An 18 pointers guide to setting up an Exadata machine

Amardeep Sidhu

who am i

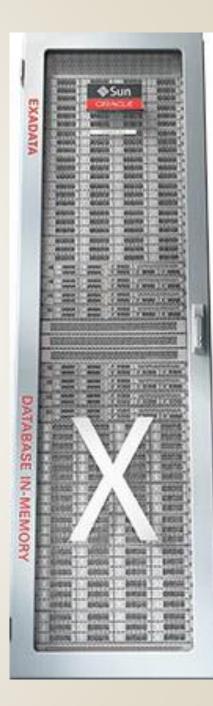
- DBA with 13 years of experience
- Working with Oracle ACS
- http://amardeepsidhu.com/blog
- <u>http://twitter.com/amardeep_sidhu</u>

Disclaimer

- This is my understanding of the things
- I don't know "everything"
- I could be wrong

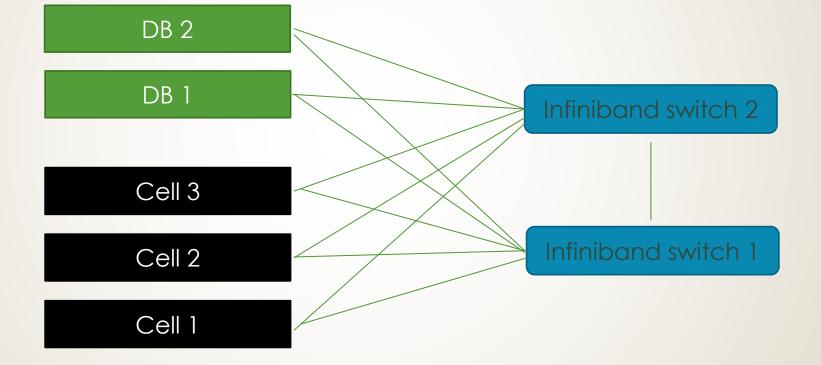
Basics

- Comes as a single physical rack
- An Engineered system All components tested together
- Optimized for running Oracle databases
- Comprises of Compute servers, Storage servers, Infiniband switches, Cisco switch and PDUs
- Can have standard configurations like eighth, quarter, half, full rack.
- Can have flex configuration also (any number of compute and storage servers).
- Can be expanded by adding more Computer servers & Storage servers





Basics contd.



Deployment process

- Order is placed
- Hardware is received
- Fill the details in OEDA (MOS note 888828.1) and generate the configuration files.
- Hostnames & IPs entries in the DNS
- Run checkip script and validate the output
- Deployment is started

Networks

Traditional

- Public network
- Private network

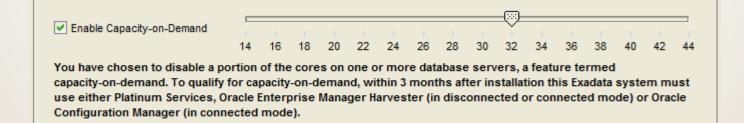
Exadata

- Management network
- Client/Public network
 - IG/10G
 - Active-Passive/LACP
 - VLAN Tagging
- Private network
 - Infiniband security
- Backup network (optional)

				Exadata	
Welcome	Define Customer N	etworks			
Customer Details					
Hardware Selection			omer subnets. This page allows you I network. Some customers have m		
V Rack Details	configure one of those add	itional subnets for 'b	ackup', 'replication', 'dr' or for an 'ind	dependent client' network in multi cli	
Define Customer Networks	This is included here as sub Click Advanced button to er		subnet is NOT mandatory for deploy	yment	
Administration Network			any and very searcy		
Client Ethernet Network	Subnet 1	• • • · · · ·	O Bonded		-
InfiniBand Network		Admin			
Backup Network		255.255.255.0	Non Bonded		
	Gateway :		- B T () 40 01-1 0-1	VLAN ID :	
Identify Compute Node OS	Subnet 2	1/10 Gbit Coppe	r Base-T 🔘 10 Gbit Optical		_
Review and Edit	Name :	Client	Bonded Enable LACP		
Define Clusters	Subnet Mask :	255.255.255.0	Non Bonded		
Cluster 1	Gateway :			VLAN ID : 106	
Review and Edit	-		r BaseT 🔵 10 Gbit optical		
Alerting	Subnet 3		<u> </u>		-
Platinum Configuration	Name :	Private	Bonded		
Auto Service Request	Subnet Mask :	255.255.252.0	O Non Bonded		
Oracle Config. Manager	Private Network Format :	 InfiniBand 			
Grid Control Agent	Subnet 4				-
Comments	Available Network :	Backup	Bonded Enable LACP	Share Client Network ports	
Generate	Subnet Mask :	255.255.255.0	Non Bonded		
	Gateway :			VLAN ID : 107	
O Finish	Backup Network Format :	1/10 Gbit Coppe	r BaseT 💿 10 Gbit optical		

