

TRACE FILE ANALYZER DEEP DIVE

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LEARNING OBJECTIVES

- TFA: What is it, why use it?
- Obtain, install, configure TFA
- TFA log collection for SR process
- TFA advanced features

DEMO ENVIRONMENT

- VirtualBox 5.1.26
- OEL 7.4
- Oracle Database 12.1.0.2 EE
- TFA 12.2.1.2.2 (July 2017)

- Slides, demos available at <https://github.com/oraclesean/utoug2017>

WHAT IS TFA?

- Trace File Analyzer
 - RAC/non-RAC databases
 - Collects diagnostic files
 - Runs as a lightweight daemon
 - External to GI or Oracle database installations

WHY USE TFA?

```
/u01/app/12.1.0/grid/cfgtoollogs
/u01/app/12.1.0/grid/crf/db/ol74-rac1
/u01/app/12.1.0/grid/crs/log
/u01/app/12.1.0/grid/css/log
/u01/app/12.1.0/grid/cv/log
/u01/app/12.1.0/grid/evm/admin/log
/u01/app/12.1.0/grid/evm/admin/logger
/u01/app/12.1.0/grid/evm/log
/u01/app/12.1.0/grid/install
/u01/app/12.1.0/grid/inventory/ContentsXML
/u01/app/12.1.0/grid/log
/u01/app/12.1.0/grid/network/log
/u01/app/12.1.0/grid/oc4j/j2ee/home/log
/u01/app/12.1.0/grid/opmn/logs
/u01/app/12.1.0/grid/racg/log
/u01/app/12.1.0/grid/rdbms/log
/u01/app/12.1.0/grid/scheduler/log
/u01/app/12.1.0/grid/srvm/log
/u01/app/oraInventory/ContentsXML
/u01/app/oraInventory/logs
/u01/app/oracle/cfgtoollogs
/u01/app/oracle/crsdata/ol74-rac1/acfs
/u01/app/oracle/crsdata/ol74-rac1/afd
/u01/app/oracle/crsdata/ol74-rac1/chad
/u01/app/oracle/crsdata/ol74-rac1/core
```

```
/u01/app/oracle/crsdata/ol74-rac1/core
/u01/app/oracle/crsdata/ol74-rac1/crsconfig
/u01/app/oracle/crsdata/ol74-rac1/crsdiag
/u01/app/oracle/crsdata/ol74-rac1/cvu
/u01/app/oracle/crsdata/ol74-rac1/evm
/u01/app/oracle/crsdata/ol74-rac1/output
/u01/app/oracle/crsdata/ol74-rac1/trace
/u01/app/oracle/diag/asm/+asm/+ASM1/cdump
/u01/app/oracle/diag/clients/user_oracle/host_4142647144_82/
/u01/app/oracle/diag/clients/user_oracle/host_4142647144_82/
/u01/app/oracle/diag/crs/ol74-rac1/crs/cdump
/u01/app/oracle/diag/crs/ol74-rac1/crs/trace
/u01/app/oracle/diag/rdbms/_mgmtdb/-MGMTDB/cdump
/u01/app/oracle/diag/rdbms/_mgmtdb/-MGMTDB/trace
/u01/app/oracle/diag/rdbms/cdbrac/cdbrac1/cdump
/u01/app/oracle/diag/rdbms/cdbrac/cdbrac1/trace
/u01/app/oracle/diag/tnslsnr
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener/cdump
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener/trace
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener_scan1/cdump
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener_scan1/trace
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener_scan2/cdump
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener_scan2/trace
/u01/app/oracle/diag/tnslsnr/ol74-rac1/listener_scan3/cdump
```

WHY USE TFA?

- Supplements SR creation
 - Simplifies log collection
 - Works across directory structures
 - Clusterware, ASM, database, OS
- Superior to RDA
 - RDA not cluster aware
 - RDA must be run manually

BASIC ARCHITECTURE

- TFA_BASE
 - \$GRID_HOME/tfa
 - \$ORACLE_BASE/tfa
- TFA_HOME*
 - \$TFA_BASE/<node>/tfa_home
 - \$TFA_BASE/tfa/localhost/tfa_home
- Repository*
 - \$TFA_BASE/tfa/repository

