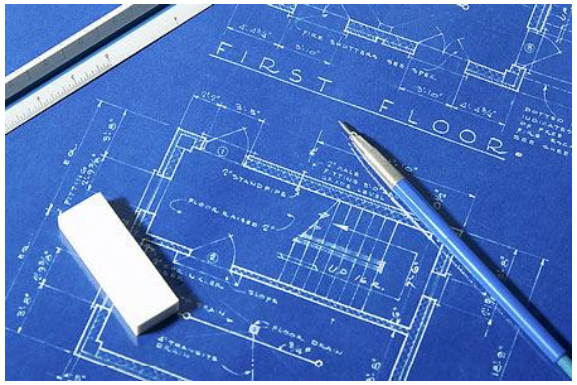
Configuration Design - Template

		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

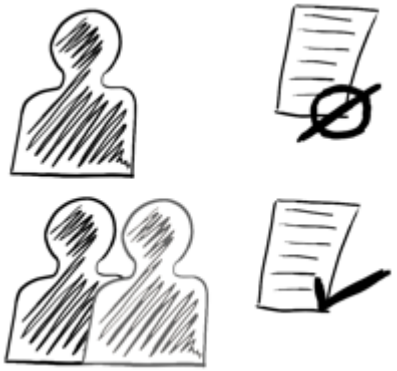
Knowledge

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



Architecture

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

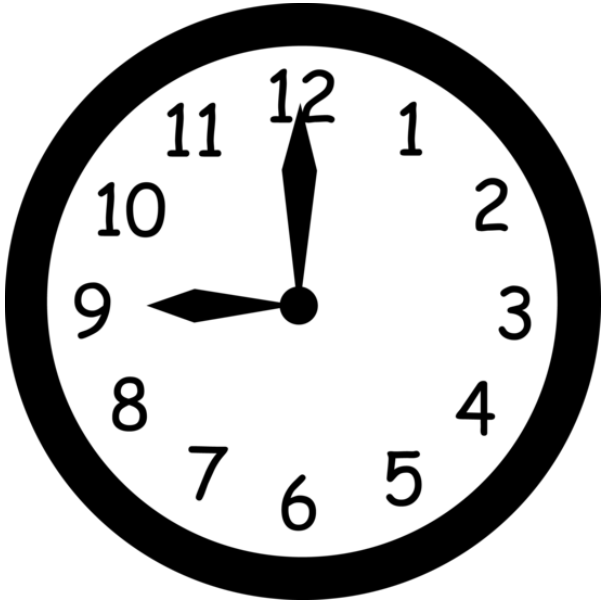


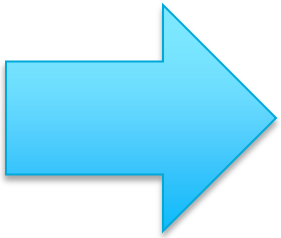
Double Eye's Principle

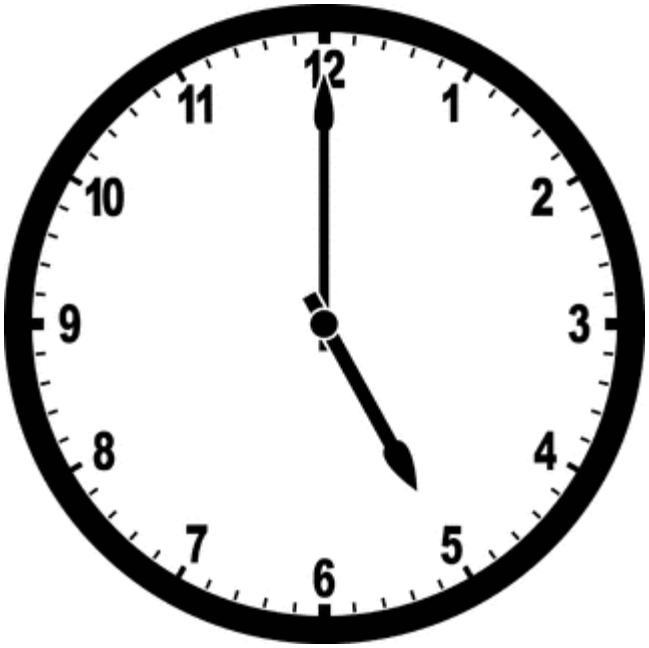
- ✓ Avoid typo's
- ✓ Check every step

Installation ……..

