

Migration Guide: Amazon RDS to HeatWave MySQL on Oracle Cloud Infrastructure (OCI)

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Before you start:

- You must have an account on Oracle Cloud Infrastructure (OCI) and Amazon Web Services (AWS).
- Some OCI knowledge is preferred.
- This migration guide only covers how to migrate your database from Amazon RDS for MySQL to HeatWave MySQL on OCI. Before performing the migration, you should have considered downtime (the length of the downtime will mostly depend on the size of your database and checks you may want to perform before bringing your database back online), application compatibility, current database metrics (CPU, storage size, RAM, max number of concurrent users, backups, binary logs expiration, number of replicas if any, etc.), desired database metrics, networking, security, user testing, etc.
- The migration method shown in this guide works for Amazon RDS for MySQL v5.7 and above.
- When following the guide, you should always execute the commands/steps shown as an admin/root user wherever applicable.
 - o On OCI and AWS you must have the ability to create and manage resources.
 - For your Amazon RDS MySQL instance, use an admin/root user.
- You do not need to make any configuration changes to your Amazon RDS MySQL for this downtime migration.
- If you have MySQL replication configured in your current Amazon RDS MySQL environment, you can perform the migration steps shown in this guide from either your source or replica instance.
- The Overview section of this migration guide contains all the steps that are needed to finish the database migration from Amazon RDS MySQL to HeatWave MySQL on OCI.
- In the Walkthrough section, we will apply the information provided in the Overview section and give you a simple step-by-step guide. In this step-by-step guide, we will have an Amazon RDS for MySQL instance with some sample data pre-loaded and will migrate it over to HeatWave MySQL on OCI. This will help you follow and better visualize the process/information provided in the Overview section.
- You can use the Walkthrough section's step-by-step guide as a reference for your migration from Amazon RDS MySQL to HeatWave MySQL. When following the guide, make changes along the way to your AWS and OCI environments accordingly or as required. Since each user following the step-by-step guide will have their environments configured differently, we cannot provide an ideal example that works for everyone.



Overview:

Following are the required steps to migrate data from Amazon RDS MySQL to HeatWave MySQL on OCI:

I) Have an Oracle Cloud Infrastructure (OCI) account and Amazon Web Services (AWS) account.

OCI Sign in/Sign up page: <u>https://cloud.oracle.com</u> AWS Sign in/Sign up page: <u>https://aws.amazon.com/</u>

II) Set up a VPN connection from OCI to AWS.

[A VPN connection will allow you to bridge your AWS network with the OCI VCN. The VPN connection will allow your Amazon RDS MySQL to connect to HeatWave MySQL on OCI and it also ensures that your data in transit is encrypted while it is being migrated.]

VPN Connection to AWS: https://docs.oracle.com/en-us/iaas/Content/Network/Tasks/vpn_to_aws.htm

III) On OCI, create a HeatWave MySQL instance.

[You can create either a Standalone or High Availability HeatWave MySQL instance. Both options are fully-managed.] Provision OCI HeatWave MySQL: <u>https://docs.oracle.com/en-us/iaas/mysql-database/doc/creating-db-system1.html</u>

IV) Install MySQL Shell 8.1 or above on an EC2 instance that can connect to Amazon RDS MySQL.

[MySQL Shell on the EC2 will be used to copy DDL and data from Amazon RDS MySQL to HeatWave MySQL on OCI. You must download MySQL Shell 8.1 or above.] Download MySQL Shell: <u>https://dev.mysql.com/downloads/shell/</u> Install MySQL Shell: <u>https://dev.mysql.com/doc/mysql-shell/8.0/en/mysql-shell-install.html</u>

V) Connect to Amazon RDS MySQL using MySQL Shell on EC2. Afterwards, execute the MySQL Shell util.copyInstance() utility to export all schemas (including users, indexes, routines, triggers) from Amazon RDS MySQL to HeatWave MySQL on OCI.

[The dump created by MySQL Shell's instance copy utility comprises DDL files specifying the schema structure, and tab-separated .tsv files containing the data.] MySQL Shell Copy Utilities: https://dev.mysql.com/doc/mysql-shell/8.1/en/mysql-shell-utils-copy.html

VI) (Optional) On OCI, use the Cloud Shell to verify whether the data was migrated successfully from Amazon RDS MySQL to HeatWave MySQL on OCI.

[Cloud Shell is a web browser-based terminal accessible from the Oracle Cloud Console.] OCI Cloud Shell: <u>https://docs.oracle.com/en-us/iaas/Content/API/Concepts/cloudshellintro.htm</u>

VII) (Optional) On OCI, if the HeatWave option was enabled during HeatWave MySQL DB creation, add the HW Cluster and load data from the MySQL InnoDB storage into the HW Cluster using automation.

[Attaching the HeatWave in-memory Cluster combines transactions, analytics, and machine learning services into one MySQL Database.]

Add a HeatWave Cluster: <u>https://docs.oracle.com/en-us/iaas/mysql-database/doc/adding-heatwave-cluster.html#GUID-2335AC1F-FB01-4701-9EFD-810A3489A850</u> Load Data into HeatWave: <u>https://dev.mysgl.com/doc/heatwave/en/mys-hw-auto-parallel-load.html</u>

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Walkthrough:

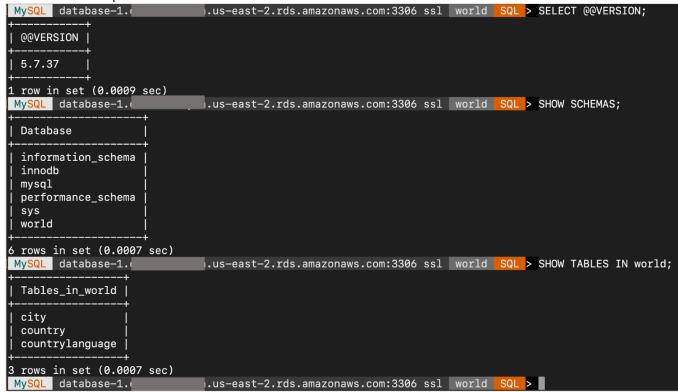
I) Have an Oracle Cloud Infrastructure (OCI) account and Amazon Web Services (AWS) account.

OCI Sign in/Sign up page: <u>https://cloud.oracle.com</u> AWS Sign in/Sign up page: <u>https://aws.amazon.com/</u>

II) Set up a VPN connection from OCI to AWS.

Resource map Info

 Below is the Amazon RDS MySQL instance version and <u>the sample database ("world"</u>) that will be migrated for this guide. The sample world database consists of 3 tables. The Amazon RDS MySQL instance used for this does not have public access.



2. The AWS VPC associated with the above Amazon RDS MySQL instance uses an IPv4 CIDR: 10.1.0.0/16. You can view the VPC resource map below:

VPC Show details Your AWS virtual network	Subnets (4) Subnets within this VPC	Route tables (4) Route network traffic to resources	Network connections (1) Connections to other networks
MySQL-vpc	us-east-2a	MySQL-rtb-private1-us-east-2a	MySQL-igw
	MySQL-subnet-public1-us-east-2a	rtb-027b6f0a9c4be9523	
	MySQL-subnet-private1-us-east-2a	MySQL-rtb-public	
	us-east-2b	MySQL-rtb-private2-us-east-2b	
	MySQL-subnet-public2-us-east-2b		
	MySQL-subnet-private2-us-east-2b		

- 3. Log in to <u>OCI</u> and create a VCN. Open the OCI navigation menu, click **Networking**, and click **Virtual cloud networks**.
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4. Ensure you are in your desired compartment - we have chosen the root compartment. Click **Start VCN Wizard**.

Networking	virtual Cio	ud Networks	in (root)	Compar	tment		
Overview	A Virtual Cloud Netw gateways that you ca		work that you set up in Oracle of	lata centers. It clo	sely resembles a traditional ne	twork, with firewall rules and spe	ecific types of communication
Virtual cloud networks	Create VCN	Start VCN Wizard					
Web Application Acceleration	Name	State	IPv4 CIDR Block	IPv6 Prefix	Default Route Table	DNS Domain Name	Created
Load balancers				No item	s found.		
Luad Dalancers				No item	s found.		

5. Select Create VCN with Internet Connectivity and click Start VCN Wizard.

	earch resources, services, documentation, and Marketplace	US East (Ashburn) 🗸 🕢 💮 🤮 😦
Networking Overview	Virtual Co A Virtual Cio gateways th	ith firewall rules and specific types of communication
Virtual cloud networks Web Application Acceleration Load balancers DNS management Customer connectivity IP management Network Command Center List scope Compartment I (root) C	Create VCN with Internet Connectivity Add Internet Connectivity and Site-to-Site VPN to a VCN Creates a VCN with a public subnet that can be reached from the internet Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network. Includes: VCN, public subnet, private subnet, internet gateway (IG), NAT gateway (NAT), service gateway (SG).	NS Domain Name Created
Filters State Terminating Service logs Resources: 2 (2 total logs) ©		
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6. Enter a VCN name and configure your VCN's IPv4 CIDR block - including the public and the private subnet. The guide uses the default values for all. Make sure that the OCI VCN IPv4 CIDR block does not overlap with your AWS VPC IPv4 CIDR.

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Create a VCN wit	h internet connectivity	Help
Configuration Review and create	Configuration	VCN with internet connectivity
	Resource availability checked successfully.	Close
	Basic information	
	VCN name ① MySQL-VCN	
	Compartment ①	Cracle services network VCN Oracle services network VCN Oracle services network VCN Oracle services network VCN
	Configure VCN VCN IPv4 CIDR blook ① 10.0.0.0/16	Public subnet Private subnet Internet gateway (IG) NAT gateway (NAT) Service gateway (SG)
	If you plan to peer this VCN with another VCN, the VCNs must not have overlapping CIDR blocks. Learn more,	
	IPv6 prefixes Optional Enable IPv6 in this VCN	
	DNS resolution	
Next <u>Cancel</u>		
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7. Click **Next** after the configuration for your VCN is completed.

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Create a VCN with	internet connectivity									!	Help
Configuration Review and create	DNS resolution Use DNS hostnames in this VCN Required for instance hostname assignment if you plan to use	e VCN DNS or a	a third-party DNS. This choice cannot be char	nged after the VCN is created. Lea	m more.						
	Configure public subnet										
	IP address type		IPv4 CIDR block								
	IPv4 CIDR block	0	10.0.0/24		×						
			Example: 172.16.0.0/16.								
		(1	Maximum number of items added)	+ Another IP address ty	ype						
	Configure private subnet										
	IP address type		IPv4 CIDR block								
	IPv4 CIDR block	\$	10.0.1.0/24		×						
			Example: 172.16.0.0/16.								
		(1	Maximum number of items added)	+ Another IP address ty	ype					6	A
	Constraints and the second sec	Show tagging options									
Next Cancel											
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8. On the Review and create page, validate the information for your VCN and click **Create**.

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Create a VCN wit	h internet connectivity					<u>Help</u>
 <u>Configuration</u> Review and create 	Review and create					
	Resource availability checked successfully.	Close				
	Oracle VCN					
	Name: MySQL-VCN					
	Compartment: (root)					
	Tags: VCN: VCN-2023-05-15T14:57:35					
	IPv4 CIDR block: 10.0.0.0/16					
	DNS label: MySQLVCN					
	DNS domain name: MySQLVCN.oraclevcn.com					
	Subnets					
	Public subnet					
	Subnet name: public subnet-MySQL-VCN					
	IPv4 CIDR block: 10.0.0.0/24					
	Security list name: default security list for MySQL-VCN					
	Route table name: default route table for MySQL-VCN					
	BNO Label - ADDIED -					
Previous Create Cancel						
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9. Click View VCN after your VCN creation has been completed.

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Create a VCN w	ith internet connectivity		Help
 <u>Configuration</u> Review and create 	Created VCN		
	Creating resources		
	VCN creation complete		
	Create VCN (1 resolved)	Done 🥑	
	Create subnets (2 resolved)	Done 🕢	
	Create internet gateway (1 resolved)	Done 🥑	
	Create NAT gateway (1 resolved)	Done 🥑	
	Create service gateway (1 resolved)	Done 🕑	
	Create route table for private subnet (1 resolved)	Done 🥑	
	 Create security list for private subnet (1 resolved) 	Done 🥑	
	Update route tables (2 resolved)	Done 🥑	(P
	Update private subnet (1 resolved)	Done 🥑	
View VCN			
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10. On the Virtual Cloud Network Details page under Resources, click **Subnets** section. Click on **private subnet-**<vcn-name>.

