

Clone Your Databases in Minutes

With Enterprise Manager 12c
Snap Clone

January 2015

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Program Agenda

- 1 Current Challenges
- 2 EM 12c Solution
- 3 The Details
- 4 Summary

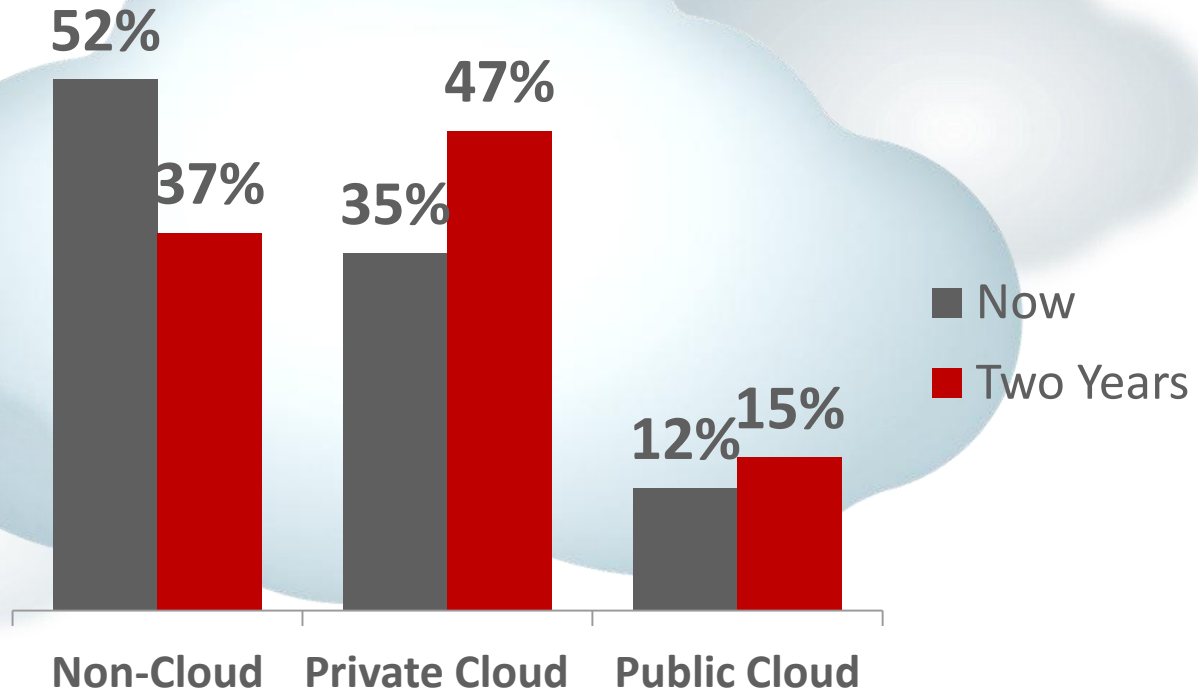
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5x

Cloud computing
investment is growing
FIVE TIMES faster than
traditional IT
investment

Private Cloud: **Fastest** Growing!



Source: Computerworld Strategic Marketing Services, February-March 2014 Cloud Survey

Platform as a Service: Fastest Growing Private Cloud Segment

27%

“current PaaS adoption ”



72%

“expecting to adopt PaaS **next five years****”

*Source: Computerworld Strategic Marketing Services, February-March 2014 Cloud Survey

**Source: [GigaOM Research and VC North Bridge](#)

Application Development and Testing

The most adopted cloud use case in the next two years



Source: Computerworld Strategic Marketing Services, February-March 2014 Cloud Survey

Application Development and Testing all Need Data(bases)

