ORACLE DATABASE APPLIANCE:

One Button, Multiple Shows

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About BIAS Corporation

OVERVIEW

- **Founded in 2000**

- **Distinguished Oracle Leader**

  – Oracle Excellence Award – Big Data Analytics

  – Technology Momentum Award

  – Portal Blazer Award

  – Titan Award – Red Stack + HW Momentum Awards

  – Excellence in Innovation Award

- **Management Team is Ex-Oracle**

- **Location(s):** Headquartered in Atlanta; Regional offices in Reston, VA, Denver, CO and Charlotte, NC; Offshore – Hyderabad and Bangalore, India

- **~300 employees with 10+ years of Oracle experience on average**

- **Inc.500|5000 Fastest Growing Private Company in the U.S. for the 8th Time**

- **Voted Best Place to work in Atlanta for 2nd year**

- **35 Oracle Specializations spanning the entire stack**

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ORACLE SPECIALIZATIONS

Oracle created the OPN Specialized Program to showcase the Oracle partners who have achieved expertise in Oracle product areas and reached specialization status through competency development, business results, expertise and proven success. BIAS is proud to be specialized in 35 areas of Oracle products, which include the following:
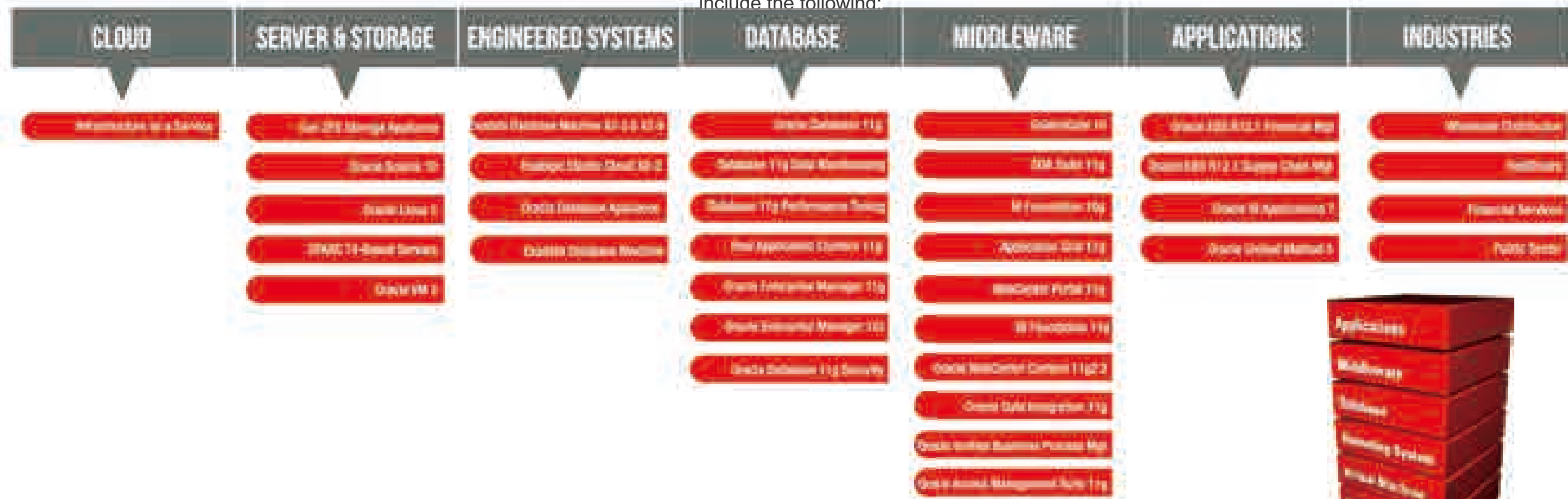
CLOUD	SERVER & STORAGE	ENGINEERED SYSTEMS	DATABASE	MIDDLEWARE	APPLICATIONS	INDUSTRIES

About Speaker

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HEEMA SATAPATHY

Senior Principal Consultant
BIAS Corporation

Heema.Satapathy@biascorp.com

- **12+ years of IT experience worked world-wide**

- **Specialized in Oracle DBA, Oracle EBS DBA, Engineered Systems including Exadata/ODAs**

