SnapManager for Oracle® 2.2

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▶ **Introduction**

▶ **Key Features**

▶ **Concepts**

▶ **Platform & Protocol Support**

▶ **Installation & Configuration**

▶ **New in Version 2.2**

▶ **Coming Up**

▶ **Resources**

Introduction

- ▸ **Provides integrated data management for Oracle 9i, 10g and 11g databases**

- ▸ **Simplifies and automates backup, recovery and cloning of Oracle databases**

- ▸ **Leverages NetApp Snapshot™, SnapRestore™ and FlexClone™ technologies**

- ▸ **Seamless integration with Oracle Technologies like RMAN, ASM, RAC & Direct NFS**

- ▸ **Handles FC, iSCSI and NFS protocols**

- ▸ **Provides both Command Line and Graphical User Interfaces**

▶ **Automated, instantaneous and space-efficient backups using Snapshot™**

▶ **Backup:**

– **Entire database**

– **Tablespaces**

– **Datafiles**

▶ **Verifies backups using the Oracle Database Verify utility (optional)**

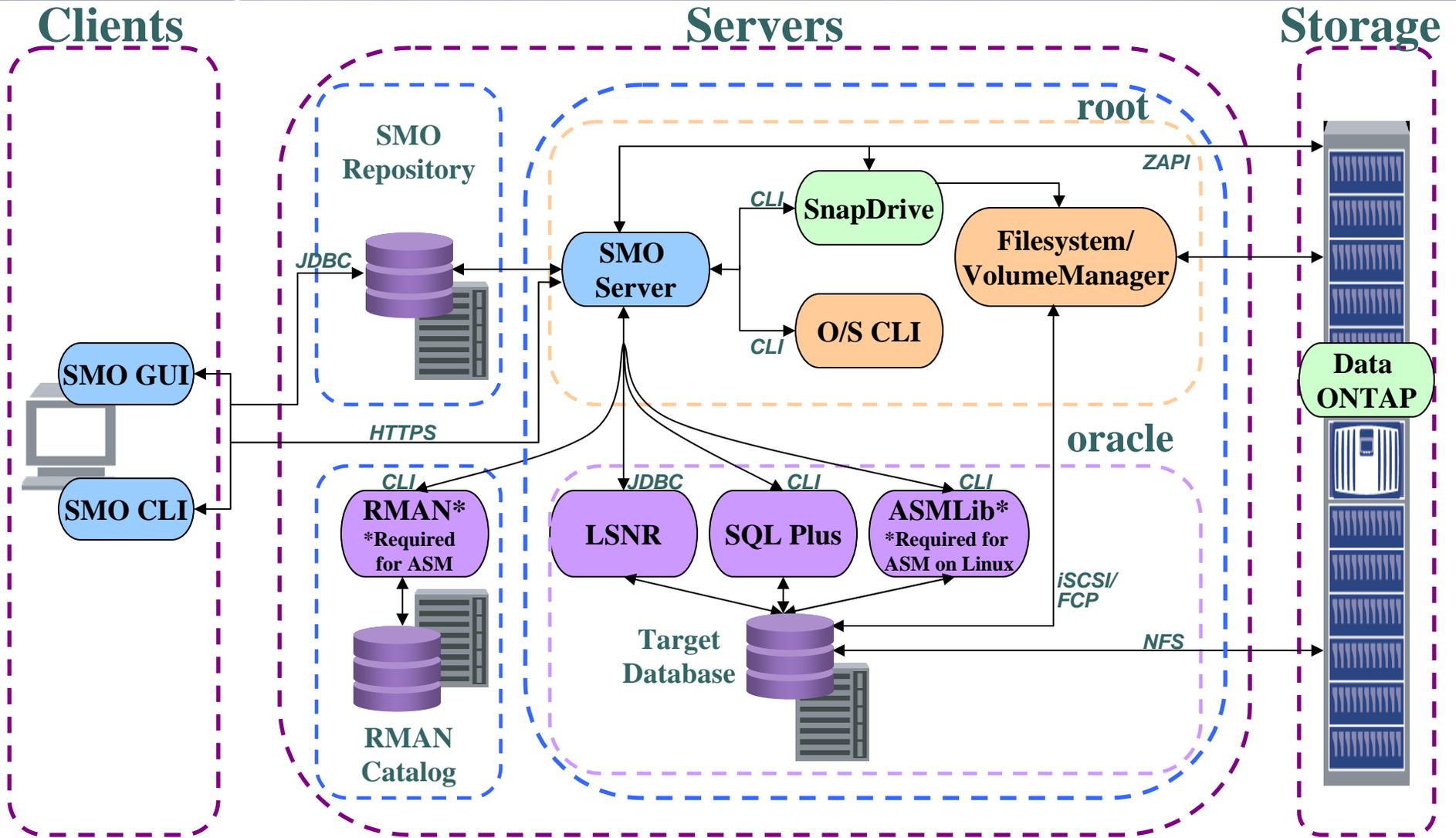▶ **Catalogs backups with RMAN (optional)**