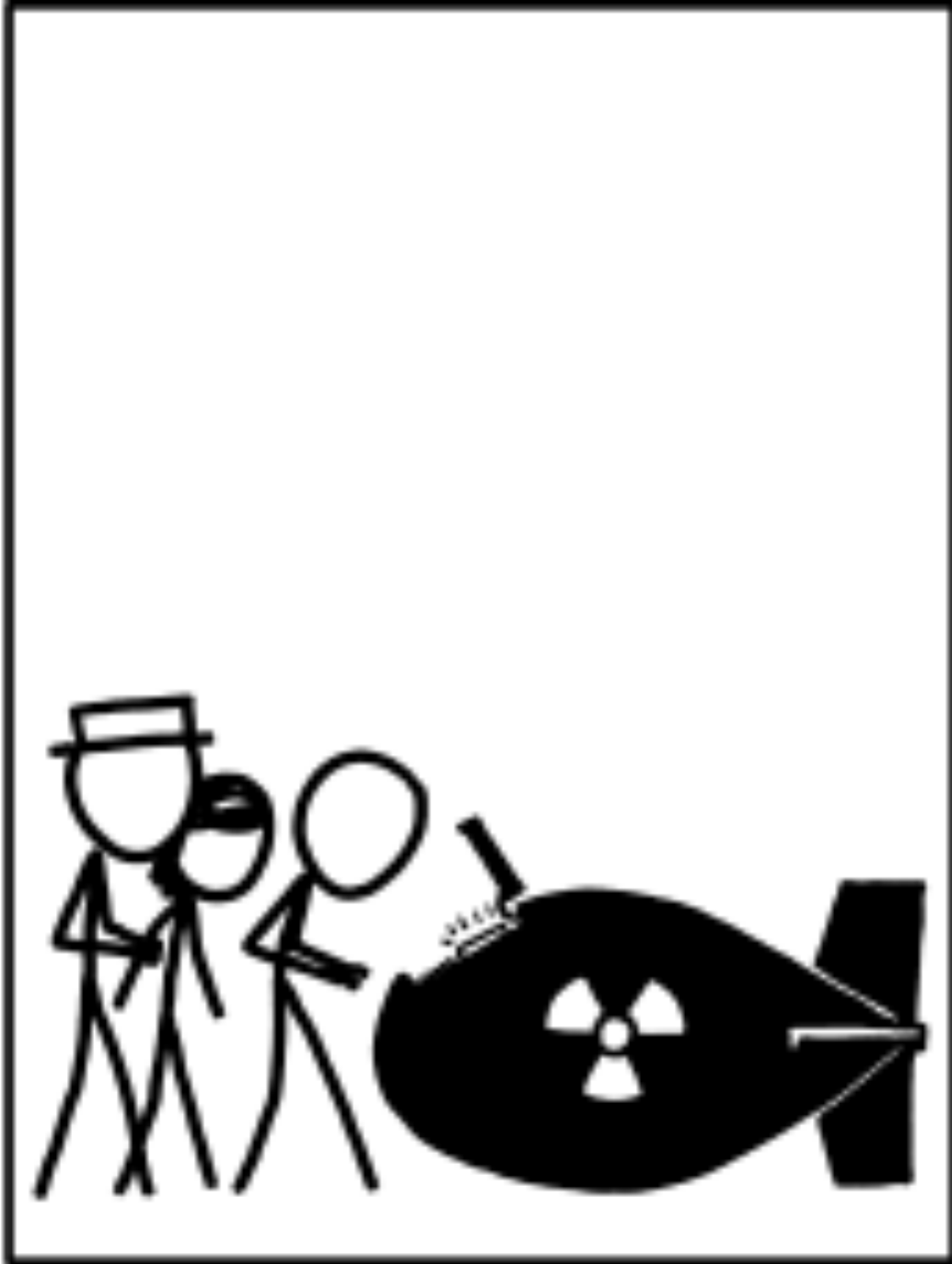
BASIC ARCHITECTURE

- Runs and owned as root*
- JVM and Java CLI
- Main process:TFAMain
- Monitors logs via daemon
- Nodes communicate via secure socket

BENEFITS OF TFA

- Reduced cost
- Reduced complexity
- Improved quality of service
- Improved agility

BENEFITS OF TFA



COMPATABILITY AND AVAILABILITY

- Included in Grid Infrastructure/DB 11.2.0.4, 12cR1, 12cR2
- Supported versions
 - 10gR2 onward
 - Database, ASM, clusterware
 - Engineered systems (Exadata, appliances)