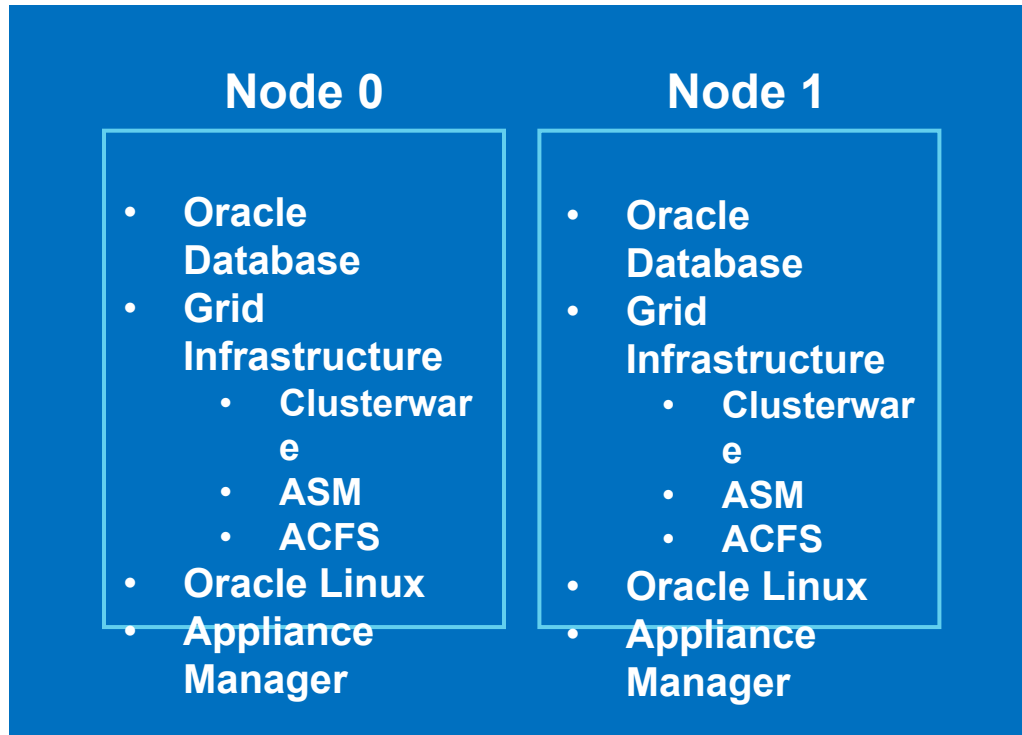**BIAS**

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PRESENTATION
AGENDA

- What is Oracle Database Appliance
- ODA Virtualized Platform – OVM Architecture
- Database Migration Strategy
- Performance Results on Guest VMs
- ODA_Base Architecture
- Performance Results on ODA_Base
- Re-Architecture Steps
- Project Costs
- Disaster Recovery
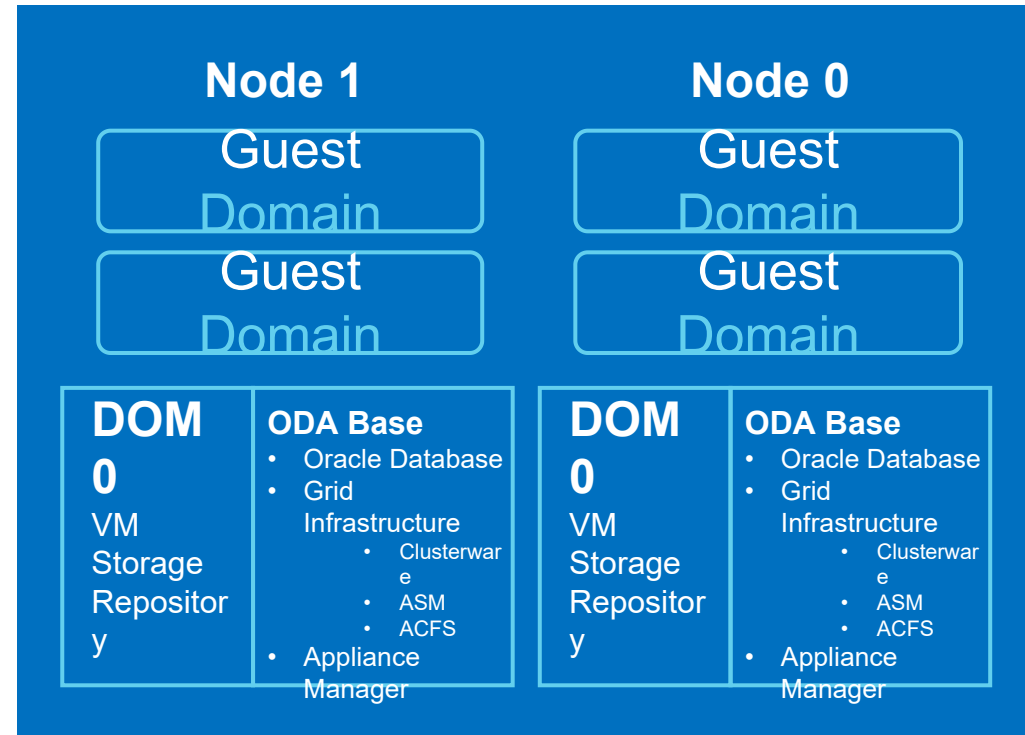
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ORACLE DATABASE APPLIANCE