But currently that has some bottlenecks

Time

4+ months
to deploy new
business applications

Money

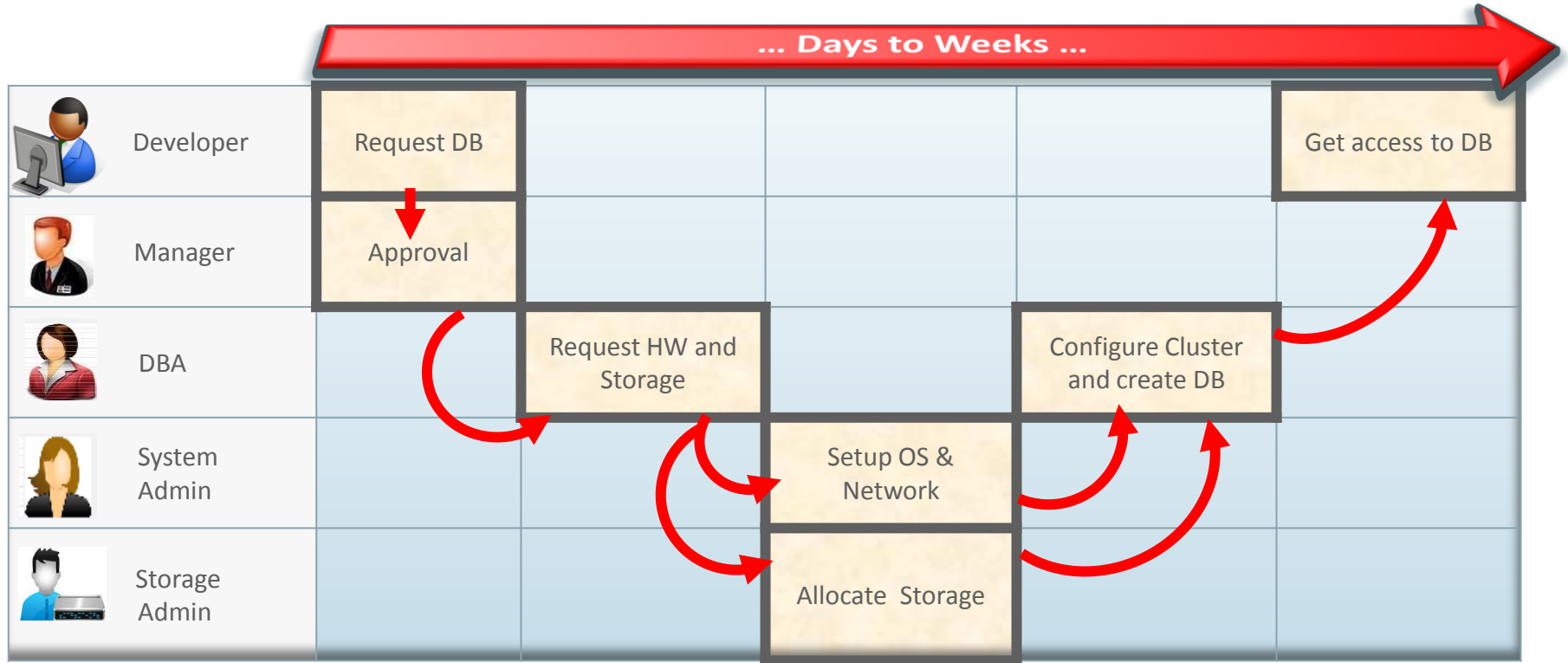
5x storage
to provide DB test copies

Risk

Availability Issues
introduced by migrations and
upgrades

Current Database Provisioning Process

Time Consuming and Inefficient



Real-life Challenges

60,000
refresh/year

2,000+
Dev/Test DB

3 – 5 TB
Typical DB size

RMAN
full clones

10 - 20
issues/day

EMC & NetApp
storage

“Database Refresh
is a
necessary evil!”

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What is Snap Clone?

DBaaS approach to creating clones of large (~TB) databases



Space Efficient

Significantly reduce the storage footprint



Time Efficient

Clone DBs in minutes not days/weeks



Storage Agnostic

Supports ALL storage vendors (NAS & SAN)



Self Service

Empower the user to make adhoc clones



Space efficient

Eliminating DB Storage Overhead Costs for Dev/Test

Business Value: 90%+ reduction in storage overhead via 'Snap Clone'

- Substantial DB storage overhead exists to support operations
 - For every DB in prod, 8-12 copies exist
 - Uses: Development, Test, Back-up, Archive
- DBaaS Snap Clone benefits:
 - 95% reduction in storage overhead, impact easily quantified
 - Storage growing 35-40% / year
 - Delivery time cut from 2 weeks to > 1 hour

Financial Customer Scenario

- 5 Prod DB = 30 TB
- 5 Standby DB = 30 TB
- 5 *Masked DB* = 30 TB
- 6 Clones (6 * 5 * 2 GB of writable space)
= ~~180TB~~ 60 GB

- Total **270 ~90 TB**
- Time = ~~days/weeks~~ minutes

Eliminating DB Storage Overhead Costs for Dev/Test

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- **Oracle assessment:** Likely millions more dollars of value to recapture though **not included in ROI study.**

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Developers/Q&A team request new DB's all the time

- Storage needs are exploding
- Lack of automation
- Archaic processes followed to conserve storage
 - Clones **shared** by multiple users and applications
 - Degraded **performance** due to increased sharing amongst users
 - All data changes have to be managed, this adds to OPEX
- Low rate of refresh
 - Fixed refresh cycle; no adhoc cloning requests

Customer Scenarios with Snap Clone



Customer Scenario 1 [Telecom Industry]

- Prod DB = 12 TB
- Standby DB = 12 TB
- 7 Clones = 84 TB
-
- Total **108 ~24 TB**

Customer Scenario 2 [Banking Industry]

- 5 Prod DB = 30 TB
- 5 Masked DB = 30 TB
- 6 Clones (6 * 5 * 2 GB of writable space) = 180TB **60 GB**
-
- Total **270 ~90 TB**

Over 99.97% Storage Savings



Time efficient

Provisioning and Cloning takes too much time



51% DBAs state dealing with manual tasks like provisioning & cloning of new databases for test/dev systems is too time consuming



“Provisioning a database server takes us 4-5 days with involvement of different groups to create a system meeting enterprise standards. Need to ***roll out services on short order*** in matter of minutes and hours”

Same customer scenarios **with Snap Clone**



Customer Scenario 1 [Telecom Industry]

- Prod DB = 12 TB
- Standby DB
- 7 Clones
- Time = _____ minutes

Customer Scenario 2 [Banking Industry]

- _____ = 180TB
-
- Time = weeks _____ hours

Significant reduction in Time.
A typical terabyte database takes just a few minutes to clone



Storage Agnostic



Supported Cloning Options

Full Clones

Database Native [Storage Agnostic]

RMAN
Restore

RMAN
Duplicate

Data Pump

- Leverage your existing investments
- Cater to both functional and stress testing needs
- Maximize for best performance

Use Snap Clone whenever you need >1 clones!