COMPATABILITY AND AVAILABILITY

- Linux, Solaris, HP-UX, AIX
- July 2017 v.12.2.1.2.2 added support for Windows
- RAC and single instance databases
- Minimal system impact

OBTAINING TFA

- Included in 11.2.0.4, 12cR1, 12cR2
- Downloadable from OSS
 - Document 1513912.1
 - Patch 21757377
 - Download the platform-specific file
- Included in PSU since mid/late 2014*

OBTAINING TFA

- Historically was called “TFALite”
- Now mature, simply `installTFA-<platform>`
 - Latest version
 - Includes additional tools
 - RAC and DB Support Tools Bundled

INSTALLED VERSION

- What version do I have?

```
$GRID_HOME/bin/tfactl toolstatus
```

- Failure or empty listing:

```
.-----.  
| External Support Tools |  
+-----+-----+-----+  
| Host   | Tool   | Status |  
+-----+-----+-----+  
'-----+-----+-----'
```

TFA INSTALLATION

- Download, copy to directory
- Unzip, run as root
- In *nix systems, the new recommended install directory is /opt

POST INSTALLATION REQUIREMENTS

- TFA auto-discovers new databases
- Only maintenance is adding nodes

POTENTIAL INSTALLATION ISSUES

- May have to uninstall an old version
- -local option requires installation be run on all nodes
- Check for existing procwatcher

CUSTOM INSTALLATION OPTIONS

- Non-daemon mode:
 - Supports non-root installation
 - No automatic collection
 - May not capture all logs

TFA AND PATCHING

- PSU may overwrite existing TFA bundle
- When applying a PSU, TFA may not be stopped properly leading to patch failure
- PSU < 12.1.2.6.0 may move custom TFA repository
- Non-PSU patching may fail on remote nodes

CONFIGURATION RECOMMENDATIONS

- Autostart w/cluster (best practice)
enable
- Allow alert log scanning:
set rtscan=on
- Confirm oracle access
access lsusers
- Set automatic diagnostic collection
set autodiagcollect=on
- Limit collection sizes
set trimfiles=on

CONFIGURATION - VIEWING

- See all settings:
`tfactl print config`

RUNNING COMMANDS

- Direct, via menu, or command line
 - TFA calls
`$GRID_HOME/bin/tfactl cmd -opt`
 - Start TFA menu mode
`$GRID_HOME/bin/tfactl menu`
`tfactl> menu`
 - TFA command line
`tfactl> cmd -opt`
- Demos assume CLI (no tfactl prefix)
- Commands can be called from scripts

HELP, -H AND PRINT

- Help on (most) commands with -h, help
help
help print
print -h

COLLECTING DIAGNOSTICS

- Initiated by any non-privileged user granted access
 - `diagcollect` command called from one node
 - Command securely propagated to other nodes
 - Collections occur in parallel on all nodes
 - Remote nodes write files locally, compress
 - Remote nodes securely transmit files to master node repository
 - Remote nodes purge local repository files
 - Collection completes

COLLECTING DIAGNOSTICS

- Four hours collection by default
diagcollect
diagcollect -last 6h
diagcollect -last 1d
diagcollect -from "OCT/01/2016 00:00:00" \
-to "OCT/02/2016 00:01:00"
diagcollect -for "OCT/01/2016"
- since=last and now marked as "Kept for backward compatibility"

COLLECTING DIAGNOSTICS

- Default is to “trim” logs
 - notrim
- Skip core dumps
 - nocores

LIMITING COLLECTIONS

- TFA will collect logs created prior to installation
- After moving or deleting files - run a new inventory
- Only time options are days, hours

BASIC SRDC OPTIONS

- Collect for error conditions
`diagcollect -srdc ora600`
- ORA-600, 700, 4030, 4031, 7445, and other internal errors
- ORA-27300, 27301, 27302 (OS errors)
- List grows regularly
- View all options:
`diagcollect -srdc -h`

PURGING COLLECTIONS

- Auto purge based on size, age
 - Min age, 12 hours by default
set AutoPurge=on -c
- Manual purge (root user only):
 - purge -older 1d
 - purge -older 12h
 - purge -older 7d -force

