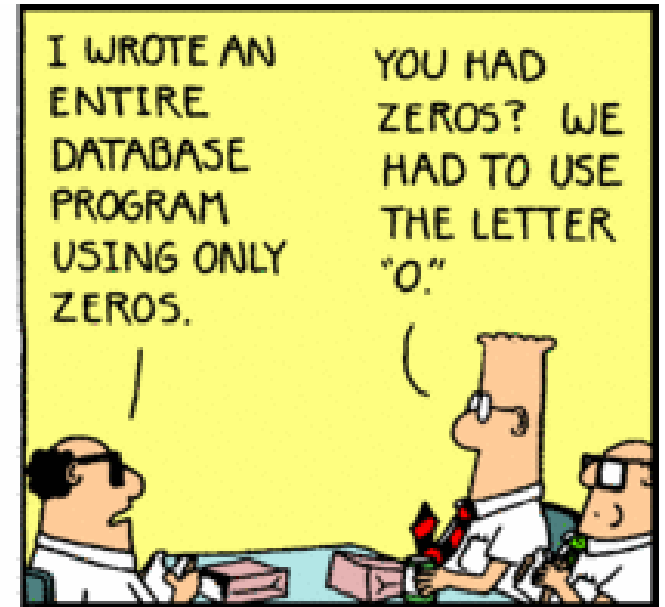
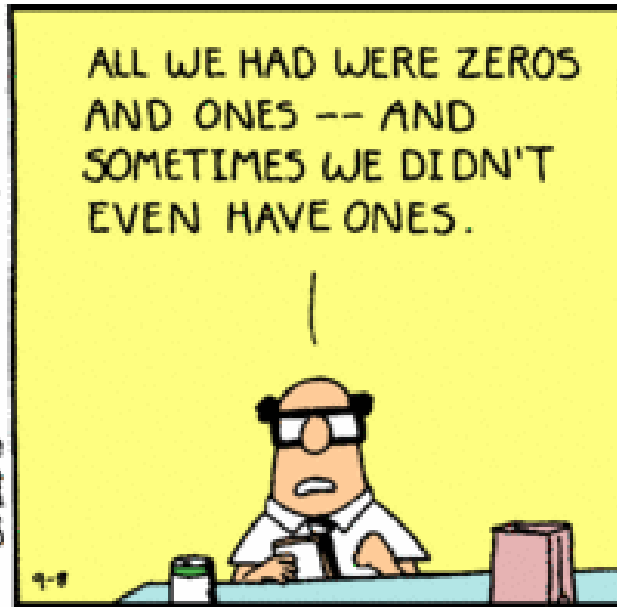




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```
SQL> select * from val;
```

```
*
```

```
ERROR at line 1:
```

```
ORA-08103: object no longer exists
```

```
SQL> analyze table val;
```

```
*
```

```
ERROR at line 1:
```

```
ORA-08103: object no longer exists
```



Boris Oblak
Abakus plus d.o.o.

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OO18
hroug

15.-19.10.2013.
Crveni otok, ROVINJ

**Monitoring large number of
databases**



O podjetju

ORACLE Gold Partner

Zgodovina:

od 1992, 15-20 zaposlenih

Oracle zbirka podatkov, GNU/linux (1995)

Dobitniki srebrnega priznanja za inovacije – Aerodrom Ljubljana: Flight Information System

Dobitniki srebrnega priznanja za inovacije – Arbiter

Razvoj in vzdrževanje:

Razvoj visoko razpoložljivih sistemov z OS GNU/linux

Sistemska podpora in ugaševanje sistemov z OS GNU/linux

Ugaševanje in administracija zbirk podatkov Oracle





O podjetju

ORACLE Gold Partner

History

from 1992, ~20 employees

Applications:

special (DB - Newspaper Distribution, FIS - Flight Information System)

ARBITER - the ultimate tool in audit trailing

APPM - Abakus Plus Performance Monitoring Tool

Services:

DBA, OS administration, programming (MediaWiki, Oracle)

networks (services, VPN, QoS, security)

open source, monitoring (Nagios, OCS, Wiki)

Hardware:

servers, SAN storage, firewalls

Infrastructure:

from 1995 GNU/Linux *(18 years of experience !)*

Oracle on GNU/Linux: since RDBMS 7.1.5 & Forms 3.0 *(before Oracle !)*

>20 years of experience with High-Availability !





Daily DBA to-do list (1)

- check space
- check object status
- monitor alert log
- back up parameter file
- check users
- check backup
- check standby
- check RAC status and services





Daily DBA to-do list (2)

- check redo logs
- check listeners
- check connectivity
- check block corruptions
- housekeeping
 - cleanup trace files
 - cleanup audit files
 - cleanup alert log
 - cleanup listener log





Checking space

- disk space
 - archived logs
 - audit files
 - trace files
- ASM space
- tablespace space
 - autoextensible





Checking object status (1)

- invalid objects