Snap (Thin) Clones

Software Solution [Vendor Agnostic]



Hardware Solution [Vendor Specific]

NAS

SAN





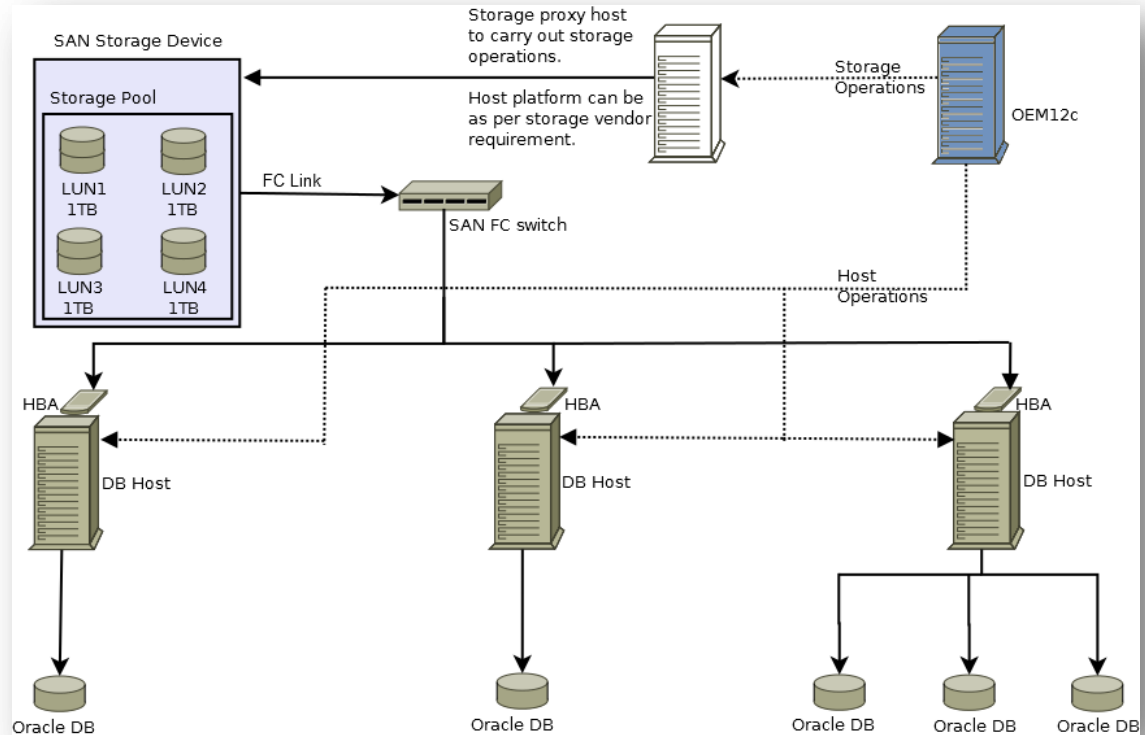
Snap Clone using Solaris File System (ZFS)

- Uses a single stock Solaris 11.1+ image – physical or virtual [and **NOT** the Sun ZS3 Appliance]
- Supports any kind storage – NAS or SAN
- For SAN, mount luns as raw disk and format with ZFS filesystem
- Does **NOT** require the snapshot/clone licenses from the storage vendor, these features are available for free
- **Additional** features include compression, deduplication, IO caching, etc
- **HA** has to be handled externally either via Solaris Clusters, or by using HA features of the underlying hypervisor

Snap Clone on ASM + EMC Storage



- Ability to create 'live' thin clones of databases on ASM
- *Live Clone*: **NOT** snapshot based, but a live clone of DB
- Clone can be within the same or on a different cluster
- EMC VMAX (with Time Finder VPSnap) and VNX storage appliances
- Supported configurations: SI and RAC
- Supported Versions: DB = 10.2.0.5 or higher; GI = 11.2 and higher





Self Service

Self Service Provisioning and Service Catalog



Database Cloud Self Service Portal

Home Chargeback My Preferences

Notifications
Databases Due to Expire in Next 7 Days 2

Your Usage
You have permission to use these cumulative quota allowances when making database requests.

Databases: 4

Memory: 3.42 GB

Storage: 1.72 GB

My Databases

Service Name	Type	Status	Zon
DB353bac.adc2101112.us.oracle.com	Database Instance	↑	112
DB479444.adc2101112.us.oracle.com	Database Instance	↑	112
DB681ea5.adc2101112.us.oracle.com	Database Instance	↑	112
DB89d1af.sta00138.us.oracle.com	Database Instance	↑	112

My Requests

Request Name	Status	Creation Date	Start Date	End Date
JDOE - Tue Sep 13 18:21:36 PDT 2011	Success	9/13/2011	9/13/2011	9/30/2011
JDOE - Wed Sep 14 12:20:50 PDT 2011	Success	9/14/2011	9/14/2011	9/28/2011
JDOE - Thu Sep 22 15:07:27 PDT 2011	Success	9/22/2011	9/22/2011	10/7/2011
JDOE - Thu Sep 22 15:25:30 PDT 2011	Success	9/22/2011	9/22/2011	10/7/2011

Select Service Template

Search Service Template Name

Service Template Name	Description
Full 1.5 TB Database Clone	Full 1.5 TB Database Clone of production database
Generic Application Schema	Generic schema on database 11.2.0.3
HR Sample Schema	Creates the HR sample schema with data.
Small 200 GB database from RMAN ba...	Small clone of database using RMAN backup
StoreFront Application Schema	Schema for the StoreFront Application with seed data on data...