BUNDLED TOOLS

- Show all available tools
`toolstatus`

TFA UTILITIES

alertsummary*

dbglevel*

history

menu

pstack*

triage*

calog

events

ls/dir

param

summary

vi/notepad

changes

grep/findstr

managelogs

ps/tasklist

tail*

* Unix/Linux only

ALERTSUMMARY

- List a summary of important events in all alert logs
- Works across nodes
- Oracle determines what events are visible

CHANGES

- List all changes to the system
- In RAC, lists changes in all member nodes
- Lists old/new values where applicable
- Useful for issue correlation

EVENTS

- Lists important system events
- Can be limited to a date, range, or last n days/hours
- More specific/controllable than alertsummary

PARAM

- List parameter values
- Similar to “show parameter”
- Limitations:
 - Container database only
 - Will not display from ASM, pluggable DB
 - Does not show hidden parameters

SUMMARY

- Generates a summary of the environment
- Run as root
- Can be limited to components
- Collects information & invokes interactive summary session
- h/help for help

ANALYZE

- Log analyzer tool
- Scans registered alert and OS log files

ANALYZE

- Search limiters
 - String pattern
 - Component
 - Type
 - Node
 - Times

SHELL ACCESS

- Run shell commands with !

```
tfact1> !pwd
```

```
/home/oracle
```

```
tfact1>
```

*NIX VS. WINDOWS

- July 2017 release was a milestone release
- Represents product maturity
- Added basic Windows support
- Windows functionality will be extended in the future

CUSTOM REPOSITORY LOCATION

- Use a shared filesystem for repo:
tfactl set repositorydir=/dir
tfactl set reposizeMB=num

REPOSITORY TIPS

- Shared repository in RAC must specify node subdirectories
- Why do I have both:
 `$TFA_BASE/repository` and
 `/custom_dir/repository?`

MULTIPLE TFA_HOMES?

- Why do I have both
\$TFA_BASE/tfa_home and
\$TFA_BASE/<node>/tfa_home

VIEW ACTIVITY, SETTINGS

- `print actions`
- `print repository`
- `print config`
- `print status`

DIRECTORY MANAGEMENT

- Add non-default directories
tfactl directory add /dir -node n1
- Exclusion policies
 - collectall
 - exclusions
 - noexclusions
 - public
 - private

ACCESS CONTROL

- User management
 - access enable
 - access add -user goodguy
 - access remove -user badguy
 - access block -user goodguy
 - access unblock -user goodguy
 - access reset
 - access lsusers

CERTIFICATES & PROTOCOLS

- Self-signed certificates may be replaced
 - Use a personal self-signed certificate
 - Use a certificate from a CA
- List and restrict protocols
print protocols

SETTING CONTEXT

- Set the default context for the session

```
tfact1> database cdbrac
```

```
Set db to CDBRAC
```

```
CDBRAC tfact1>
```

- Remove context

```
CDBRAC tfact1> database
```

```
Removed db from analysis context.
```

```
tfact1>
```

SCRIPTING

- TFACTL can be called from scripts
- Analogous to SQL*Plus, e.g.:

```
# /opt/tfa/bin/tfactl <<EOF
access lsusers -local
print config -node local
EOF
```

SCRIPTING

```
diagstat=`$TFA_BASE/bin/tfactl print config | \  
grep "Automatic diagnostic collection" | \  
awk '{print $6}`\  
echo "Diagnostic collection is: " $diagstat
```

AGILE TFA

- TFA can be integrated/into installed/on:
 - Virtual environments
 - Vagrant builds
 - Ansible scripts
 - Docker containers
 - Cloud (compute) instances

ADVANCED DIAGNOSTICS

- `-tag <tagname>`: Place files into a specific directory within repository
- `-z <zipname>`: Give files a specific file name, zipped
- `-silent`: Non-interactive mode

ADVANCED DIAGNOSTICS

- Default is to “trim” logs
 - notrim
- Limit by component
 - ASM, database, OS, etc.
- Skip core dumps
 - nocores
- ASH and AWR collections as HTML or text

SRDC DIAGNOSTICS

- Options include:
 - Various EM diagnostics
 - XDB database installation and object issues
 - OS resource issues
 - Installation, patching, upgrade conflicts
 - Performance issues
 - Must be run as database or grid owner

SRDC DIAGNOSTICS

- Database performance collections run cluster wide
- All other SRDC collections run locally

SRDC DIAGNOSTICS

- `-srdc dbperf`
- `-srdc dbinstall`
- `-srdc dbupgrade`
- `-srdc dbpatchinstall`
- `-srdc dbpatchconflict`