- Engineered System

- Lesser storage, memory and CPUs compared to Exadata

- Targeting mid-market customers

- Pay as you grow model

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Bare Metal Vs Virtualized(ODA_Base)

BAREMETAL

VIRTUALIZED

Node 0

- **Oracle Database**
- **Grid Infrastructure**
  - **Clusterware**
  - **ASM**
  - **ACFS**
- **Oracle Linux**
- **Appliance Manager**

Node 1

- **Oracle Database**
- **Grid Infrastructure**
  - **Clusterware**
  - **ASM**
  - **ACFS**
- **Oracle Linux**
- **Appliance Manager**

Node 1

Guest Domain

Guest Domain

DOM 0
VM Storage Repository

ODA Base
- Oracle Database
- Grid Infrastructure
  - Clusterware
  - ASM
  - ACFS
- Appliance Manager

Node 0

Guest Domain

Guest Domain

DOM 0
VM Storage Repository

ODA Base
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Platform Migration from IBM p7 to ODAs

CUSTOMER CASE STUDY

Business Situation

- Separate Guest VM for each healthcare plan

- Database Import was running for 40+ hours on Guest VMs

- Application migration for running for 30 plus days

BIAS Solution

- Drop Guest VMs and vdisks
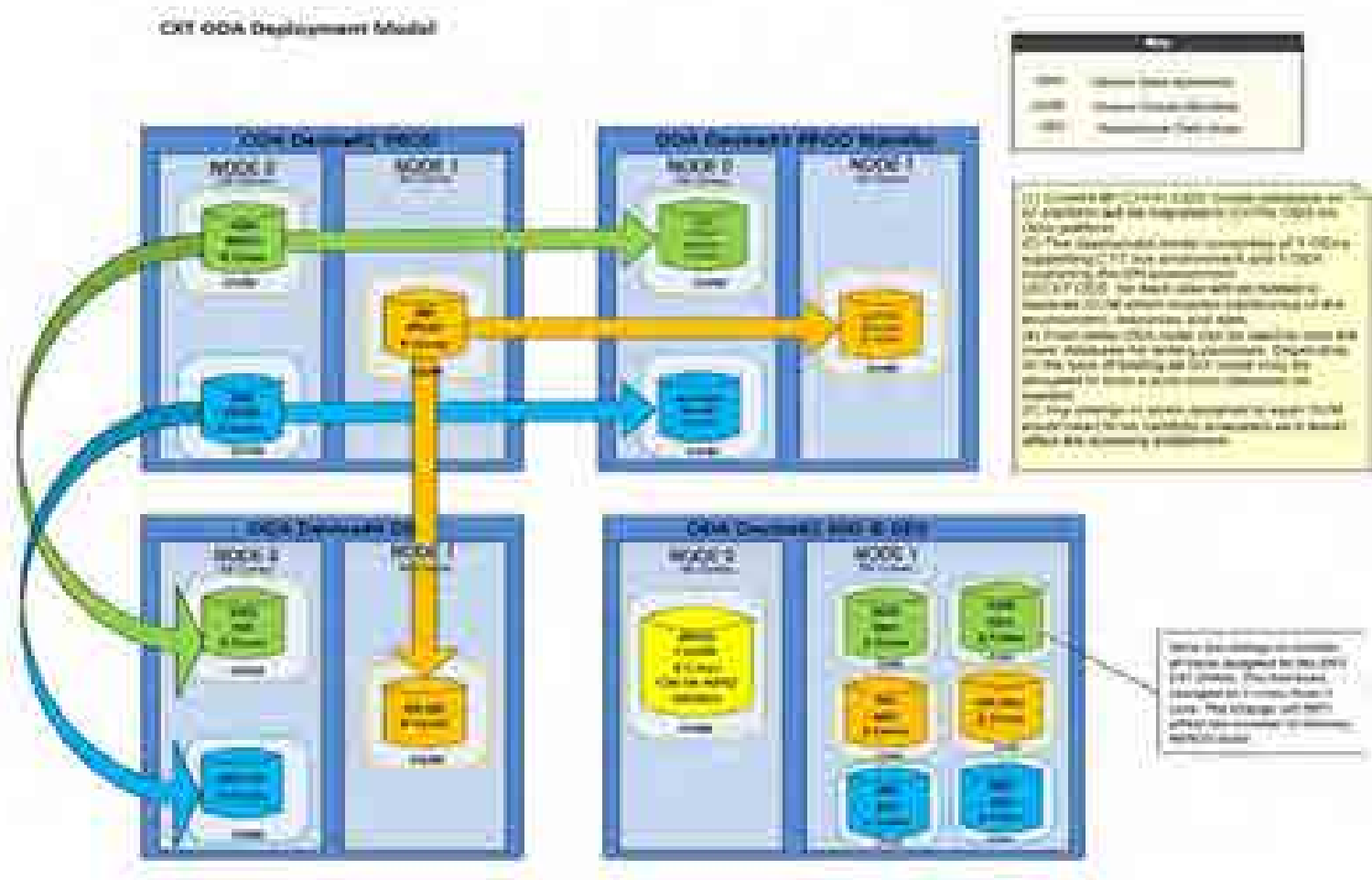
- Drop repos

- Import into a database onto ODA_Base

Results

- Performance gain by 500%

Proven Performance Increase with flexibility of licensing cores and revised architecture

