MySQL Architectures for Oracle DBA's

UKOUG Conference 2011
December 5th, Birmingham

Oli Sennhauser

Senior MySQL Consultant, FromDual

oli.sennhauser@fromdual.com

FromDual

- **FromDual provides neutral and independent:**
    - **Consulting for MySQL (on-site and remote)**
    - **Remote-DBA / MySQL operations**
    - **Support for Galera (synchronous MySQL Replication)**
    - **Support for MySQL (Basic and Silver)**
    - **Training for MySQL**
- **Consulting Partner of Open Database Alliance (ODBA.org)**
- **Oracle Silver Partner (OPN)**
- **More informations at: www.fromdual.com**
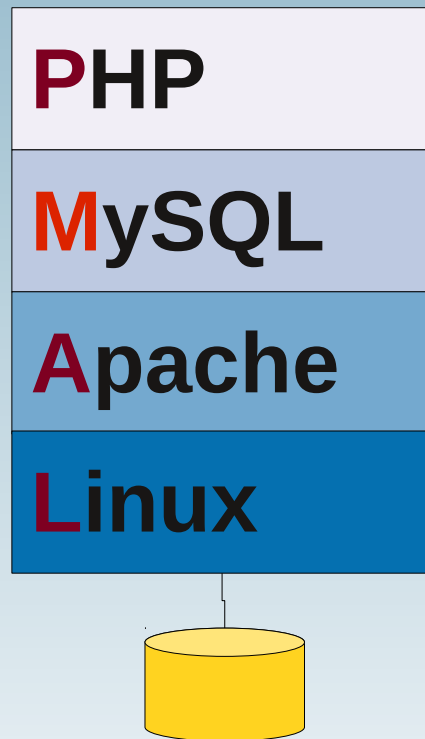
Our customer

Content

- **The LAMP Stack**
- **History of MySQL**
- **Open Source**
- **Branches and Forks**
- **Move from Oracle?**
- **MySQL Architecture**
- **Pluggable Storage Engines**
- **Differences between Oracle and MySQL**
- **Scale-Up vs. Scale-Out**
- **High-Availability solutions**
- **Architectures put in place**

The LAMP Stack

We are the Web!

PHP		
MySQL		
Apache		
Linux		

Who is behind?

Zend Technologies

MySQL/Oracle

Apache Software Foundation

Linux Foundation
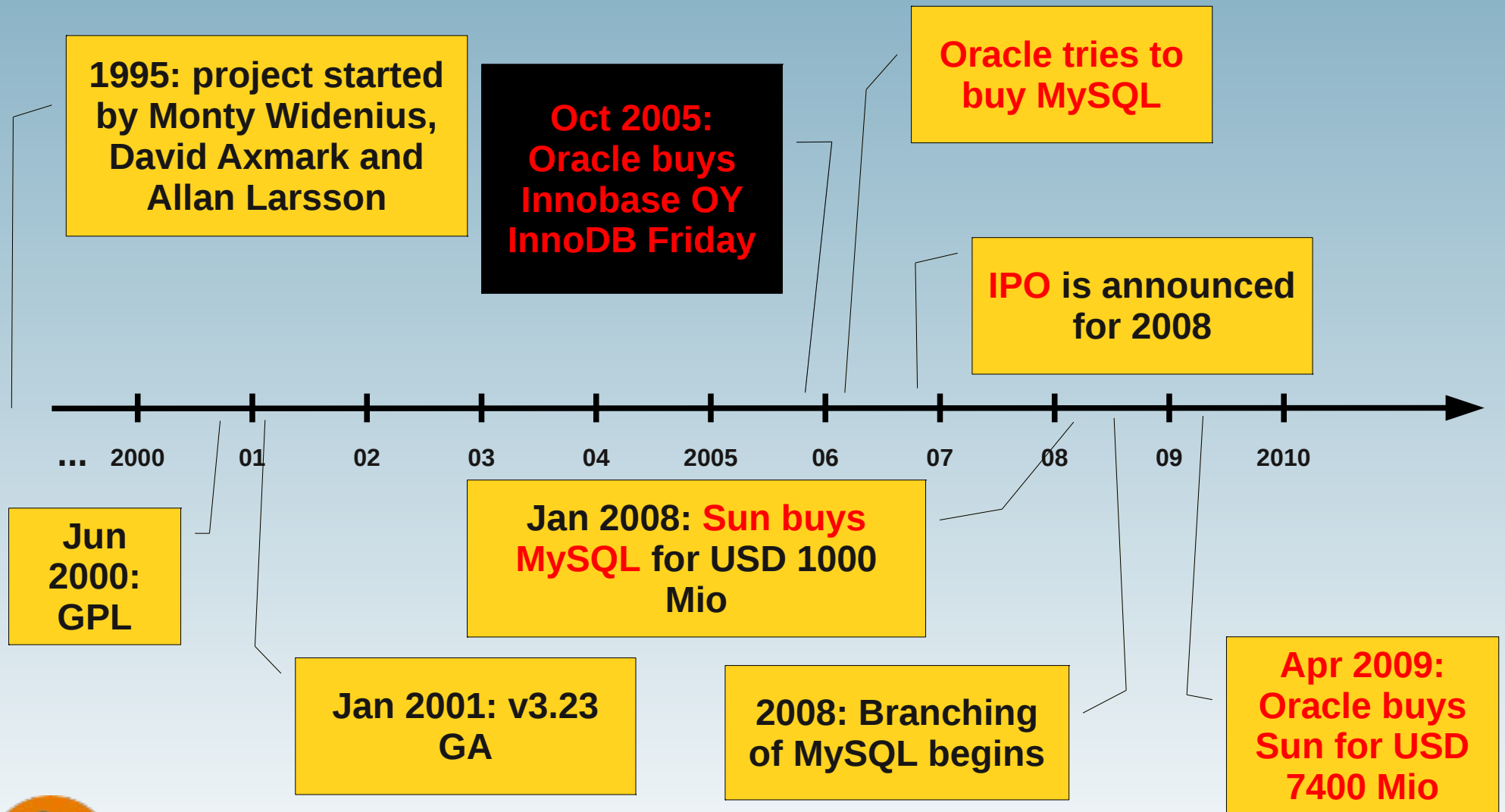
Alternatives

Perl, Java, Python, Ruby

PostgreSQL, others

Lighty (lighttpd), IIS
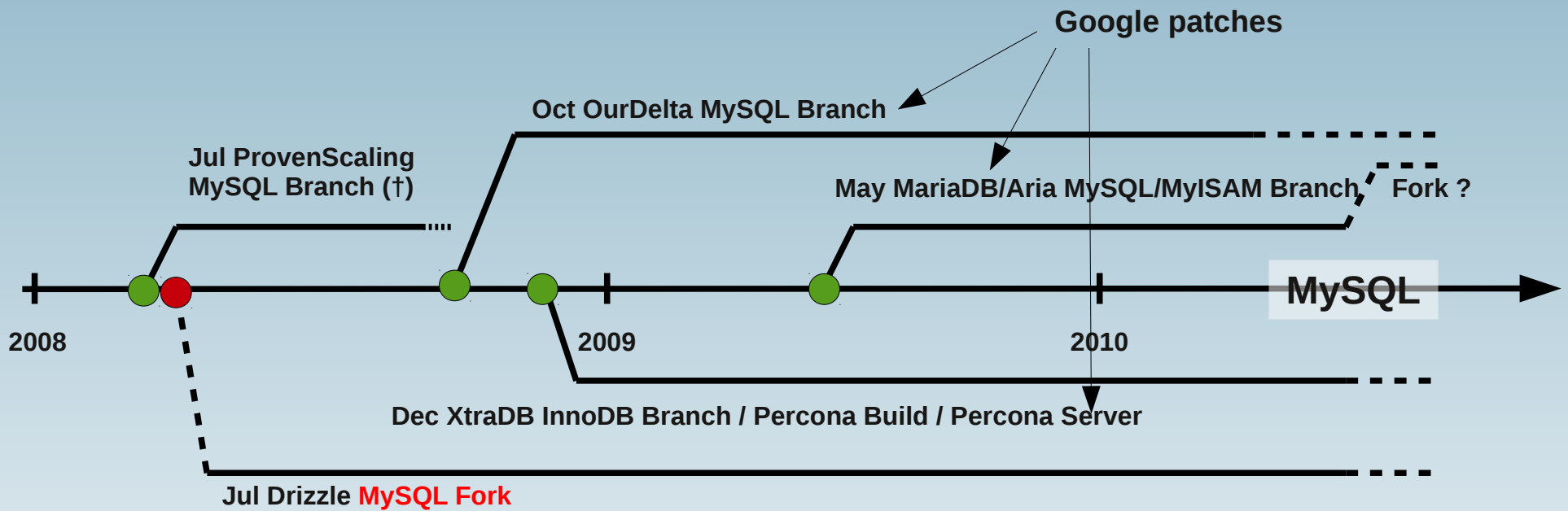
Windows, Solaris, BSD, others