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Networking > Virtual cloud network	s > Virtual Cloud Network Details	MINER					(3)11		
	MySQL-VCN								
VCN	Move resource Add tags	Delete							
	Compartment: root)				ya <u>Show</u> <u>Copy</u>				
AVAILABLE	Created: Tue, Sep 19, 2023, 16	:17:24 UTC			er: <u>MySQL-VCN</u> te Table: default route table f	or MySQL-VCN			
	IPv6 Prefix: - DNS Domain Name: mysqlvcn.oraclevcn.com								
Resources	Subnets in r	(root) Co	ompartment						
Subnets (2)	Create Subnet								
CIDR Blocks/Prefixes (1)	Name	State	IPv4 CIDR Block	IPv6 Prefixes	Subnet Access	Created		•	
Route Tables (2)	private subnet-MySQL-VCN	Available	10.0.1.0/24	-	Private (Regional)	Tue, Sep 19, 202	3, 16:17:26 UTC	G	-
Internet Gateways (1)	public subnet-MySQL-VCN	Available	10.0.0/24	-	Public (Regional)	Tue, Sep 19, 202	3, 16:17:26 UTC	9	
Dynamic Routing Gateways Attachments (0)					,		howing 2 items	_	_
Network Security Groups (0)								1011	_
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11. Click on **security list for private subnet-<vcn-name>** to add an Ingress Rule which will allow HeatWave MySQL to access the RDS instance on AWS and the Compute instance on OCI.

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Networking > Virtual cloud networks	» MySQL-VCN » Subnet Details						
	private subnet-MySQL	-VCN					
C	Edit Move resource Add tags C	ireate path analysis 👻 Terminate					
	Subnet Information Tags						
	OCID:6xni2a Show Copy		Compartment (root)				
	IPv4 CIDR Block: 10.0.1.0/24		DNS Domain Name: sub0919	91617221 Show Copy			
AVAILABLE	IPv6 Prefix: -		Subnet Access: Private Subn	net			
	Virtual Router MAC Address: 00:00:17:2D:45:1A DHCP Options: Default DHCP Options for MySQL-VCN						
	Subnet Type: Regional		Route Table: route table for p	rivate subnet-MySQL-VCN			
Resources	Security Lists						
Security Lists (1)	Add Security List					[
Logs	Name	State	Compartment	Created			
IPv6 Prefixes (-)	security list for private subnet-MySQL-VCN	Available	(root)	Tue, Sep 19, 2023,	16:17:26 UTC	;	:
Tag filters add I	clear			SI	howing 1 item	< 1 of	1 >
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12. Click Add Ingress Rules.

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Networking > Virtual cloud networks > My	SQL-VCN	» Security List D	etails	77.1.1.1.			MINING					571
	sec	urity list	for private s	subnet-M	ySQL-VCN	١						
	Instance traffic is controlled by firewall rules on each Instance in addition to this Security List											
SL >	Move	e resource Ad	ld tags Terminate									
	See	curity List Infor	rmation Tags									
AVAILABLE		I D: 653adq <u>Sh</u> ated: Tue, Sep 1	10W Copy 9, 2023, 16:17:26 UTC			Compartme	nt: (root)					
Resources	Ingi	ress Rule	es									
Ingress Rules (3)	Add	Ingress Rules	Edit Remove									
Egress Rules (1)		Stateless -	Source	IP Protocol	Source Port Range	Destination Port Range	Type and Code	Allows	Descri	iption		
		No	10.0.0.0/16	TCP	All	22		TCP traffic for ports: 22 SSH Remote Login Prot ocol				
		No	0.0.0.0/0	ICMP			3, 4	ICMP traffic for: 3, 4 De stination Unreachable: F ragmentation Needed a				:
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13. For **Source CIDR** type **0.0.0/0** (you can be more restrictive here and enter only the AWS and OCI VPC and VCN IPv4 CIDR). For **Destination Port Range**, enter **3306,33060**. Click **Add Ingress Rules**.

	Search resources, services, documenta	tion, and Marketplace		US East (Ashbi	ım)∨ ⋈ Ӆ (?)	₩ 9
Networking > Virtual cloud networks >	MySQL-VCN > Security List Details	Add Ingress Rules	3			
	security list for pr	·				
	Instance traffic is controlled by fire	Allows TCP traffic 3306,33060				
(SL)	Move resource Add tags	Stateless (i)				
		Source Type	Source CIDR		IP Protocol (i)	
	Security List Information	CIDR \$	0.0.0/0		TCP	\$
			Specified IP addresses: 0.0.0.0-255.255.255	5.255 (4,294,967,296 IP addresses)		
AVAILABLE	OCID:653adq Show Copy	eouroe rorernange optional O		Destination Port Range Optional (D	
	Created: Tue, Sep 19, 2023, 1	All		3306,33060		
		Examples: 80, 20-22		Examples: 80, 20-22		
	L D L	Description Optional				
Resources	Ingress Rules	MySQL Ports				
Ingress Rules (3)	Add Ingress Rules Edit	Maximum 255 characters				
Egress Rules (1)	Stateless - Source				+ Another Ing	ress Rule
	No 10.0.00	-				
	No 0.0.0.0/0	Add Ingress Rules Cancel				
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- 14. Open the OCI navigation menu, click **Networking** and click **Dynamic routing gateway** under Customer Connectivity.
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15. Click Create Dynamic Routing Gateway.

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Networking > Customer connectivity >	Dynamic routing gateways									
Customer connectivity Overview Site-to-Site VPN	Dynamic routing ga Dynamic routing gateways (DRGs) are Create dynamic routing gateway	ateways e optional virtual routers that you can add to your VCN. The	ry provide a path for private network traffic between	your VCN and or	-premises	network.				
FastConnect	Name	Lifecycle state	Oracle redundancy status (\hat{i})	c	eated					
Dynamic routing gateway		No items in the selected compartment.								
Customer-premises equipment				Showi	ng 0 items	< 1 of	1 >			

16. Enter a DRG name. Under Create in compartment - choose the compartment where your VCN resides. Click Create Dynamic Routing Gateway.

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Networking > Customer connectivity > Dyn	namic routing gateways	Create dynamic routing gateway				Help
Oustomer connectivity Overview Site-to-Site VPN FastConnect	Dynamic routing Dynamic routing gateways (DRGs) Create dynamic routing gatewa Name	Name MySQL-DRG Create in compartment froot) Show Advanced options				\$
Dynamic routing gateway Customer-premises equipment List scope Compartment ((root)) Tag filters add clear		°− augustanaaraa				
no tag filters applied						
		Create dynamic routing gateway Cancel				
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17. You will be taken to the DRG Details page. Once your DRG changes its state from Provisioning to **Available**, under Resources, click **Virtual Cloud Network Attachment**. Click **Create Virtual Cloud Network**

Attachment.									_
	Search resources, services, docu	mentation, and Market	olace		US East (As	shburn) 🗸 🕟	\$?		
Networking > Customer connectivity >	 Dynamic routing gateways > MyS 	QL-DRG		5		111111			1
	MySQL-DRG								
	Edit Add tags Mo	ve resource Termina	ate						
DRG	Dynamic routing gat	eway information	Tags						
	Compartment:	(root)		OCID:fx4nt5ypqq	Show Copy				
	Oracle redundancy sta	tus: —	Created: Tue, Sep 19, 2023, 16:28:53 UTC						
AVAILABLE									
Resources	VCN attachm		(root) Compartr		ite table. Learn more.				
VCN attachments (0)		na by an allasmont i	an ale for type. To a sarroomigue		to table. <u>Louin moro</u> .				
Virtual circuit attachments (0)	Create virtual cloud net	work attachment							
IPSec tunnel attachments (0)	Attachment name	Lifecycle state	Virtual cloud network	DRG route table	VCN route type	Created			
Remote peering connection attachments (0)				No items found.					
Loopback attachments (0)						Showing	0 items	(1 of 1)	
Cross-tenancy attachments (0)									
DRG route tables (2)									
Import route distributions (2)									
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18. Enter a Virtual Cloud Network Attachment name and select the appropriate VCN from the drop-down list. Click Create Virtual Cloud Network Attachment.

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Networking > Customer connectivity > Dynamic routing gateways > MySQL-DF	Create VCN attachment		Hel	p
AVAILABLE	Attachment name <i>Optional</i> MySQL-VCN-Attachment Virtual cloud network in (change compariment) MySQL-VCN [©] _C Show Advanced options		•]
VCN attachments VCN attachments VCN attachments (0) Create virtual cloud network at IPSec tunnel attachments (0) Remote paering connection attachments (0) Attachment name				
attachments (0) Loopback attachments (0) Cross-tenancy attachments (0) DRG route tables (2)				
Import route distributions (2)	Create VCN attachment Cancel			
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19. Wait for your VCN Attachment to be in an **Attached** state.

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Networking > Customer connectivity	» Dynamic routing gateways » MySQL	-DRG	The second second			1000			
	MySQL-DRG								
	Edit Add tags Move	resource Terminal	te						
DRG	Dynamic routing gatew	vay information	Tags						
	Compartment:	ot)		OCID:fx4nt5ypqq Show	<u>Copy</u>				
AVAILABLE	Oracle redundancy status	s: —	Created: Tue, Sep 19, 2023, 16:28:53 UTC						
Resources	VCN attachmer	-	(root) Compartn		e. <u>Learn more</u> .				
VCN attachments (1) Virtual circuit attachments (0)	Create virtual cloud networ	k attachment							
IPSec tunnel attachments (0)	Attachment name	Lifecycle state	Virtual cloud network	DRG route table	VCN route type	Created	I		
Remote peering connection attachments (0)	MySQL-VCN-Attachment	Attached	MySQL-VCN	Autogenerated Drg Route Ta ble for VCN attachments	Subnet CIDR blocks	Tue, Sep UTC	o 19, 2023, ⁻	16:33:45	:
Loopback attachments (0)						Showi	ing 1 item	< 10	
Cross-tenancy attachments (0) DRG route tables (2)									<u> </u>
Import route distributions (2)									
Terms of Use and Privacy Cookie Prefer	ences				Copyright © 2023	, Oracle and/or it	s affiliates. Al	I rights res	erved.

- 20. Open the OCI navigation menu, click **Networking** and click on **Virtual cloud networks**. After landing on the Virtual Cloud Networks page, click on **the name of your VCN**.
- 21. On the Virtual Cloud Network Details page, under Resources, click on **Route Tables**.

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Networking > Virtual cloud networks	» Virtual Cloud Network Details » Subnets	NITE STIL		s III B			3111	
	MySQL-VCN							
	Move resource Add tags	Delete						
VCN	VCN Information Tags							
	Compartment: r (root)			OCID:qsiv	ya Show Copy			
	Created: Tue, Sep 19, 2023, 16:17:24 UTC DNS Resolver: MySQ			er: MySQL-VCN				
AVAILABLE	IPv4 CIDR Block: 10.0.0.0/16			Default Rout	te Table: <u>default route table f</u>	or MySQL-VCN		
	IPv6 Prefix: -			DNS Domair	Name: mysqlvcn.oraclevcn	.com		
Resources	Subnets in	(root) Co	mpartment					
Subnets (2)	Create Subnet							
CIDR Blocks/Prefixes (1)	Name	State	IPv4 CIDR Block	IPv6 Prefixes	Subnet Access	Created		•
Route Tables (2)	private subnet-MySQL-VCN	Available	10.0.1.0/24	-	Private (Regional)	Tue, Sep 19, 2023,	16:17:26 UTC	
Internet Gateways (1)	public subnet-MySQL-VCN	Available	10.0.0/24	-	Public (Regional)	Tue, Sep 19, 2023,	16:17:26 UTC	
Dynamic Routing Gateways Attachments (1)						Shov	wing 2 items	< 1 of 1
Network Security Groups (0)								



22. You should see two Route Tables, one for your private subnet and the other for your public subnet. Click on **route table for private subnet-<vcn-name>**.

Resources	Route Tables in	(root) Compartm	nent	
Subnets (2)	Create Route Table			
CIDR Blocks/Prefixes (1)	Name	State	Number of Rules	Created
Route Tables (2)	route table for private subnet-MySQL-VCN	Available	2	Tue, Sep 19, 2023, 16:17:26 UTC
Internet Gateways (1) Dynamic Routing Gateways	default route table for MySQL-VCN	Available	1	Tue, Sep 19, 2023, 16:17:24 UTC
Attachments (1)				Showing 2 items < 1 of

23. On the private subnet route table page, click **Add Route Rules**.

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Networking > Virtual cloud networks	s > MySQL-VCN > Route Table Details				(G 5
	route table for private subnet-l	MySQL-VCN			
RT	Move resource Add tags Terminate				
	Route Table Information Tags				
	OCID:2ffena <u>Show Copy</u> Created: Tue, Sep 19, 2023, 16:17:26 UTC		Compartment (root)		
AVAILABLE					
Resources	Route Rules				
Route Rules (2)	Traffic within the VCN is handled by the VCN's local routing to <u>Network Path Analyzer</u> to check your connections.	by default. Intra-VCN routing all	ows you more control over routing betwe	en subnets. <u>Learn more.</u> If	you're having problems, use
	Add Route Rules Edit Remove				
	Destination	Target Type	Target	Route Type	Description
	0.0.0.0/0	NAT Gateway	NAT gateway-MySQL-VCN	Static	
	All IAD Services In Oracle Services Network	Service Gateway	Service gateway-MySQL-VCN	Static	
	0 selected			Ę	Showing 2 items < 1 of 1 >
Terms of Use and Privacy Cookie Prefe	rences			Copyright © 2023, Oracle a	and/or its affiliates. All rights reserved.



24. Under Target Type, select Dynamic Routing Gateway from the drop-down list. For Destination Type, select CIDR Block and for Destination CIDR Block - enter your AWS VPC IPv4 CIDR block that you will be using to connect to OCI. The AWS VPC CIDR block that will be used for this guide is 10.1.0.0/16. Click Add Route Rules afterwards.