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OVM Architecture

ODA Deployment Model – As-Is *faced severe performance issues (Import running for 40+ hours)

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Infra Tasks

OVM Architecture

- ODA Validation & Deploy DOM0 and DOM1

- Download Oracle VM 3 Templates for Oracle Linux 6 - V100308-01.zip - Oracle Linux 6 Update 7 template (OVF) - Paravirtualized x86_64 (64 bit)

- Create storage repo & carve out storage luns for Guest VMs

- Created Guest VMs using Oracle VM3 templates & Install RPMs/mount points/OS settings on Guest VMs

- Upload Oracle Database 12c software to Guest VMs & Install Oracle database 12c on Guest VMs

- Install dummy database on 12c binaries

- Database Migration

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Technical Challenges

ODA Architecture

- **ODA Validation**
  - ❖ Fixing the cabling will let you get past storage issues

- **Deploy Physical ODAs**
  - ❖ Ensure ILOM IPs are correctly configured for each ODA
  - ❖ Issues with nodenum configuration on ODA#1 and ODA#3 and worked with Oracle SR 3-13627643541: oakcli deploy failure. SR analyst requests to re-image and re-deploy ODA(s)
  - ❖ Ensure DOM0,DOM1,database VIP, Scan IPs, Guest VMs hostnames are in DNS