▶ **Automated, rapid and granular restore & recovery using SnapRestore™**

▶ **Reduces Mean Time to Recovery on failure**
  - **Quick Restores**
  - **More frequent backups ➔ Less logs to replay ➔ Faster Recovery**

▶ **Restore options include restoring:**
  - **The entire backup**
  - **Only the tablespaces or data files you specify**
  - **Only control files**
  - **Control files along with data files or tablespaces**

▶ **Recovery options include recovering the database to:**
  - **The last transaction that occurred in the database**
  - **A specific date and time**
  - **A specific Oracle SCN**
  - **The time of the backup**

▸ **Fast, automated, and space-efficient clones using FlexClone™**

▸ **Ideal for test and development environments**

▸ **Backup and clone in one step (optional)**

▸ **Clone to the same or different host**

▸ **Clone RAC as well as non-RAC databases**

- ▶ **Architecture**

- ▶ **Central Management**

- ▶ **Repository**

- ▶ **Profiles**

- ▶ **Policy Based Backup Management**

- ▶ **Credentials**

Concepts: Architecture

Clients

Servers

Storage

root

SMO Repository

SMO GUI

SMO CLI

JDBC

HTTPS

SMO Server

CLI

CLI

SnapDrive

O/S CLI

Filesystem/ VolumeManager

ZAPI

Data ONTAP

oracle

CLI

RMAN*
*Required for ASM

JDBC

LSNR

CLI

SQL Plus

CLI

ASMLib*
*Required for ASM on Linux

RMAN Catalog

Target Database

iSCSI/ FCP

NFS

SMO provides:

▶ **Centralized Administration, Reporting and Processing**
  - **View the status of operations across hosts**
  - **Administer across hosts**
    - **e.g. create, update and delete Profiles**
    - **e.g. manage clones, backup policy**
  - **Perform Processing operations on remote Nodes**
    - **e.g. backup, restore, clone**

▶ **Works seamlessly across host O/S platforms & versions**
  - **Linux (RHEL, OEL, SuSE), Solaris, HP-UX, AIX, Windows**

▸ **Used to store all processing information**

- **Similar to RMAN catalog in principle**
- **Stores time of backup, tablespaces/datafiles backed up, filer(s) used, Snapshots created etc.**

▸ **Database schema created at install time**

- **Can reside on any Oracle Database Instance**
- **DBA can determine where schema resides**
- **Must not be a part of the database being backed up using SMO**

- **Stores all database credentials to complete operation**
  - Oracle username and passwords
  - Host and O/S account running the Database
  - RMAN Repository connection info