ORACLE Cloud	Search resources, services, documentatio	n, and Marketplace US East (Ashburn) V 🔂 🔔 🤅	₿ 0
Networking > Virtual cloud networks	» MySQL-VCN » Route Table Details	Add Route Rules	<u>Help</u>
	route table for pri		
RT	Move resource Add tags	Important: For a route rule that targets a Private IP, you must first enable "Skip Source/Destination Check" on the VNIC that the Private IP is assign to.	ned
	Route Table Information	Route Rule	
	OCID:2ffena Show Copy	Target Type	
	Created: Tue, Sep 19, 2023, 16	Dynamic Routing Gateway	\$
AVAILABLE		Destination Type	^
Resources	Route Rules	CIDR Block	¢
	Traffic within the VCN is handled b	Destination CIDR Block	
Route Rules (2)	Network Path Analyzer to check yo	10.1.0.0/16	
		Example: 10.0.0.0/24	
	Add Route Rules Edit	Target Dynamic Routing Gateway	
	Destination	Name: MySQL-DRG	
		Compartment: (root)	
	0.0.0/0	Description Optional	
	All IAD Services In Oracle		
	0 selected	Maximum 255 characters	
		Add Route Rules Cancel	
Terms of Use and Privacy Cookie Prefer	rences	Copyright @ 2023, Oracle and/or its affiliates. All rights	reserved.

25. Now, repeat the same process for the other route table. Go back to Virtual Cloud Network Details page, click **Route Tables**, and click on **default route table for <vcn-name>**.

■ ORACLE Cloud	Search resources, services, documentation, and N	larketplace		US East (Ashburn) 🗸 🚺	2 🗇 🕀 (
Networking > Virtual cloud networks >	 Virtual Cloud Network Details > Route Tables 	5777. MARINE		57. MARINE	ME
	MySQL-VCN				
	Move resource Add tags Delete				
VCN	VCN Information Tags				
	Compartment: root)		OCID:qsivya Show Copy		
	Created: Tue, Sep 19, 2023, 16:17:24 UT	°C	DNS Resolver: MySQL-VCN		
AVAILABLE	IPv4 CIDR Block: 10.0.0/16		Default Route Table: default	oute table for MySQL-VCN	
	IPv6 Prefix: -		DNS Domain Name: mysqlvc	n.oraclevcn.com	
Resources	Route Tables in	(root) Compartme	ent		
Subnets (2)	Create Route Table				
CIDR Blocks/Prefixes (1)	Name	State	Number of Rules	Created	÷
Route Tables (2)	route table for private subnet-MySQL-VCN	Available	3	Tue, Sep 19, 2023, 16:17:26	
Internet Gateways (1)					
Dynamic Routing Gateways	default route table for MySQL-VCN	Available	1	Tue, Sep 19, 2023, 16:17:24	UTC :::
Attachments (1)				Showing 2 ite	ems < 1 of 1 >
Network Security Groups (0)					
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26. On the default route table page, click **Add Route Rules**.

E ORACLE Cloud	Search resources, services, documenta	ition, and Marketplace		US East (Ashb	urn) 🗸 🚺 🇘 🤆	2 🌐 9
Networking > Virtual cloud network	s > MySQL-VCN > Route Table Details					
	default route tab	le for MySQL-V	CN			
DT	Move resource Add tags	Terminate				
R T	Route Table Information	Tags				
AVAILABLE	OCID:u6nmca Show Cop Created: Tue, Sep 19, 2023, 1		Compartment:	(root)		
Resources	Route Rules Traffic within the VCN is handled Network Path Analyzer to check y		sfault. Intra-VCN routing allows you more control	over routing between subnets. <u>Learn</u>	more. If you're having pro	blems, use
	Add Route Rules Edit	Remove				
	Destination	 Target Type 	Target	Route Type	Description	
	0.0.0/0	Internet Gateway	Internet gateway-MySQL-VCN	Static		_ <u></u>
	0 selected				Showing 1 item	< 10
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27. Under Target Type, select Dynamic Routing Gateway from the drop-down list. For Destination Type, select CIDR Block and for Destination CIDR Block - enter your AWS VPC IPv4 CIDR block that you will be using to connect to OCI. The AWS VPC CIDR block that will be used for this guide is 10.1.0.0/16. Click Add Route Rules afterwards.

E ORACLE Cloud	Search resources, services, documentation	n, and Marketplace	US East (Ashburn) ✓	
Networking > Virtual cloud network	s > MySQL-VCN > Route Table Details	Add Route Rules		Help
	default route tabl			
RT	Move resource Add tags	Important: For a route rule that targets a Private IP, you must first enable "Skip to.	o Source/Destination Check" on the VNIC that	the Private IP is assigned
	Route Table Information	Route Rule		
	OCID:u6nmca Show Copy	Target Type		
	Created: Tue, Sep 19, 2023, 16	Dynamic Routing Gateway		\$
AVAILABLE		Destination Type		
Resources	Route Rules	CIDR Block		\$
	Traffic within the VCN is handled b	Destination CIDR Block		
Route Rules (1)	Network Path Analyzer to check yo	10.1.0.0/16		
		Example: 10.0.0.0/24		
	Add Route Rules Edit	Target Dynamic Routing Gateway		
MANIE MANASA	Destination	Name: MySQL-DRG		
	0.0.0/0	Compartment: (root)		
	0.0.0.0	Description Optional		
1111/1	0 selected			
		Maximum 255 characters)
		Add Route Rules Cancel		
Terms of Use and Privacy Cookie Prefe	ferences		Copyright @ 2023, Oracle ar	nd/or its affiliates. All rights reserved.



28. Login to <u>AWS</u> to modify the VPC security groups for the RDS MySQL instance which will allow RDS to access the HeatWave MySQL instance on OCI and the EC2 instance on AWS. From the main AWS portal, expand the Services menu at the top left of the screen, click **Databases**, click **RDS**, and **select your RDS instance**. Click **Connectivity & security**, under the **Security** section, look for **VPC security groups** and click on **the security group**. For this guide, our RDS instance only uses one security group - **default**.

aws Services Q Search		[Option+S]		▶ � ⑦ Ohio ▼
🙋 EC2 🛛 VPC 🔯 RDS 🛅 IAM	⊡ S3			
Amazon RDS ×	RDS > Databases > database-1			
Dashboard	database-1			Modify Actions
Databases Query Editor	Summary			
Performance insights Snapshots Exports in Amazon S3 Automated backups Reserved instances Proxies	DB identifier database-1 Role Instance	CPU 2.49% Current activity 0 Connections	Status Available Engine MySQL Community	Class db.t3.micro Region & AZ us-east-2a
Subnet groups	Connectivity & security Monitoring	Logs & events Configuration	Maintenance & backups Tags	
Parameter groups Option groups	Connectivity & security			
Custom engine versions Zero-ETL integrations	Endpoint & port	Networking Availability Zone	Security VPC security groups	
Events Event subscriptions	database-1. us-east- 2.rds.amazonaws.com Port	us-east-2a VPC MySQL-vpc (vpc-0e70c2c402d3ceb74)	default (sg-087aff3dc48d38afa) Active Publicly accessible	
Recommendations 3	3306	Subnet group default-vpc-0e70c2c402d3ceb74	No Certificate authority Info	its affiliates. Privary Terms Conkie preferences

29. On the Security Groups page, select your RDS security group. From Actions, choose Edit inbound rules.

Tett us what you think X Security groups (1/1) into C Actions ▲ Export security groups to CSV Create security group EC2 Dashboard Q. Filter security groups View details Edit inbound rules Events Vame Vecurity group ID Vecurity group name Manage tags Vecurity groups Vecurity groups	aws Services Q Search	h [Option+S]
Total us why you have Security Groups (1/1) into Into us why you have Class security group is Security group rules Security	🔊 EC2 🌀 VPC 🔯 RDS 🛅	am 🔁 53
EC2 Dashbaard EC2 Dashbaard EC2 Dashbaard EC2 Dashbaard EC2 Global View Events	New EC2 Experience	Security Groups (1/1) Info C Actions 🔺 Export security groups to CSV 💌 Create security group
Instances Security group nume Instances Instances Instances Instances Security Group nume Instances Instances Instances Security group nume Instances Security group nume Instances Instances Instances Details Inbound rules Outbound rules Tags Instances Instances Instances Instances Instances Details Inbound rules Outbound rules Instances Instan	EC2 Global View	Q Filter security groups Edit inbound rules Edit inbound rules
Instances isg-087aff3dc48d38afa default vpc-de70c2c402d3ceb/4 L2 default VPC security gr 5287/09447/7 Instance Types	Events	☑ Name ▽ Security group ID ▽ Security group name Manage tags ▽ Description ▽ Owner
Instance Types	Instances	Z – sg-087aff3dc48d38afa default vpc-0e70c2c402d3ceb74 [2] default VPC security gr 528770944777
Launch Templates Spot Requests Savings Plans Reserved Instances Details Inbound rules Outbound rules Tags Details Inbound rules Outbound rules Tags Details Inbound rules Outbound rules Tags Details Inbound rules (1/1) Images Inbound rules (1/1) AMIs AMIs AMIs AMIs AMIs C Filter security group rules AMIs C 1 > 0 AMI Catalog Elastic Block Store Volumes Snapshots	Instances	
Details Inbound rules Outbound rules Tags Dedicated Hosts Capacity Reservations Images AMIs AMIs AMIs calog Images AMI Catalog Images Images AMIs calog Images Images AMIs calog Images Images Images AMIs calog Images Images <	Launch Templates	
Images AMIs C Manage tags Edit inbound rules AMIs Q Filter security group rules < 1 > AMI Catalog I Name Security group rule ▼ IP version ▼ Type Protocol ▼ Port range Volumes Snapshots Snapshots Security Group rule ▼ IP version All traffic All All	Reserved Instances	Details Inbound rules Outbound rules Tags
Images Q. Filter security group rules < 1 > AMIs Q. Filter security group rules < 1 > AMI Catalog IP version ▼ Images IP version ▼ Images AMIs AMIs Images Ima	Capacity Reservations	
AMIs Q Filter security group rules <	Images	Inbound rules (1/1) C Manage tags Edit inbound rules
Image: State Block Store Image: State Bl	-	Q Filter security group rules < 1 >
Elastic Block Store Image: Store Sto	AMI Catalog	
Volumes Snapshots	Elastic Block Store	
	Volumes	
Lifecycle Manager	Snapshots	
	Lifecycle Manager	
	CloudShell Feedback Language	© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie pr

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30. Click Add rule. Under Type, select MySQL/Aurora. For Source, input the AWS VPC IPv4 CIDR. Click Add rule. Under Type, select MySQL/Aurora. For Source, input the OCI VCN IPv4 CIDR block. Click Save rules.

aws	Services Q Search			[Option+S]			D	\$	Ohio •	
ø	ecz 🌀 VPC 🔯 RDS 🛅 IAN	м 🔁 S3								
E	2 > Security Groups > sg-087	7aff3dc48d38afa - default > Edit i	nbound rules							١
	dit inbound rules	Info traffic that's allowed to reach the ins	ance.							
	Inbound rules Info									
	Security group rule ID	Type Info	Protocol Info	Port range	Source Info		Description - opti	onal Info		
	sgr-055933e9e223c2b99	All traffic 🔹	All	All	Custom 🔻	Q			Delete	
						sg- X 087aff3dc48d38afa				
	-	MYSQL/Aurora 🔻	ТСР	3306	Custom 🔻	Q	AWS VPC		Delete	
						10.1.0.0/16 🗙				
	-	MYSQL/Aurora 🔻	ТСР	3306	Custom 🔻	Q	OCI VCN		Delete	
						10.0.0/16 🗙				
	Add rule									
							Cancel	view chang	es Save ru	les
ک. Cle	oudShell Feedback Language					© 2023, Amazon W	eb Services, Inc. or its af	filiates. P	rivacy Terms	Cookie preferences

31. From the main AWS Services menu, navigate to **Networking & Content Delivery** and click **VPC**. From the left-hand AWS menu, scroll down and click **Customer Gateways** under Virtual private network (VPN). Click **Create customer gateway** once you have landed on the appropriate page.

aws Services Q Search		[Option+S]		D Q	⑦ Ohio ▼ r
 Virtual private network (VPN) 	Customer gatewa	-		C Actions T	Create customer gateway
Customer gateways Virtual private gateways	Q Filter customer ga				< 1 > @
Site-to-Site VPN connections Client VPN endpoints	Name			✓ IP address No custom	Type er gateways found



32. Enter a **temporary customer gateway name**. For **BGP ASN** input **31898** and for **IP address** enter **1.1.1.1**. Leave the rest as-is and click **Create Customer Gateway**.