```
SELECT e.owner, e.type, e.name, e.line, e.position,  
       e.text, e.attribute, e.message_number  
FROM   dba_objects o, dba_errors e  
WHERE  e.owner = o.owner  
       AND e.name = o.object_name  
       AND e.type = o.object_type  
       AND o.status = 'INVALID'  
       AND e.message_number != 0  
ORDER BY o.owner, o.object_type, o.object_name,  
        e.sequence, e.line;
```





Checking object status (2)

- invalid objects

OWN	TYPE	NAME	LINE	POS	TEXT	ATTRIBUTE	MESSA
HR	PROCEDURE	MY_PROC1	178	47	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364
HR	PROCEDURE	MY_PROC1	182	29	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364
HR	PROCEDURE	MY_PROC1	276	84	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364
HR	PROCEDURE	MY_PROC1	312	47	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364
HR	PROCEDURE	MY_PROC1	316	29	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364
HR	PROCEDURE	MY_PROC1	404	84	PLS-00364: loop index variable 'R_ES' use is invalid	ERROR	364

6 rows selected





Checking alert log

- ORA-600, ORA-7445 (internal errors)
- ORA-27102 (out of memory errors)
- ORA-00312, ORA-00313, ORA-00349 (redo log errors)
- ORA-1578 (block corruption)
- ORA-60 (dead lock)





Backing up parameter file

```
CREATE pfile='/backup/location/initdb.ora' FROM  
SPFILE;
```



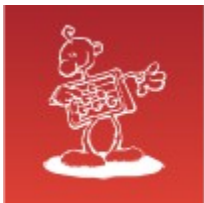


Checking users (1)

- expired users, days before expiry

```
SELECT *
  FROM (SELECT u.name AS username,
              decode(d.account_status, 'EXPIRED(GRACE)', 'EXP(GRACE)',
              d.account_status) AS status,
              d.profile AS profile,
              to_char(u.ctime, 'DD.MM.YYYY') AS created,
              to_char(u.pctime, 'DD.MM.YYYY') AS pwd_change_time,
              trunc(u.pctime + days - SYSDATE) days_before_expiry
        FROM (SELECT NAME,
                    pctime,
                    ctime
              FROM sys.user$) u,
              (SELECT username,
                    profile,
                    account_status
              FROM sys.dba_users) d,
              (SELECT profile,
                    decode(LIMIT, 'UNLIMITED', 99999, 'DEFAULT', 99999,
                    LIMIT) days
              FROM sys.dba_profiles
              WHERE resource_name = 'PASSWORD_LIFE_TIME') p
        WHERE u.name = d.username
              AND d.account_status NOT LIKE '%LOCKED%'
              AND d.profile = p.profile)
        WHERE days_before_expiry BETWEEN - 7 AND 7;
```





Checking users (2)

Username	Account Status	Profile	Created Time	Pwd Last Time Chg	Days Before Expire
PETKOVSEKA	OPEN	DEFAULT	15.02.2011	31.03.2013	2
PAVLOVICH	EXP (GRACE)	DEFAULT	15.02.2011	30.03.2013	1
VESNAG	OPEN	DEFAULT	15.02.2011	30.03.2013	1
PRACA	OPEN	DEFAULT	15.02.2011	29.03.2013	0
MIHAK	EXP (GRACE)	DEFAULT	15.02.2011	28.03.2013	0
MILKA	EXP (GRACE)	DEFAULT	15.02.2011	27.03.2013	-1

6 rows selected.





Checking backup (1)

- V\$RMAN_STATUS
- snapshot control file errors





Checking backup (2)

- RMAN errors