- Out-of-box self service portal
- Catalog of different database configuration with varied datasets
- Resource quota based on role
- Integrated monitoring, snapshot/rollback, etc

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Evolution of Solutions

Point Features

- ✓ Storage level: snapshot, volumn/lun thin clone, dedupe, compression, etc
- ✗ Lacked DB or application context
- ✗ Does not solve process problem

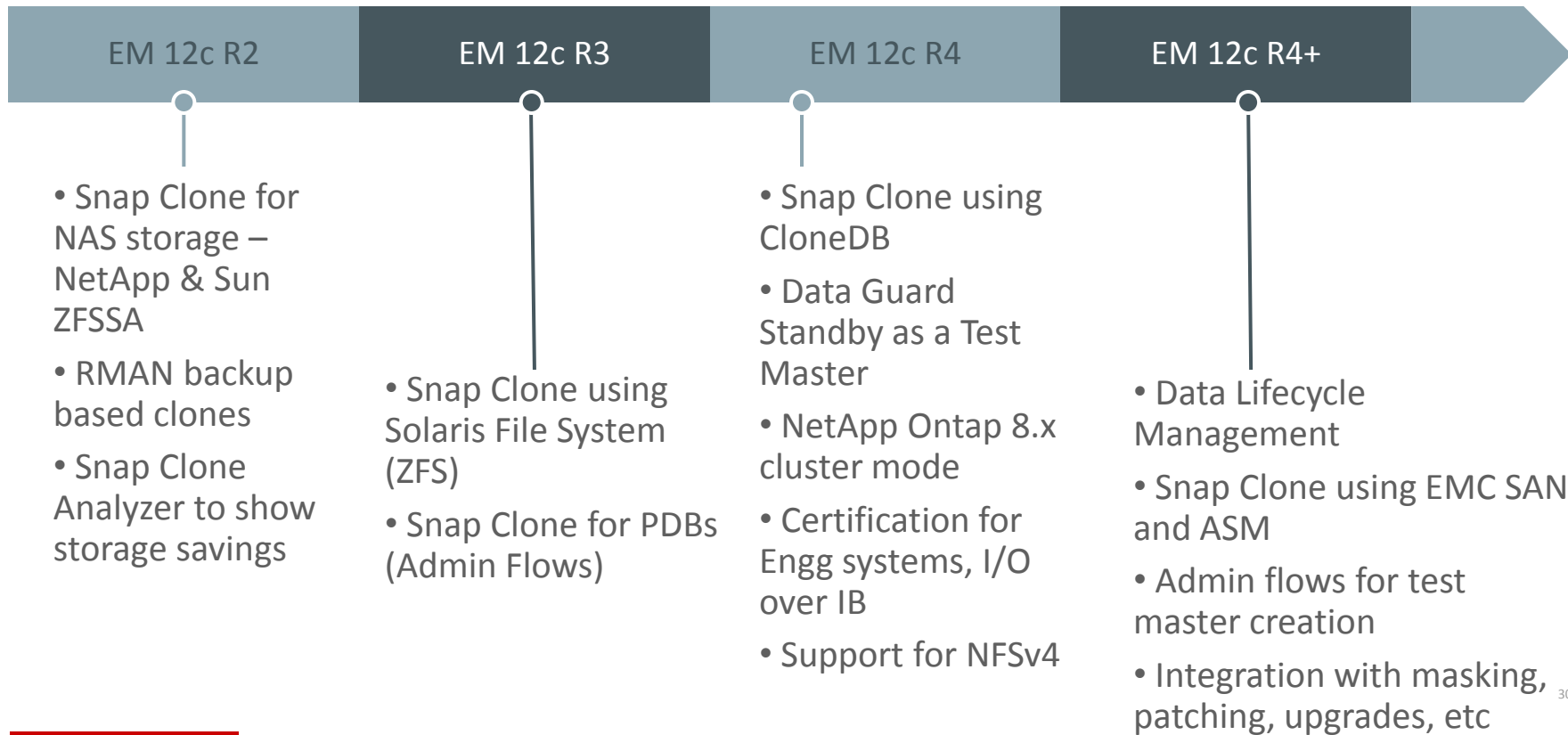
Point Tools

- ✓ VM cloning
- ✓ DB cloning using smart file systems
- ✗ Limited focus on just cloning
- ✗ Lacked lifecycle management of clones