Licensed cores

- Enable only the number of cores that you are licensed for
- More cores can be enabled later if you procure the licenses
- Number of cores enabled can't be decreased
- May result in licensing violation



OVM

- Virtualize compute nodes. Storage cells aren't virtualized.
- Allows you to create multiple VMs hence multiple RAC clusters
- Can isolate Prod and Dev/Test environments
- Different environments can use different subnets for client network
- Infiniband security can be used to segregate private traffic

Identify Compute Node OS and Enable Capacity	-on-Demand, if applicable.
Select the Operating System for the database servers	
All Linux All OVM Solaris is not an available Operating System when Active Bonding	is enabled on the InfiniBand Network
If the Solaris OS is required then go back to the InfiniBand Network	
Rack : 1 Compute : 1 : Virtual OVM Server Rack : 1 Compute : 2 : Virtual OVM Server	

Flashcache mode

- Writethrough Reads go to flash, writes go to disk
- Writeback Both reads and writes go to flash, Redundancy maintained in flash until blocks are written to disk
- Applications doing small writes e.g. OLTP ones may benefit from Writeback mode

GI & DB version

- What is the minimum Database version you need to run ?
- Take care of compatible.rdbms
- Can you run GI at the latest available version ? Saves you the upgrade efforts later.
- What are the patch levels needed for GI & DB homes ?

Image version

- Generally deployed with latest available version
- Any specific reasons to have the lower version ?
- Is the system going to be part of any Primary/Standby configuration ?
- Is the system going to be part of any multiracked configuration ?

Diskgroups

- 3 Diskgroups created in the standard install (DATA, RECO & DBFS)
- Decide the Diskgroup names
- Decide the sizing (DBFS size is fixed)
- Decide the redundancy. Changing redundancy means drop/recreate
- Need Sparse Diskgroup ? May need a minimum GI/DB version

Multiracking scenario

- Multiple Engineered systems connected over Infiniband
- Each Engineered system should have unique set of private IPs
- Infiniband switch firmware versions should be considered
- Best to multirack during deployment phase itself
- Doing it later may involve downtime
- Order required cables with the machine

Split rack scenario

- Applies where you have 4 or more db nodes and 6 or more cells
- Each RAC cluster has its own dedicated physical db nodes and cells
- Infiniband fabric is shared
- Can be used for isolation of environments