IPS DIAGNOSTICS

- Incident Packaging Service
- `ips show incidents`
- `ips show problems`
- `diagcollect -ips`
 - `-incident n`
 - `-problem n`

MANAGELOGS

- View or purge logs older than n minutes, hours, or days
- Limit to GI or database logs
- Limit to specific nodes
- -dryrun option
- -show variation option

AUTOMATED LOG MANAGEMENT

- TFA can manage log purges
- `set manageLogsAutoPurge=ON`
- `set manageLogsAutoPurgePolicyAge=n<d|h>`
- `set manageLogsAutoPurgeInterval=<minutes>`
- `set diskUsageMonInterval=<minutes>`
- `set diskUsageMon=<ON|OFF>`

AUTOMATED COLLECTION

- When a trigger event occurs TFA:
 - Waits 5 minutes
 - Begins a collection
 - Continues until
 - no event for 30 seconds
 - a maximum of 5 minutes
 - Waits 10 minutes before triggering another collection
- Flood controlled

AUTOMATED COLLECTION

- Collects relevant components only
- Trims logs automatically
- Consolidates to single node

AUTOMATED COLLECTION

- Triggering events
 - ORA-600
 - ORA-7445
 - ORA-4031
 - ORA-494
 - ORA-32701
 - Misc hang events
 - System state dump
 - Node evictions

AUTOMATED COLLECTION

- Set a general notification email:
`set notificationAddress=dba@oracle.com`
- Set a home-specific notification email:
`set notificationAddress=OH_owner:admin@oracle.com`
- Multiple emails in a comma-separated list

ANALYZE

- analyze -examples
 - Not always accurate :(
- Set database context is not passed; must be specified
- Analyze output of oswatcher
- Analyze output of oratop

REDACTION CAPABILITIES

- High-level only
- Simple string replacement
- Must be managed individually on each node
 - Can use symlinked/shortcut...
- Managed via XML
 - `$TFA_HOME/resources/mask_strings.xml`

ADDITIONAL SUPPORT TOOLS

(*NIX ONLY)

orachk (exachk now integrated)

oratom

darda

oswbb

prw (procwatcher)

sqlt (SQLTXPLAIN)

ORACHK

- Cool features:
 - Can be configured to upload to a DB (uses wallet credentials)
 - Can diff two reports
 - Can merge multiple reports
 - Can run in automated (daemon) mode
 - Requires expect
 - Saves root password in (protected) configuration file

ORACHK

- Auto-run of orachk can be managed via TFA
 - Set a notification email for results
 - Manage via a cron-like schedule
 - Create multiple profiles with different settings
- orachk documentation shows double quotes for some options
 - TFA version uses single quotes!

PRW

- Collect process information for locking, blocking, latching events
 - Hanging, blocking, deadlocking SQL
 - Severe SQL contention and performance issues
 - Memory management and process memory issues
 - Instance evictions
 - High CPU consumption by a database or cluster
 - Slowness or contention in RMAN
- Tunable background process

PRW

- Not useful for:
 - Node evictions
 - Node reboots
 - Less severe SQL performance (not related to blocking/locking)

PRW

- Collection parameters can be set in prwinit.ini
 - Includes CPU throttle levels, cleanup
- Useful commands:
 - `prw start all`
 - `prw param`
 - `prw log n (last n lines)`
 - `prw log runtime (tail procwatcher log)`
 - `prw pack`

PRW

- Collection parameters are hardcoded in `prwinit.ini`
 - Node specific
 - Includes CPU throttle levels, retention period
 - Specify background, cluster processes to monitor
 - Set a notification email
 - Can include up to three custom SQL scripts

PRW

- `prw` (procwatcher) scripts exist in `$TFA_HOME/ext/prw`
- Power user feature: `prw.sh` may be edited/customized

DARDA

- TFA invocation follows RDA protocols
- Uses TFA repository
- Provides access to RDA, ADR, OCM
- Correct MOS DocID is 201804.2 (TFA docs are wrong)
- darda FAQ: DocID 471608.1

DARDA

- Targeted or menu-driven discovery
- The only commands *you need*:
 - `setupmos`
 - `menu`

DARDA

- Useful commands for power-users:
 - runmenu
darda runmenu 201804.1
 - collect
 - upload
 - draftsr

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QUESTIONS

<https://github.com/oraclesean/utoug2017>

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