History of MySQL

1995: project started by Monty Widenius, David Axmark and Allan Larsson

Oct 2005: Oracle buys Innobase OY InnoDB Friday

Oracle tries to buy MySQL

IPO is announced for 2008

... 2000   01   02   03   04   2005   06   07   08   09   2010

Jun 2000: GPL

Jan 2008: Sun buys MySQL for USD 1000 Mio

Jan 2001: v3.23 GA

2008: Branching of MySQL begins

Apr 2009: Oracle buys Sun for USD 7400 Mio

Open Source

- **Basics:**
    - **Source code is available and visible (transparency)**
    - **Source code can be changed, adapted or used elsewhere**
    - **Everybody can participate: Communities**
- **Advantages**
    - **„no" Vendor Lock-in!**
    - **More flexibility!**
    - **Less costs?**
    - **Better Quality?**
    - **Higher reliability?**
- **Disadvantages**
    - **Not everything is served on a golden plate: „read the source"!**
    - **Potential for conflicts as soon as commercial interests come into the game**
- **For me personally important: Know-how transfer, freedom of know-how**

Branches and Forks

Google patches

Oct OurDelta MySQL Branch

Jul ProvenScaling
MySQL Branch (†)

May MariaDB/Aria MySQL/MyISAM Branch   Fork ?

MySQL

2008

2009

2010

Dec XtraDB InnoDB Branch / Percona Build / Percona Server

Jul Drizzle **MySQL Fork**

Switch from Oracle?

Oracle   **MySQL**

It needs some time to adapt (3 - 6 monts?)!

MySQL Architecture
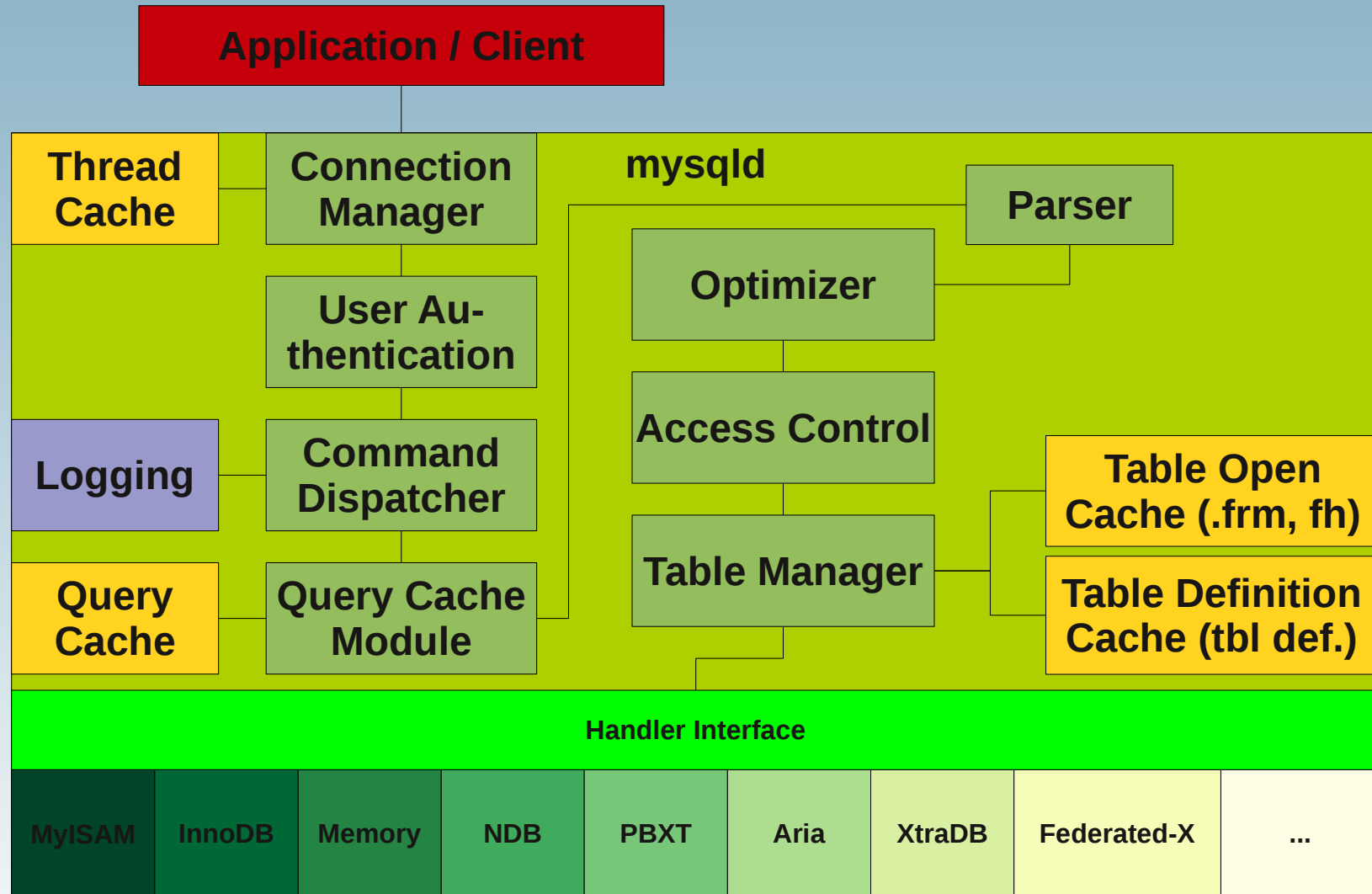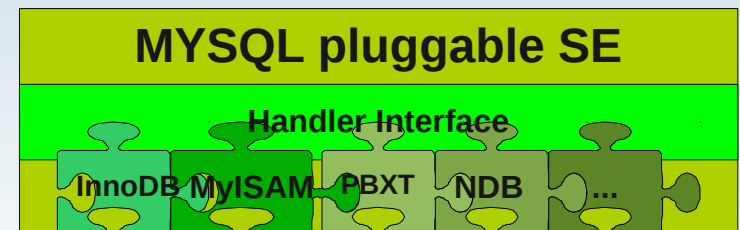
Pluggable Storage Engines (SE)

- **The concept of Storage Engines (SE)**

- **A Storage Engine is a database kernel**

**Conventional
(R)DBMS
= monolithic**

MYSQL SE

Handler Interface

| ISAM | MyISAM | BDB | ... |

built-in

plug-in

MYSQL pluggable SE

Handler Interface

InnoDB MyISAM PBXT NDB ...
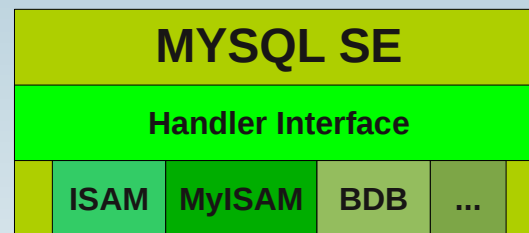
The most important Storage Engines (SE)

- **MyISAM** / Aria
- **InnoDB** / XtraDB / PBXT (transactional SE)
- **MEMORY**
- **NDB** (MySQL Cluster)
- Federated-X (~ Oracle DB-Link)
- CSV, Archive, Blackhole
- Spider, etc.

Migration from Oracle to MySQL

- **Application?**

- **Most difficult: PL/SQL**

- **>> 1 Tbyte?**

- **MySQL Migration Tool-kit helps you**

- **ETL tools help you**

Differences between Oracle and MySQL

- **Characteristics is SE dependent → configuration**
- **Transactions/Locking is SE dependent**

  → **InnoDB / XtraDB / PBXT are the closest SE**
- **Some buffers / caches are SE dependent, others are not**

  → **Configure differently depending on you needs**
- **Connections in Oracle are expensive, in MySQL they are quite cheap**
- **Oracle is a multi-process architecture, MySQL is a multi-thread architecture**
- **Oracle has a fixed size shared memory SGA, MySQL has dynamic memory for the process → can grow!**

Other differences between Oracle and MySQL

- Oracle has tablespaces / redo log files → in MySQL 1 system TS (+ 1 tablespace per table) and the transaction log files (`ib_logfile<n>`).