Other customizations in OEDA

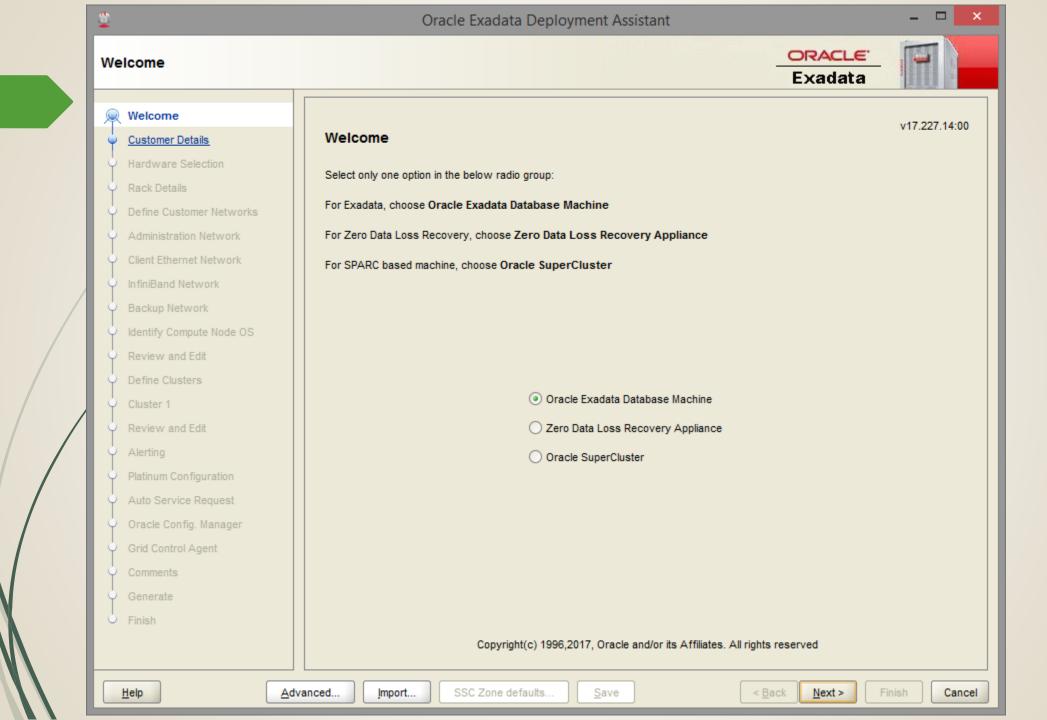
- Hostnames
- VIP names
- Scan name and port
- Non contiguous IPs
- Cores and memory allocation in VMs

Others

- Check if you are licensed for RAC; If not disable RAC mode
- Use Infiniband listener if application runs on Exalogic/SuperCluster/Exalytics

References

- MOS Note 888828.1
- Exadata documentation <u>https://docs.oracle.com/cd/E80920_01/index.htm</u>



Customer Details Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network InfiniBand Network Backup Network	Customer Details <u>C</u> ustomer Name : [<u>Application : [</u> Network <u>D</u> omain Name : [<u>N</u> ame Prefix : [<u>R</u> egion : [Testing oracle.com dm01	Exadata
 Identify Compute Node OS Review and Edit Define Clusters Cluster 1 Review and Edit Alerting Platinum Configuration Auto Service Request Oracle Config. Manager Grid Control Agent Comments 	DNS : [Advanced Setting Enable Infiniband Security Enable Network VLAN Enable Sparse DiskGroup (Requires GI Version >= 12.1.0.2 DBBP5) Remove PDU Nodes Enable ACFS Configuration (Requires GI Version >= 12.1.0.2) Enable ASM-Scoped Security Option (Requires imaging Version >= 12.2.1.1.0)
Generate Finish			

Welcome <u>Customer Details</u>	Hardware Selection		
Hardware Selection	Select Interconnected hardware to deploy		
Rack Details	→ X6-2	Add > X6-2 Quarter Rack HC 8TB	
Define Customer Networks			
Administration Network	Quarter Rack	<u>R</u> emove <	
Client Ethernet Network	X6-2 Quarter Rack EF 3.2TB		
	X6-2 Quarter Rack HC 8TB	cer Clear <<	
InfiniBand Network	Eighth Rack		
Backup Network	Elastic Rack		
Identify Compute Node OS	E Full Rack		
Review and Edit	Elastic Rack		
Define Clusters	₽ X5-2		
	E Full Rack		
Cluster 1	Half Rack		
C Review and Edit	Quarter Rack Group Eighth Rack		
4 Alerting	Eughti Rack		
↓ ♀ Platinum Configuration	2→ X5-8		
Auto Service Request	Full Rack		
	Elastic Rack		
 Oracle Config. Manager 	→ X4-8 with X5 cells		
🔶 Grid Control Agent			
Comments	→ X4-2		
Q Generate	E Full Rack		
 Finish 	Half Rack	▼	