- **IP challenges**
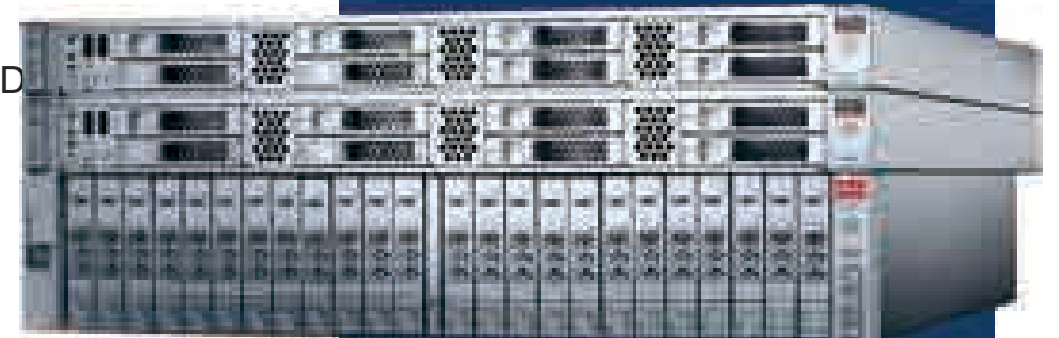 - ❖ Ensure DOM0,DOM1,database VIP, Scan IPs, Guest VMs of each OD on compatible networks

- **Download Restricted Access**

  Oracle Database Appliance 12.1.2.x.0 VM ISO Image. (DOM0)
  Oracle Database Appliance 12.1.2.x.0 VM Template (ODA_BASE)

- **Carving out Storage luns**
  - ❖ 3 TB disks takes 3 hrs. Recommendation is to kick off a script to carve total luns through nohup script

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DATABASE MIGRATION
STRATEGY

- Execute CSSSCAN/DMU tool on Source 11.2.0.4 DB

  NLS_CHARACTERSET= WE8MSWIN1252
  NLS_NCHAR_CHARACTERSET = AL16UTF16

- Install 12.1.0.2 Target DB with UTF8 character set

  NLS_CHARACTERSET = AL32UTF8
  NLS_NCHAR_CHARACTERSET = AL16UTF16

- Create Schemas and Tablespaces as per Application Requirements

- Execute CSSSCAN/DMU tool results on Source and Target (after Import)

- Take an export on Source Database(11.2.0.4) using 'SYSTEM' user

- Ensure Async IO and huge pages are enabled at OS level on Target Server

- Ensure below DB parameters in place on Target Database

  disk_asynch_io=TRUE
  FILESYSTEMIO_OPTIONS=SETALL
  use_large_pages=ONLY

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DATABASE MIGRATION STRATEGY

CONTINUED

- Ensure SGA and PGA are sufficient on Target Database

- Ensure Redo logs, TEMP and UNDO tablespaces are sufficient on Target Database

- Ensure DB automatic jobs are disabled before Import on Target Database

- Ensure SYS objects statistics are current before Import on Target Database

- Apply Patch 22273229: IMPDP DOES NOT USE PARALLEL LOAD FOR PRIMARY KEY

- Import on Target Database using 'SYSTEM' user

- Run utlrp.sql on Target Database

- Validate Invalid Objects after Import

- Enable DB automatic jobs that were disabled before Import on Target Database

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- Import running for 40+ hours

- Application migration running for 720+ hours(30 days)

- Create Index running for 36+ hours due to high IO bottleneck
  - ❖Bug 25573238 - IO MAXED OUT ON ODA X5-2 DURING INDEX CREATION