aws	Services Q Search	[Option+S]	E	🔶 🕐 Ohio 🔻	
EC2 آق	: 🕝 VPC 🥳 RDS 🔠 IAM 🔁 S3				
	> Customer gateways > Create customer gateway				٥
Cr	eate customer gateway Info				
	stomer gateway is a resource that you create in AWS that represents the customer gat vork.	eway device in your on-premises			
C	Details				
	lame tag - optional reates a tag with a key of 'Name' and a value that you specify.	_			
	Temp-Gateway				
в	alue must be 256 characters or less in length. IGP ASN Info he ASN of your customer gateway device.				
	31898				
IF	alue must be in 1 - 2147483647 range. P address Info pecify the IP address for your customer gateway device's external interface.				
	1.1.1.1				
	ertificate ARN he ARN of a private certificate provisioned in AWS Certificate Manager (ACM).	_			
	Select certificate ARN				
	vevice - optional nter a name for the customer gateway device.				
	Enter device name				
▶ Cloud	IShell Feedback Language		© 2023, Amazon Web Services, Inc. or its affili	iates. Privacy Terms	Cookie preferences

33. From the Customer gateways page, scroll down on the left-hand AWS menu. Under Virtual private network click **Virtual private gateways**. Click **Create virtual private gateway**.

aws Services Q Searc	h [Option+S]	∑
🗗 EC2 🕜 VPC 🔯 RDS 🧕	IAM 🔁 S3	
 Virtual private network (VPN) 	Virtual private gateways Info	C Actions Create virtual private gateway
Customer gateways	Q Filter virtual private gateways	< 1 > ©
Virtual private gateways Site-to-Site VPN	Name \heartsuit Virtual private gateway ID \heartsuit State \heartsuit Type	
connections	No virtual private gateways fo	bund
Client VPN endpoints		



34. Enter a virtual private gateway name. Leave everything as-is and click Create virtual private gateway.

aws	Services	Q Search			[Option+S]			(2 ¢	0	Ohio 🔻	
🧔 EC2	2 🕜 VPC	😥 RDS 🛅 IAM	🔁 S3									
VPC	> Virtual p	orivate gateways > 🤇	Create virtual private gateway									(j
C -	ooto vii	rtual privat	o antourou									
Ch	eate vii	rtuat privat	e gateway Info									
A vir	rtual private ga	ateway is the VPN con	centrator on the Amazon side	of the site-to-site	VPN connection.							
D	Details											
	lame tag - opt Treates a tag with	t ional n a key of 'Name' and a val	ue that you specify.									
	MySQL-VPG											
Vá	alue must be 25	6 characters or less in leng	jth.									
A	Autonomous Sy	ystem Number (ASN)										
-	Amazon dei											
	Custom ASI	Ν										
A	Tags tag is a label tha	at you assign to an AWS re track your AWS costs. Nan	esource. Each tag consists of a key a ne tag helps you track your resource	and an optional value es more easily. We re-	. You can use tags to commend adding Na	search and filter me tag.						
ĸ	(ey		Value - optional									
	Q Name		X Q MySQL-VPG		X Remov	e						
	Add new ta	-										
YC	'ou can add 49 m	iore lags.										
				Cancel	Create virtual	private gateway						
▶ Cloud	iShell Feedba	ack Language		Guncer	e. cute th fuat	guestay	© 2023, Amazon We	eb Services, Inc. or it:	s affiliates.	Privacy	Terms	Cookie preferences

35. While still on the Virtual Private Gateway page, select the **virtual private gateway** that we just created. Click on the **Actions** menu and select **Attach to VPC**.

aws Services Q Search	[Option+S]	<u>ک</u> چ	Ohio 🔻
🙋 EC2 🛛 VPC 🔯 RDS 🧕	им 🔁 53		
 Virtual private network (VPN) 	⊘ You successfully created vgw-09d5fcfd127de5c1b / MySQL-VPG.		× (i)
Customer gateways	Virtual private gateways (1/1) Info	C Actions A Create virt	ual private gateway
Virtual private gateways	Q Filter virtual private gateways	Attach to VPC	< 1 > 0
Site-to-Site VPN connections		Detach from VPC	
Client VPN endpoints	Virtual private gateway ID: vgw-09d5fcfd127de5c1b X Clear filters	Manage tags	
AWS Verified Access	Name \bigtriangledown Virtual private gateway ID \bigtriangledown State \bigtriangledown Type	Delete virtual private gateway	
Verified Access instances	● MySQL-VPG vgw-09d5fcfd127de5c1b	-	64512

36. From the drop-down list, select **your VPC**. Click **Attach to VPC** once completed.

aws services Q Search	[Option+S]	▶ 🗘 🕐 Ohio 🕶	
🗗 EC2 🖓 VPC 😥 RDS 🛅 IAM 🔁 S3			
VPC > Virtual private gateways > vgw-09d5fcfd127de5c1b > Attach to VPC Attach to VPC Info			١
Details			
Virtual private gateway ID vgw-09d5fcfd127de5c1b Available VPCs Attach the virtual private gateway to this VPC. vpc-0e70c2c402d3ceb74 / MySQL-vpc	▼ Cancel Attach to VPC		



37. Wait until your Virtual private gateway changes its state to **Attached**. It is now time to update the AWS route tables - similar to what we did on OCI. From the Virtual private gateways page, scroll up on the left-hand AWS menu. Under Virtual private cloud, select **Route tables**.

aws Services Q Sea	arch	[Option+S]		6	D) Ohio 🔻
🙋 EC2 🏾 🏠 VPC 🔯 RDS	🛅 IAM 🕞 S3					
 Virtual private cloud 	Route tables (4) Info			C	Actions 🔻	Create route table
Your VPCs New	Q. Find resources by attribute or tag					
Subnets Route tables	VPC = vpc-0e70c2c402d3ceb74 ×	Clear filters				< 1 > ©
Internet gateways	Name Name		Explicit subnet associati	Edge associations	Main ⊽	VPC
Egress-only internet	MySQL-rtb-private1-us-east-2a	rtb-066d50087e38653a8	subnet-06e1fc1a1c7c780	-	No	vpc-0e70c2c402d3ceb74
gateways	□ -	rtb-027b6f0a9c4be9523	-	-	Yes	vpc-0e70c2c402d3ceb74
DHCP option sets Elastic IPs	MySQL-rtb-public	rtb-0033ebf39db8bc3aa	2 subnets	-	No	vpc-0e70c2c402d3ceb74
Managed prefix lists	MySQL-rtb-private2-us-east-2b	rtb-0cad898363cd36674	subnet-047738387622cb	-	No	vpc-0e70c2c402d3ceb74
Endpoints						

38. For this guide, the main route table (rtb-027b6f0a9c4be9523 - the one with no name) is not being used, although we will use the public route table (to deploy on EC2 later) and both private route tables (for RDS). For each of the route tables that you wish to use, you will need to add an additional route rule. Select the appropriate route table one-by-one and from the **Actions** menu, click **Edit routes**.

aws Services Q Sea	rch	[Option+S]			[2] 슈 ② Ohio	•
🗗 EC2 🌀 VPC 🙀 RDS	🛅 IAM 🔁 S3					
 Virtual private cloud 	Route tables (1/4) Info			C	Actions Create	route table
Your VPCs New	Q Find resources by attribute or tag				View details	
Subnets	VPC = vpc-0e70c2c402d3ceb74 X	Clear filters			Set main route table	
Route tables					Edit subnet associations	1 > ③
Internet gateways	Name		xplicit subnet associati	Edge associations	Edit edge associations	
Egress-only internet	MySQL-rtb-private1-us-east-2a	rtb-066d50087e38653a8 s	ubnet-06e1fc1a1c7c780	-	Edit route propagation	0c2c402d3ceb74
gateways DHCP option sets	—	rtb-027b6f0a9c4be9523 -		-	Edit routes	0c2c402d3ceb74
Elastic IPs	MySQL-rtb-public	rtb-0033ebf39db8bc3aa	subnets	-	Manage tags	0c2c402d3ceb74
Managed prefix lists	MySQL-rtb-private2-us-east-2b	rtb-0cad898363cd36674 s	ubnet-047738387622cb	-	Delete route table	0c2c402d3ceb74

39. Click Add route and under the Destination, input your OCI VCN CIDR block that you are using when you created your OCI VCN (the guide uses OCI VCN CIDR block of 10.0.0/16). Afterwards, for Target, click Virtual Private Gateway from the drop-down list and select your Virtual Private Gateway. Once your route has been added as shown in the below image, click Save changes.

Q Search	[Option+S]		Ъ � ⊘ Ohio ▼	
EC2 Image: Signal state of the signa				
Destination	Target	Status	Propagated	
10.1.0.0/16	Q, local	× O Active	No	
Q 10.0.0/16	X Q vgw-09d5fcfd127de5c1b	× -	No Remove	
Add route				
			Cancel Preview Save c	nanges



40. Repeat the same process for the remaining route tables that you will use.

aws Services Q Search	ŕ	[Option+S]		▶ ♦ ⊘ Ohio	•
🗗 EC2 🕜 VPC 🔯 RDS 🧕	ам 🔁 53				
VPC dashboard	Route tables (1/4) Info		C	Actions 🔺 Create	route table
EC2 Global View 🔀 New	Q. Find resources by attribute or tag			View details	
Filter by VPC:	VPC = vpc-0e70c2c402d3ceb74 ×	Clear filters		Set main route table	1 > @
Select a VPC 🔹				Edit subnet associations	· / @
	Name		plicit subnet associati Edge associations	Edit edge associations	
Virtual private cloud	MySQL-rtb-private1-us-east-2a	rtb-066d50087e38653a8 sub	onet-06e1fc1a1c7c780 –	Edit route propagation	0c2c402d3ceb74
Your VPCs New	□ -	rtb-027b6f0a9c4be9523 –	-	Edit routes	0c2c402d3ceb74
Subnets	MySQL-rtb-public	rtb-0033ebf39db8bc3aa 2 s	ubnets –	Manage tags	0c2c402d3ceb74
Route tables	MySQL-rtb-private2-us-east-2b	rtb-0cad898363cd36674 sub	onet-047738387622cb –	Delete route table	0c2c402d3ceb74
Internet gateways				L	-

AWS Services Q Search	4 53	[Option+S]		D	
VPC > Route tables > rtb-0033ebf39					
Edit routes					
Destination	Target		Status	Propagated	
10.1.0.0/16	Q local		× O Active	No	
Q 0.0.0.0/0	X Q igw-0	5181c48b2dd21e7d	× O Active	No	Remove
Q 10.0.0/16	X Q vgw-C	9d5fcfd127de5c1b	× -	No	Remove
Add route					
				Cancel	Preview Save changes

	aws Services Q Search		[Option+S]		도 수 ⑦ Ohio	•
VPC dashbaard × Indice cubres (1/14) mino Values Values	🛃 EC2 🕜 VPC 🔯 RDS 🔤	IAM 🔁 S3				
EC2 Global View /z New	VPC dashboard	Route tables (1/4) Info		C	Actions Create	route table
Name ▼ Route table ID ▼ Explicit subnet associations Edge associations Edit subnet associations Y Virtual private cloud MySQL-rtb-private1-us-east-2a rtb-066d50087e38653a8 subnet-06e1fc1a1c7c780 - Edit route propagation 0c2c402d3ceb74 Your VPCs New - rtb-027b6f0a9c4be9523 - - Edit routes 0c2c402d3ceb74 Subnets MySQL-rtb-public rtb-0033ebf39db8bc3aa 2 subnets - Manage tags 0c2c402d3ceb74	EC2 Global View 🔀 New	Q Find resources by attribute or tag			View details	
Select a VPC Edit subnet associations Edit subnet associations Edit subnet associations Virtual private cloud MySQL-rtb-private1-us-east-2a rtb-066d50087e38653a8 subnet-06e1fc1a1c7c780 - Edit route propagation 0c2c402d3ceb74 Your VPCs New - rtb-027b6f0a9c4be9523 - - Edit route propagation 0c2c402d3ceb74 Subnets MySQL-rtb-public rtb-033ebf39db8bc3aa 2 subnets - Manage tags 0c2c402d3ceb74	Filter by VPC:	VPC = vpc-0e70c2c402d3ceb74 X Clear fi	ilters		Set main route table	1
Virtual private cloud MySQL-rtb-private1-us-east-2a rtb-066d50087e38653a8 subnet-06e1fc1a1c7c780 - Edit route propagation 0c2c402d3ceb74 Your VPCs New - - rtb-027b6f0a9c4be9523 - - Edit route propagation 0c2c402d3ceb74 Subnets MySQL-rtb-public rtb-033bef53d9b8bc3aa 2 subnets - Manage tags 0c2c402d3ceb74	Select a VPC 🔹				Edit subnet associations	• / •
Your VPCs New - rtb-bbbd3008/e3bb3sa8 subnet-bbe1tc1a1C/C/80 - Edit route propagation 0c2c402d3ceb74 Your VPCs New - - rtb-bbd3008/e3bb3sa8 - - Edit route propagation 0c2c402d3ceb74 Subnets MySQL-rtb-public rtb-0035ebf39db8bc3aa 2 subnets - - Edit routes 0c2c402d3ceb74 Route tables - rtb-0035ebf39db8bc3aa 2 subnets - Manage tags 0c2c402d3ceb74		Name ∇ R	oute table ID	Edge associations	Edit edge associations	
Subnets - rtb-027b6f0a9c4be9523 - - Edit routes Oc2c402d3ceb74 Subnets MySQL-rtb-public rtb-0033ebf39db8bc3aa 2 subnets - Manage tags Oc2c402d3ceb74		MySQL-rtb-private1-us-east-2a rt	tb-066d50087e38653a8 subnet-06e1fc1a1c7c780	-	Edit route propagation	0c2c402d3ceb74
Route tables - MySQL-rtb-public rtb-0033ebf39db8bc3aa 2.subnets - Manage tags 0c2c402d3ceb74		🗆 – rt	tb-027b6f0a9c4be9523 –	-	Edit routes	0c2c402d3ceb74
		MySQL-rtb-public rt	tb-0033ebf39db8bc3aa 2 subnets	-	Manage tags	0c2c402d3ceb74
Internet gateways		MySQL-rtb-private2-us-east-2b rt	tb-0cad898363cd36674 subnet-047738387622cb	-	Delete route table	0c2c402d3ceb74