1	Velcome Customer Details	Rack Details	
j	Hardware Selection		
-	Rack Details	Rack 1 : X6-2 Quarter Rack HC 8TB	
Ý		Compute Node count : 2	
Î	Administration Network	Storage Cell count : 3	
Ý	Client Ethernet Network	Include a spine switch in this rack	
Ý	InfiniBand Network		
ģ	Backup Network		
ģ	Identify Compute Node OS		
ģ	Review and Edit		
ģ	Define Clusters		
9	Cluster 1		
9	Review and Edit		
9	Alerting		
9	Platinum Configuration		
9	Auto Service Request		
9	Oracle Config. Manager		
ģ	Grid Control Agent		
4	Comments		
ģ	Generate		
	Finish		

2	Oracle Exadata Deployment Assistant	- • ×
Define Customer Networks	ORACLE Exadata	
Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network	Define Customer Networks Exadata requires a minimum of 2 separate customer subnets. This page allows you to describe those subnets, for includes subnet 3 which is the Private infinband network. Some customers have more than 2 subnets. In those can configure one of those additional subnets for 'backup', 'replication', 'dr' or for an 'independent client' network in multiplication' is included here as subnet 4 however this subnet is NOT mandatory for deployment Click Advanced button to enable infiniBand security and VLAN setting Subnet 1	ases Exadata can
 InfiniBand Network Backup Network Identify Compute Node OS 	Name : Admin O Bonded Subnet Mask : 255.255.255.0 Image: Non Bonded Gateway : 5.4.3.1 VLAN ID : Admin Network Format : Image: 1/10 Gbit Copper Base-T Image: 10 Gbit Optical Subnet 2 Image: Non Bonded	
 Review and Edit Define Clusters Cluster 1 Review and Edit 	Name : Client Bonded Enable LACP Subnet Mask : 255.255.255.0 Non Bonded Gateway : 6.5.4.1 VLAN ID : 106 Client Network Format : 1/10 Gbit Copper BaseT 10 Gbit optical 	
Alerting Platinum Configuration Auto Service Request Oracle Config. Manager	Subnet 3 Name : Private Bonded Subnet Mask : 255.255.252.0 Non Bonded Private Network Format : InfiniBand Implement InfiniBand Network Security	
Grid Control Agent Comments Generate Finish	Subnet 4 Available Network : Backup O Bonded Enable LACP Share Client Network ports Subnet Mask : 255.255.255.0 O Non Bonded Gateway : VLAN ID :	5
	Backup Network Format : 1/10 Gbit Copper BaseT 10 Gbit optical vanced Import Oracle VM Defaults Save < Back Next >	Finish Cancel

Administration Network	ORACLE Exadata
 Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network InfiniBand Network Backup Network Identify Compute Node OS Review and Edit Define Clusters Cluster 1 Review and Edit Alerting Platinum Configuration Auto Service Request Oracle Config. Manager Grid Control Agent Comments Generate 	Administration Network Starting IP Address for Pool: 5.4.3.2 Ualid network range : 5.4.3.2 - 5.4.3.254] Ualid network range : 5.4.3.2 - 5.4.3.254] Dool Size : 15 Inding IP Address for Pool: 5.4.3.16 Is the default gateway for database servers Is the default gateway for database servers Is pool should consist of consecutive IP addresses. If you cannot provide this then specific IP addresses can be modified at the end of the configuration process. Sample first host names Database Server Admin Name : dm01dbadm01 Is torage Server Admin Name : dm01celadm01 Is torage Server Admin Nam