- Oracle has `rman`, in MySQL you have many tools (`mysqldump`, `mysql`, `mysqlbackup`, `xtrabackup`, ...)

  - Backup in MySQL can be done wrong!

- `exp` / `imp` → `mysqldump` / `mysql`

- `rman` → `mysqlbackup` / `xtrabackup`

- OEM/Grid Control → MySQL Enterprise Monitor (will be integrated into OEM/GC?)

- RAC → Galera / MySQL Cluster

- Oracle Streams Replication → MySQL Replication

Further differences between Oracle and MySQL

- **MySQL has different Logs:**
  - **Error Log (= alert.log)**
  - **Binary Log (~ archive log)**
  - **Transaction Log (~ REDO log, but Binary Log != Transaction Log)**
  - **General Query log (Oracle ?)**
- **Schema in Oracle: User + Objects**
- **Schema in MySQL: indepent of user**
- **Oracle: Scale-up, MySQL: Scale-out**

MySQL Scale-Out vs. Scale-Up

Scale-Up

- **Cost**
- **MySQL design**
- **Physical bottlenecks**

- **„Relaxation of Constraints"**
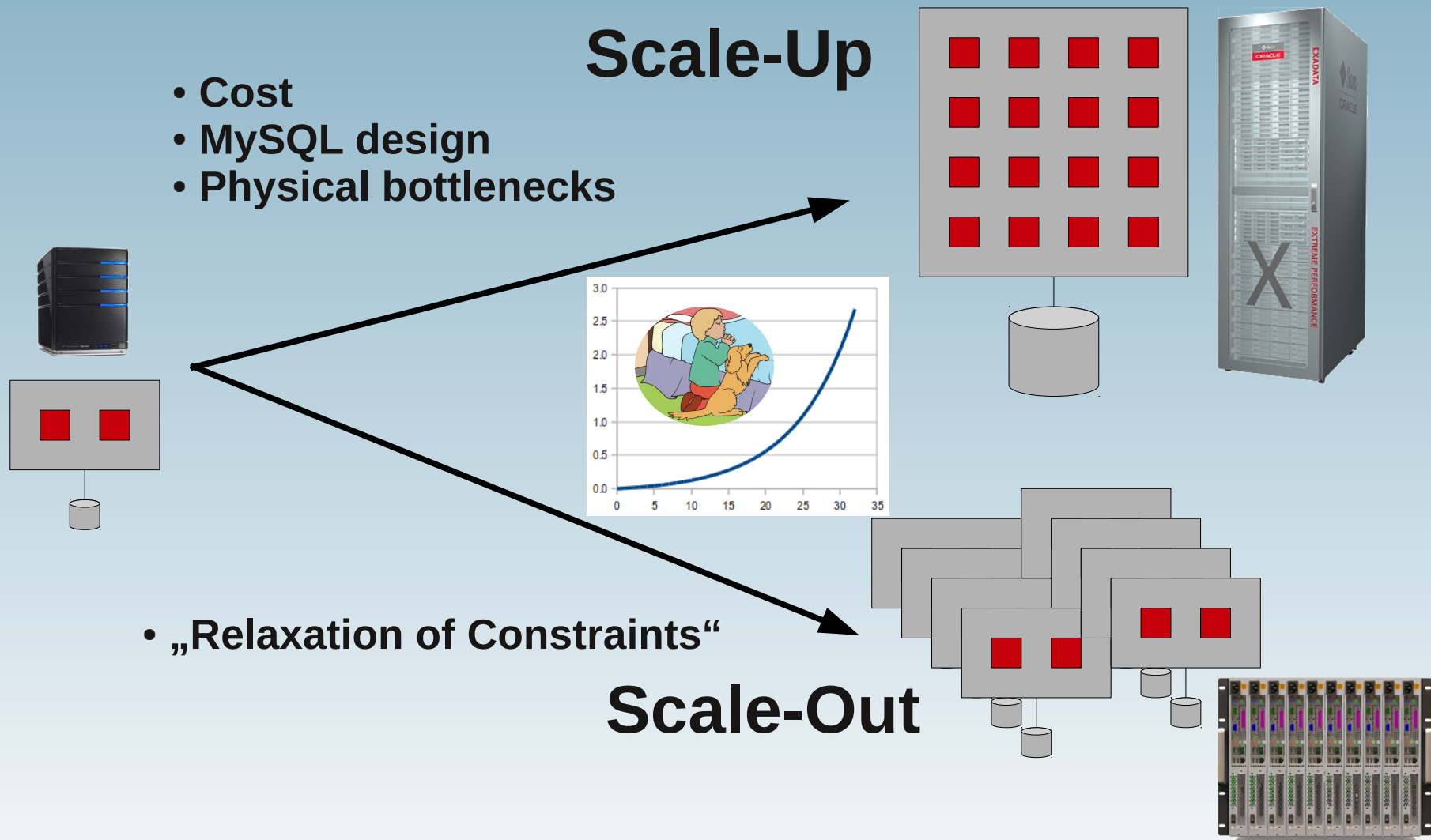
Scale-Out