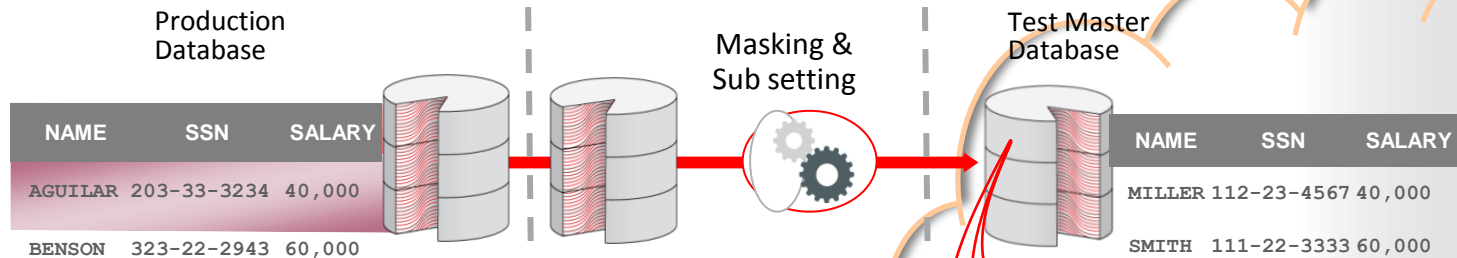
EM Solution

- ✓ Technology agnostic
- ✓ End-to-End automation from prod to test/dev
- ✓ Designed for DBAs
- ✓ Complete mgmt of clones - masking, performance, patch/upgrade, etc

Strong Investment in EM's Data Cloning Solution

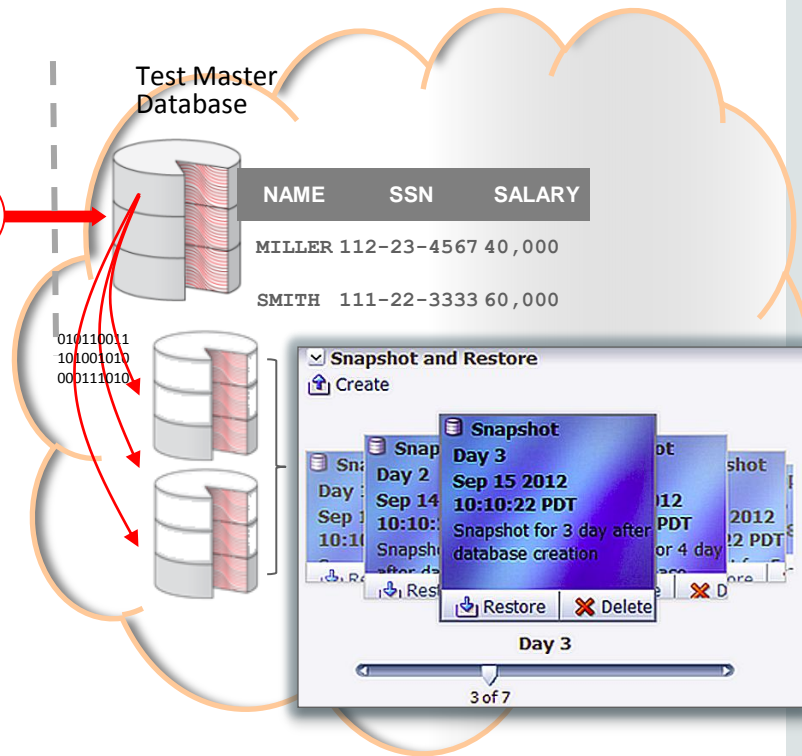


DBaaS “Snap Clone”