	2	Oracle Exadata Deployment Assistant – 🗖 🗙
	Administration Network	ORACLE Exadata
	Welcome Customer Details Hardware Selection Rack Details Define Customer Networks	Administration Network Starting IP Address for Pool : 5.4.3.2 [Valid network range : 5.4.3.2 - 5.4.3.254] Pool Size : 15
🚆 🛛 Admi	in Network Format Masks	ddress for Pool : 5.4.3.16
Name : dm01dbadm% Starting ID : 1 Sample Name : dm01dbadm0 Cell Node	Starting ID : 1 Sample Name : dm01dbadi Cell ILOM s will be replaced with the Start ID. Name : dm01celadr Starting ID : 1	e configuration process. Sample first host names abase Server Admin Name : dm01dbadm01 ILOM Name : dm01dbadm01-ilom orage Server Admin Name : dm01celadm01 ILOM Name : dm01celadm01-ilom Modify
Switches and PDUs	'PDU' names will be replaced with the Rack	D
Cisco switch : dm01sw-adm KVM switch : dm01sw-kvm PDU-A : dm01sw-pdua PDU-B : dm01sw-pdua	%% InfiniBand Spine : dm01sw-ib %% InfiniBand Leaf : dm01sw-ib a%% InfiniBand Leaf : dm01sw-ib	s%% a%%
	Help Adv	anced Import Oracle ⊻M Defaults Save < Back Next > Finish Cancel

Client Ethernet Network	ORACLE Exadata
Welcome Customer Details Hardware Selection Rack Details Define Customer Networks <u>Administration Network</u> Client Ethernet Network InfiniBand Network Backup Network	Client Ethernet Network Starting IP Address for Pool : 6.5.4.2 [Valid network range : 6.5.4.2 - 6.5.4.254] Pool Size : 7 Ending IP Address for Pool : 6.5.4.8 Is the default gateway for database servers Defines the hostname for the database servers
Identify Compute Node OS Review and Edit Define Clusters Cluster 1 Review and Edit Alerting	The pool should consist of consecutive IP addresses. If you cannot provide this then specific IP addresses can be modified at the end of the configuration process. Sample first database client names Compute Client Name : dm01db01 VIP Name : dm01db01-vip Client Scan name : dm01-scan <u>M</u> odify
 Platinum Configuration Auto Service Request Oracle Config. Manager Grid Control Agent Comments Generate Finish 	Client Network Format Masks X Client Access Details VIP Details Name : dm01db%% Name : dm01db%% Starting ID : 1 Sample Name dm01db01 ScAN Details Sample Name Name : dm01-scan

Infinil	Band Network	ORACLE Exadata
	elcome ustomer Details ardware Selection ack Details efine Customer Networks dministration Network ient Ethernet Network	InfiniBand Network Starting IP Address for Pool : 192.168.10.1 Pool Size : 10 Ending IP Address for Pool : 192.168.10.10 Image: Enable Active Bonding on Compute node Network
	finiBand Network	The pool should consist of consecutive IP addresses. If you cannot provide this, then specific IP addresses can be modified at the end of the configuration process.
	ackup Network entify Compute Node OS eview and Edit efine Clusters uster 1 eview and Edit	Sample first InfiniBand Name Compute Priv Name : dm01db01-priv Cell Priv Name : dm01cel01-priv Modify Infiniband Network Security has been enabled. This page now defines the 'Storage Network' for all nodes
O Pla O At O Or O Gr	erting atinum Configuration uto Service Request racle Config. Manager rid Control Agent omments enerate hish	Private (IB) Network Format Masks Compute Private Details Name : Cell Private Details Name : dm01db%%-priv Starting ID : 1 Sample Name : dm01db01-priv Sample Name : dm01db01-priv Save Cancel

Velcome Customer Details	Not in Use Backup Network
Hardware Selection	Starting IP Address for Pool :
Rack Details Define Customer Networks	
Administration Network	Pool Size :
Client Ethernet Network	Ending IP Address for Pool :
InfiniBand Network	The pool should consist of consecutive IP addresses. If you cannot provide this, then specific IP addresses can be modified at the end of the configuration process.
Backup Network	Sample first backup names
Identify Compute Node OS	Compute Backup Name :
 Review and Edit 	Modify
Define Clusters	
Cluster 1	
Review and Edit	
 Alerting 	
Platinum Configuration	
Auto Service Request	
Oracle Config. Manager	
Grid Control Agent	
♀ Comments	
Q Generate	
O Finish	