- Do it right once
- Pre defined configuration sheet

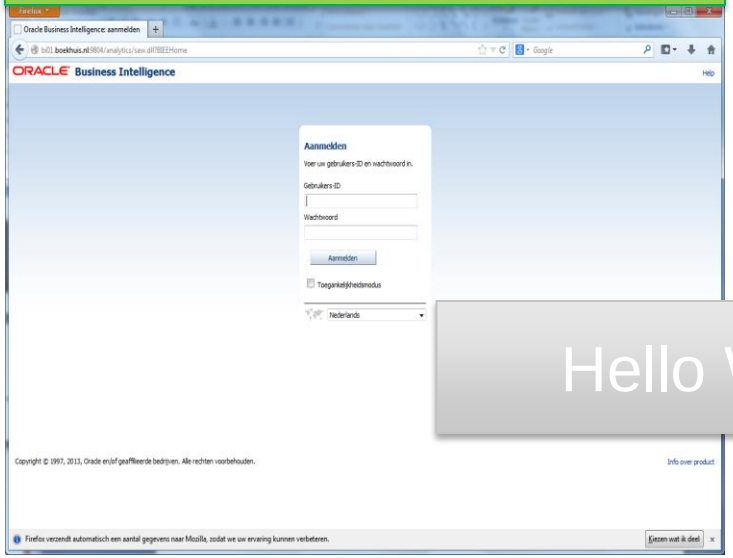




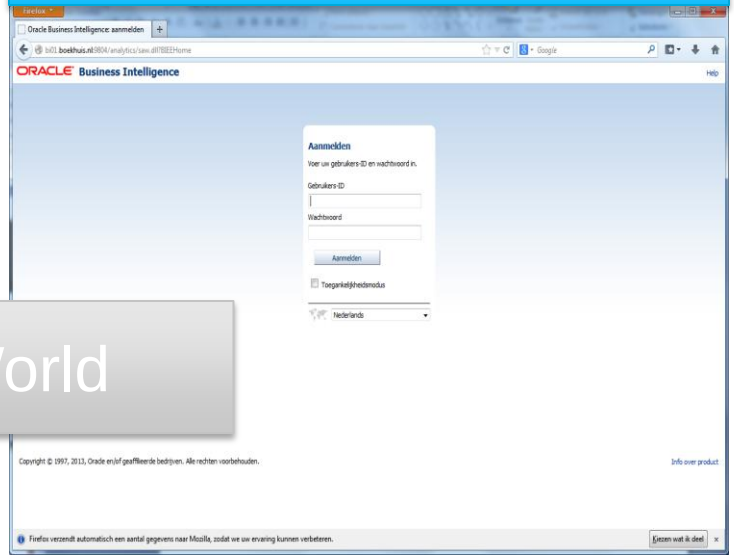


Result …

INTERNAL



EXTERNAL

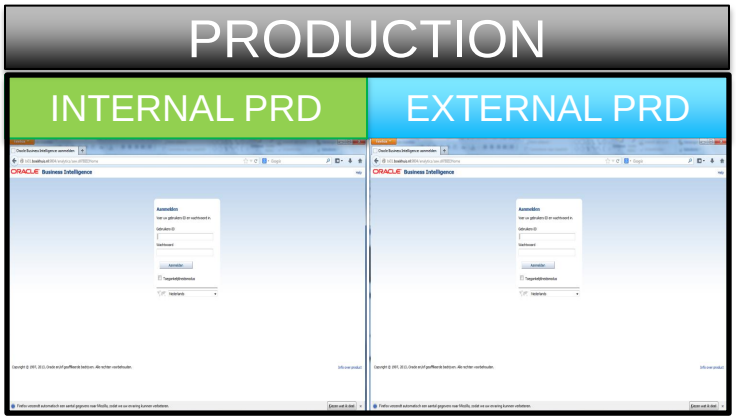


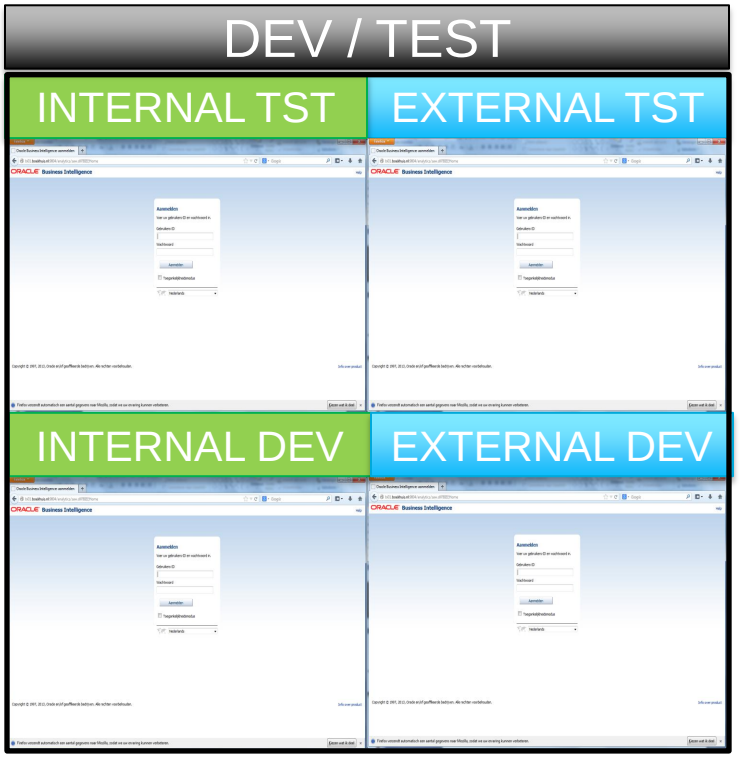
Hello World

Post installation steps

- Migrate users
- Merge Usage Tracking
- Backup
- Monitor
- etc

And another few hours .....