The MySQL Scale-Out approach
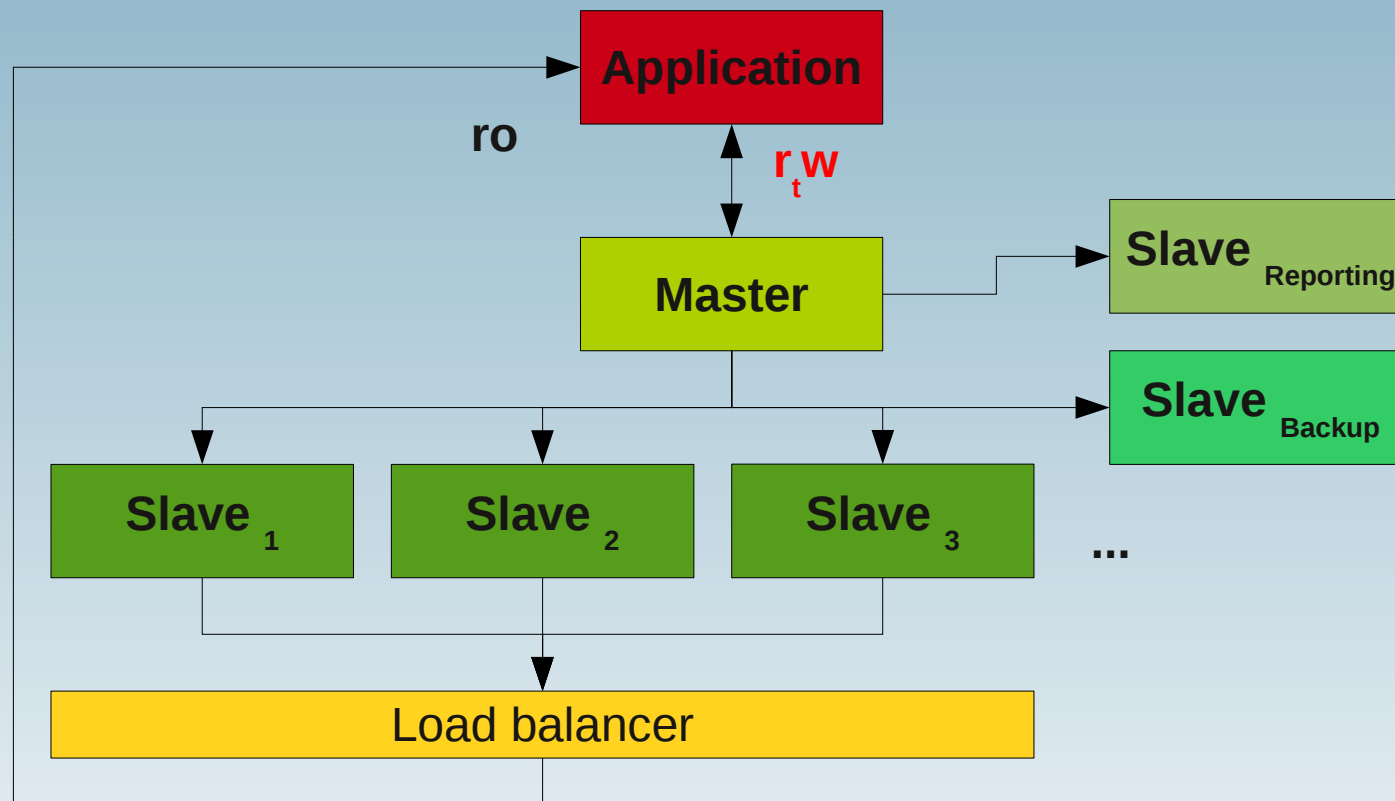
Active/passive fail-over with SAN
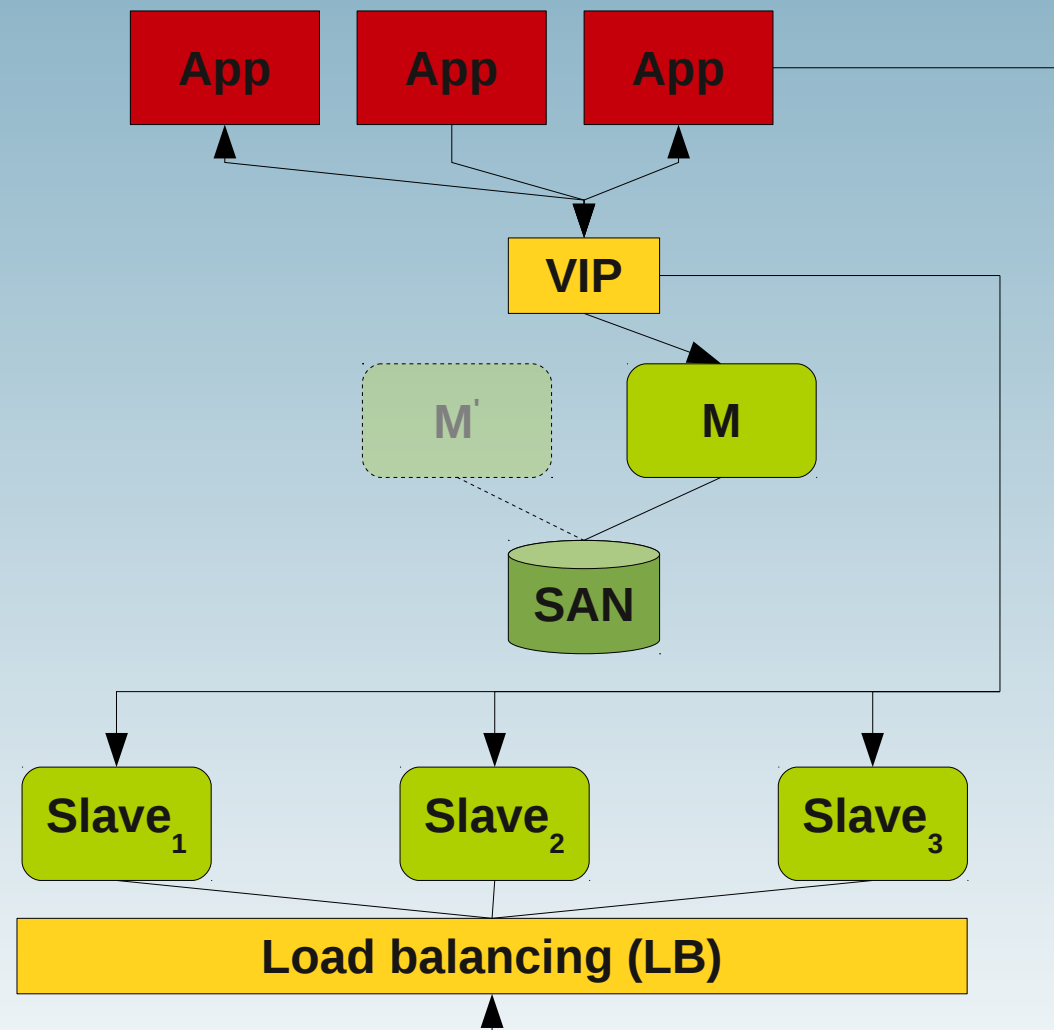
Active/passive fail-over with SAN