```
SELECT to_char(rs.start_time, 'dd.mm.yyyy hh24:mi:ss')
start_time,
       rs.status, rs.operation, ro.output
FROM   v$rman_status rs, v$rman_output ro,
       v$rman_backup_job_details jrd
WHERE  rs.recid = ro.rman_status_recid
       AND jrd.session_recid = rs.session_recid
       AND jrd.status NOT IN ('COMPLETED', 'RUNNING')
       AND rs.status != 'COMPLETED'
       AND rtrim(ro.output) IS NOT NULL
       AND jrd.end_time > SYSDATE - 2
ORDER BY ro.recid;
```





Checking backup (3)

- snapshot controlfile errors (RAC)
 - ORA-00245: control file backup failed; target is likely on a local file system

```
SELECT COUNT(*)  
  FROM v$rman_status rs,  
       v$rman_output ro  
 WHERE rs.recid = ro.rman_status_recid  
       AND (status LIKE '%ERROR%' OR status LIKE '%FAILED%')  
       AND ro.output LIKE '%ORA-00245%'  
       AND rs.end_time > SYSDATE - 2  
 ORDER BY ro.recid
```





Checking standby

- standby lag

```
SELECT round((SYSDATE - CAST(MAX(first_time) AS DATE)) * 24  
* 60, 0) AS lag_minutes  
FROM v $log_history
```





Checking redo logs

- groups with less than 2 members
- redo logs with different sizes
- redo log errors

```
SELECT COUNT (*)
  FROM (SELECT group#, COUNT (*)
        FROM v$logfile
        GROUP BY group#
        HAVING COUNT (*) < 2);
```

```
SELECT COUNT (*)
  FROM (SELECT COUNT (*)
        FROM v$log
        GROUP BY bytes);
```

```
SELECT COUNT (*)
  FROM v$logfile
 WHERE status IS NOT NULL;
```





Checking block corruption

- RMAN:
 - `backup check logical validate database;`
 - `restore check logical validate database;`
- database
 - `v$database_block_corruption`
- backup
 - `v$copy_corruption`
 - `v$backup_corruption`
- alert log
 - ORA-1578, ORA-08103





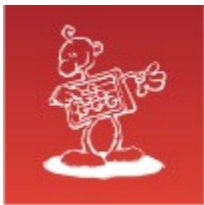
Block corruption (1)

- error during long query run
 - ORA-08103: object no longer exists

alert log:

```
Fri Jul 05 22:01:46 2013
GATHER_STATS_JOB encountered errors.  Check the trace file.
Fri Jul 05 22:01:46 2013
Errors in file
d:\oracle\product\10.2.0\admin\ecrm\bdump\ecrm_j000_216.trc:
ORA-08103: object no longer exists
```





Block corruption (2)

```
Dump file d:\oracle\product\10.2.0\admin\ecrm\bdump\ecrm_j000_216.trc
Fri Jul 05 22:01:46 2013
ORACLE V10.2.0.4.0 - 64bit Production vsnsta=0
vsnsql=14 vsnxtr=3
Oracle Database 10g Release 10.2.0.4.0 - 64bit Production
Windows NT Version V6.1
Instance name: ecrm
```

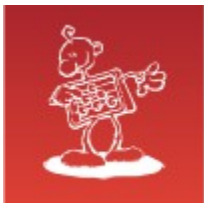
```
Redo thread mounted by this instance: 1
```