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ecz 🏠 VPC 🐯 RDS 🛅 IAM 😤	∃ s₃			
PC > Route tables > rtb-0cad898363	3cd36674 > Edit routes			
Edit routes				
Destination	Target	Status	Propagated	
10.1.0.0/16	Q local	× O Active	No	
Q 10.0.0/16	X Q vgw-09d5fcfd127de5c1b	× -	No	Remove
Add route				
			Cancel	eview Save change
ide: Amazon RDS to HeatW	/ave MySQL on Oracle Cloud Infrastructure (OCI)		0	RACLE

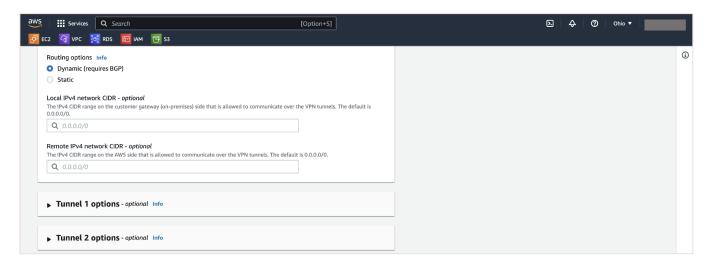
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41. After you have updated all your route tables on AWS, from the left-hand menu, scroll down and click **Site-to-Site VPN Connections** under Virtual Private Network (VPN). Once on the appropriate page, click **Create VPN**

Connection.						
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🙋 EC2 🌀 VPC 🔯 RDS 🙋	🔟 IAM 🔁 S3					
 Virtual private network (VPN) 	VPN connections Info		C Actions Download configuration	Create VPN connection		
Customer gateways Virtual private gateways	Q Filter VPN connections			< 1 > 💿		
Site-to-Site VPN connections	Name \bigtriangledown VPN ID	⊽ State	▽ Virtual private gateway ▽ Transit gateway	∇ Customer gate		
Client VPN endpoints						

42. Give a VPN connection name, for Target gateway type select Virtual private gateway. Under Virtual private gateway drop-down - select the VPG that we had created earlier. For Customer gateway select Existing and under the Customer gateway ID drop-down - select the temporary Customer Gateway that we had created earlier. Under Routing options select Dynamic (requires BGP). Leave the Local and Remote IPv4 network CIDR fields blank.

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🧔 EC	2 🖓 VPC 🔯 RDS 🛅 IAM 🔁 S3		
VP	> VPN connections > Create VPN connection		0
_			
C	reate VPN connection Info		
Sel	ect the resources and additional configuration options that you want to	use for the site-to-site VPN connection.	
	Details		
	Name tag - <i>optional</i>		
	Creates a tag with a key of 'Name' and a value that you specify.		
	MySQL-VPN		
	Value must be 256 characters or less in length.		
	Target gateway type Info		
	Virtual private gateway		
	 Transit gateway 		
	Not associated		
	Virtual private gateway		
	vgw-09d5fcfd127de5c1b / MySQL-VPG	▼	
	Customer gateway Info		
	Existing		
	O New		
	Customer gateway ID		
	cgw-0d4728ff9e1ffc33d / Temp-Gateway	▼	



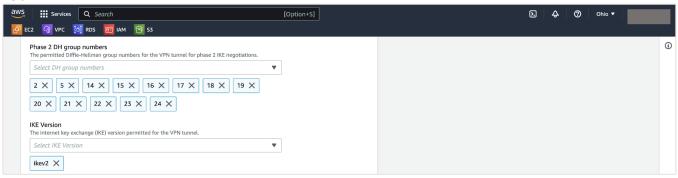
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- 43. While still on the Create VPN Connection page, expand the **Tunnel 1 options**. Choose a /30 CIDR from within the link local 169.254.0.0/16 range. Input the full CIDR in the Inside IPv4 CIDR for Tunnel 1 field. The guide uses the CIDR block of 169.254.6.0/30. Ensure that OCI supports the chosen /30 address for the inside tunnel IPs. OCI does not allow you to use the following IP ranges for inside tunnel IPs:
 - 169.254.10.0-169.254.19.255
 - 169.254.100.0-169.254.109.255
 - 169.254.192.0-169.254.201.255

Under Advanced options for tunnel 1, click the radio button for Edit tunnel 1 options.

Services	Search	[Op	ition+S]	D 4	0	Dhio 🔻 🛛
22 🕜 VPC 🥳 R	DS 🛅 IAM 🕞 S3					
🔻 Tunnel 1 opti	ons - optional Info					
Inside IPv4 CIDR for t	tunnel 1					
169.254.6.0/30						
A size /30 IPv4 CIDR blor	ck from the 169.254.0.0/16 range.					
Pre-shared key for tu The pre-shared key (PSK)		en the virtual private gateway and custome	r gateway.			
Generated by Amaz	on					
The pre-shared key must	t have 8-64 characters. Valid characters: A	-Z, a-z, 0-9, _ and . The key cannot begin wi	ith a zero.			
Advanced options for	r tunnel 1					
 Use default optio 						
 Edit tunnel 1 opti 	ions					
Phase 1 encryption a The permitted encryptio	lgorithms n algorithms for the VPN tunnel for phas	e 1 IKE negotiations.				
Select encryption al	gorithms	•				
AES128 X AES	AES128-GCM-16 X	AES256-GCM-16 ×				
	le e sitte se e					
Phase 2 encryption a The permitted encryption		e 2 IKE negotiations				
	n algorithms for the VPN tunnel for phas	e 2 IKE negotiations.				
The permitted encryptio	n algorithms for the VPN tunnel for phas	-				
The permitted encryption Select encryption algorithms and AES128 X AES Phase 1 integrity algorithms algorithms algorithms algorithms algorithms algorithm algorithms algorithms algorithm algorithm algorithms algorithm alg	n algorithms for the VPN tunnel for phas gorithms 2256 X AES128-GCM-16 X	AES256-GCM-16 X				
The permitted encryption Select encryption algorithms and AES128 X AES Phase 1 integrity algorithms algorithms algorithms algorithms algorithms algorithm algorithms algorithms algorithm algorithm algorithms algorithm alg	n algorithms for the VPN tunnel for phase gorithms AES128-GCM-16 X orithms algorithms for the VPN tunnel for phase	AES256-GCM-16 X				

44. Once the tunnel 1 options expand, scroll down and look for **IKE Version**. Click the **X** and remove the **ikev1** field.





45. After you have finished the configuration, click **Create VPN connection**.

aws Services Q Search	[Option+S]		🗘 🕐 Ohio 🔻
🗗 EC2 🌀 VPC 🔯 RDS 🔠 IAM 🔁 S3			
○ Start			()
VPN logging Info			
Tunnel activity log			
Tunnel activity log captures log messages for IPsec activity and DPD protocol messages.			
Enable			
Tunnel maintenance			
Tunnel endpoint lifecycle control Info			
Tunnel endpoint lifecycle control provides control over the schedule of endpoint replacements.			
Turn on			
► Tunnel 2 options - optional Info			
Tags			
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. Yo	u can use tags to search and filter		
your resources or track your AWS costs. Name tag helps you track your resources more easily. We recom	mend adding Name tag.		
Key Value - optional			
Q Name X Q MySQL-VPN X	Remove		
Add new tag			
You can add 49 more tags.			
Cancel	Create VPN connection		
CloudShell Feedback Language		© 2023, Amazon Web Services, Inc. or its affiliate	es. Privacy Terms Cookie preferences

46. On the VPN Connections page, make sure that your VPN connection is selected and click the **Download configuration** button.

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🗗 EC2 🏾 🏠 VPC 🔯 RDS 🧕	I IAM 🔁 S3		
 Virtual private network (VPN) 	⊘ You successfully created vpn-0d2671318be47c28e / MySQL-VPN.		× ()
Customer gateways Virtual private gateways	VPN connections (1/1) Info	C Actions ▼ Download configuration	Create VPN connection
Site-to-Site VPN	Q Filter VPN connections		< 1 > @
connections Client VPN endpoints	VPN ID: vpn-0d2671318be47c28e X Clear filters		
AWS Verified Access	Name \bigtriangledown VPN ID \bigtriangledown State	▽ Virtual private gateway ♡ Transit gateway	
Verified Access instances	● MySQL-VPN vpn-0d2671318be47c28e ^(C) Pending	vgw-09d5fcfd127de5c1b –	cgw-0d4728ff9
New			



47. For Vendor and Platform, select Generic. For IKE version, select ikev2. Click Download afterwards.

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🙋 EC2 🛛 VPC 🔯 RDS	00 IAM 🔁 S3			
 Virtual private network (VPN) 				
Customer gateways				
Virtual private gateways		Download configuration	×	
Site-to-Site VPN connections		Choose the sample configuration you wish to download based on your customer		
Client VPN endpoints		gateway. Please note these are samples, and will need modification to use Advanced Algorithms, Certificates, and/or IPv6.		
AWS Verified Access		Vendor The manufacturer of the customer gateway device (for example, Cisco Systems, Inc).		
Verified Access instances		Generic		
Verified Access trust providers <u>New</u>		Platform The class of the customer gateway device (for example, J-Series).		
Verified Access groups New		Generic		
Verified Access endpoints		Software		
Transit gateways		The operating system running on the customer gateway device (for example, ScreenOS). Vendor Agnostic	a l	
Transit gateways				
Transit gateway attachments		IKE version The IKE version you are using for your VPN connection.	_	
Transit gateway policy tables		ikev2		
Transit gateway route tables		Cancel Download		
Transit gateway multicast				
▼ Traffic Mirroring	Jage	© 2023, Amazon Web Services, I	nc. or its affiliates.	Privacy Terms Cookie preferences

 Open the downloaded configuration file in your text editor of choice. Look under IPSec Tunnel #1, section #1 Internet Key Exchange Configuration. Here you find your automatically generated Pre-Shared Key for your tunnel. Save this value.

41	vpn-088ae880a93d15855.txt ×	
19		Parton. District View Market I USA - 2000- PATA-server District View Market
2:	1 #1: Internet Key Exchange Configuration	Barran Contractor
	3 Configure the IKE SA as follows:	Marine Marine
	4 Please note, these sample configurations are for the minimum requirement of AES128, SHA1, and DH Group 2.	RANDON CONTRA-
2!	5 Category "VPN" connections in the GovCloud region have a minimum requirement of AES128, SHA2, and DH Group 14.	1977
20	6 You will need to modify these sample configuration files to take advantage of AES256, SHA256, or other DH groups like 2, 14–18, 22, 23, and 24.	BURGER STREET
		Bran Bar
28		
29	9 Higher parameters are only available for VPNs of category "VPN," and not for "VPN-Classic".	PAR SHIRESON
30	Ø The address of the external interface for your customer gateway must be a static address.	20220°
	1 Your customer gateway may reside behind a device performing network address translation (NAT).	Bicoscillor on the
32	2 To ensure that NAT traversal (NAT-T) can function, you must adjust your firewall !rules to unblock UDP port 4500.	
33	If not behind NAT, and you are not using an Accelerated VPN, we recommend disabling NAT-T. If you are using an Accelerated VPN, make sure that NAT-T is enabled.	
	4 - IKE version : IKEv2	
3!	5 - Authentication Method : Pre-Shared Key	
30		
31		
39		
40		
43		
43	3 #2: IPSec Configuration	
	1 Characters selected Spaces: 2	Plain Text

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Note: AWS might generate a pre-shared key using the period or underscore characters (. or _). OCI does not support using those characters in a pre-shared key. A key that includes these values must be changed. To change your pre-shared key in AWS for a tunnel, select your VPN connection, click the Actions button, then Modify VPN Tunnel Options. Select the IPSec Tunnel #1 Virtual Private Gateway outisde IP address from the drop-down (you can find this in the AWS downloaded configuration file). Remove the period or characte d click **S**a do c fr - h

underscore characters	from your	nra charad kay	and click Se	avo changos
underscore characters	nom your	pre-snareu key		ave changes.