- **SPOF!**
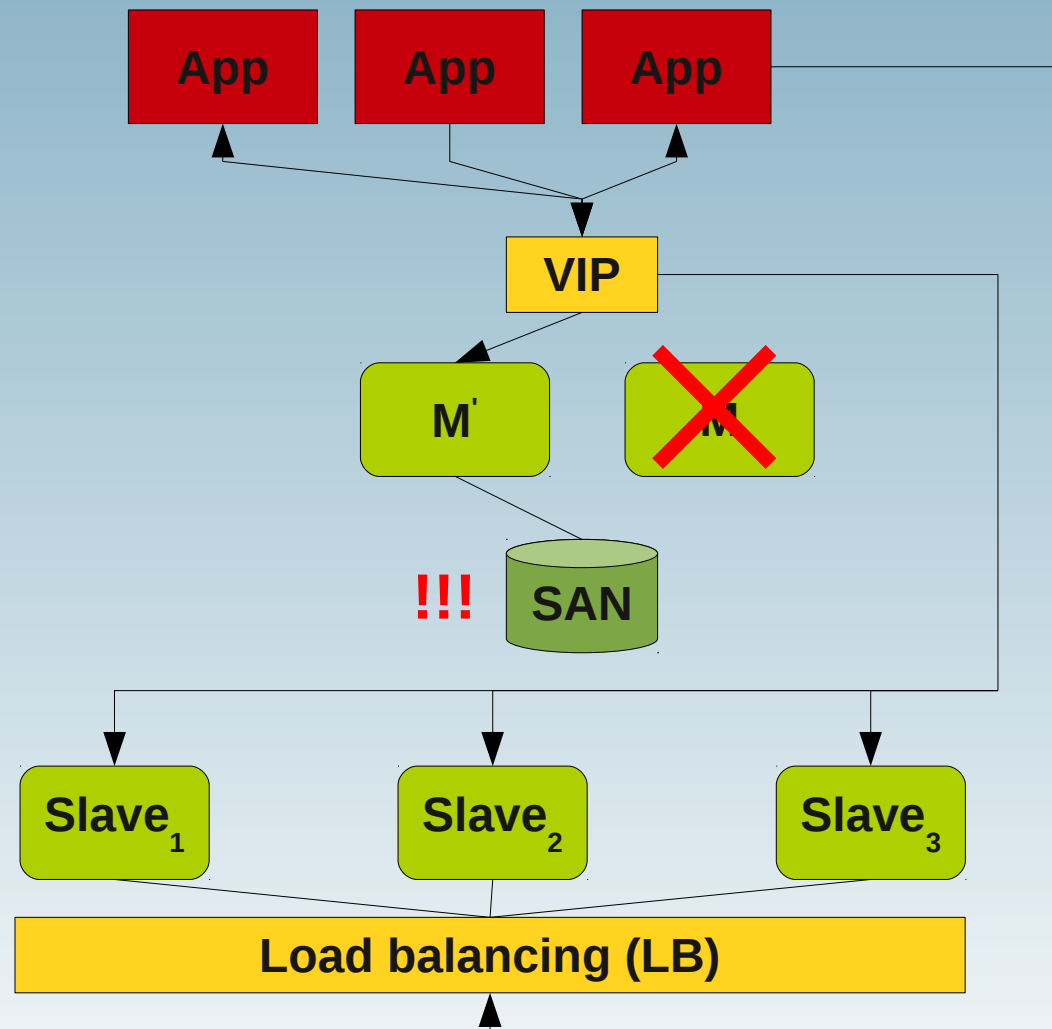
Active/passive fail-over with DRBD
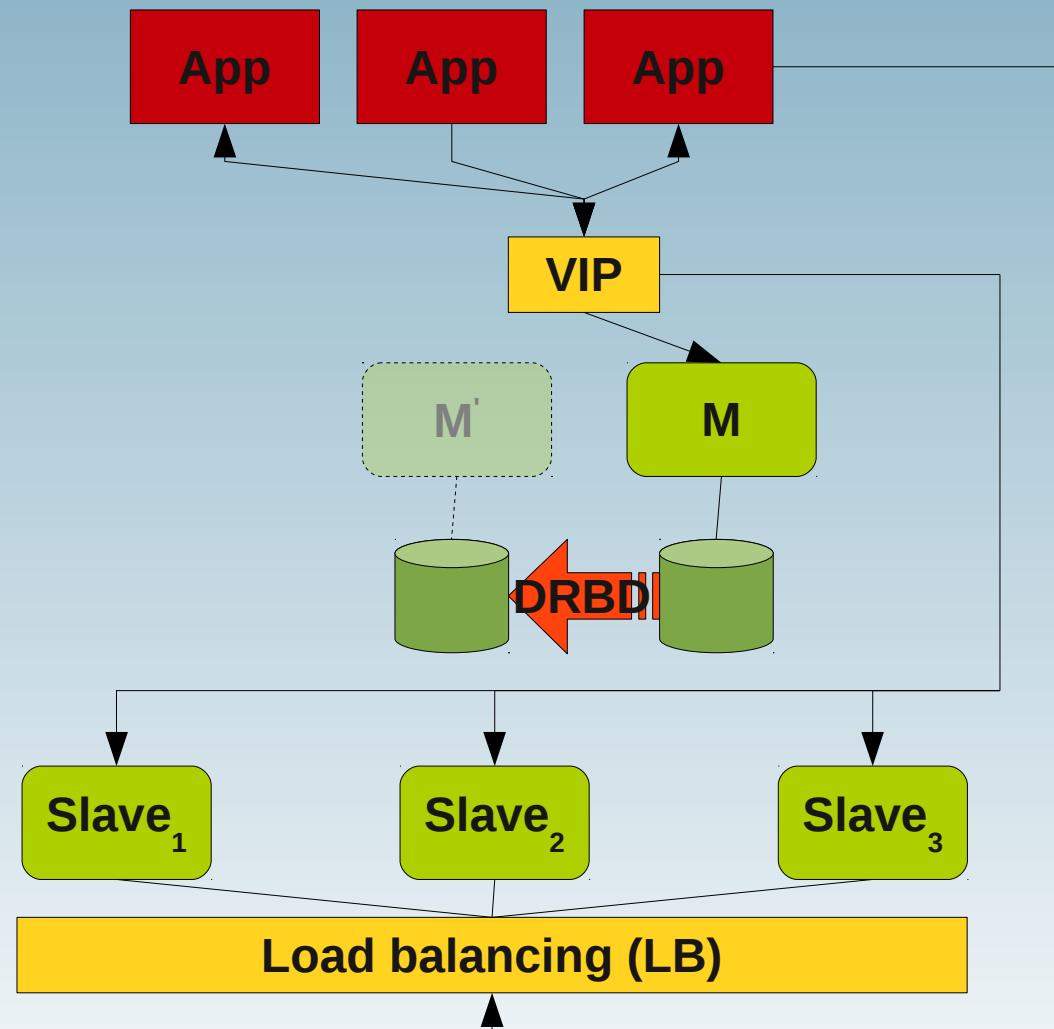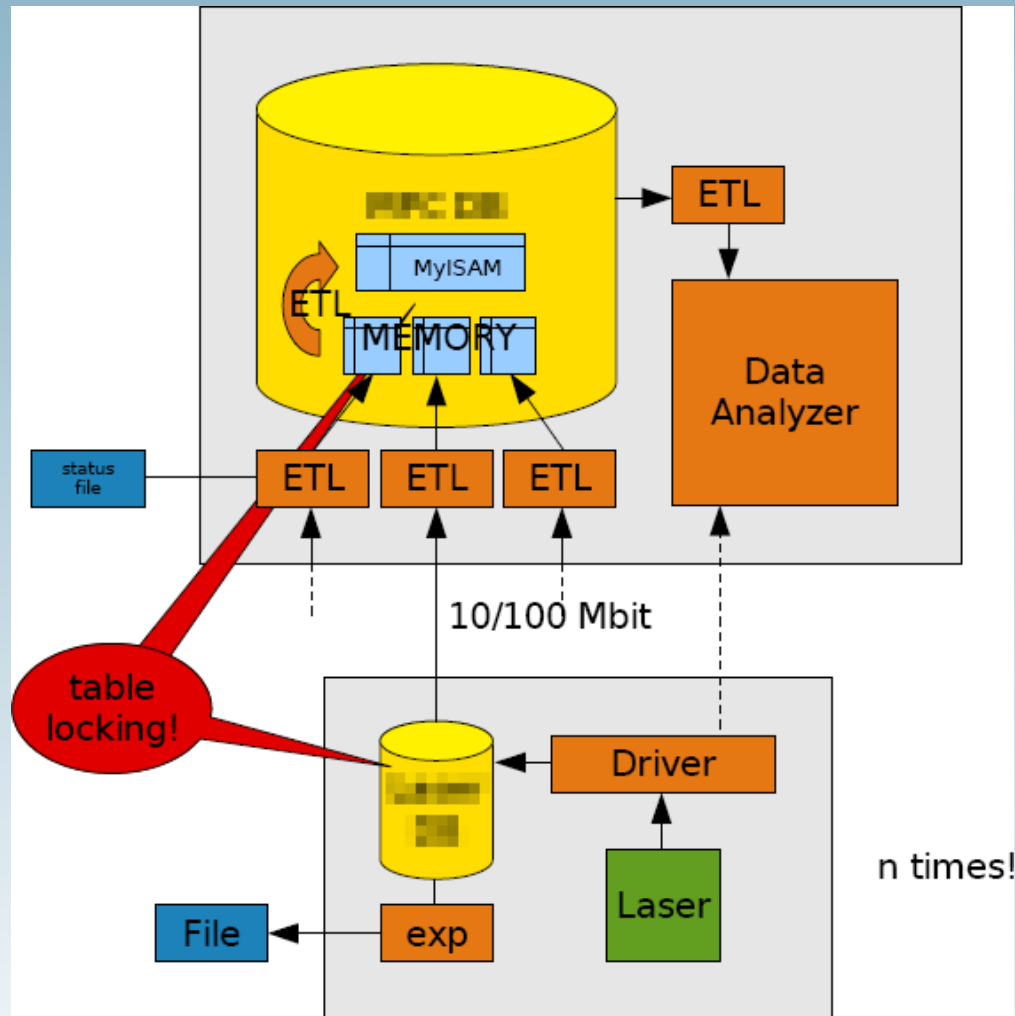