```
Oracle process number: 38
```

```
Windows thread id: 216, image: ORACLE.EXE (J000)
```

```
*** 2013-07-05 22:01:46.745
*** ACTION NAME GATHER_STATS_JOB) 2013-07-05 22:01:46.745
*** MODULE NAME DBMS_SCHEDULER) 2013-07-05 22:01:46.745
*** SERVICE NAME SYS$USERS) 2013-07-05 22:01:46.745
*** SESSION ID(11.2602) 2013-07-05 22:01:46.745
ORA-08103: object no longer exists
*** 2013-07-05 22:01:46.745
GATHER_STATS_JOB: GATHER_TABLE_STATS('PORTAL','VAL','','...')
ORA-08103: object no longer exists
```





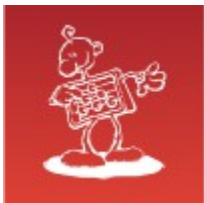
Block corruption (3)

```
SQL> select * from v$database_block_corruption;
```

```
no rows selected
```

```
RMAN> backup check logical validate database;
```





Block corruption (4)

```
SQL> select * from v$database_block_corruption;
```

FILE#	BLOCK#	BLOCKS	CORRUPTION_CHANGE#	CORRUPTION_TYPE
4	83111	8	0	ALL ZERO
4	83159	8	0	ALL ZERO
4	8871	8	0	ALL ZERO
4	83095	8	0	ALL ZERO
4	83175	8	0	ALL ZERO
4	83047	8	0	ALL ZERO
4	83127	8	0	ALL ZERO
...				
4	8807	8	0	ALL ZERO
9	345961	8	0	ALL ZERO

28 rows selected





Block corruption (5)

```
SQL> drop table portal.val;  
drop table portal.val  
ORA-08103: object no longer exists
```