1 ready, 1 to go

Extreme engineering

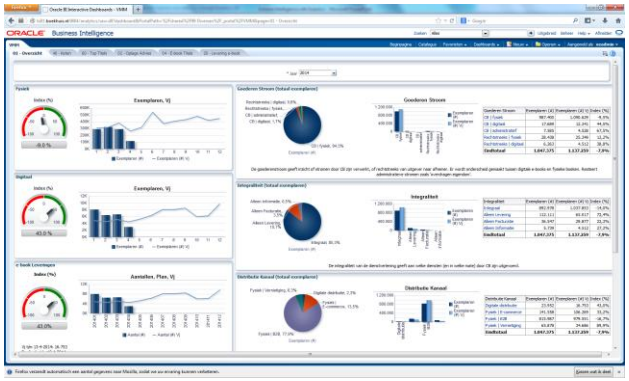

DON'T
TRY THIS
AT HOME

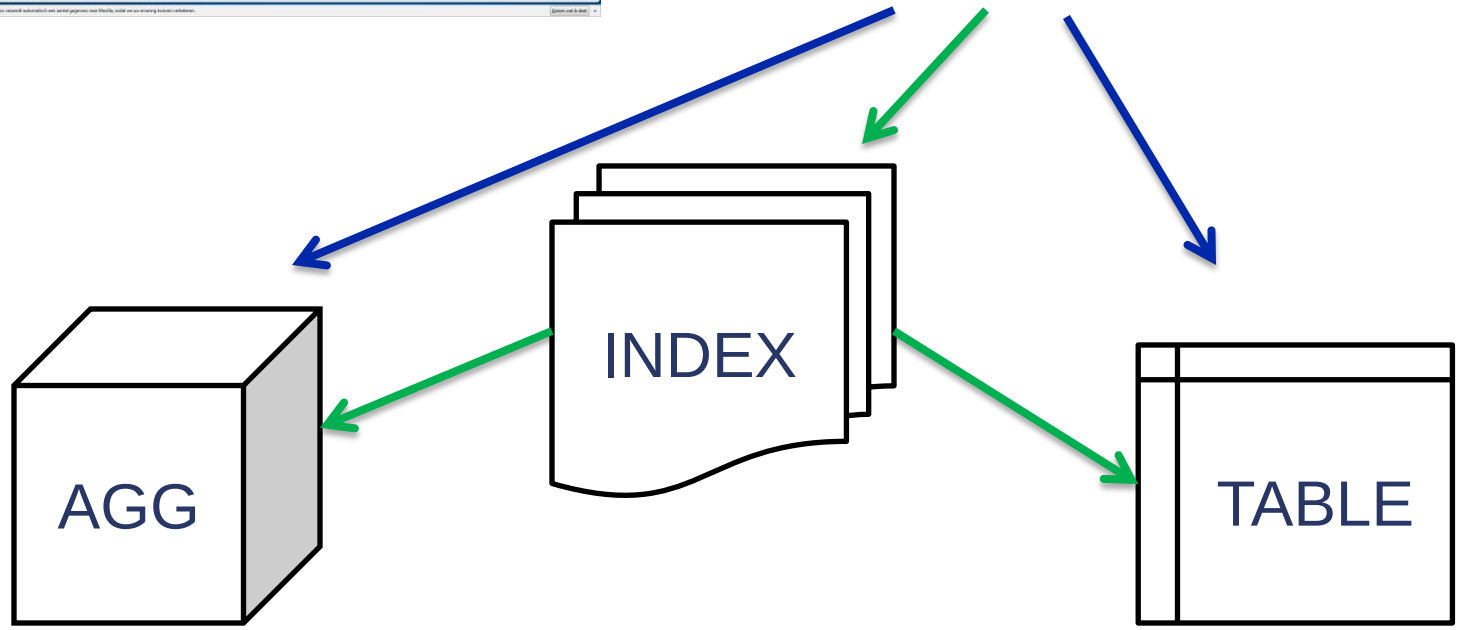
Engineering

- **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 index is needed

Data Driven Design Principle





Times Ten Indexes

Rule of thumb

H Hash index

```
fact.dim1_id  = dim1.id
and dim1.code = nnn
```

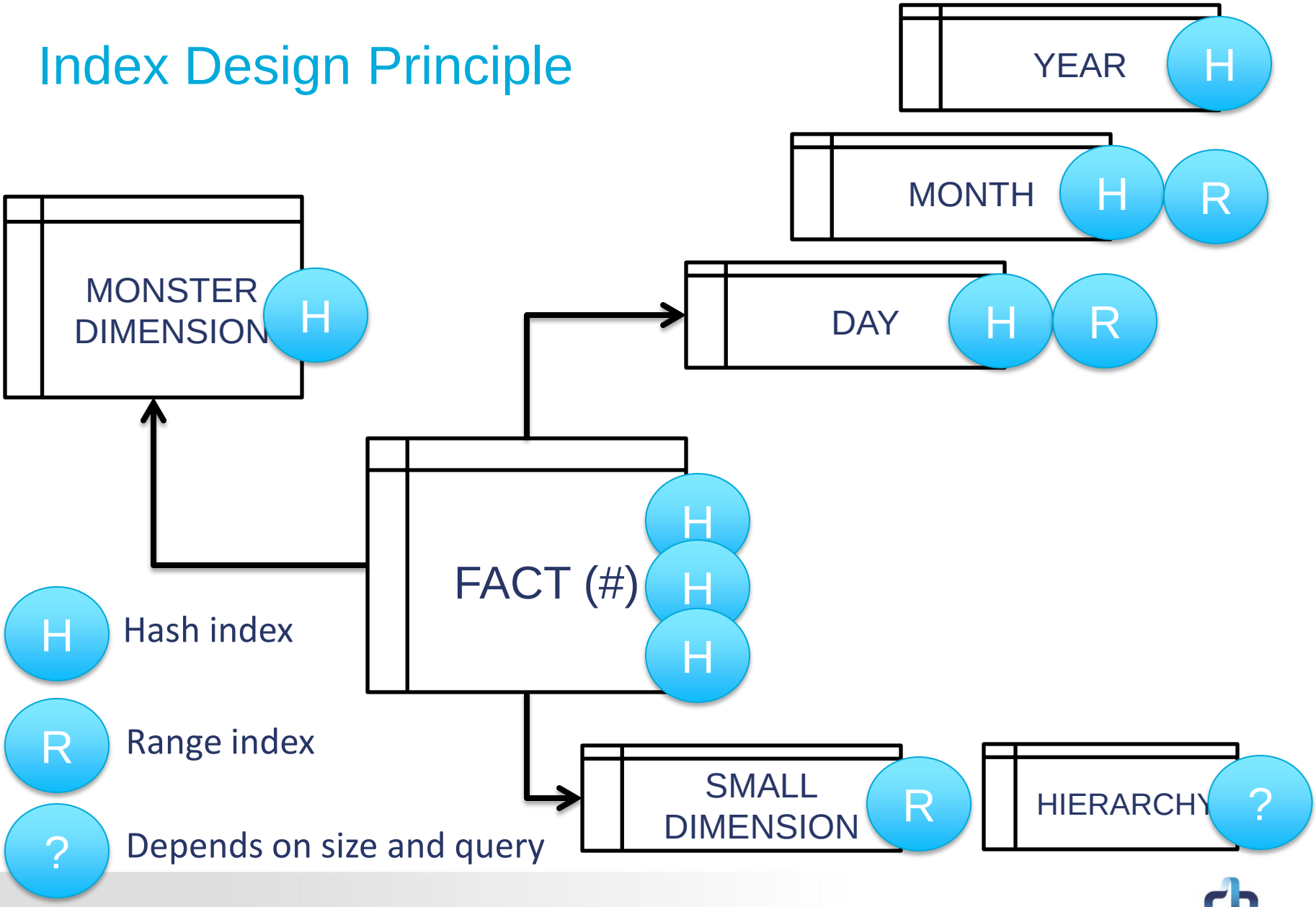
Typical **customer dimension**

R Range index

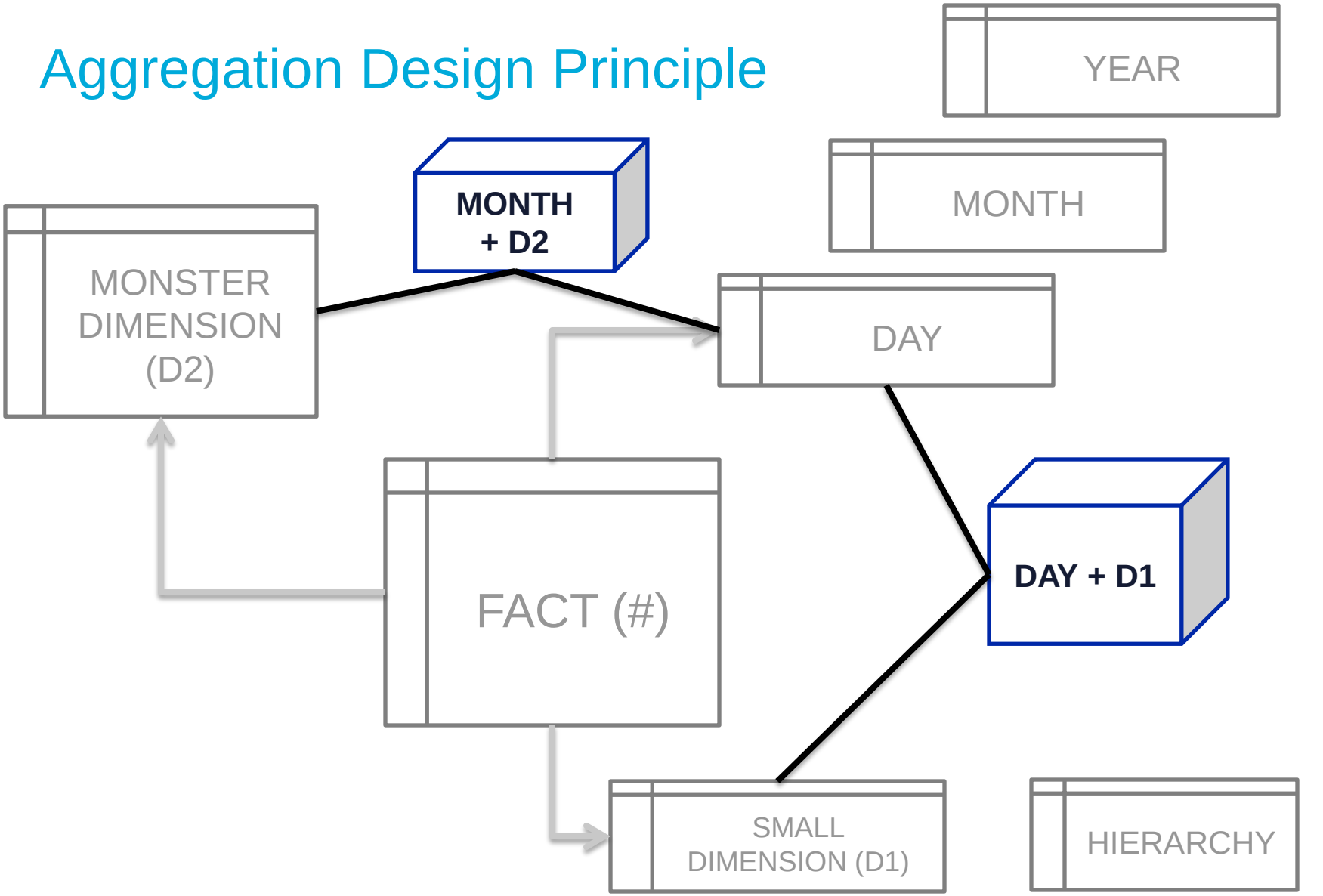
```
fact.dim1_id  = dim1.id
and dim1.code < nnn
```

Typical **time dimension**

Index Design Principle