Active/passive fail-over with DRBD
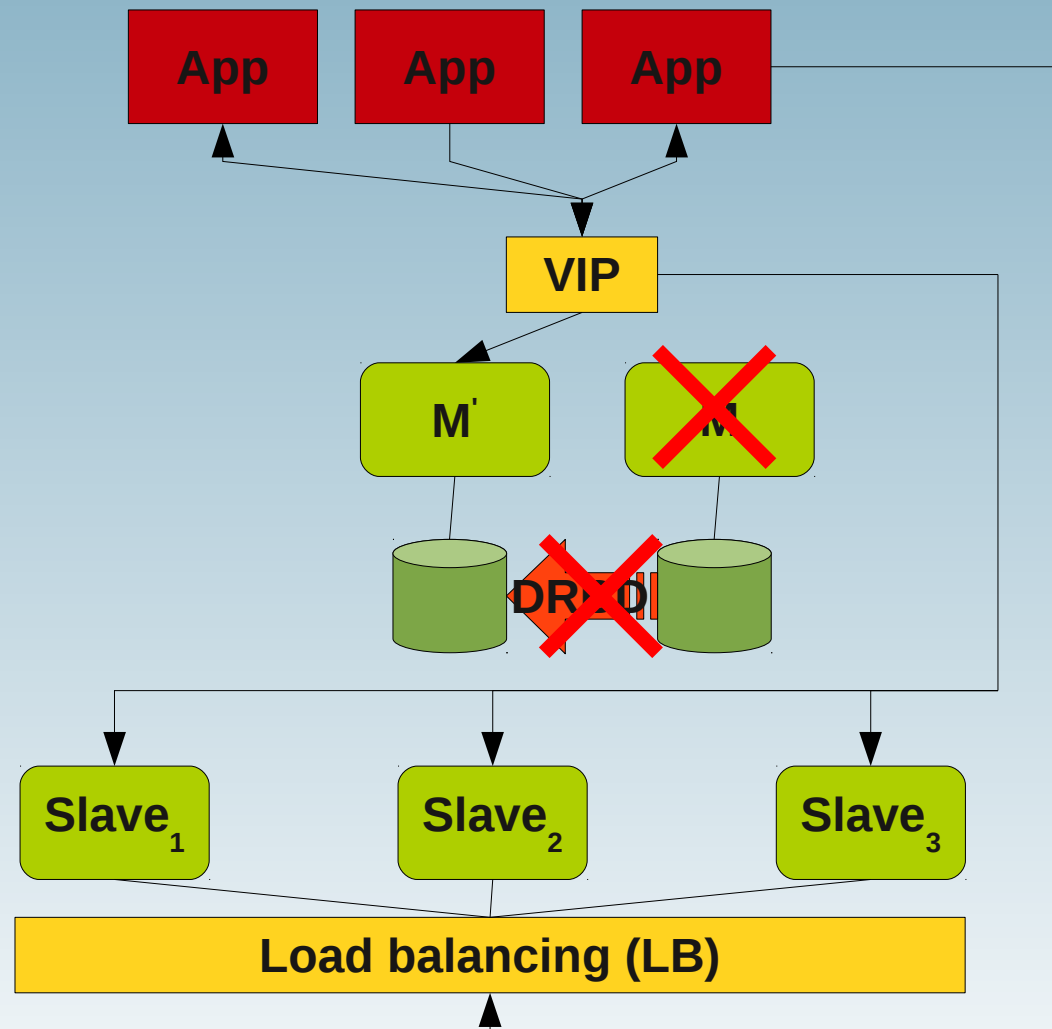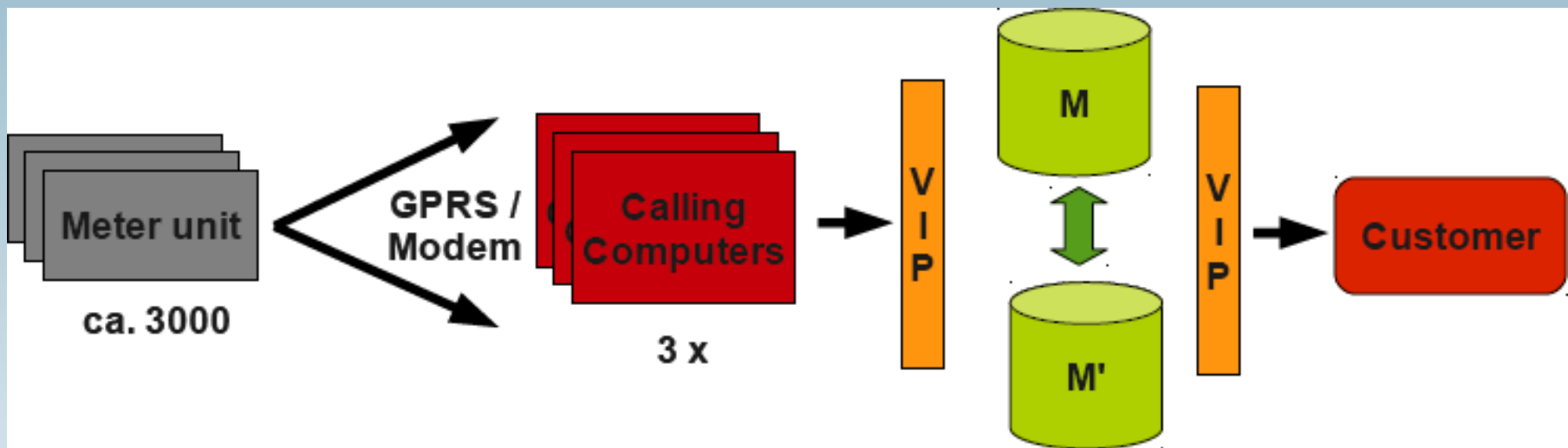
MySQL Cluster
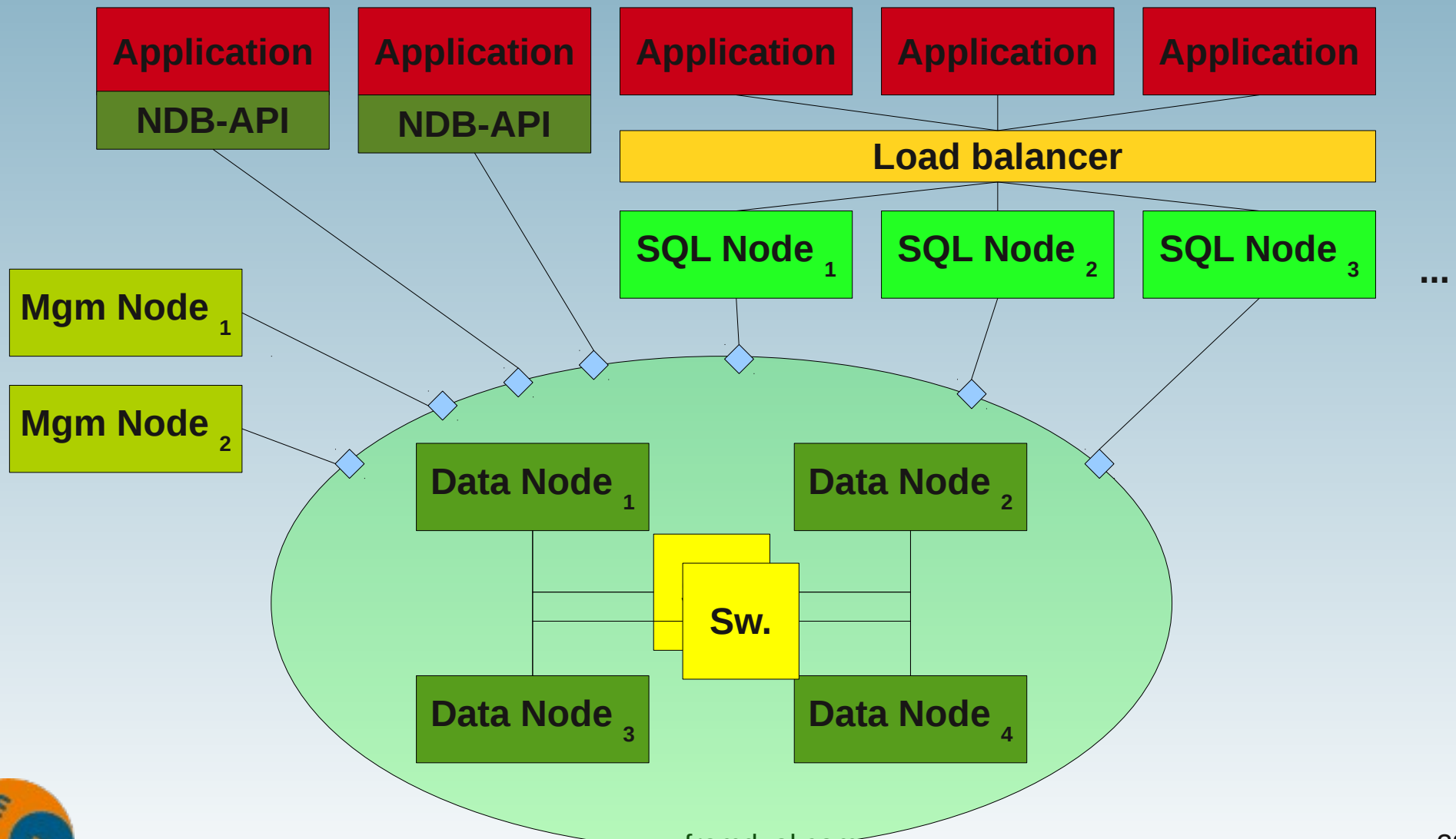
Some Architectures put in place