- **Stored in the Repository**

- **Eliminates needs to enter this info each time an operation is performed**
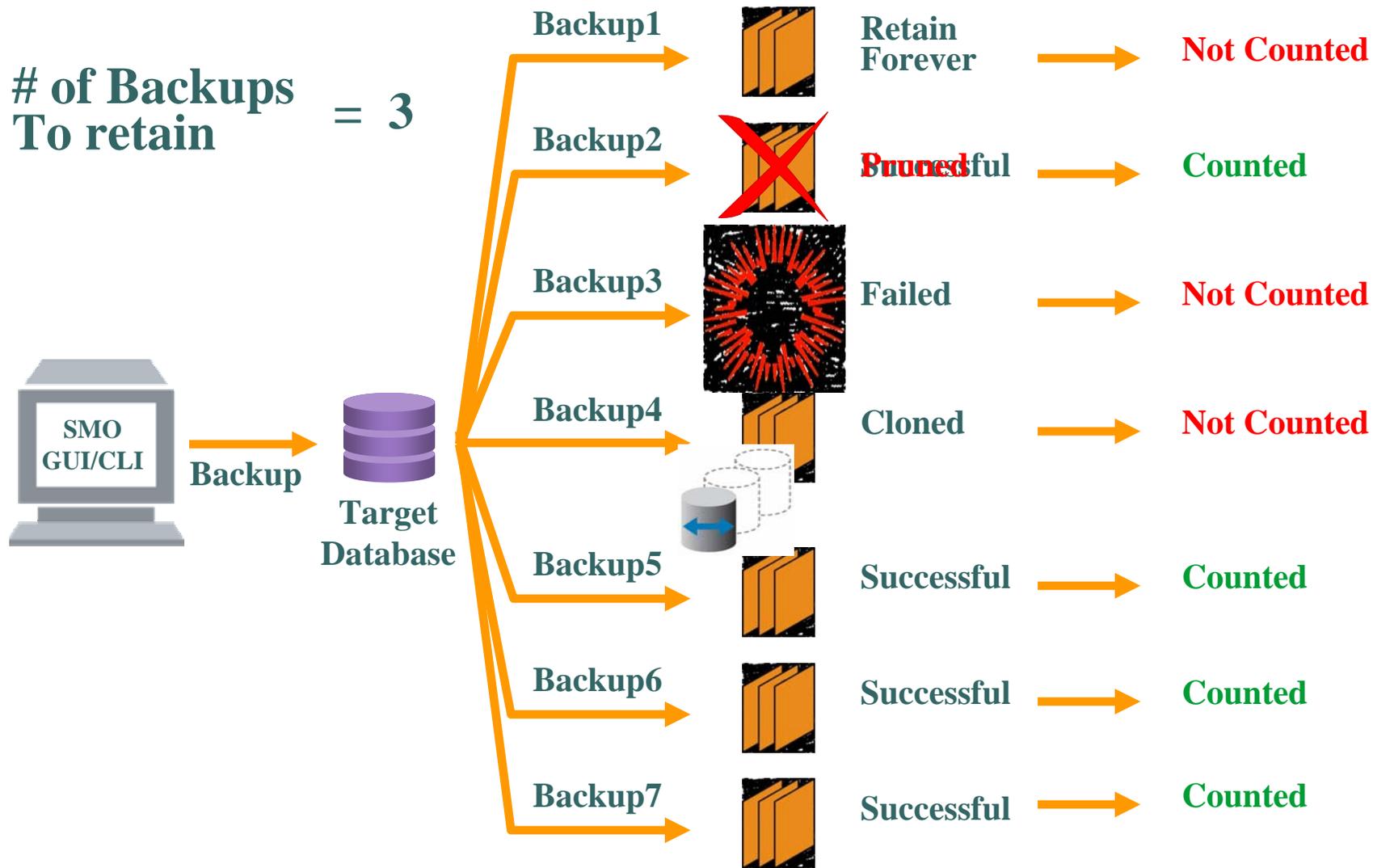
- **Logical unit of management**

SMO maintains a "sliding window"

- ▶ **Specified on the Profile**
  - – **Number of backups to retain parameter**
  - – **Counts back from newest backup**

- ▶ **Certain backups that are <u>not</u> counted towards the "sliding window" and are not pruned**
  - – **Failed backups**
  - – **Backups marked "Retain forever"**
  - – **Backups currently in use for clones**
  - – **Backups currently mounted**
  - – **Freed Backups**

- ▶ **After a successful backup, the backups outside the sliding window will be pruned**

- ▶ **Pruning is equivalent of smo backup delete command**
  - – **All associated Snapshots are removed, mountpoints etc.**
  - – **Related information in the SMO Repository is deleted**
  - – **Backup is disassociated from RMAN (if used)**