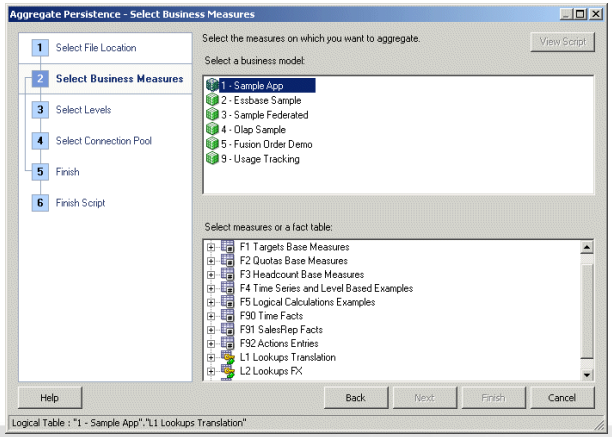


Aggregation Design Principle

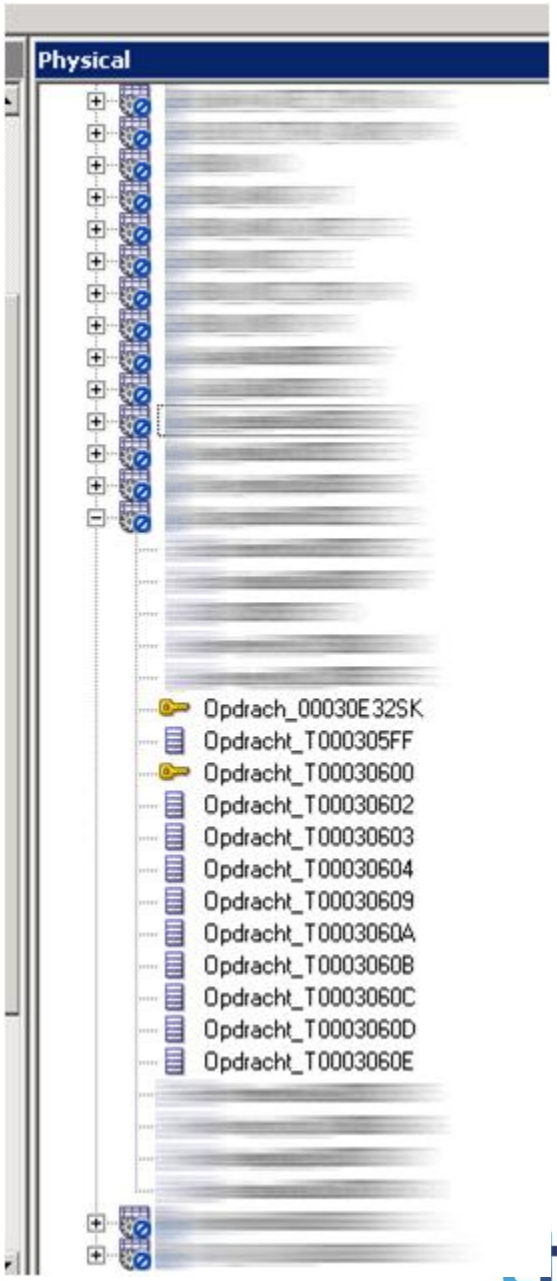


Tool: Aggregation Wizard

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



nqcmd



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 both scenario's*
- Can save hours troubleshooting if an error occurs
- We saved money on memory consumption
  - 1 TB upgrade costs 100K €
  - You need 2 because DEV/TEST & PROD
  - By lean aggregate and index design we went from 400 Gb usage to 100 Gb usage (saved 60.000 €!!!!)
  - Lack of intelligence in advisory tools (summary advisor, index advisor)