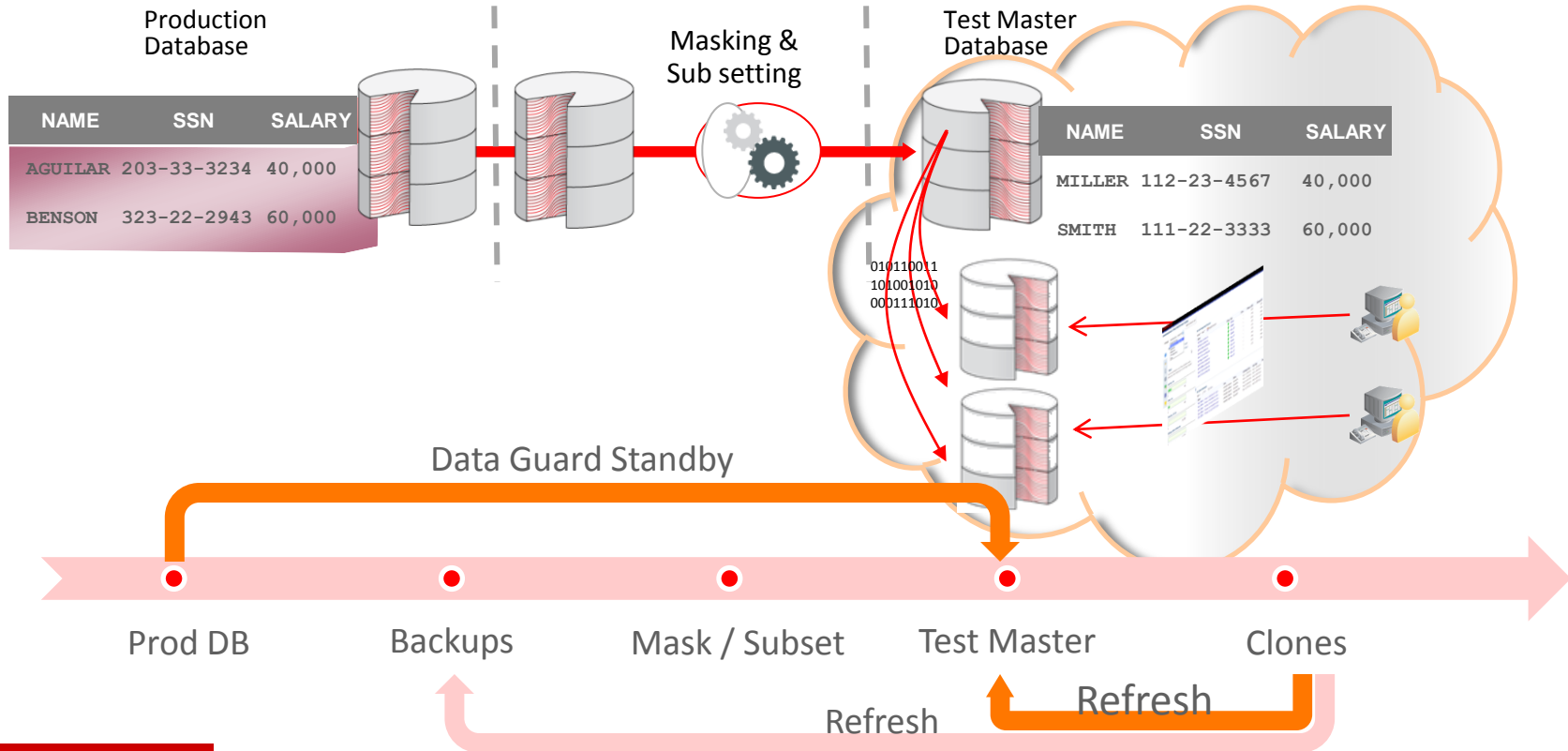


- Features

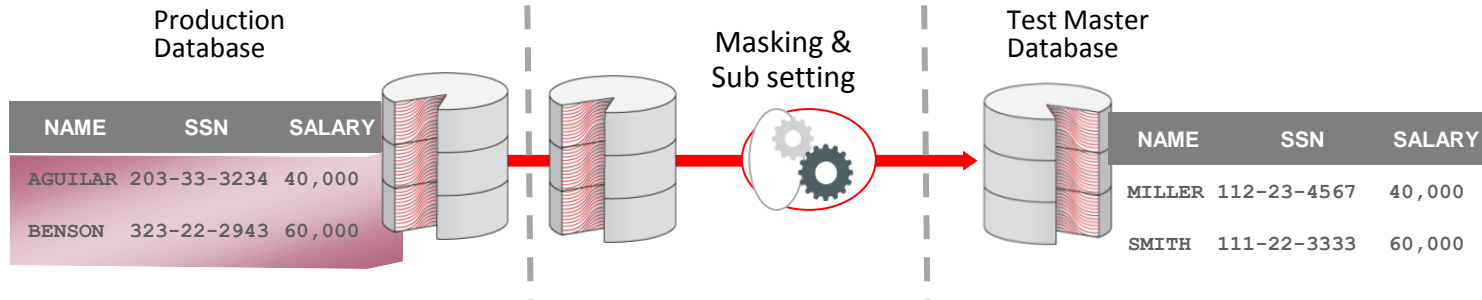
- **Rapid** and **space efficient** cloning of large databases; **versions** 10g to 12c
- Supports **ALL storage vendors** and configurations (SAN and NAS)
- Integrated lifecycle management (**lineage and association tracking**)
- “**Rewind**” capability to restore and access past data