<u><u><u></u></u></u>	Oracle Exadata Deployment Assistant -
Identify Compute Node OS	ORACLE Exadata
 Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network InfiniBand Network Backup Network Identify Compute Node OS Review and Edit Define Clusters Cluster 1 Review and Edit Alerting Platinum Configuration Auto Service Request 	Identify Compute Node OS and Enable Capacity-on-Demand, if applicable. Select the Operating System for the database servers All Linux All Univ All OVM Solaris is not an available Operating System when Active Bonding is enabled on the InfiniBand Network. If the Solaris OS is required then go back to the InfiniBand Network Page and de-select the Active Bonding Checkbox Rack: 1 Compute : 1 : Physical Linux Rack: 1 Compute : 2 : Physical Linux
 Oracle Config. Manager Grid Control Agent Comments Generate Finish 	✓ Enable Capacity-on-Demand 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 You have chosen to disable a portion of the cores on one or more database servers, a feature termed capacity-on-demand. To qualify for capacity-on-demand, within 3 months after installation this Exadata system mususe either Platinum Services, Oracle Enterprise Manager Harvester (in disconnected or connected mode) or Oracle Configuration Manager (in connected mode). anced Import Oracle VM Defaults Save < Back

<u> </u>	Oracle Exadata Deployment Assistant - 🗖
Review and Edit	ORACLE Exadata
Review and Edit Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network Backup Network Backup Network Welcome Cluster 1 Review and Edit Alerting Platinum Configuration	
 Auto Service Request Oracle Config. Manager Grid Control Agent Comments Generate Finish 	Admin IP: 5.4.3.3 Ilom Name: dm01dbadm02-ilom.oracle.com Ilom IP: 5.4.3.8 Priv Name: dm01db02-priv1.oracle.com Priv Name: dm01db02-priv1.oracle.com Exadata Cell Node HC 8TB 1 Rack 1 - Rack Location 2 Admin Name: dm01celadm01.oracle.com Admin IP: 5.4.3.4 Ilom Name: dm01celadm01-ilom.oracle.com Ilom Name: dm01celadm01-ilom.oracle.com

2	Oracle Exadata Dep	loyment Assistant	- 🗆 🗙
Define Clusters		ORACI Exada	
 Welcome Customer Details Hardware Selection Rack Details Define Customer Networks Administration Network Client Ethernet Network InfiniBand Network Backup Network Identify Compute Node OS Review and Edit Alerting Platinum Configuration Auto Service Request Oracle Config. Manager Grid Control Agent Comments Generate Finish 	Define Clusters Number of Clusters to create : 1 → Cluster 1 Cluster 1 Cluster Name : cluster-test CELL dm01celadm01.oracle.com CELL dm01celadm03.oracle.com CELL dm01celadm03.oracle.com CELL dm01celadm03.oracle.com	Add > All >> Remove < Clear << dm01dbadm01.oracle.com dm01celadm01.oracle.com dm01celadm02.oracle.com dm01celadm03.oracle.com	
<u>H</u> elp <u>A</u> dva	nced Import Oracle VM Defaults	<u>Save</u> < <u>Back</u> <u>N</u> ext >	Finish Cancel

2	Oracle Exadata Deployment Assistant	_ □
Cluster 1	ORACLE Exadata	
Welcome	Cluster 1	
Customer Details	Cluster name : cluster-test Physical Cluster	-
Hardware Selection	Prefix : dm01	
Rack Details	DNS: 2.3.4.5	
 Define Customer Networks 		
 Administration Network 		
Client Ethernet Network	NTP : 3.4.5.6	
InfiniBand Network		
Backup Network		
Identify Compute Node OS	Domain Name : oracle.com	
 Review and Edit 	Region : Asia 👻 TimeZone : Kolkata 👻	
Define Clusters	Viteback Flash Cache	
Cluster 1	Users and Groups	
Review and Edit	Role Separated	
 Alerting 	User name : oracle ID : 1001 base : /u01/app/oracle	
 Platinum Configuration 	DBA Group name : dba ID : 1002	
 Auto Service Request 	OINSTALL Group name : oinstall ID : 1001	
 Oracle Config. Manager 	Software Locations	
Grid Control Agent	Inventory Location : /u01/app/oralnventory	
Comments	Grid Infrastructure Home : 11.2.0.4 BP170814 /u01/app/11.2.0.4/grid	
o Generate	Database Home Location : 11.2.0.4 BP170814 /u01/app/oracle/product/11.2.0.4/dbhome_1	
ບໍ່ Finish	Disk Group Details	
	Diskgroup Layout : Legacy 80%:20% Legacy 40%:60%	_
		[
<u>H</u> elp	Advanced Import Oracle VM Defaults Save < Back Next > F	inish Cance