```
SQL> create table portal.val (i int);  
create table portal.val (i int)  
ORA-00955: name is already used by an existing object
```





Housekeeping

- cleanup trace files
- cleanup audit files
- cleanup alert log
- cleanup listener log





Reporting

- create check scripts
- periodically run in cron
- sending mail from scripts
- many databases?
- report when check failed
 - How do you know that error is fixed?
 - How do you know that check script itself has not failed?
- many DBAs work on same problem?

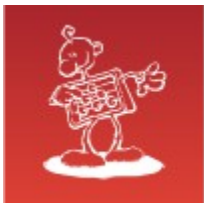




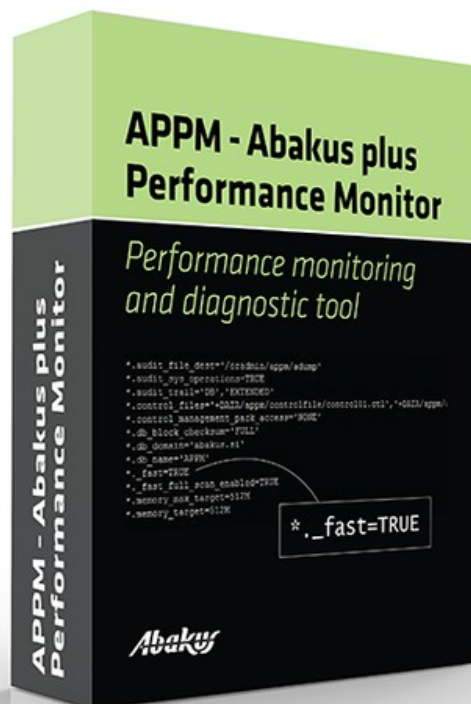
Conclusion

- cron and mail solution
 - works for small number of databases and for one DBA
- with many databases it becomes confusing





APPM





APPM

APPM Enterprise Monitor: Hosts

2013-09-24 08:32:18 | boris (my profile | logout)

APPM Monitor

Dashboard Instances Databases **Hosts** Worklog Partners Users Agent

Agents State

hestia.abakus.si
2013-09-24 08:20 for 1 minute(s).

urh
2013-07-01 10:23 for 0 minute(s).

Active Tasks

Boris Oblak @ brana.abakus.si
standby

[My Report](#) | [My Task](#)

Support Contact

dba@abakus.si
sistem@abakus.si
+386 (4) 287-11-00

Hosts

[New Host](#)

Severity	A, W, C	Hostname	Target Definition	Last Update	Options
300	1, 0	mls.abakus.si	Nagios oracle@mls.abakus.si:22	2013-08-26 01:31:00	Delete Begin Work
130	0, 1	brana.abakus.si	Nagios oracle@brana.abakus.si:22	2013-09-20 19:17:00	Delete Begin Work
120	2, 1	paris.abakus.si	Nagios oracle@paris.abakus.si:22	2013-09-24 01:56:00	Delete Begin Work
110	1, 1	pisni.abakus.si	oracle@pisni.abakus.si:22	2013-09-24 01:45:00	Delete Begin Work
100	0, 1	vmwvms.abakus.si	Nagios oracle@vmwvms.abakus.si:22	2013-09-23 18:12:00	Delete Begin Work
100	0, 1	gbrsavn.abakus.si	oracle@gbrsavn.abakus.si:22	2013-09-23 16:16:00	Delete Begin Work
70	0, 0	atlas.abakus.si	Nagios oracle@atlas.abakus.si:22	2013-09-16 14:27:00	Delete Begin Work
60	6, 0	ljuba.abakus.si	abakus@ljuba.abakus.si:22	2013-09-23 19:16:00	Delete Begin Work
20	2, 0	triban2.abakus.si	Nagios oracle@triban2.abakus.si:22	2013-09-23 23:15:00	Delete Begin Work
10	1, 0	gbr01.abakus.si	Nagios oracle@gbr01.abakus.si:22	2013-09-24 01:00:00	Delete Begin Work
10	1, 0	gbr02.abakus.si	Nagios oracle@gbr02.abakus.si:22	2013-09-24 01:00:00	Delete Begin Work
10	1, 0	delov.abakus.si	Nagios oracle@delov.abakus.si:22	2013-09-24 01:15:00	Delete Begin Work
10	1, 0	lcvms1.abakus.si	Nagios oracle@lcvms1.abakus.si:22	2013-09-24 01:01:00	Delete Begin Work
10	1, 0	pisni.abakus.si	oracle@pisni.abakus.si:22	2013-09-24 01:45:00	Delete Begin Work
10	1, 0	solius.abakus.si	Nagios oracle@solius.abakus.si:22	2013-09-24 01:10:00	Delete Begin Work
10	1, 0	mls.abakus.si	Nagios oracle@mls.abakus.si:22	2013-09-24 01:00:00	Delete Begin Work
10	1, 0	lcvms2.abakus.si	Nagios oracle@lcvms2.abakus.si:22	2013-09-23 23:53:00	Delete Begin Work
10	1, 0	triban1.abakus.si	Nagios oracle@triban1.abakus.si:22	2013-09-24 01:00:00	Delete Begin Work
5	0, 0	jata.abakus.si	oracle@jata.abakus.si:22	2013-09-24 08:22:08	Delete Begin Work
0	0, 0	vmwvms-ar.abakus.si	Nagios oracle@vmwvms-ar.abakus.si:22	2013-09-23 18:41:00	Delete Begin Work
0	0, 0	vmwvms-by.abakus.si	Nagios oracle@vmwvms-by.abakus.si:22	2013-09-24 01:55:00	Delete Begin Work
0	0, 0	skvsnovi.abakus.si	Nagios oracle@skvsnovi.abakus.si:22	2013-09-23 18:51:00	Delete Begin Work
0	0, 0	sl-spenia.abakus.si	oracle@sl-spenia.abakus.si:22	2013-09-24 01:10:00	Delete Begin Work



APPM monitor: User roles

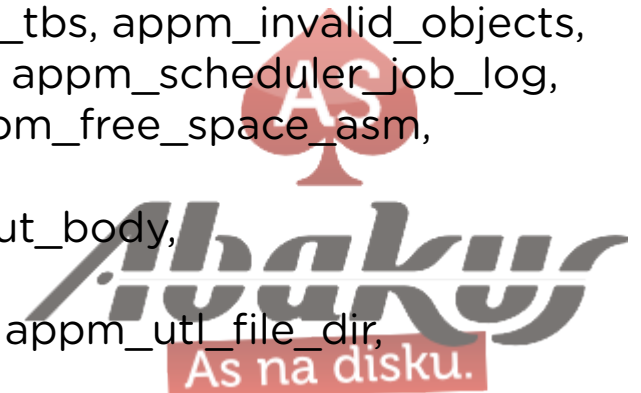
- Database and System Administrators
 - have full access to appm-monitor app
 - they manage supervised hosts
 - but **might** not have privileges to access all of them
- Users
 - have limited access (only their servers)
 - can filter checks by category (write their own application checks)





APPM monitor: Checks

- Oracle PL/SQL Procedures
- bash Scripts
- imported from Nagios
- Currently available over 30 out of the box checks!
 - os_diskspace, asm_disks, asm_voting_disks, asm_space, db_standby, db_listener, db_srvctl, db_alert_log, db_redo, db_parameters, db_health, appm_outstanding_alerts, appm_temp_seg_in_perm_tbs, appm_invalid_objects, appm_rman_backup, appm_dictionary_integrity_hm, appm_scheduler_job_log, appm_synonyms, appm_free_space_tablespaces, appm_free_space_asm, appm_users_with_defpwd, appm_block_corruption, appm_diagnostic_repository, appm_packages_without_body, appm_datapump_jobs, appm_service_per_instance, appm_auto_segment_advisor, appm_datafile_status, appm_util_file_dir, ext_appm_backup, ext_copy_logs, ...





Custom bash ckeck