- Guest VMs are not made to run IO intensive DBs

- 1 GB pipe between Guest VMs and ODA_Base

- Guest VMs Instability

PERFORMANCE RESULTS ON GUEST VMs

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ODA_Base Architecture

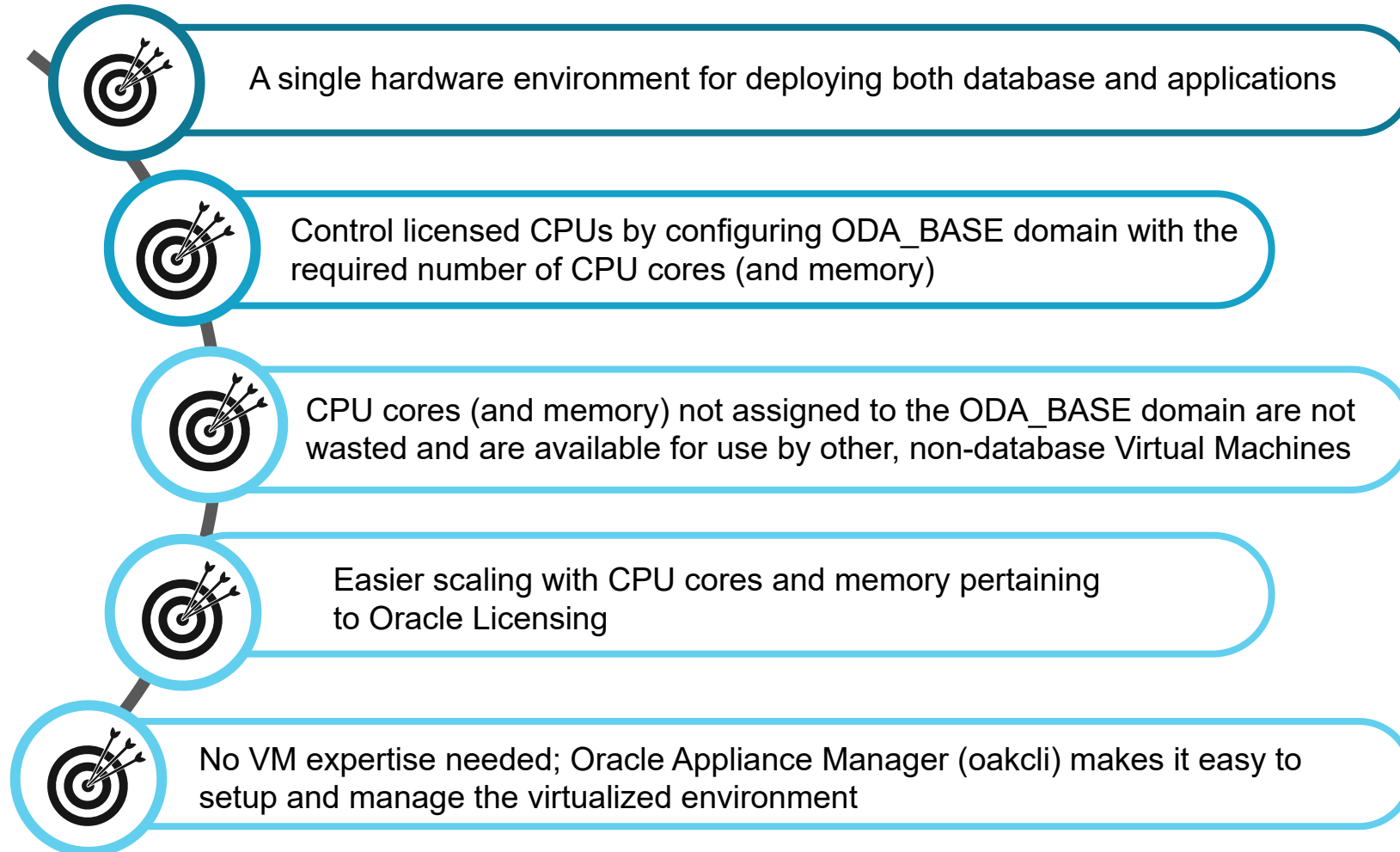Revised ODA Deployment Model – As-Is *performance Enhanced 10 times (Import completed in 5-6 hours)
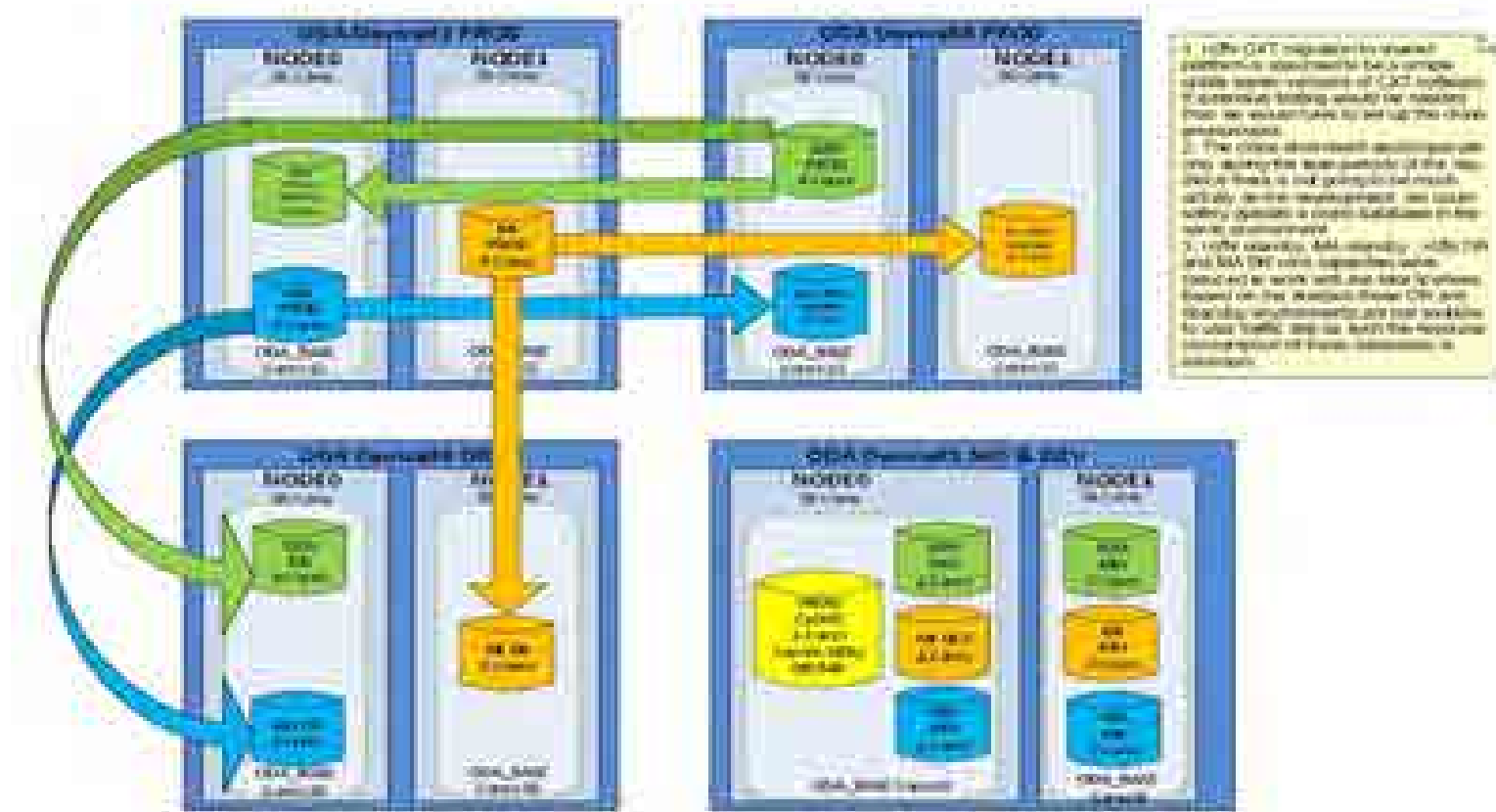
Performance Results On ODA_Base