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🗗 EC2 🖓 VPC 🔯 RDS 🧕	IAM 🔁 S3		
 Virtual private network (VPN) 	VPN connections (1/1) Info	C Actions 🔺 Download conf	figuration Create VPN connection
Customer gateways	Q Filter VPN connections	Edit static routes	< 1 > 🐵
Virtual private gateways		Modify VPN connection	
Site-to-Site VPN	Name \triangledown VPN ID \triangledown	State V Modify VPN tunnel certificate	ansit gateway \bigtriangledown Customer gate
connections	MySQL-VPN vpn-0d2671318be47c28e	O Available Modify VPN connection options	cgw-0d4728ff9
Client VPN endpoints		Modify VPN tunnel options	
AWS Verified Access		Replace VPN tunnel	

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EC2 🖸	с 🕝 VPC	tos RDS	61 IAM	🔁 S3											
VPC	VPN con	nections	> von-Oc	d2671318be47c28e	Modify VE	PN tunnel options									Ġ
VEC	/ VPN CON	nections	/ vpn-oc	1207131000470200	· / Moully VP	FN turnet options									
Mo	odify V	PN tı	unnel	options Int	o										
Seleo	ct a VPN tunn	el based o	on the tunne	els outside IP addre	ss to modify its	ipsec options.									
D	Oetails														
v	'PN connectio	۱D													
ć	v pn-0d2671	318be47	c28e												
v	'PN tunnel out	side IP ad	dress												
	Select tunnel	outside IP	address												
	۹								_						
	3 Down Ipsec i	s down					Cancel	Save changes							
	1 Down Ipsec i	s down													
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🙋 EC2 🖓 VPC 🙀 RDS 🔤 IAM 🔂 S3			
VPC > VPN connections > vpn-0d2671318be47c28e > Modify VPN tunnel options			١
Modify VPN tunnel options			
Select a VPN tunnel based on the tunnels outside IP address to modify its ipsec options.			
Details			
VPN connection ID Vpn-od2671318be47c28e			
VPN tunnel outside IP address			
Inside IPv4 CIDR A size /30 IPv4 CIDR block from the 169.254.0.0/16 range.			
Pre-shared key The pre-shared key must have 8-64 characters. Valid characters: A-Z, a-z, 0-9, _ and . The key cannot begin	n with a zero.		



49. While still under Tunnel 1 in the downloaded configuration, scroll down to section **#3 Tunnel Interface Configuration**. Here, note down all the values for **Outside IP Addresses** and **Inside IP Addresses**.

Scroll down to section **#4: Border Gateway Protocol (BGP) Configuration** and note down the **Virtual Private Gateway ASN** value.

85	The Customer Gateway outside IP address was provided when the Customer Gateway
86	was created. Changing the IP address requires the creation of a new
87 88	Customer Gateway.
89	The Customer Gateway inside IP address should be configured on your tunnel
90	interface.
91	
92	Outside IP Addresses:
93	- Customer Gateway : 1.1.1.1
94	– Virtual Private Gateway : 3
95	
96	Inside IP Addresses - Customer Gateway : 169.
97 98	– Customer Gateway : 169. – Virtual Private Gateway : 169.
99	- Virtuat Frivate Gateway . 109.
100	Configure your tunnel to fragment at the optimal size:
101	– Tunnel interface MTU : 1436 bytes
102	
103	<pre>#4: Border Gateway Protocol (BGP) Configuration:</pre>
104	
	The Border Gateway Protocol (BGPv4) is used within the tunnel, between the inside
106 107	IP addresses, to exchange routes from the VPC to your home network. Each
107	BGP router has an Autonomous System Number (ASN). Your ASN was provided to AWS when the Customer Gateway was created.
109	to And when the customer dateway was created.
110	BGP Configuration Options:
111	
112	– Virtual Private Gateway ASN : 64512
113	
114	– Neighbor Hold Time : 30

50. Log back in to <u>OCI</u>. From the OCI Navigation menu, navigate to **Networking**, click **Customer connectivity**, and click on **Customer-premises equipment**.

51. Click Create CPE.

ORACLE Cloud	Search resources, services, docum	nentation, and Marketplace		US East (Ashburn) 🗸	ŝ	40	0	90				
Networking > Customer connectivit	/ > Customer-premises equipment				45							
Customer connectivity		Customer-premises equipment in (root) Compartment										
Overview	Configure your on-premises network (VCN).	device (the customer-premises equipment, or CPE) a	at your end of the Site-to-Site VPN so traffic can fl	ow between your on-premise	es netwo	ork and vir	ual clou	bu				
Site-to-Site VPN	Create CPE											
FastConnect	Name	IP address	Created					-				
Dynamic routing gateway												
Customer-premises equipment			No items found.									
100000000000000000000000000000000000000				5	Showing	0 items	< 1 of	1 >				
List scope												
Compartment												
(root)	0											

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52. Enter a **CPE name**. For the **Public IP address**, input the **Outside IP Address of the Virtual Private Gateway** - you can find this in the configuration file downloaded from AWS. For **CPE Vendor**, select **Other** from the dropdown. Click **Create CPE**.

Ξ	CRACLE Cloud	Search resources, services, documen	ation, and Marketplace		US East (Ashburn) 🗸	$\overline{\mathbf{O}}$	\$ (?) 🌐	9
	Create CPE							F	lelp
	Name								
	MySQL-CPE								
	Create in compartment								
	ı (root)							:	2
	Allow IPSec over FastConnect								
	IP address								_
	3								
	This IP address will be used as your CPE IKE	E identifier.							
	Cpe vendor informat	ion (i)							
	Vendor 🕡	Ū.							
	Other							¢	
	Add tags to organize your resource	es. What can I do with tagging?							
	Tag namespace		Tag key	Tag value					
	None (add a free-form tag)	\$							
							Ac	ld tag	
	Create CPE Save as stack	Cancel							
	Terms of Use and Privacy Cookie Prefer	rences			Copyright © 2023, Oracle a	and/or its a	affiliates. All	rights rese	rved.

- 53. From the OCI Navigation menu, navigate to **Networking** and click on **Site-to-Site VPN**.
- 54. Click Create IPSec connection.

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Networking > Customer connectivit	y » Site-to-Site VPN	1. Salar									
Customer connectivity	nnectivity Site-to-Site VPN in (root) Compartment Site-to-Site VPN securely connects your on-premises corporate network to Oracle Cloud Infrastructure, using your existing internet connection.										
Overview		Site-to-site VPN securely connects your on-premises corporate network to Oracle Cloud intrastructure, using your existing internet connection. If your users have client devices that need offsite access to Oracle Cloud resources, you can also create an OpenVPN access server. See their marketplace solution.									
Site-to-Site VPN FastConnect	Create IPSec connection Start VPN wizard										
Dynamic routing gateway	Name	Lifecycle state	Customer-premises equipment	Dynamic routing gateway	c	reated					
Customer-premises equipment			No items fou	nd.							
List scope					Showi	ng 0 iten	ns <	1 of 1	>		
Compartment (root)	٥										



55. Enter a **IPSec connection name**. Under **Customer-premises equipment** dropdown, select the CPE we previously created. For **Dynamic routing gateway compartment** select the DRG we created. For **Routes to your on-premises network**, enter **0.0.0.0/0**.

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Networking > Customer connectivity > Site-to-Site VPN	Create IPSec connection
Customer connectivity Site-to-Site VP Site-to-Site VPN securely con Overview If your users have client device Site-to-Site VPN	MySQL-VPN Create in compartment
FastConnect Dynamic routing gateway Customer-premises equipment	Image: state of the state o
List scope Compartment Troot)	Dynamic routing gateway compartment MySQL-DRG
Filters Dynamic routing gateway in ((root) (Change compartment)	table for that attachment type. To use static routing instead of BGP dynamic routing, provide at least one static route (an IPv4 CIDR block and optionally an IPv6 prefix). Otherwise, see the tunnel-specific options below to configure BGP or policy-based routing. You can also enter a unique local address (ULA) in place of an IPv6 prefix. Routes to your on-premises network
Any DRG	0.0.0/0 × Provide an IPv4 CIDR block or IPv6 prefix. Press enter after typing each one. Example: 10.0.0.0/24 or 2001:db2:6/126
Change compartment) Terms of Use and Privacy Cookie Preferences	Create IPSec connection Cancel Copyright © 2023, Oracle and/or its affiliates. All rights reserved.

56. While on the Create IPSec connection page, configure your **Tunnel 1**. Enter a **tunnel name**, check the **Provide custom shared secret** box, and input the **Pre-Shared Key** from the AWS VPN configuration file. For **IKE version**, select **IKEv2** and under **Routing type** - make sure **BGP dynamic routing** is selected.

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Networking > Customer connectivity > Si	ite-to-Site VPN		Create IPSec connection				E	Help			
Customer connectivity	0.110 10	Site VPN	✓ Tunnel 1								
Overview		N securely connect ave client devices th	Name Optional Tunnel-1								
Site-to-Site VPN FastConnect	Create IPSe	ec connection	Provide custom shared secret (i)								
Dynamic routing gateway Customer-premises equipment	Name	Lifecycle st	Shared secret								
List scope		252-1111/	IKE version (i)				\$				
Compartment (root)			Routing type ① BGP dynamic routing	Static routing	Policy based	routing					
Filters			The available routes are learned dy- namically through BGP. The Oracle router learns the routes from your on- premises network, and advertises your	Routes are static and not learned dy- namically. Here you provide routes to your on-premises network that you want the Oracle router to know about.	Use this option for device or if you red tion domains.	a policy based C					
Dynamic routing gateway in r (root) (<u>Change compartment</u>)			VCN's subnets to your on premises network.	Your network engineer must also con- figure your CPE device with static routes to the VCN's subnets.				a			
Any DRG			BGP ASN								
Customer-premises equipment in r(root) (Change compartment)			Create IPSec connection <u>Cancel</u>					1			
Terms of Use and Privacy Cookie Preference	s				Copyright © 2023, Oracle a	and/or its affiliates. A	Il rights rese	erved.			

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57. Under **BGP ASN**, input the **BGP Virtual Private Gateway ASN** from the AWS VPN configuration file. The default AWS BGP ASN is **64512**. For **IPv4 inside tunnel interface - CPE**, enter the **Inside IP Address of the Virtual Private Gateway**. For **IPv4 inside tunnel interface - Oracle**, enter the **Inside IP Address of the Customer Gateway**. You can find all this information from the AWS VPN configuration file.

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Networking > Customer connectivity > Si	te-to-Site VPN	Create IPSec connection			Help
Customer connectivity Overview Site-to-Site VPN FastConnect Dynamic routing gateway	Site-to-Site VPN Site-to-Site VPN securely connect If your users have client devices th Create IPSec connection	Routing type ③ BGP dynamic routing The available routes are learned dy- namically through BGP. The Oracle router learns the routes from your on- premises network, and advertises your VCN's subnets to your on premises network.	Static routing Routes are static and not learned dy- namically. Here you provide routes to your on-premises network that you want the Oracle router to know about. Your network engineer must also con- figure your CPE device with static routes to the VCN's submets.	Policy based routing Use this option for a policy based CPE device or if you require multiple encryp- tion domains.	
Customer-premises equipment List scope Compartment (root) Filters Dynamic routing gateway in Froot) (Change compartment)		BGP ASN 64512 IPv4 inside tunnel interface - CPE ③ 169. 169. /30 Provide IPv4 CIDR block: Example: 10.0.0.090 IPv4 inside tunnel interface - Oracle ④ 169. /30 Provide IPv4 CIDR block: Example: 10.0.0.031 IPv4 ODR block: Example: 10.0.0.031			
Any DRG		Show advanced options			
Terms of Use and Privacy Cookie Preference:	s			Copyright @ 2023, Oracle and/or its affiliates. All rights	s reserved.

58. Configure your **Tunnel 2** by copying and pasting the same values from Tunnel 1 into Tunnel 2. Click **Create IPSec connection**.

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Networking > Customer connectivity > 3	Site-to-Site VPN		Create IPSec connection			<u>Help</u>
Customer connectivity Overview	Site-to-Site VF	-Site VPN PN securely connect ave client devices th	 ✓ Tunnel 2 Name Optional Tunnel-2 			
Site-to-Site VPN FastConnect	Create IPS	ec connection	Provide custom shared secret (i)			
Dynamic routing gateway Customer-premises equipment	Name	Lifecycle st	Shared secret			
List scope			IKE version ① IKEv2			\$
Compartment (root)			Routing type ③ BGP dynamic routing	Static routing	Policy based routing	
Filters Dynamic routing gateway in (root) (Chance compartment)			The available routes are learned dy- namically through BGP. The Oracle router learns the routes from your on- premises network, and advertises your VCN's subnets to your on premises network.	Routes are static and not learned dy- namically. Here you provide routes to your on-premises network that you want the Orcale router to know about. Your network engineer must also con- figure your CPE device with static routes to the VCN's subnets.	Use this option for a policy based C device or if you require multiple enc tion domains.	
Any DRG			BGP ASN]		
Customer-premises equipment in root (Change compartment)			64512 Create IPSec connection Cancel			
Terms of Use and Privacy Cookie Preference	es				Copyright @ 2023, Oracle and/or its affiliates, A	Il rights reserved

Note: only Tunnel 1 will be used for this VPN connection and migration. We need to configure Tunnel 2 otherwise we cannot click Create IPSec connection.



59. After your IPSec connection is provisioned, make note of the **Oracle VPN IP Address** of **Tunnel-1**. This address will be used to create a new customer gateway in the AWS portal.