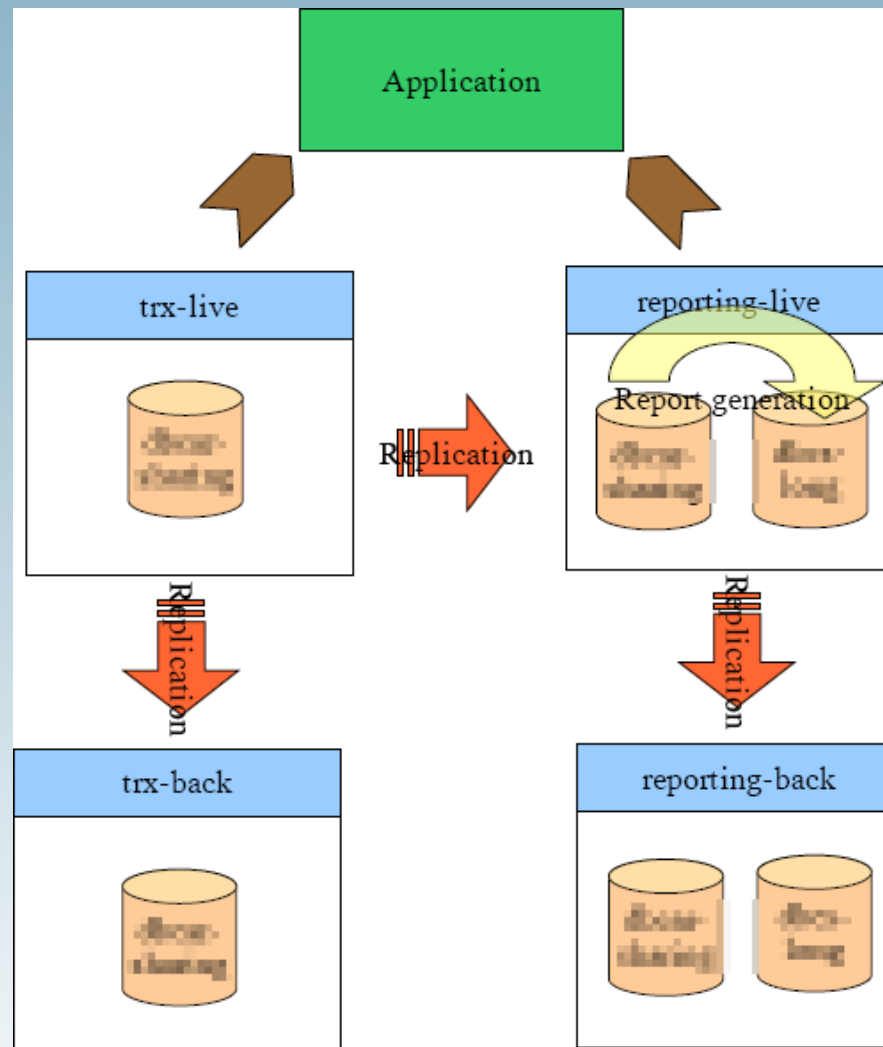# Laser welding device from the car industry
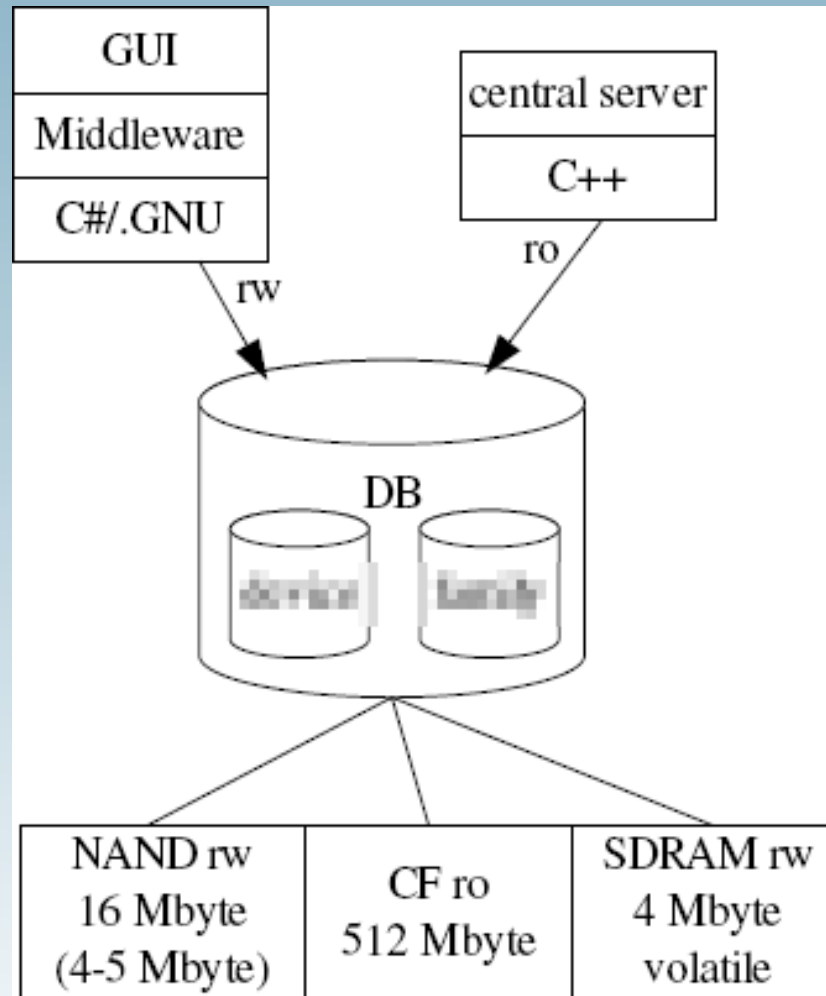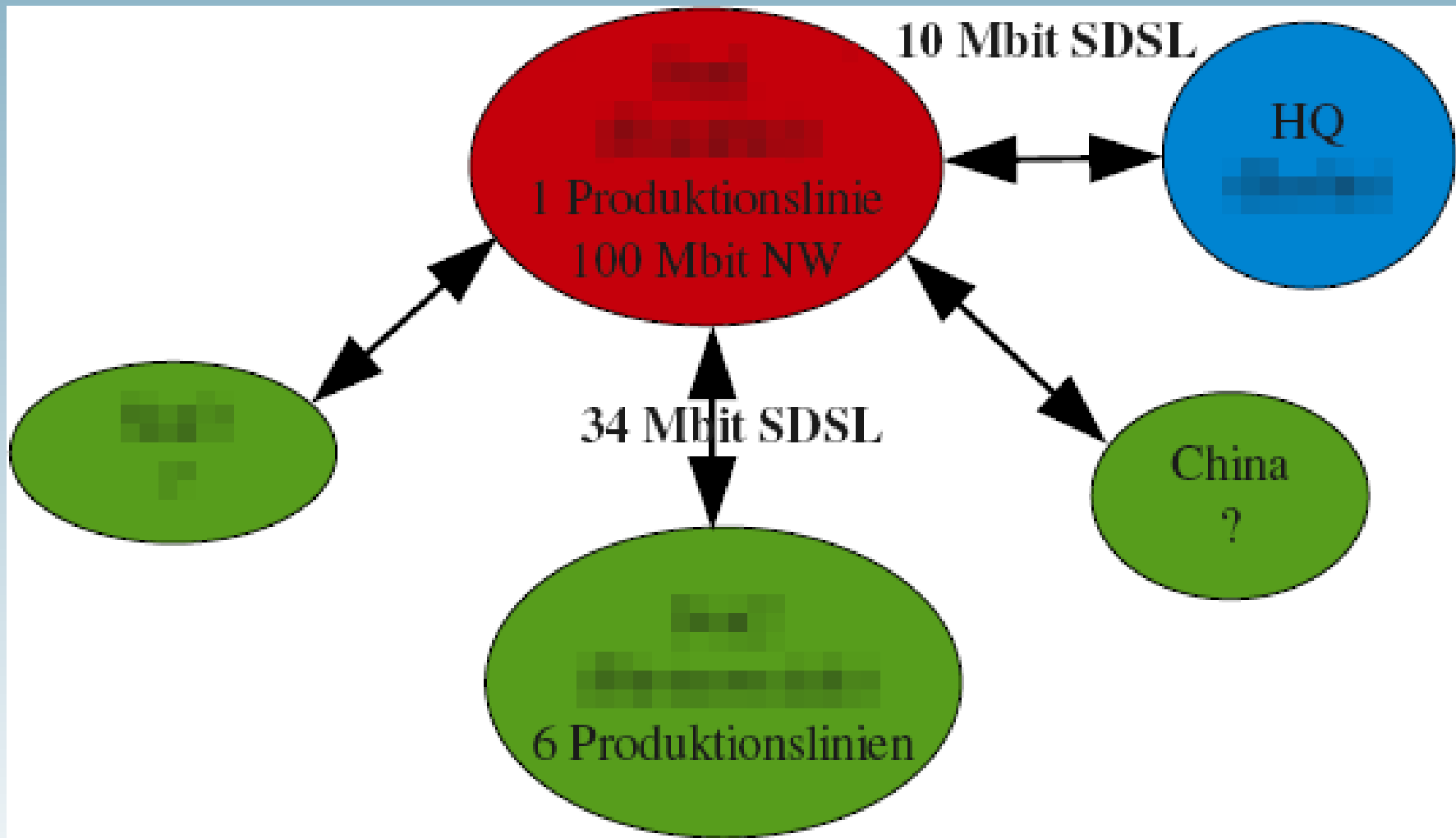
Data collection of laser devices
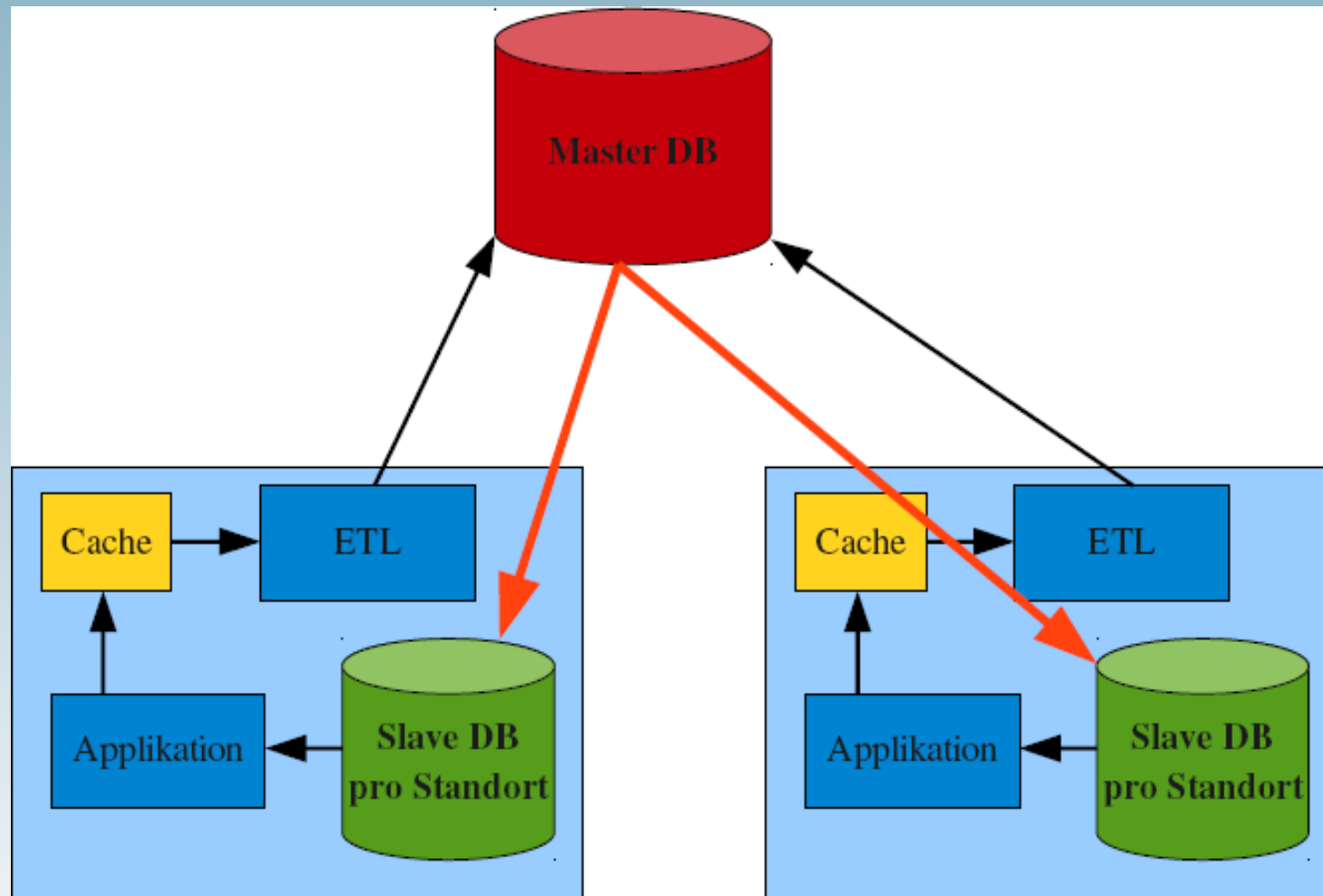