# of Backups To retain **= 3**

SMO GUI/CLI

Backup

Target Database

Backup	Status	Count
Backup1	Retain Forever	Not Counted
Backup2	Pruned / Successful	Counted
Backup3	Failed	Not Counted
Backup4	Cloned	Not Counted
Backup5	Successful	Counted
Backup6	Successful	Counted
Backup7	Successful	Counted

▶ **Objects in the SMO environment are secured by passwords**

  – **Repository**

    • **Ensures user is allowed to access**

  – **Profile**

    • **Ensures user is allowed to operate on database represented by profile attributes**

  – **SMO Server ("host")**

    • **Ensures user is allowed to make requests to specific SMO Server**

▶ **A credential is the password configured for the user for that object, not the password configured on the object itself**

▶ **User credentials are cached under the OS user home directory**

Platform & Protocol Support

▸ **Additions in SMO 2.2**

▸ **Oracle Versions**

▸ **Oracle on Windows**

▸ **SMO Versions**

▸ **SMO Components**

▸ **ONTAP Versions**

▸ **SnapDrive Versions**

▶ Platform Support

- Windows 2003 Server with Multipathing
  - FCP: Data ONTAP DSM 3.1 for Windows MPIO
  - ISCSI: Microsoft iSCSI DSM (2.0.3 or higher)
  - Microsoft Multiple Connections Session (MCS)
- Oracle Enterprise Linux (OEL) 4
- RHEL 4.0 (Update 5)

▶ Host-Side Stack Support

- Additional host-side stacks supported by SDU 3.0
  - HP-UX IA-64
  - Veritas volume manager (HP-UX and AIX)
  - For others, see SDU support matrix

▶ Database Support

- Oracle 11g

▶ vFiler (multistore) Support

▶ **9iR2, 10gR2, and 11gR1**

– Only Linux x86 versions of 11gR1 are supported

– 11g supported only on NFS or DNFS without RMAN

• 2 Oracle bugs pending for ASM/RMAN/DNFS

▶ **RAC and Standalone**

– Windows 2003 Server is Standalone only

▶ **ASM support for 10gR2 and 11gR1**

– ASM not supported on HP-UX and AIX due to a Oracle bug

– ASMLib required on Linux

– ASM on Windows not supported

– ASM on NFS not supported

▶ **RMAN integration**

– Required for ASM, Optional in other environments

Platform & Protocol Support: Oracle on Windows

- ▶ **Windows 2003 Server**

- ▶ **9iR2, 10gR2**

- ▶ **Standalone only (no RAC)**

- ▶ **FCP and iSCSI w/ NTFS only**

- ▶ **x86 and x86_64 only (no IA64)**

- ▶ **SnapDrive for Windows 5.0**

▸ **SMO 2.2 supports NAS and SAN on each of the supported *nix versions**

- **Need a valid SnapDrive compatibility stack**
- **Need a supported Oracle version**
- **Need a supported clusterware (RAC only)**

▸ **SnapManager/SnapDrive Compatibility Matrix**

- **http://now.netapp.com/NOW/knowledge/docs/olio/guides/snapmanager_snapdrive_compatibility/snapmanager.shtml#Oracle**

Platform & Protocol Support: SMO Components

▸ **SMO 2.2 Server runs on database host**

  – **On Windows, runs as a service**

▸ **SMO 2.2 CLI runs on any supported host**

▸ **SMO 2.2 GUI is for Windows (XP, 2000, 2003 Server)**

  – **Started via Java WebStart (https://host:27214)**

  – **No separate installer**

  – **GUI not supported on *nix platforms**

- ## Minimum ONTAP is 7.0
  - SMO 2.2 tested against 7.1 GA & 7.2 GA

- ## vFiler support requires ONTAP 7.2.2+

- ## ONTAP Licenses required
  - Protocols (NFS, iSCSI, FC) as required
  - SnapRestore
  - FlexClone (for NAS, not required for SAN)