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Networking > Customer connectivity >	Site-to-Site VPN >	MySQL-VPN										
	(i) Afte	r creating an IPSec connec	ction, your configuration i	nformation will be available und	der the CPE & tunnels informatic	on tab under IPSec connection	ns.		Close	•		
	MySQ	MySQL-VPN										
	Edit Cr	noose new compartment	Add tags Open CP	E configuration helper	ninate							
	IPSec c	onnection information	CPE & tunnels in	formation Tags								
AVAILABLE		ute CIDR block: Not in use	1		OCID:hgydda Show Copy							
		Created: Wed, Sep 20, 2023, 13:22:29 UTC DRG: MySQL-DRG Site-to-Site VPN version: v2 () CPE: MySQL-CPE										
Resources	Tunnel	s in r	oot) Compar	tment								
Tunnels (2)	Name	Lifecycle state (i)	IPSec status (i)	Oracle VPN IP address	IPv4 BGP status (i)	IPv6 BGP status (i)	Routin	g type				
Dynamic routing gateway attachments (2)	Tunnel-1	Available	Down	150.1			BGP dy	namic routir	ng	:		
Logs	Tunnel-2	Available	Down	150.1		-	BGP dy	namic routir				
								Showi	ng 2			

60. Log back in to <u>AWS</u>. Expand the Services menu at the top left of the screen. Navigate to **Networking & Content Delivery** and select **VPC**. From the left-hand menu, scroll down and click **Customer Gateways** under Virtual private network (VPN). Click **Create customer gateway** once you have landed on the appropriate page.

<u> </u>		
aws Services Q Searc	h [Option+S]	ב 👃 🕐 Ohio ד
	IAM 🔁 S3	
Virtual private network		
(VPN)	Customer gateways (1) Info	C Actions Create customer gateway
Customer gateways		
	Q Filter customer gateways	< 1 > @
Virtual private gateways		
Site-to-Site VPN	Name ▽ Customer gateway ID ▽ State ▽ BGP ASM	
connections		
Client VPN endpoints	○ Temp-Gateway cgw-0d4728ff9e1ffc33d ⊘ Available 31898	1.1.1.1 ipsec.1
cache er re enapoints		



61. Enter a customer gateway name. For BGP ASN, enter 31898 and for IP address, enter the Oracle VPN IP address for tunnel 1. Leave everything as-is and click Create customer gateway.

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🧿 EC	🕼 VPC 🔯 RDS 🔠 IAM 🕞 S3							
	> Customer gateways > Create customer gateway							٩
Cr	eate customer gateway Info							
A cu netv	tomer gateway is a resource that you create in AWS that represents the customer gal ork.	eway device in your on-premises						
	etails							
	ime tag - optional eates a tag with a key of 'Name' and a value that you specify.							
	MySQL-CG							
E	lue must be 256 characters or less in length. SP ASN Info e ASN of your customer gateway device.							
	31898							
 	lue must be in 1 - 2147483647 range. address Info ecify the IP address for your customer gateway device's external interface. 150.							
	r tificate ARN e ARN of a private certificate provisioned in AWS Certificate Manager (ACM).							
	elect certificate ARN							
	tvice - optional ter a name for the customer gateway device.							
	Enter device name							
Cloud	hell Feedback Language	© 2023, Amazon Web Service	s, Inc. or its affi	liates.	Privacy	Terms	Cookie preferen	ces

62. From the left-hand AWS menu, scroll down and click **Site-to-Site VPN Connections** under Virtual Private Network (VPN). Select your VPN connection and click the **Actions** button, then **Modify VPN connection**.

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🛃 EC2 🔏 VPC 🔯 RDS 🧕	📴 IAM 🔁 53	
 Virtual private network (VPN) 	VPN connections (1/1) Info	Actions Download configuration Create VPN connection
Customer gateways	Q Filter VPN connections	Edit static routes < 1 > @
Virtual private gateways	VPN ID: vpn-0d2671318be47c28e X Clear filters	Modify VPN connection
Site-to-Site VPN	Clear filters	Modify VPN tunnel certificate
connections	Name VPN ID V State V	Modify VPN connection options ansit gateway v Customer gate
Client VPN endpoints		Modify VPN tunnel options
▼ AWS Verified Access	MySQL-VPN vpn-0d2671318be47c28e OAvailable	Replace VPN tunnel
Verified Access instances		Manage tags
New		Delete VPN connection
Verified Access trust		



63. You will land on the Modify VPN connection page. Under **Target type**, select **Customer gateway** and for **Target customer gateway**, select the **new Customer Gateway** (not the Temp). Click **Save changes**.

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6 EC2	🕅 VPC 🧑 RDS 🔠 IAM 🔁 S3							
Mod	VPN connections > vpn-0d2671318be47c28e > Modify VPN connection ify VPN connection Info arget type and the resource you would like to use.							٤
Deta	ils							
🗗 vp Curre	onnection ID n-0d2671318be47c28e ht VPN gateway							
Curre	w-09d5fcfd127de5c1b nt customer gateway w-0d4728ff9e1ffc33d							
Cha	ige target							
Targe	type							
Cus	omer gateway 🔻							
Targe	: customer gateway							
cgw	-037cdf4af5f57ce92 / MySQL-CG							
		Cancel	Save changes					
▶ CloudShell	Feedback Language			© 2023, Amazon Web Ser	vices, Inc. or its affili	ates. Privacy	Terms	Cookie preferences

64. After a few minutes, your modified VPN connection should change its **State** from Modifying to **Available**.

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🙋 EC2 🏾 🏠 VPC 🔯 RDS	53 IAM 📴 S3		
 Virtual private network (VPN) 	⊘ You successfully updated vpn-0d2671318be47c28e / MySQL-VPN.		× ©
Customer gateways	VDN connections (1/1)	C Actions ▼ Download configuration	Create VPN connection
Virtual private gateways	VPN connections (1/1) Info	C Actions Download configuration	Create VPN connection
Site-to-Site VPN	Q Filter VPN connections		< 1 > 💿
connections Client VPN endpoints	VPN ID: vpn-0d2671318be47c28e X Clear filters		
▼ AWS Verified Access	Name ∇ VPN ID ∇ Sta	ate $ abla Virtual private gateway abla Virtual gateway$	
Verified Access instances	• MySQL-VPN vpn-0d2671318be47c28e •	Available vgw-09d5fcfd127de5c1b –	cgw-037cdf4af
New			



65. The VPN connection from OCI to AWS is now setup. To verify if your VPN tunnel is up, select your VPN connection and go to the **Tunnel details** tab which can be found on the same page. You should see a **Status** of **Up** (this will take a few minutes).

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	IAM 🔁 \$3	
 Virtual private network (VPN) 	⊘ You successfully updated vpn-0d2671318be47c28e / MySQL-VPN.	× 0
Customer gateways Virtual private gateways	VPN connections (1/1) Info	C Actions Download configuration Create VPN connection
Site-to-Site VPN connections	Q Filter VPN connections	< 1 > 🐵
Client VPN endpoints	VPN ID: vpn-0d2671318be47c28e X Clear filters	
AWS Verified Access	Name \triangledown VPN ID \triangledown State	▽ Virtual private gateway ♡ Transit gateway ♡ Customer gate
Verified Access instances	• MySQL-VPN vpn-0d2671318be47c28e O Available	vgw-09d5fcfd127de5c1b – cgw-037cdf4af
New Verified Access trust	=	
providers New	vpn-0d2671318be47c28e / MySQL-VPN Info	
Verified Access groups New	Details Tunnel details Tags	
Verified Access endpoints New		
Transit gateways	A This VPN connection is not using both tunnels. This mode of operation is not highly as	vailable and we strongly recommend you configure your second tunnel.
Transit gateways Transit gateway attachments	Tunnel state	
Transit gateway policy	Tunnel number V Outside IP address V Inside IPv4 CIDR V Inside IPv6	CIDR ∇ Status ∇ Last status change ∇ Details ∇
tables Transit gateway route	Tunnel 1 3. 169. –	⊘ Up September 20, 2023, 9:35:11 (UTC-04:00) 2 BGP ROUTES
tables	Tunnel 2 18 169. –	(*) Down September 20, 2023, 9:35:34 (UTC-04:00) IPSEC IS DOWN
Transit gateway multicast		
▼ Traffic Mirroring	Tunnel 1 options Info	
▶ CloudShell Feedback Languag	je	© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

66. You can verify the same on the OCI side. Select your Site-to-Site VPN and under the Resources, click **Tunnels** (the page where you got the Oracle VPN IP address). You should see an **Up** status for **IPSec status** and **IPv4 BGP status**.

E ORACLE Cloud						US East (Ashburn)	~ 🖸 🗘 🕐	
Networking > Customer connectivit	y » Site-to-Site VPN »	MySQL-VPN						
	MySQ	L-VPN						
	Edit Cr	noose new compartment	Add tags Open C	PE configuration helper Term	inate			
	IPSec c	onnection information	CPE & tunnels ir	nformation Tags				
	Static ro	ute CIDR block: Not in us	se (all tunnels use BGP) <u>S</u>	ihow (i)	OCID:hgydda Show Copy			
11.1	Created:	Wed, Sep 20, 2023, 13:22	2:29 UTC	1	DRG: MySQL-DRG			
AVAILABLE	Site-to-S	ite VPN version: v2 (i)			CPE: MySQL-CPE			
Resources	Tunnel	IS in (I	root) Compa	Oracle VPN IP address	IPv4 BGP status (i)	IPv6 BGP status (\hat{i})	Routing type	
Dynamic routing gateway attachments (2)	Tunnel-1	Available	• Up	150.	• Up	Down	BGP dynamic routing	g i
Logs	Tunnel-2	Available	Down	150.	Down	Down	BGP dynamic routing	g
							Showin	ig 2 items
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67. We are now ready to perform the migration.

34 Migration Guide: Amazon RDS to HeatWave MySQL on Oracle Cloud Infrastructure (OCI)

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III) On OCI, create a HeatWave MySQL instance.

68. From the OCI Console, click on the navigation menu, click **Databases**, and click **HeatWave MySQL**. Click

Create DB System.			-				-		
Cloud							US Eas	t (Ashburn) 🗸 🗔	△ ⑦ ⊕ €
MySQL DB Systems	() <u>Sh</u>	Syster	ents	(root) (Compartmen	it			
Backups Channels		Name	DB System State	Crash Recovery	Delete Protected	High Availability	HeatWave Cluster	HeatWave State	Created
Configurations				No DB sy	stems were found using	the selected compartm	ent and filters		
	0 sel	ected						Showing	0 items < 1 of 1 >
List scope									

69. Pick **Production** or **Development or testing** and enter **a MySQL DB system name**.

E ORACLE Cloud	Search resources, services, documentation, and Marketplace	US East (Ashburn) √ [7] (♪ (?) ⊕ 🔮
Create DB syster	n	
Production Sets up a high availability DB s	ystem with recommended defaults for a production environment. \checkmark	Development or testing Sets up a standalone DB system with recommended defaults for a development or testing environment.
Provide DB system Create in compartment (root)	information	5
Name MySQL-HW		
The user-friendly name for the DB syst Description Optional	tem. It does not have to be unique.	
User-provided data about the DB syste	em.	

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70. Select **Standalone** or **High Availability**. Turn **ON** the button for HeatWave MySQL - if you want to run OLTP, OLAP, and ML workloads. Afterwards, create your **Administrator credentials** that will be used to manage the HeatWave MySQL database.

= ORACLE Cloud Classic > Search resources, services, documentation, and Marketplace US East (Ashburn) V 🕢 🗘 🕐 🔀 🔾								
Create DB System								
Standalone Single-instance DB system	High availability Run a DB system with 3 MySQL instances providing automatic failover and zero data loss							
Configure MySQL HeatWave MySQL HeatWave Show shapes and configurations that support HeatWave for accelerated query processing, which is suitable for running both OLTP and OLAP of	orfiloads. The default data storage size is 1.024 GB.							
Create administrator credentials Username ③ admin								
Password								
Confirm password								
Configure networking Collapse								

71. For **Configuring Networking** - choose the earlier created VCN and make sure the **Private Subnet** is selected under **Subnet in <compartment-name>**. For **Configure Placement** leave it as-is.

ORACLE Cloud Search resources, services, documental		US East (Ashburn) 🗸 👩 🌐
Create DB system		
Configure networking The VCN and subnet where the DB system endpoint will be attached. The VCN, create a VCN, Virtual cloud network in Change compartment)	DB system endpoint uses a private IP address and is not directly accessible	<u>Collapse</u> from the internet. <u>How do I connect to a DB system?</u> If you do not have a
MySQL-VCN		•
Subnet in (Change compartment) private subnet-MySQL-VCN (Regional)		\$
Configure placement		Collapse
The <u>availability domain/fault domain</u> in which the DB system endpoint will Availability domain	be physically placed. It is recommended to allow Oracle to choose the best	placement for the fault domain.
AD-1 ODIL:US-ASHBURN-AD-1	AD-2 Qdfl:US-ASHBURN-AD-2	AD-3 QDrl:US-ASHBURN-AD-3
Choose a fault domain If you do not select a fault domain, Oracle will choose the best placement for you.		Ū.
Create Save as stack Cancel		
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72. **Configure hardware** (OCPU and Memory) for MySQL by choosing an appropriate DB Shape. For this guide, we will use the default HeatWave shape. For the **Data Storage Size** be sure to make the size large enough for future growth.