Dimensional model > Aggregation model

Fact 125M

Book 8M

Shops: 200K

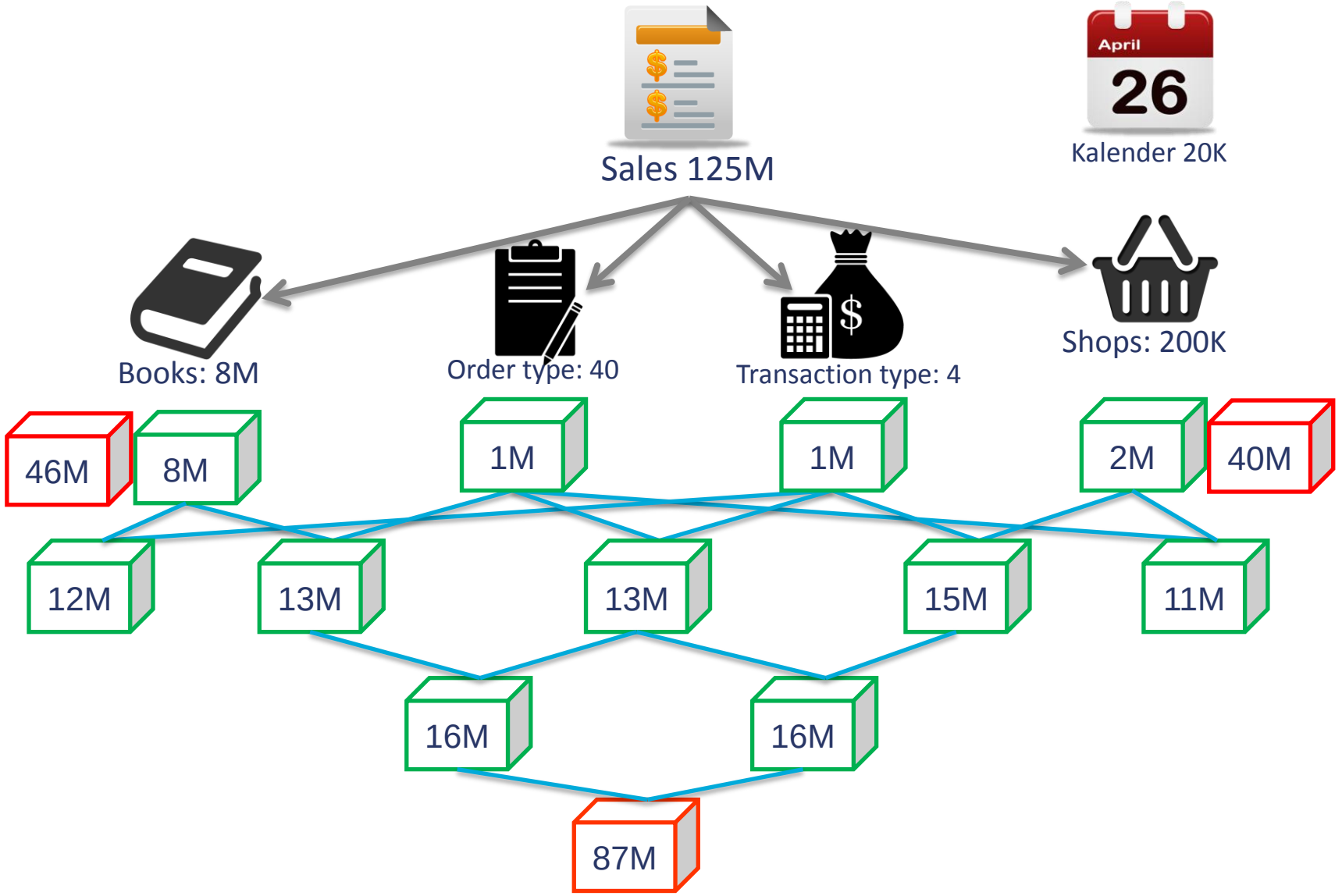
Kalender 20K

DAY
1M

Order type: 40

Transaction type: 4

FACT- DIM	DAY - MTH		2 join		3 join	4 join
	BOOK DAY 45 M	BOOK MTH 8M	BOOK ORDT MND 13M	BOOK TRAN MND 12M	BOOK ORDT TRAN MND 16M	BOOK SHOP ORDT TRAN MND 87M
	SHOP DAY 40 M	BOOK MTH 11M	BOOK SHOP MND 50 M		SHOP ORDT TRAN MND 16M	
	ORDT DAY 2M		SHOP ORDT MND 11M	SHOP TRAN MND 15M		
	TRAN DAY 2M		ORDT TRAN MTH 300K			


Sales 125M
April
26
Kalender 20K
Books: 8M
Order type: 40
Transaction type: 4
Shops: 200K
46M
8M
1M
1M
2M
40M
12M
13M
13M
15M
11M
16M
16M
87M