Measuring of media consumption
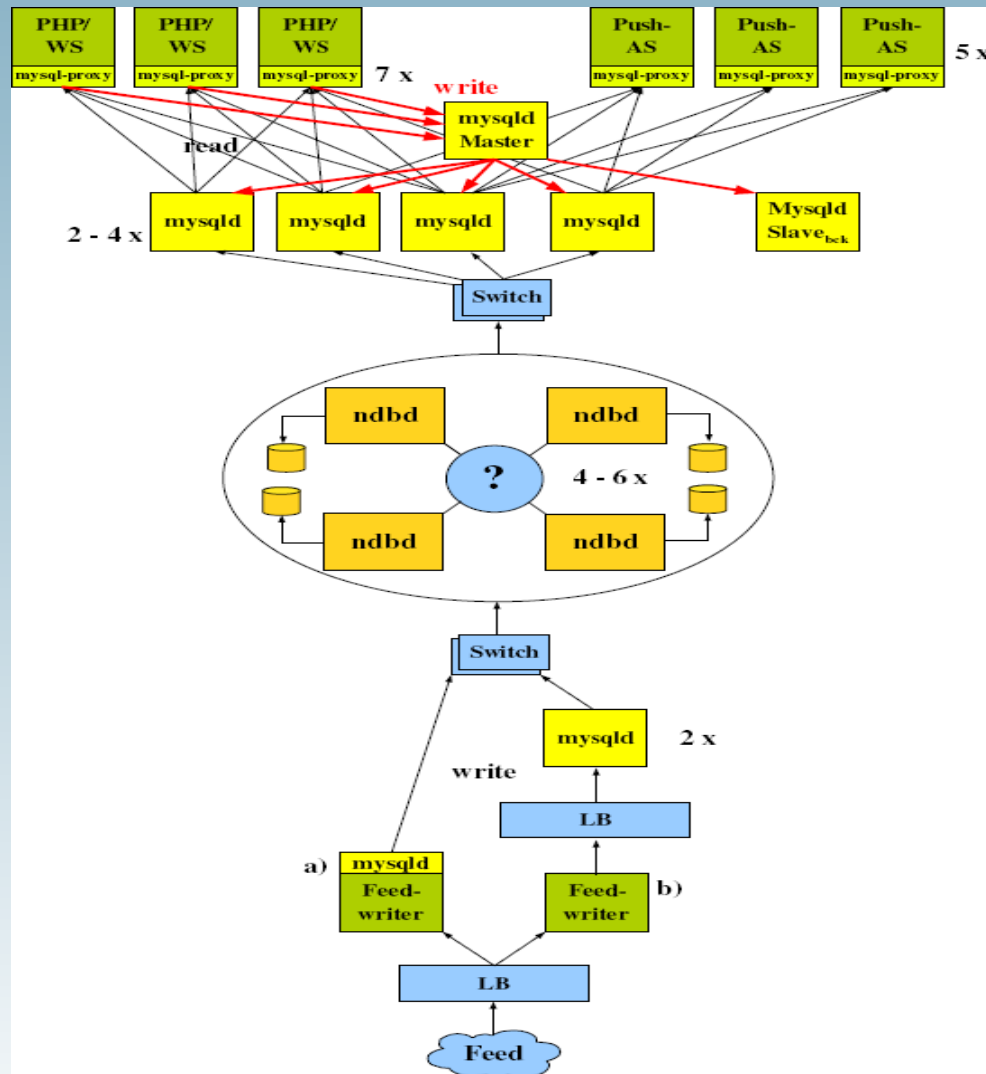
Car-Sharing platform

Solar cell production

Solar cell production

Online Stock trading platform

Questions and Discussion

?

Slides: www.fromdual.com

or

oli.sennhauser@fromdual.com