Platform & Protocol Support: SnapDrive Versions

▶ **On Linux, HP-UX, and AIX, SMO 2.2 requires**

  – **SnapDrive for Unix (SDU) 3.0**

▶ **On Solaris, SMO 2.2 requires**

  – **SnapDrive for Unix (SDU) 3.0.1 (due to burt 260011)**

▶ **On Windows, SMO 2.2 requires**

  – **SnapDrive for Windows (SDW) 5.0**

▸ **Prerequisites**

▸ **Installation**

▸ **Configuration parameters**

▸ **Upgrading**

▶ **<u>Not</u> included in the SMO install**

▶ **Have to be downloaded and installed in this order <u>before</u> SMO is installed**

1. **Host Attach Kit**
2. **SnapDrive**

- **SMO 2.2 is installed with InstallAnywhere**

- **Install Directory**
  - **RHEL, SuSE, HP/UX, AIX: /opt/NetApp/smo**
  - **Solaris: /opt/NTAPsmo**
  - **Windows:** C:\Program Files\NetApp\SnapManager for Oracle
    - **User may change installation directory on windows**

- **NetApp and IBM branded versions available**

- **SMO Server will automatically start on reboot**
  - **Unix: files in /etc/rc are updated**
  - **Windows: SMO Server added as a service**

- **No GUI installer (start GUI via Java WebStart)**
  https://host:port **(Default port: 27214)**

▸ **smo.config - SMO property file**

▸ **In smo install directory under ./properties**

– **E.g. linux: /opt/NetApp/smo/properties/smo.config**

▸ **Documented with comments**

▸ **Examples:**

 # Archived Log files matching this Regular Expression will be excluded from all backups
 # Example: archivedLogs.exclude=/arch/logs/on/local/disk/.*
#archivedLogs.exclude=

▸ **Upgrading from SMO 2.1 is straightforward**

▸ **SMO 2.1 GUI should be uninstalled after all SMO 2.1 servers are upgraded.**

▸ **GUI and CLI are version specific**
  – **SMO 2.1 GUI/CLI can only talk to SMO 2.1 servers**
  – **SMO 2.2 GUI/CLI can only talk to SMO 2.2 servers**

▸ **Platform and Protocol Support**

▸ **Functional Changes**
- **Hooks to enable a scripted Disaster Recovery solution**
- **Zero-config ASM**
- **Restore datafiles and controlfiles in single operation**
- **View information for any operation**
- **Launch GUI via Java WebStart (no installer)**
- **New man pages for CLI**
- **Single dump jar**

▸ **Platform Support**

– **Windows 2003 Server**

▸ **Host-Side Stack Support**

– **Additional host-side stacks supported by SDU 3.0**

• **HP-UX IA-64**

• **Veritas volume manager (HP-UX and AIX)**

• **For others, see SDU support matrix**

▸ **Database Support**

– **Oracle 11g**

▸ **vFiler (multistore) Support**

▸ **SMO 2.2 does not directly integrate with SnapVault, SnapMirror, or Protection Manager**

▸ **SMO 2.2 provides hooks to enable a scripted Disaster Recovery solution via the ability to:**
  – **Free backups**
  – **Restore from an alternate location**

- ▸ **Deletes SMO snapshots from primary storage, but retains backup metadata in the SMO repository**

- ▸ **Used after snapshots have been copied to secondary storage**

- ▸ **Frees up space occupied by Snapshots**

- ▸ **Enables more frequent backups**

- ▸ **Helps avoid reaching the Snapshot limit**

- ▸ **Exposed via**
  - – **"smo backup free" CLI command**
  - – **GUI backup free wizard**

- ▶ **Allows restoring from somewhere other than the snapshots on primary storage**

- ▶ **Alternate location must be accessible on the database host**

- ▶ **Alternate locations specified in new "restorespec" xml file**

- ▶ **Restorespec file specified when restoring via CLI or GUI**

▸ **Previous versions of SMO required ASM configuration on the profile and in clone specifications**

▸ **SMO 2.2 dynamically determines the needed ASM configuration at runtime**

▸ **RMAN must still be enabled in the profile for ASM databases**

▶ Previous versions of SMO required

– One restore operation to restore controlfiles, and

– One restore operation to restore datafiles

▶ SMO 2.2 now supports restoring datafiles and controlfiles in a single operation

▶ **Summary information for all operations is now provided via "operation list" CLI**

▶ **Detailed information for any individual operation is now provided via "operation show" CLI**