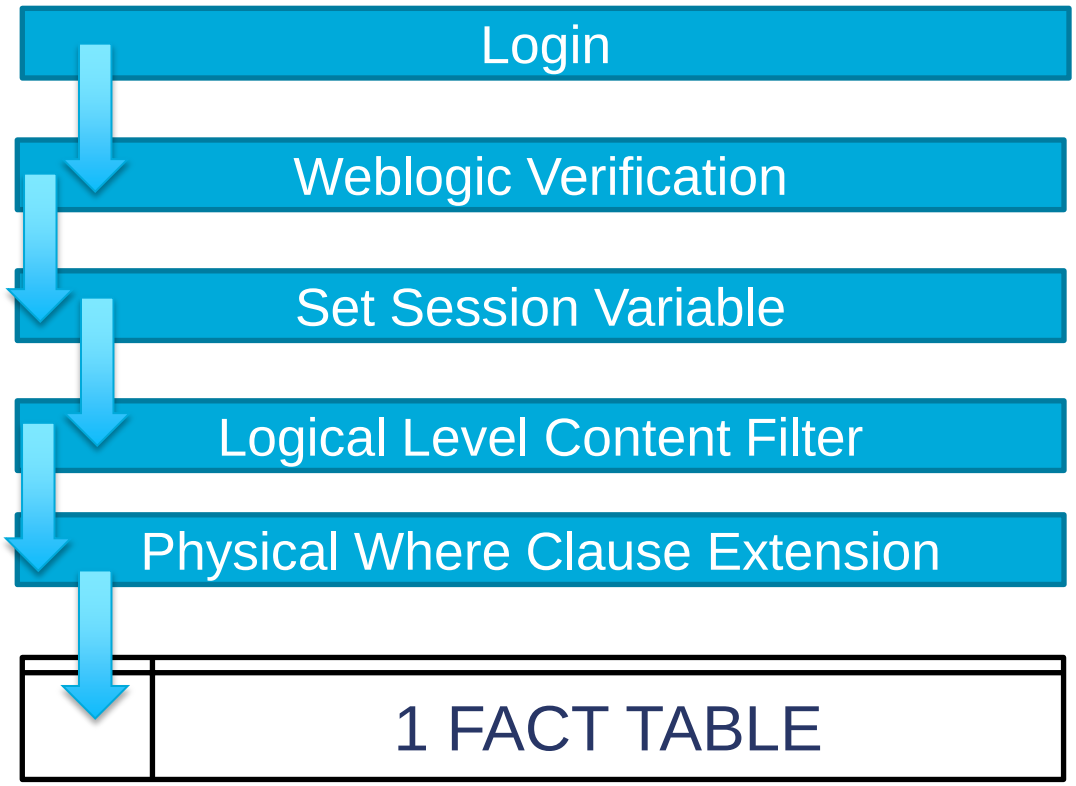
Manual Aggregation Steps

- Create Table (TT)
- *Create Index (TT)*
- ~~Import~~ or Copy (RPD)
- Physical Joins (RPD)
- Logical Sources (RPD)
- Column Mapping (RPD)
- Logical Level (RPD)
- Row Level Security (RPD)

Loading data / creating aggregates into TimesTen

- Options to load data into TT store:
  - ttisql .. *(load within timesten, agg creation)*
  - ttBulkcp .. *(load a file)*
  - ttLoadFromOracle ... *(load from exadata, through Infiniband)*
- Don't use CNTRL C
- Use "insert into T" instead of "create T as select …"
  - Will lock a row in system tables
- No open sessions
  - Risk of locks
- Count records before create
  - Prevents expensive memory consumption
  - Aggregation creation time awareness
  - ***Tip****: 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)*