_ <u>\$</u>	Oracle Exadata Deployment Assistant -	
Cluster 1	ORACLE Exadata	
Y Welcome	Cluster 1	
Customer Details	DATA DiskGroup : DATAC1 HIGH Size : 80%	
P Rack Details	RECO DiskGroup : RECOC1 NORMAL Size : 20%	
Define Customer Networks	If this is a critical production database, Oracle recommends configuring the DATA diskgroup with HIGH redundancy	
 Administration Network 	Initial Database	-
Client Ethernet Network	Database Name : dbm01 Block Size : 8192 Type : O OLTP O DW	
InfiniBand Network	Characterset : AL32UTF8	
Backup Network	Client Network	_
Identify Compute Node OS	Base Adapter : Client 💌 Domain : oracle.com	
Review and Edit	Start IP : 6.5.4.2	
Define Clusters	Subnet Mask : 255.255.255.0 Pool size : 7	
Oluster 1	Gateway IP : 6.5.4.1 VLAN ID : 106	
eview and Edit	Name mask : dm01db%% Start ld : 1	
Alerting		
Platinum Configuration	VIP Name mask : dm01db%%-vip Start ld : 1	
Auto Service Request	SCAN Name : dm01-scan SCAN Port: 1521	
Oracle Config. Manager	InfiniBand Partitioning - Compute Cluster Network	-
Grid Control Agent	Cluster PKEY : 0xa000	
Comments	Subnet Mask : 255.255.254.0	
Generate	Start IP : 192.168.112.1	
U Finish	Name Mask : dm01db%%clu01-priv Start ID : 1	
	InfiniBand Partitioning - Storage Network	-
	Storage PKEY : 0xaa00	
Help A	<u>d</u> vanced Import Oracle <u>V</u> M Defaults Save < <u>B</u> ack Next > Finish Car	nc

2		Oracl	e Exadata Deployme	nt Ass	istant – 🗆	
Re	eview and Edit				ORACLE Exadata	
A-0-0-0-	Customer Details Hardware Selection Rack Details				I Backup Networks	
	Define Customer Networks Administration Network Client Ethernet Network	Cluster cluster-te	est			
Ý	InfiniBand Network	SCAN Name :	dm01-scan			
ļΎ	Backup Network	SCAN IP 1 :	6.5.4.6			
ļΎ	Identify Compute Node OS	SCAN IP 2 :	6.5.4.7	6.5.4.7		
ļΎ	Review and Edit	SCAN IP 3 :	6.5.4.8			
ļΎ	Define Clusters	Compute Node 1		_		
ψ	Cluster 1	Client Name :	dm01db01	IP :	6.5.4.2	
•	Review and Edit	VIP Name :	dm01db01-vip	IP :	6.5.4.3	
ΙÝ	Alerting	Cluster PKey Net Name :	dm01db01clu01-priv1	IP :	: 192.168.112.1	
ļΎ	Platinum Configuration	Compute Node 2		_		
Ý	Auto Service Request	Client Name :		=	: 6.5.4.4	
Ý	Oracle Config. Manager	VIP Name :	dm01db02-vip	IP :	6.5.4.5	
Ý	Grid Control Agent	Cluster PKey Net Name :	dm01db02clu01-priv1	IP :	: 192.168.112.3	
Ý	Comments					
Ý	Generate					
5	Finish					
	Help A	dvanced Import C	racle ⊻M Defaults	<u>S</u> ave	< <u>B</u> ack <u>N</u> ext > Finish Can	