▶ **Summary and detailed information for incomplete operations provided in the GUI**

▸ **SMO 2.2 has no GUI installer**

▸ **GUI is accessed via Java WebStart by going to <u>https://host:port</u> and clicking on a link to start the GUI**

  – **Host = host on which smo server is running**
  – **Port = port on which smo server is running (27214)**

▸ **As with SMO 2.1, the GUI is only supported on Windows XP, 2000, 2003 Server**

▶ **Man pages for**

- **smo**
- **smo_server**

▸ **SMO 2.1 dumps generated**

– **One client dump jar**

– **One server dump jar**

▸ **SMO 2.2 dumps generate a single dump jar:**

```
Dump file created. Path:
  ~/.netapp/smo/2.2.0/smo_dump_8abc01e91581bd0b011581b
  d11720001.jar
```

NetApp

▶ **Some performance improvements**

– **Faster profile open/refresh. Burt 251818**

– **Can close repositories. Burt 237158**

▶ **Changes related to new features:**

– **Backup Free**

– **Restore from alternate location**

– **Clone space reserve**

– **Incomplete operation list**

– **View backup/clone logs from backup/clone properties dialog**

2.2 Demo

Coming Up ….

Coming Up ….

▶ **Support for Protection Manager**

▶ **Clone a protected backup (on Secondary)**

▶ **RBAC integration**

▶ **Improved restore performance**

▶ **Update multiple profiles**

▶ **User defined SMO Snapshot naming**

▶ **ASM over NFS**

▶ **Scheduling backups**

▶ **Parallel operations in the GUI**

▶ **Universal GUI**

▶ **Extended platform & protocol support**

SnapManager for Oracle – Resources

▶ **SnapManager for Oracle**

– **Installation and Administration Guide**
http://now.netapp.com/knowledge/docs/SnapManager/relsmoracle22/pdfs/install.pdf

– **Release Notes**
http://now.netapp.com/knowledge/docs/SnapManager/relsmoracle22/pdfs/rnote.pdf

– **NOW Description and Download pages**
http://now.netapp.com/NOW/cgi-bin/software/?product=SnapManager&platform=Oracle

– **Demos**
http://my.netapp.com/psweb/appmanager/mktgportal/mktgdesktop?_nfpb=true&nodeId=10345&_pageLab
el=mktgPS_docdetail&contentId=P_029458

– **Technical Marketing**
http://my.netapp.com/psweb/appmanager/mktgportal/mktgdesktop?_nfpb=true&nodeId=10345&_pageLab
el=mktgPS_generic

▶ **Technical reports**

– **SMO 2.0 Best Practices Guide TR 3554**
http://www.netapp.com/library/tr/3554.pdf

– **SMO with Oracle 10g TR 3426**
http://www.netapp.com/library/tr/3426.pdf

– **Network Appliance Best Practice Guidelines for Oracle 11g TR 3633**
http://www.netapp.com/library/tr/3633.pdf

– **Network Appliance Best Practice Guidelines for Oracle TR 3369**
http://www.netapp.com/library/tr/3369.pdf

– **Oracle Database Solutions (NetApp Partners Site)**
http://www.netapp.com/partners/oracle/

SnapManager for Oracle – Resources

- ▶ **What additional resources are available?**
  - – **SnapManager™ product page**
    - • **http://mktg-web.netapp.com/products/software/snapmanager/oracle/index.html**
  - – **SnapManager™ Data Sheet**
    - • **http://www.netapp.com/ftp/snapmanager-oracle.pdf**
  - – **Product bulletins & FAQs**
    - • **http://mktg-web.netapp.com/products/prodbulletins/PB_SMO_0306.htm**

- ▶ **Who else can I get information from?**
  - – **Product Management:**
    - • Tim Rutherford (timr@netapp.com)
  - – **Product Marketing:**
    - • Generosa Litton (generosa@netapp.com)
  - – **Product & Partner Engineer:**
    - • Anand Ranganathan (anandr@netapp.com)

- ▶ **Email**
  - – **dl-smo-answers - For basic Q&A**
  - – **dl-smo-esc – For L2 & L3 escalations to engineering**

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