Row Level Security Implementation

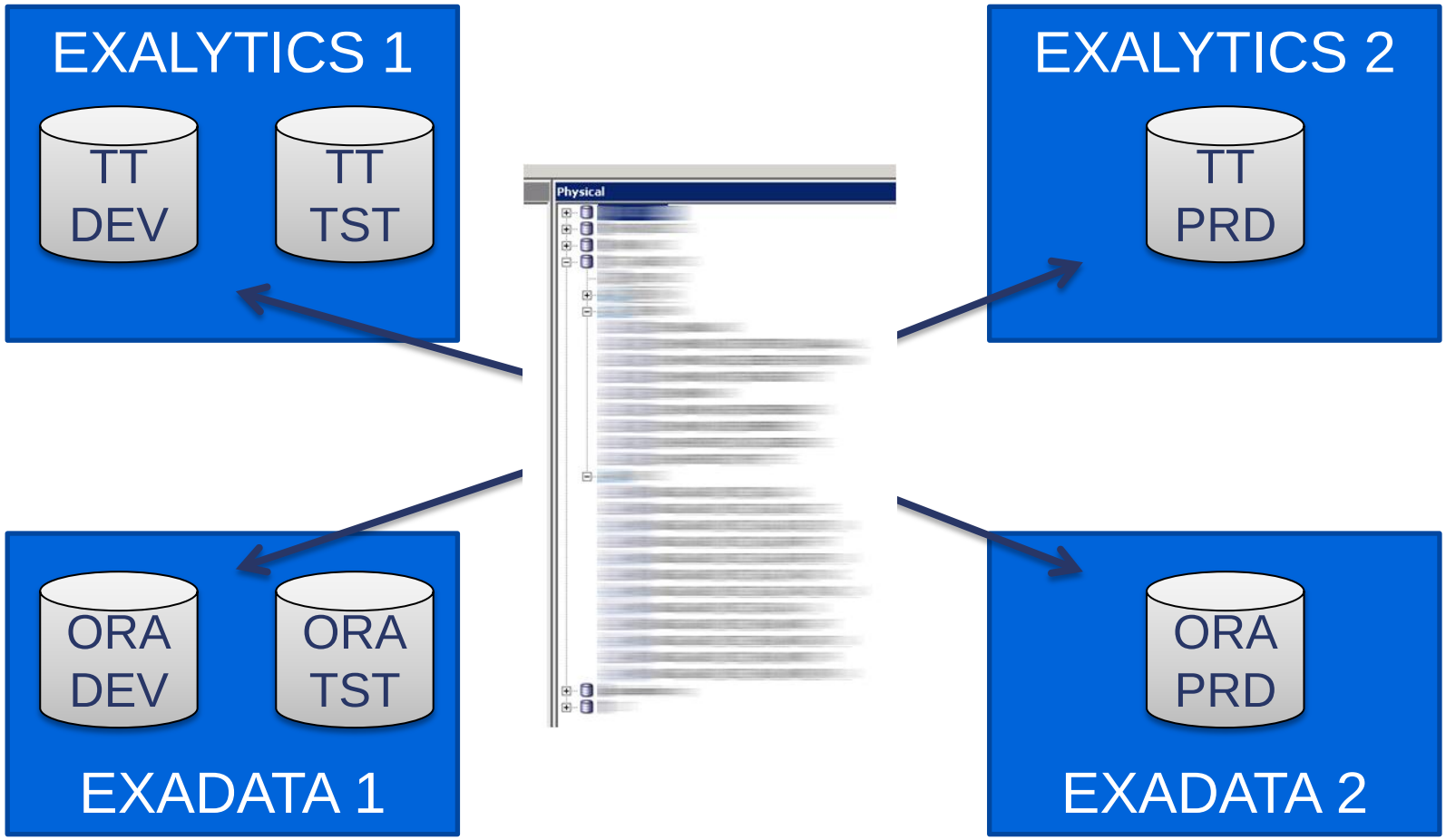


Every query will contain fact.id = nnnn

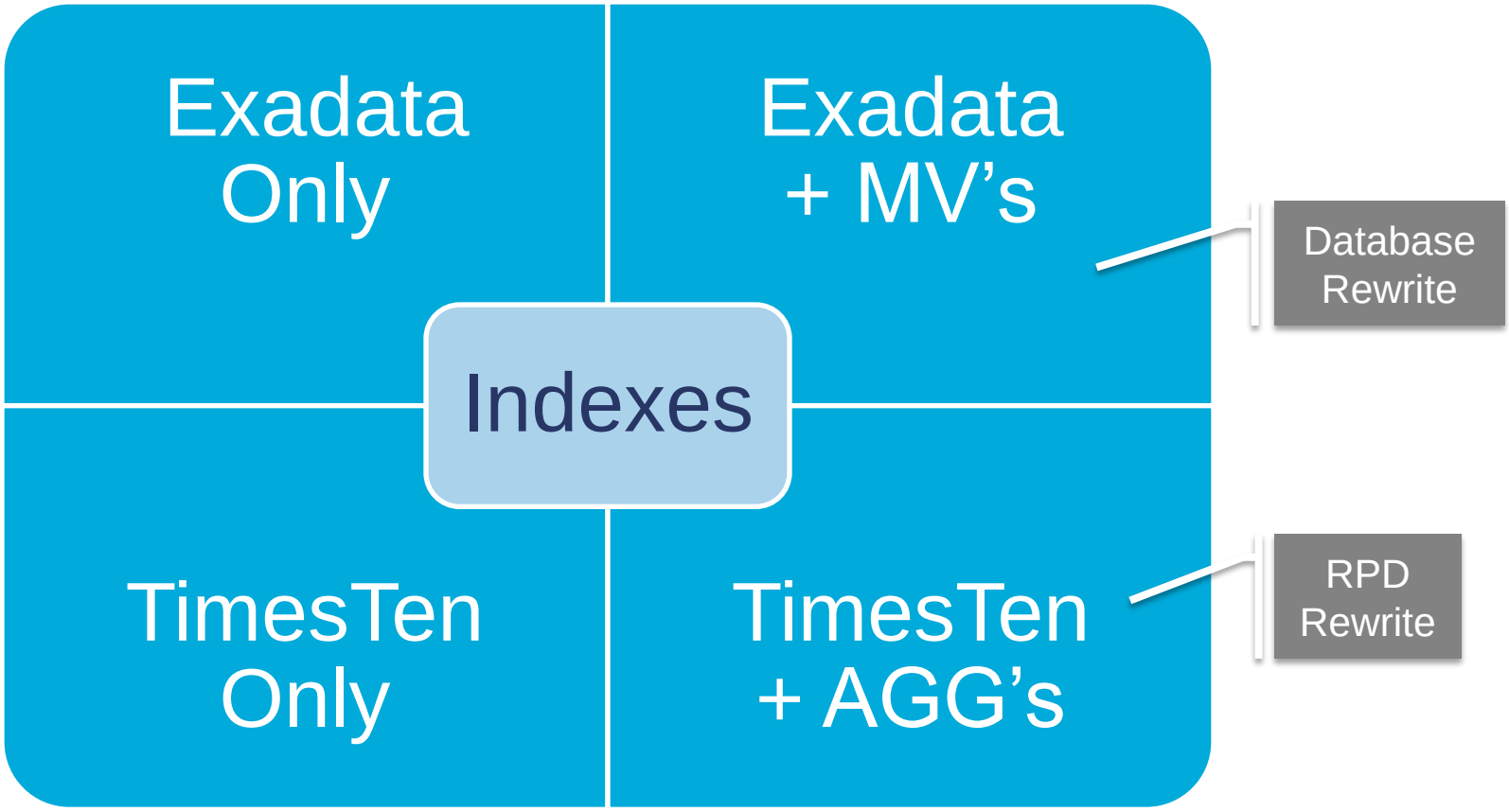
(hash) Indexes & Aggregates Design

Flexible Data architecture

- Database cross over

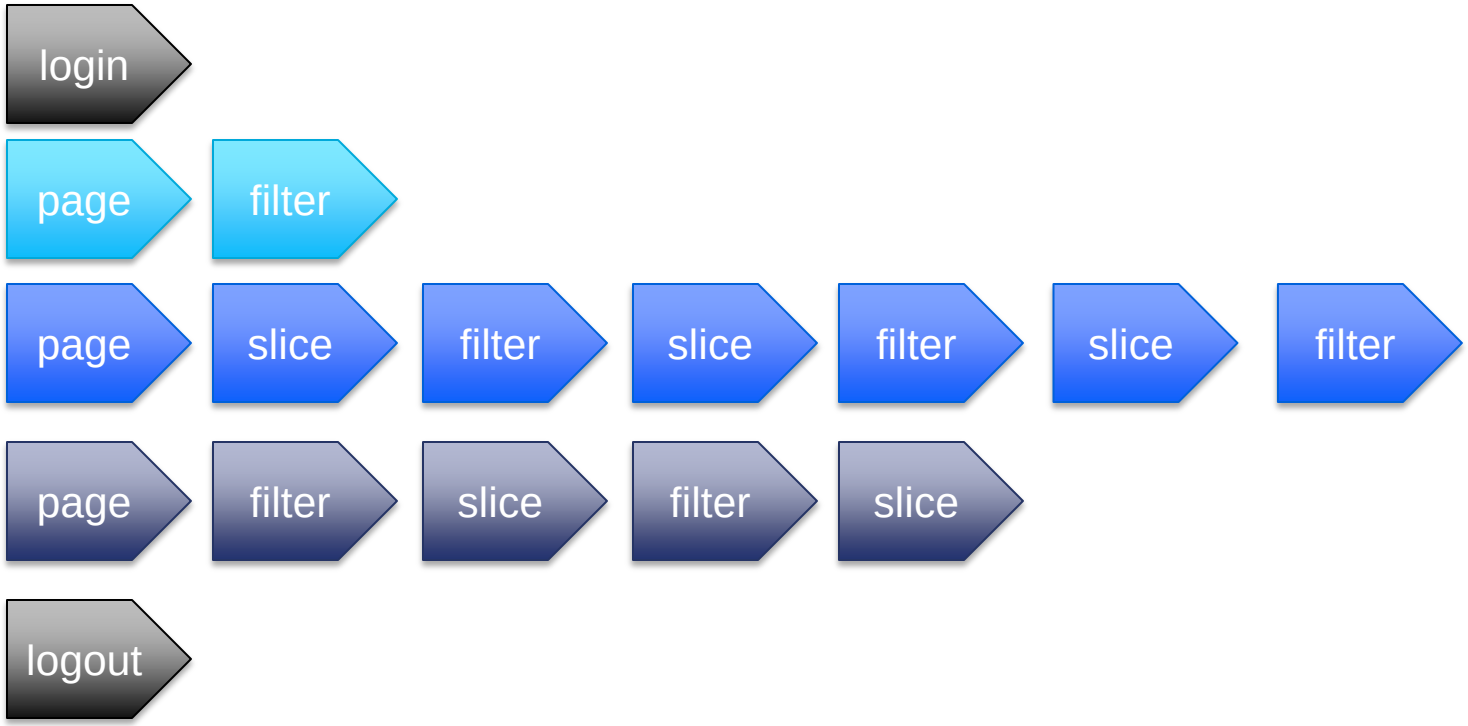


Multiple Architectures

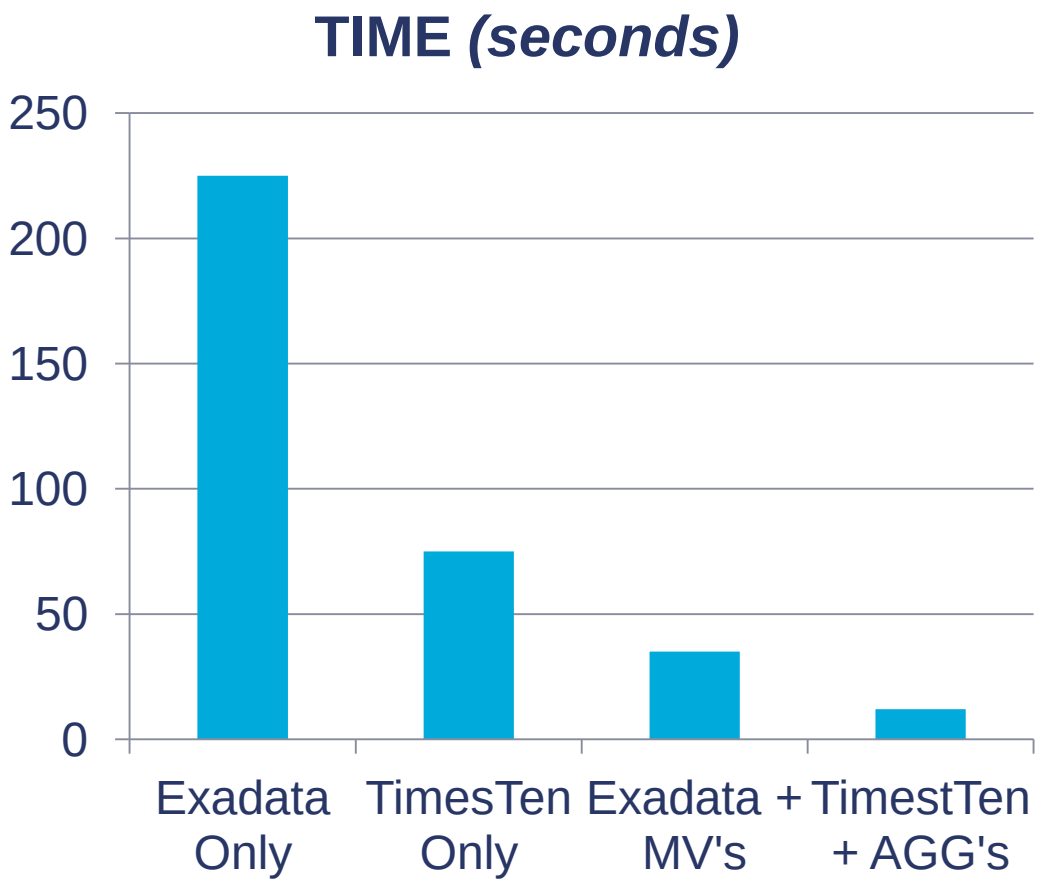


Use case

- 16 steps
- Thinktime random 5-15 seconds



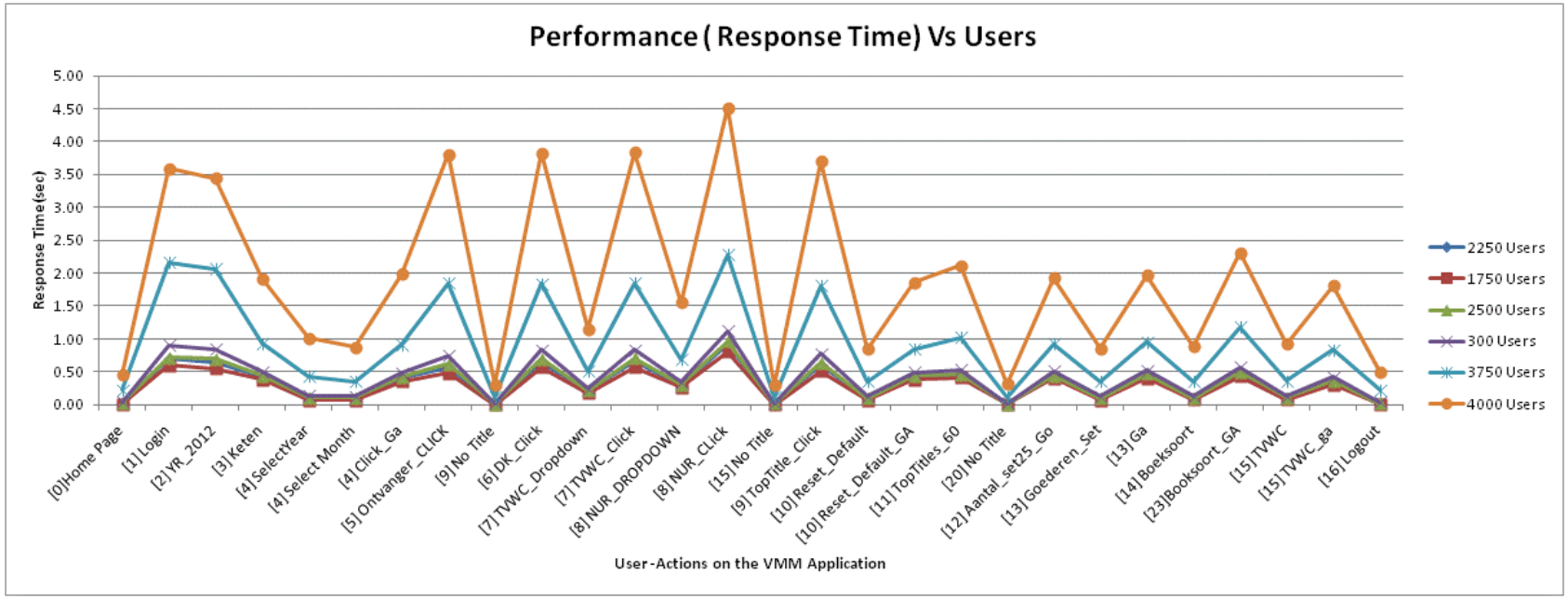
Performance metrics multiple architectures



- 1 user journey
- End 2 End
- No Browser!

Metrics TimesTen with Aggregates

3000 Users **120 M Rows** **< 2 seconds**



Publishers reaction

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

To do

- Merge UT into Exalytics
- Decommission the existing production evironment (Windows)
- Times Ten Refresh strategy
- Security password change
- Choose the right (hybrid) data architecture

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!**

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