- Import completed in 5-6 hours

- Application migration completed in 144 hours(6 days)

- 10 GB pipe between Dom0 and ODA_Base

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Virtualized(ODA_Base) over Baremetal

Configuration seems to provide everything that the Bare Metals configuration does plus more

A single hardware environment for deploying both database and applications

Control licensed CPUs by configuring ODA_BASE domain with the required number of CPU cores (and memory)

CPU cores (and memory) not assigned to the ODA_BASE domain are not wasted and are available for use by other, non-database Virtual Machines

Easier scaling with CPU cores and memory pertaining to Oracle Licensing

No VM expertise needed; Oracle Appliance Manager (oakcli) makes it easy to setup and manage the virtualized environment

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Re-Architecture Steps

- Move all DB backups from Guest VMs to ACFS mount point on ODA_Base

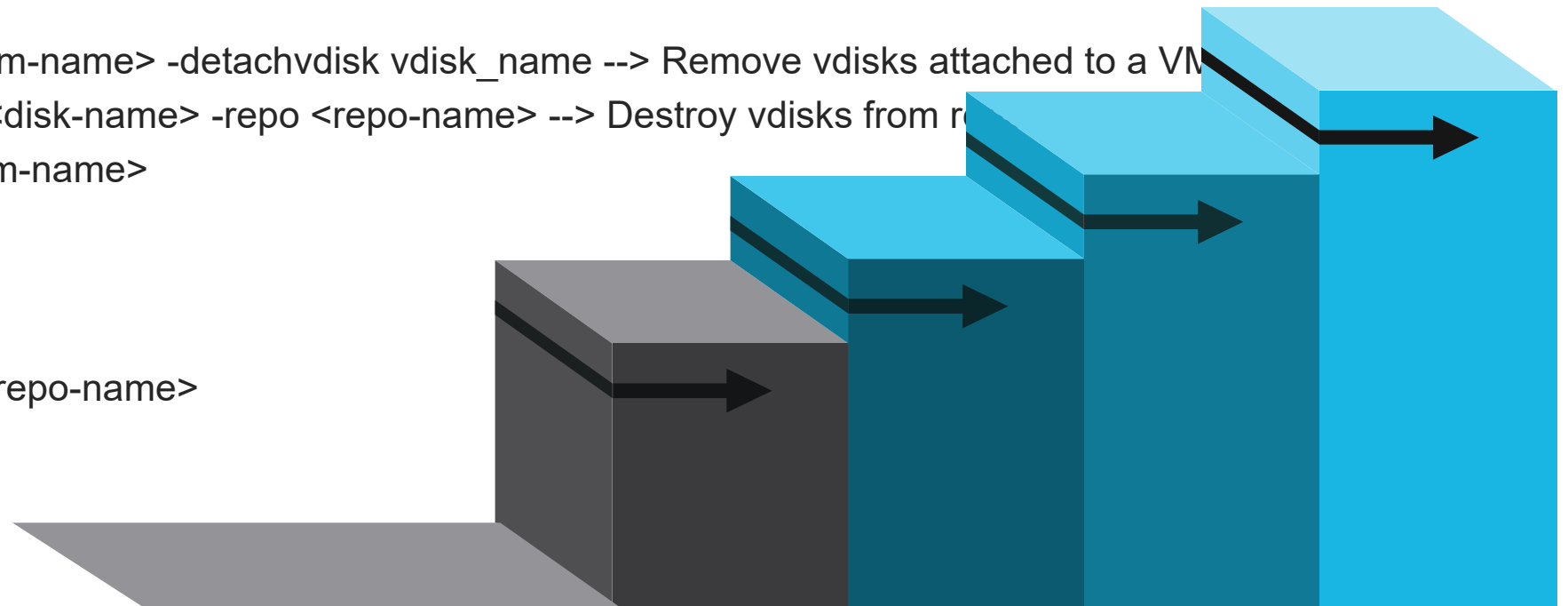- Delete VMs and vdisks

  oakcli modify vm <vm-name> -detachvdisk vdisk_name --> Remove vdisks attached to a VM
  oakcli delete vdisk <disk-name> -repo <repo-name> --> Destroy vdisks from re
  oakcli delete vm <vm-name>

- Delete Repo

  oakcli delete repo <repo-name>

Project Costs

- Reduced Implementation and support cost by having 3 health care plans PROD/PROD Standby/UAT/DEV in only 3 ODAs.

- CPU cores can be decreased on ODA_base architecture(unlike in Bare Metal configuration)

- Tune CPU cores per ODA_base to keep total accountable license in control

- Keep the CPU and memory requirements of DR databases less than the primary production databases

- IBM p7 has licensing factor '1' and ODA has licensing factor '0.5'

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DISASTER RECOVERY

- Additional X5-2 on DR site

- ODA_Base(Virtualized) configured

- 3 Standby databases – Each plan has its own standby database in sync with Primary

- CPU cores on DR ODA_Base lesser than Primary ODA_Base CPU configuration

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QUESTIONS?

THANK YOU FOR ATTENDING
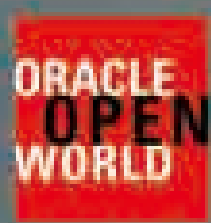
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Contact Us

HEEMA SATAPATHY

Senior Principal Consultant
BIAS Corporaiton

Heema.Satapathy@biascorp.com
Work # (770) 685-6301
Cell Phone # (216) 236-8551

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