IBExpert

Behind the scenes of
a very big project
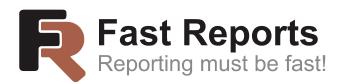
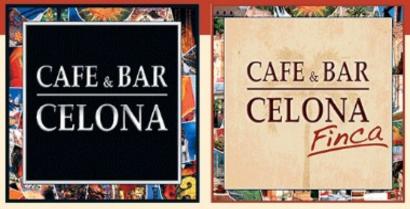# Background

-Main Customer CE/CBC Group
-Servcieprovider for several other restaurants
-Backoffice Software and network responsible for 10500 employees

Basics

- Project started 2014
  - First requirement: 50 restaurant locations
  - IBExpert knowledge for firebird replication solutions since 2001
  - Firebird 2.5 has no built in replication, but all we need
- Backoffice Software is created by third party company using Delphi since more than 10 years
  - Used already Firebird, but without replication
  - Employee ressource planning and working time documentation
  - Salary calcuation and reporting
  - ERP, Productmanagement, menu and pricing definition for POS Systems
  - Sales reporting and long term central storage for POS System data

Basics

- Technologies we use:
  - FB25, FB30
- Windows
  - 2012R2, 2016
- Linux
  - Ubuntu 16.04 LTS, Ubuntu 18.04 LTS
- Virtual machines
  - Vmware, Virtualbox
- All Firebird Installations outside VM
  - Performance inside VMs would be a bottleneck

Basics

- Multimaster, all nodes offer async read write on all tables
- 1.2 billion records currently in main database
- 2.5 million new daily records
  - Each ordered and paid product is replicated to Main dbs
  - Upload data from POS Systems start at 5:30am and should be available in main dbs not later than 8:00am
  - All "Non-POS" data is created and replicated almost in real time
- 350GB main database size

Basics

- Hybrid Cloud Architecture
  - 10 "high end" server located in datacenter or different main accounting offices
    - price per server 4500€
    - all running linux, some with windows vm
  - 180 "low level" server located in each restaurant and some at developer offices
    - price per server 900€
    - all running linux
  - Expected 20 more within next 3 month

Why not everything in the cloud?

- Local employee resource planning and working time documentation do not allow outtime when no internet connection available
- Backoffice software should be available at each restaurant 24/7
  - On special holidays, last employees end work after 4am and first will come back at 7am
- Working time must be documented digitally due to complicated regulations and law in Germany, but also because of automated complex salary calculation
- Running a local software with a remote db server no option due to latency
- Web application was no option due to limited backoffice software developer knowledge and large amounts of data created by local running POS Systems

Communication

- Each server communicates with direct fb connection using a reverse ssh tunnel to one of two available central cluster server

- Reverse tunnel allows to connect from central datacenter to any server directly using fb connection

- IBExpert IDE and IBExpert Scripts can connect from datacenter to any location with direct fb connection without any special router or port config in each restaurant

  - Works also over LTE/UMTS fallback connections

  - If restaurant is connected to the internet in whatever way, everything works. No on Site knowledge required

Demo

- Connect to remote dbs using ibexpert
  - RLOG, RLOGOP, R$DAT ....

```
CREATE OR ALTER trigger r$$awf_auswahlmodus for awf_auswahlmodus
active after insert or update or delete position 32000
as
declare variable SQL varchar(32000);
declare variable I integer;
begin
  --copyright on all R$ source code modules by ibexpert.com
  --no usage allowed without written confirmation
  if (inserting) then update or insert into R$PK(id,tp) values (new.id,'S');
  if (deleting) then delete from R$PK where id=old.id;

  if (current_user <> 'REPLICAT') then
  begin
    i=0;
    if ((inserting) or (updating)) then
    begin
      sql='UPDATE OR INSERT INTO ';
      sql=sql||'AWF_AUSWAHLMODUS ';
      sql=sql||'(';
      sql=sql||'NUMMER,';
      sql=sql||'NAME,';
      sql=sql||'ID) VALUES (';
      sql=sql||coalesce(''''||REPLACE(new.NUMMER, '''',''''')||''',', ' null,');
      sql=sql||coalesce(''''||REPLACE(new.NAME, '''',''''')||''',', ' null,');
      sql=sql||new.id||')  matching (ID) ;';
      insert into R$log(tbl_name,tbl_id,sql,tp) values ('AWF_AUSWAHLMODUS',new.id, :sql,'S');
    end
    if (deleting) then
    begin
      sql='DELETE FROM AWF_AUSWAHLMODUS WHERE ID='||old.id||';';
      insert into R$log(tbl_name,tbl_id,sql) values ('AWF_AUSWAHLMODUS',old.id, :sql);
    end
  end
end
```

Statuspage

IFS-Status - 23:17:52

IFS	Standort	Std	R+T	Up	Down	NAS	Offline	Service
01	Cluster 1	12172382	0	233979	51	0 %	-	05/20
02	Cluster 2	12172442	1227739504	0	0	6 %	-	05/20
001	IBExpert Referenz	12106220	1222111104	0	233982	6 %	7240 m	05/20
002	Verwaltungsserver CE	12172371	1227540089	0	0	6 %	-	05/20
003	CE St Augustin	12172365	-1	0	0	26 %	-	05/20
004	CBC Finca Oldenburg	12172361	16448793	0	0	26 %	-	05/20
005	CE Köln Eigelstein	12172366	7243497	0	0	29 %	-	05/20
006	CE Köln Alter Markt	12172366	17428192	0	0	30 %	-	05/20
008	CE Ibbenbüren	12172367	18705455	0	0	35 %	-	05/20
009	CE Lüdenscheid	12172365	13005426	0	0	48 %	-	05/20
011	Mobex	12172395	-1	0	0	15 %	-	05/20
012	Mobex	12172365	-1	0	0	13 %	-	05/20
013	CBC Wilhelmshaven	12172365	8756621	0	0	19 %	-	05/20
014	CBC Paderborn	12172482	12999315	0	0	57 %	-	05/20
017	CE Viersen	12172363	9917334	0	0	23 %	-	05/20
018	CBC Finca Hannover	12172352	19935437	0	0	21 %	-	05/20
019	CE Düren	12172393	-1	0	0	40 %	-	05/20
020	CE Norderney	12172425	13225216	0	0	27 %	-	05/20
021	CE Mainz 1	12172365	11367764	0	0	27 %	-	05/20
022	CE Mainz 2	12172363	13052590	0	0	27 %	-	05/20
023	CE Frankfurt Eschenheim	12172366	7989555	0	0	37 %	-	05/20
025	CBC Finca Nürnberg	12172365	15824289	0	0	38 %	-	05/20
026	CE Hilden	12172365	15739880	0	0	29 %	-	05/20
027	CE Hannover 2	12172370	9960324	0	0	36 %	-	05/20

Demo

- Connect using putty
- Connect using rdp to ibe19

Need help?

- IBExpert on site Workshop for database developer
  - Convert existing FB 2.X/3.X databases models to
    - Master Slave replication sync/async on FB2.5 or FB3.0
    - Multimaster replication sync/async on FB2.5 or FB3.0
    - All datatypes supported incl. blobs
  - Typical 3-5 days for experienced firebird 2.x developer

Need help?

- Optional hotline/remote support

- Optional unlimited distribution rights

- Optional unlimited undo/redo transactionlog in seperate db

- Solution is 100% pure firebird FB2.5/FB3.0 SP/TRG sourcecode

- Workshop participants will understand every line of code and every required operation

- Contact sales@ibexpert.com for a quote

Demo

- Bidirectional Multimaster synchronous Replication Demo db1-db2