```
source "$APPM_HOME/bin/lib/envchk.sh"  
proc_chk_external \  
    "$1_check_name" \  
    "$1_check_result" \  
    "$1_check_category" \  
    "$1_check_message" \  
    "file:$1_full_report" \  
    "$1_db_sid"
```





Custom PL/SQL check

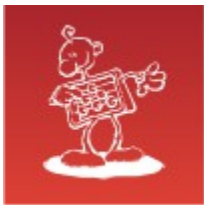
```
/**
 * Write check to file
 * */
PROCEDURE write_check (
  p_check_name      IN VARCHAR2,
  p_check_result    IN NUMBER,
  p_check_message   IN VARCHAR2 := NULL,
  p_check_time      IN DATE := SYSDATE,
  p_check_category  IN DATE := 'user',
  p_full_report     IN CLOB := NULL);
```





APPM scripts: bash environment

```
oracle@paris:~  
File Edit View Search Terminal Help  
oracle@paris:~$  
oracle@paris:~$  
oracle@paris:~$ source appm/abaenv.sh orasid  
oracle@paris [orasid] ~ $
```



APPM scripts: Help

```
oracle@myhost [11g] ~ $ stdbby_fixgap_recover.sh --help
```

```
Usage: ./stdby_fixgap_recover.sh [ --option1="value1" ]  
> Recover standby database using RMAN incremental backup.
```

Options:

- backup-dir=
Path to RMAN backup files.
- backup-tag-ctrl=
RMAN tag for backup of controlfile.
(default is 'STANDBY_FIX_CTRL')
- backup-tag-diff=
RMAN tag for backup of incremental datafile backup.
(default is 'STANDBY_FIX_DIFF')
- help
Display this help





APPM scripts: crontab example

APPM – Backup