Data Movement

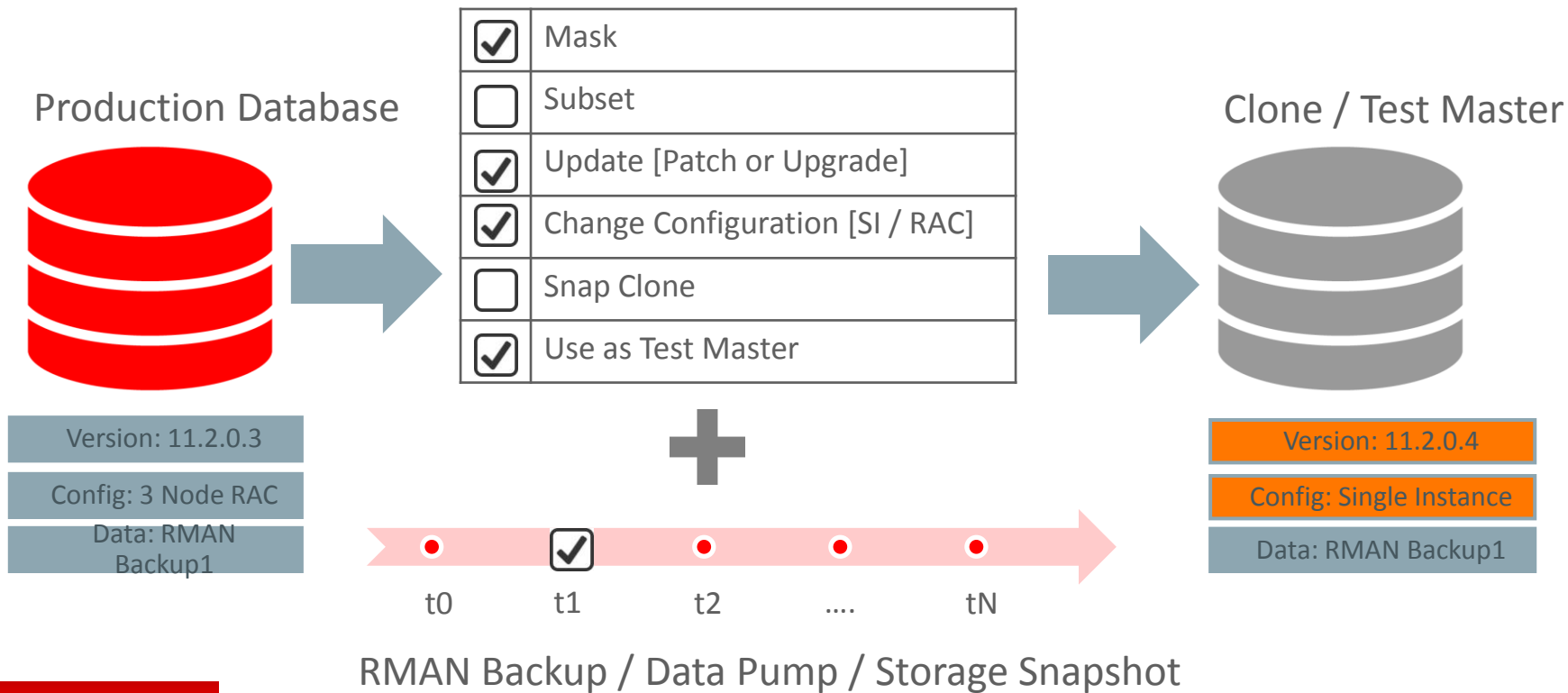


DB Clone and Refresh – Admin Flow



- Enable direct clones from production databases
- Provide automation to refresh the clone with data changes in production
- Works for storage snapshots, RMAN backups, data pump exports, etc
- Include masking & subsetting
- Works with patched or upgraded binary
- If using clone as test master, allow self service users to refresh existing clones with new data
- Reduce administrative overhead

DB Clone and Refresh – Admin Flow



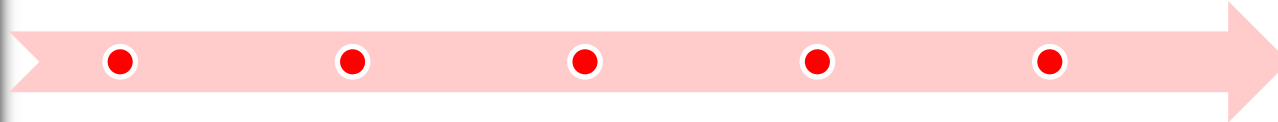
Full or Snap Clone: How it Works?



Standby / Test Master

Test master is regularly refreshed with current data from production

Scheduled or Manual **Storage Snapshots** or **RMAN Backups** of the test master database, called *Profiles*



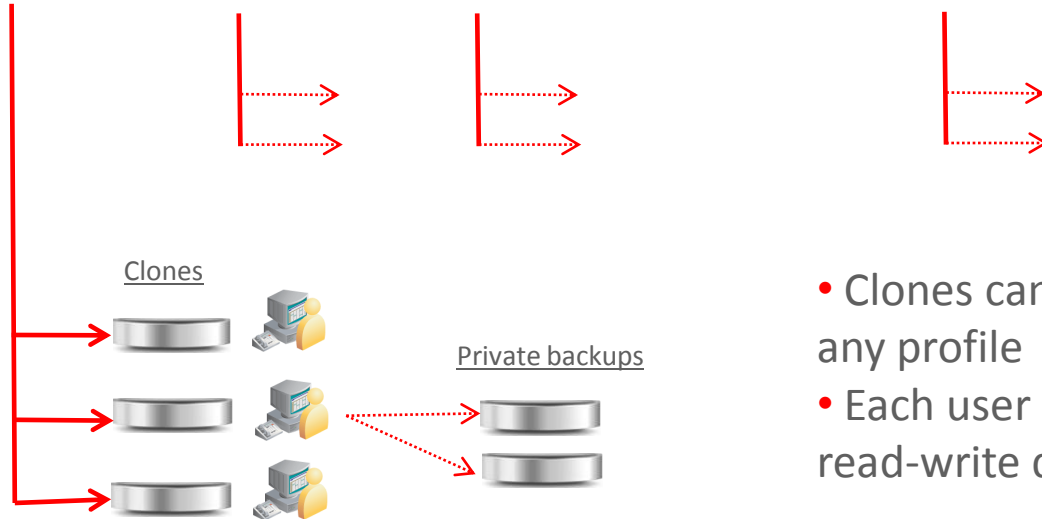
t0

t1

t2

...

tN

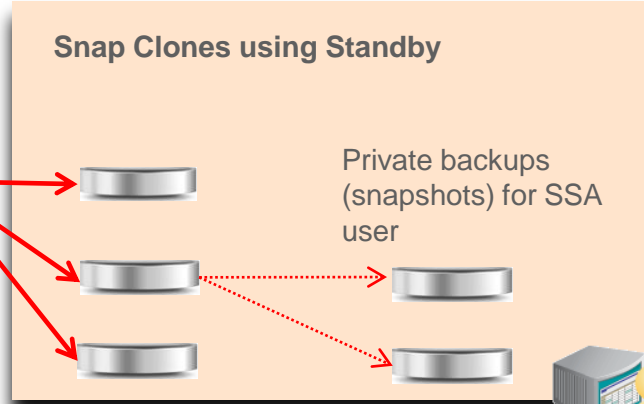


- Clones can be created from any profile
- Each user gets a personal read-write database clone