```
10 3 * * * source ~/appm/abaenv.sh && backup.sh -  
sid=orcl  
    >> "$(appm_logfile.sh 'backup.orcl')" 2>&1
```

APPM – Checks

```
40 * * * * source ~/appm/abaenv.sh && check.sh  
    >> "$(appm_logfile.sh 'check')" 2>&1
```

APPM – Housekeeping

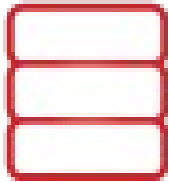
```
50 2 * * * source ~/appm/abaenv.sh && housekeeping.sh  
    >> "$(appm_logfile.sh 'housekeeping')" 2>&1
```

```
# APPM Copy Logs, Standby Refresh, ...
```



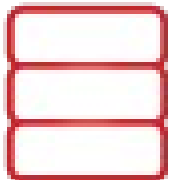


APPM scripts: high Availability on SE



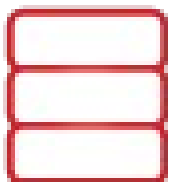
RAC Node 1

ORACLE
DATABASE
STANDARD EDITION



RAC Node 2

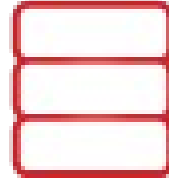
ORACLE
DATABASE
STANDARD EDITION



RAC Node 3

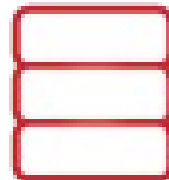
ORACLE
DATABASE
STANDARD EDITION

All managed by
APPM Scripts



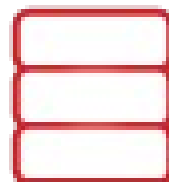
Stand-By, 8 hour lag

ORACLE
DATABASE
STANDARD EDITION



Standby, 48 hour lag

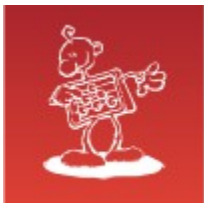
ORACLE
DATABASE
STANDARD EDITION



RMAN Backup

ORACLE
DATABASE
STANDARD EDITION





APPM scripts: DBA utilities

```
oracle@paris [abatest] ~ $ appm_dba.sh db-standby
```

```
-----  
Database Role: [PHYSICAL STANDBY]  
Current SCN   : [7955828388134]  
Standby Lag   : [35,5] hours  
-----
```

V\$LOG_HISTORY - Last 10 Applied Logs

THREAD#	SEQUENCE#	FIRST_TIME	FIRST_SCN	NEXT_SCN	RESET_SCN
1	15859	2013-07-21 01:03:52	7955828349578	7955828388135	7955615790592
1	15858	2013-07-21 01:02:01	7955828342461	7955828349578	7955615790592
1	15857	2013-07-21 01:01:39	7955828340770	7955828342461	7955615790592
1	15856	2013-07-21 01:00:52	7955828338066	7955828340770	7955615790592
1	15855	2013-07-21 00:30:35	7955828297328	7955828338066	7955615790592
1	15854	2013-07-21 00:30:18	7955828295694	7955828297328	7955615790592
1	15853	2013-07-21 00:01:05	7955828244553	7955828295694	7955615790592
1	15852	2013-07-21 00:00:12	7955828240467	7955828244553	7955615790592
1	15851	2013-07-20 23:30:24	7955828185182	7955828240467	7955615790592
1	15850	2013-07-20 23:30:09	7955828184440	7955828185182	7955615790592





Controlling

- many databases
- many DBAs
 - transparent controls
 - begin work
 - tips on troubleshooting



Boris Oblak
Abakus plus d.o.o.

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hroug

15.-19.10.2013.
Crveni otok, ROVINJ

**Monitoring large number of
databases**