Deployment Scenarios



Continuous or Discrete Replication



Replication Types:

Continuous

Discrete

	Continuous	Discrete
Technology	Data Guard, Golden Gate	RMAN, Snap Mirror, import/export ...
Data Refresh	Automatic and instantaneous	Manual and at scheduled intervals
Masking and Subsetting	Not possible	At source (in production), or in place at test master

Snap Clone with Oracle Engineered Systems

Exadata

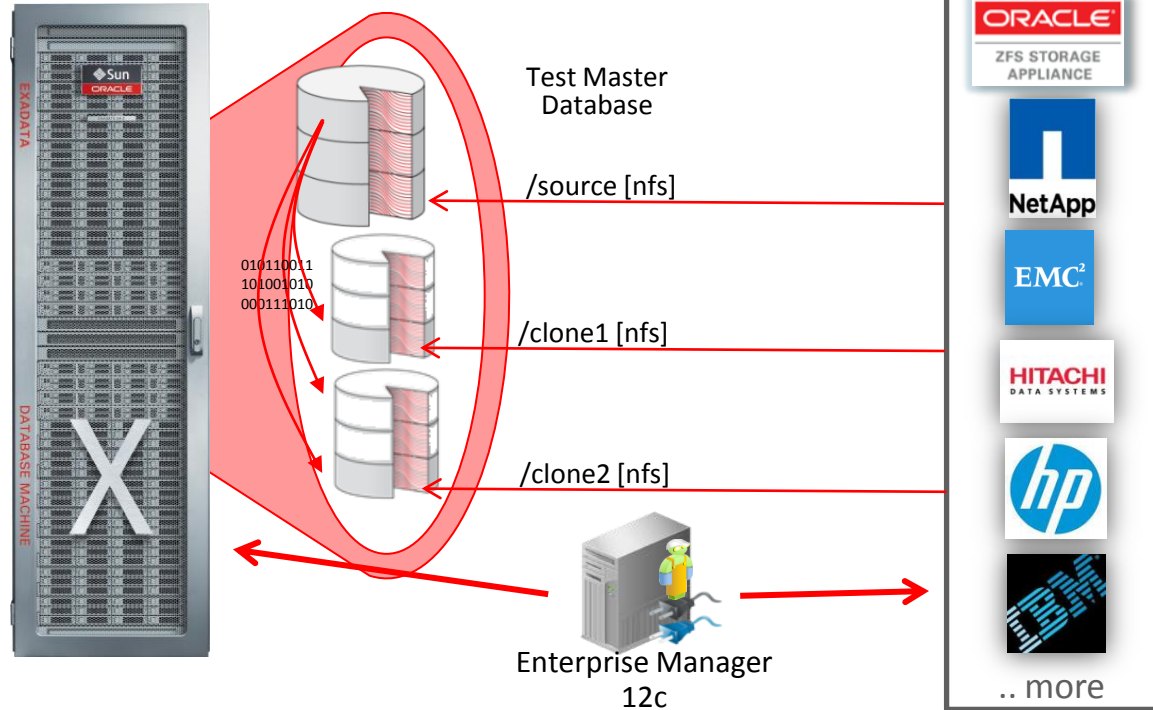
- **Compute nodes** are used to run snap clone databases
- The storage is external to Exadata and served over **NFS**
- In case of ZS3 storage, all traffic over **infiniband**

SuperCluster

- Solaris **Zones or LDOMS** used to run snap clone databases
- Embedded ZS3-ES storage served over **infiniband**

Oracle Virtual Compute Appliance

- Oracle VMs used to run snap clone databases
- Embedded ZS3-ES storage served over **infiniband**



Snap Clone Vs Competition

- Scale, Scale, Scale
 - Supports 1 to 1000s of clones
- Protects your existing investments
 - Choice between hardware and software solution
 - Use of trusted technologies like data guard for test master refresh
- Part of Enterprise Manager 12c
 - Oracle's flagship management product for all your database needs
 - In sync with DB releases (support for PDBs on day 1)
 - Secure and role based access control; used by Fortune 1000 customers
 - Protection from unnecessary point tools; reduce TCO

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Cloud Management Pack for Oracle Database Summary

Self-Service Provisioning

Supports Databases, Schema, and PDBs

Database Cloning

Full clones and Snap Clones (thin clones)

Enterprise-wide Service Catalog

Role based, Single catalog, to enforce standardization across the DB estate

Quota and Policy based Management

Enforces governance and control

Metering, Chargeback

Supports Database, Schema, and PDBs

Comprehensive REST and EMCLI APIs

For all self service and admin functions

Snap Clone



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Supports ALL storage vendors (NAS & SAN)



Self Service

Empower the user to make adhoc clones and restores

References

- [Enterprise Manager Page on O.com](#)
- [Snap Clone page on OTN](#)
- [Cloud Administration Guide \(Documentation\)](#)
- **MOS Note:** EM12c Recommended Plug-Ins and Patches for DBaaS (1549855.1)

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