ORACLE Cloud Search resources, services, documentation, and Marketplace	US East (Ashburn) 🗸		Ĵ (?		0
Create DB system					
Configure hardware Select a shape				Collapse	
MySQL.HeatWave.VM.Standard CPU core count: 16 Memory size: 512 GB Max network bandwidth: 16Gbps		Char	nge shaj	De	
A shape determines the number of OCPUs, memory, and other resources allocated to a MySQL instance of a DB system. The performance of a DB system depends on the shape you select. A shape has associated confis advanced options. See succorted ahares. Data storage size (GB)	gurations, which you can select ir	the Configur	ation tab u	inder Show	
1024 Storage allocated for data and log files. Storage size impacts IOPS and throughput. Data storage size must be an integer between 50 and 131,072. Total IOPS: 76800 Total throughput: 600 MB					
Configure bookup plan					
Create Save as stack Cancel Terms of Use and Privacy Cookie Preferences	Copyright © 2023, Oracle	nd/or its affi	liates. All	rights rese	rved.

73. **Configure a backup plan** according to what suits your needs. Lastly, scroll down until you see **Show advanced options**. Click on it to expand.

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Create DB System					
1024					
Storage allocated for data and log files. Storage size impacts IOPS and throughput. Data storage size must be an integer between 50 and 131,072.					
Total IOPS: 76800					
Total throughput: 600 MB					
Configure backup plan Enable automatic backups					
Enables automatic backups. You must also specify a retention period, and select a backup window. Backup retention period Optional ①					
7					
The retention period defines how long to store the backups, in days.					
✓ Enable point in time restore					
Enables you to restore from a DB system at a point in time.					
Select backup window					
The backup window start time defines the start of the time period during which your DB system is backed up.					
2 [∞] ₂ Show advanced options					
Create Save as stack Cancel					
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Deletion plan Configuration Connections Crash recovery Maintenance Data import Tags											
 Delete protected Protects the DB system against delete operations. To delete the DB system, this option must be disabled. By default, DB systems are not delete protected. Retain automatic backups Retain automatic backups after the DB system is deleted. By default, automatic backups are deleted if the DB system is deleted. 											
Require final backup Before deleting the DB system. By default, skip final backup.											
Create Save as stack Cance											
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74. From the advanced options screen, go to the **Configuration** tab. If you have a custom configuration that you would like to apply to your HeatWave MySQL instance - you can do so by clicking **Select configuration**. Custom configurations allow you to tweak MySQL variables (i.e., max connections, binary log expire seconds, etc.) rather than using the default values. You must create a custom configuration in advance before applying. For more information regarding custom configurations, see <u>Configuration of a DB System</u>. For this guide, we have chosen the default configuration.

Hide advanced o	ptions								
Deletion plan	Configuration	Connections	Crash recovery	Maintenance	Data import	Tags			
Select a configurat	ion Optional								
Using defa	ault configuration	for selected shap	oe MySQL.VM.Star	ndard.E4.4.64GB			Select configuration	Reset configuration	
MySQL version									
Select a MySQL	version								
Create Save as	stack Cancel								
Terms of Use and Privacy	Cookie Preferences						Copyright © 2023, Oracle	and/or its affiliates. All right:	s reserved.



75. For **MySQL version**, choose either **Innovation** or **Bug fix**. With the new MySQL versioning model, you have the flexibility to select an innovation or a bug fix release. Both releases are production-grade quality. MySQL innovation releases allows you to access the latest features and improvements. Innovation releases are ideal for fast-paced development environments with high levels of automated tests and modern continuous integration techniques for faster upgrade cycles. MySQL bug fix releases (aka long-term support releases) allow you to reduce the risks associated with changes in the database software behavior, as these releases only contain necessary fixes (bugfix and security patches). For more information regarding MySQL innovation and bug fix releases, see <u>Introducing MySQL Innovation and Bug fix versions</u>. For this guide, we have chosen **8.0.34 - Bug fix**.

Be Hide advanced	options								
Deletion plan	Configuration	Connections	Crash recovery	Maintenance	Data import	Tags			
Select a configura	ation Optional								
Usina def	ault configuration	for selected shar	be MySQL.VM.Star	ndard.E4.4.64GE	3				
			,				Select configuration	Reset configuration	
MySQL version Select a MySQL	version								ົ
8.0.34 - Bug fix									
8.0.33 - Bug fix	(Deprecated)								
8.0.32 - Bug fix	(Deprecated)								
8.0.31 - Bug fix	(Deprecated)								
8.0.30 - Bug fix	(Deprecated)								
8.1.0 - Innovatio	on								
Create Save as	stack Cancel								
erms of Use and Privacy	Cookie Preferences						Copyright © 2023, Oracle	and/or its affiliates. All rights r	eserved.

76. Click Create to finish the HeatWave MySQL DB system creation process.

Hide advanced options								
Deletion plan Configuration	Connections	Crash recovery	Maintenance	Data import	Tags			
Select a configuration Optional								
Using default configuration	for selected shap	e MySQL.VM.Sta	ndard.E4.4.64GB	l		Select configuration	Reset configuration	
MySQL version								
8.0.34 - Bug fix								
								_
Create Save as stack Cancel								
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77. Your HeatWave MySQL DB system will start **CREATING**.

	Search resources, services, documentation, and Marketplace		US East (Ashburn) 🗸	ি	۵	?	٢	0
MySQL HeatWave > DB systems >	DB system details							
	MySQL-HW							
DDO	Edit Start Stop Restart More actions 🕶							
DB2	DB system information Connections Tags							
	General information	High availability						
	OCID:yInguu7k5q Show Copy	High availability: Enabled (i)						
CREATING	Description: -	High availability type: Multi-AD						

78. Within a few minutes, HeatWave MySQL DB system will change its state from CREATING to **ACTIVE** once the instance is ready.

= ORACLE Cloud Sear	ch resources, services, documentation, and Marketplace		US East (Ashburn) 🗸	\bigcirc	\Diamond	?	٢	0
MySQL HeatWave » DB systems » DB sys	tem details							
	MySQL-HW							
DBS	Edit Start Stop Restart More actions •							
DDS	DB system information Connections Tags							
	General information	High availability						
ACTIVE	OCID:xfzg4pgbqq Show Copy	High availability: Disabled Enable (i)					
AUTIVE	Description: - Edit							

79. On the same DB system details page, click **Connections** to grab the **private IP address** for HeatWave MySQL. Save the private IP Address for later use.

E ORACLE Cloud	Search resources, services, documentation, and Marketplace	US East (Ashburn) ✓ 🕢 () ⊕ Q
MySQL HeatWave » DB systems »	DB system details	
	MySQL-HW	
	Edit Start Stop Restart More actions -	
DBS	DB system information Connections Tags	
	Networking	Endpoint
ACTIVE	Virtual cloud network: MySQL-VCN	Connect to the DB system using a MySQL client/connector via the endpoint below. How do Lconnect?
	Subnet: private subnet-MySQL-VCN Subnet type: Regional	Private IP address: 10.0.1.140 CORY (i)
	Cubice sport togicital	Internal FQDN: -
		MySQL port: 3306
		MySQL X protocol port: 33060

Note: you can navigate to the **DB System Details** page by going to the Navigation menu in OCI. Click **Databases** and click **HeatWave MySQL**. Click on the name of your MySQL DB System to open the **DB System Details** page.

IV) Install MySQL Shell 8.1 or above on an EC2 instance that can connect to Amazon RDS MySQL.

- 80. Login to <u>AWS</u>. From the Services menu, go to **Compute** and select **EC2**.
- 81. Click Launch instance.

aws Services Q Sear	ch [Option+S]	
🙋 EC2 🏾 🖓 VPC 🔯 RDS	ам 🔁 s3	
▼ Instances	Instances Info	C Connect Instance state V Actions V Launch instances V
Instances	Q. Find instance by attribute or tag (case-sensitive)	
Instance Types	Instance state = running X Clear filters	
Launch Templates		< 1 > @
Spot Requests	Name ▼ Instance ID Instance state	∇ Instance type ∇ Status check Alarm status Availability Zone ∇ Public IPv4 DN Constant Const
Savings Plans		No matching instances found
Reserved Instances		No matching instances round
Dedicated Hosts		
Capacity Reservations		

82. Enter an EC2 name. For Application and OS Images, select Red Hat Enterprise Linux 9.

llowing the simp			es, or instances,	that run on th	e AWS Cloud.	Quickly get started by	▼ Summary		
							Number of instances Info		
Name and t	ags Info						.1		
Name							Software Image (AMI)		
MySQL-EC2						Add additional tags	Provided by Red Hat, Inc. ami-02b8534ff4b424939		
							Virtual server type (instance type)		
 Applicati 	on and OS	Images (Am	iazon Machii	ne Image)	Info		t2.micro		
							Firewall (security group) New security group		
An AMI is a tem									
applications) re	quired to laund	in your instance	. Search of brow		you don't see	what you are looking for	Storage (volumer)		
applications) re below	quired to laund	n your instance	. Search or brow	ise for Amis ii	you don't see	what you are looking for	Storage (volumes) 1 volume(s) - 10 GiB		
below			f application and		you don't see	what you are looking for	1 volume(s) - 10 GiB		
below					you don't see	what you are looking for	1 volume(s) - 10 GiB ③ Free tier: In your first year includes ×		
below	full catalog in				you don't see	what you are looking for	1 volume(s) - 10 GiB Tree tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is		
Q Search our	full catalog in	cluding 1000s o	f application and	l OS images			1 volume(s) - 10 GiB		
below Q Search our	full catalog in				SUSE Lin	Q	1 volume(s) - 10 GiB Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million 105, 1 GB of snapshots, and 100 GB of bandwidth		
below Q Search our Quick Start Amazon	full catalog in	Ubuntu	f application and	d OS images Red Hat		Q Browse more AMIs Including AMIs from	1 volume(s) - 10 GiB Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million 10, 1 GB of		
Delow Q Search our Quick Start Amazon Linux	full catalog ini	cluding 1000s o	f application and	l OS images	SUSE Lii	Q Browse more AMIs	1 volume(s) - 10 GiB Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million 105, 1 GB of snapshots, and 100 GB of bandwidth		
Delow Q Search our Quick Start Amazon Linux	full catalog ini macOS	Ubuntu	f application and	d OS images Red Hat	SUSE Lii	Q Browse more AMIs Including AMIs from AWS, Marketplace and	1 volume(s) - 10 GiB Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million 105, 1 GB of snapshots, and 100 GB of bandwidth		



83. For **Instance type**, choose an instance type you think is appropriate. If you have large amounts of data - provisioning an EC2 with more vCPUs and Memory will speed up the migration process. For the **Key pair** section, you can use your existing keys or create a new pair. For this guide, we will use an existing key pair.

aws	Services Q Search	[Option+S]		2	¢	Ø 6) Ohio 🔻	
ē 👨	IC2 👍 VPC 😥 RDS 📴 IAM 🔁 S3							
≡	▼ Instance type Info		▼ Summary					٩
	Instance type		Number of instances Info					
	t2.micro Family-t2 1 vCPU 1 GiB Memory Current generation: true On-Demand Linux base pricing: 0.0116 USD per Hour On-Demand Winchows base pricing: 0.0116 USD per Hour On-Demand Witch base pricing: 0.0162 USD per Hour On-Demand HitEL base pricing: 0.0162 USD per Hour	Free tier eligible All generations Compare instance types	' Software Image (AMI) Provided by Red Hat, Inc. ami-02b83/#db42039					
	Additional costs apply for AMIs with pre-installed software		Virtual server type (instance type)					
	▼ Key pair (login) Info		Firewall (security group) New security group					
	You can use a key pair to securely connect to your instance. before you launch the instance.	Ensure that you have access to the selected key pair	Storage (volumes) 1 volume(s) - 10 GiB					
	Key pair name - required							
	MySQL-Key	▼ C Create new key pair	Free tier: In your first year includes X 750 hours of t2 micro (or t3 micro in					

84. Under Network settings, ensure that the correct VPC (the VPC that is associated with your RDS instance) and Subnet are selected. For this guide - we have decided to deploy the EC2 inside a public subnet. For Autoassign public IP select Enable. Under the Firewall (security groups), choose Create security group and have an Inbound security group rules like the below one, which allows SSH from anywhere.

Services Q Search		[Option+S]	D & Ø	Ohio ▼
🖓 VPC 🔯 RDS 🛅 IAM	₹ S3			
Network settings in	fo		▼ Summary	
VPC - required Info			Number of instances Info	
vpc-0e70c2c402d3ceb74 (M 10.1.0.0/16	ySQL-vpc)	▼ C	1	
Subnet Info				
subnet-0e8e28c5ae0c364d8 VPC: vpc-0e70c2c402d3ceb74 IP addresses available: 4090 CII	Owner: 528770944777 Availability Zone: us-east-2		Software Image (AMI) Provided by Red Hat, Inc. ami-02b8534ff4b424939	
Auto-assign public IP Info			Virtual server type (instance type)	
Enable		•	t2.micro	
Firewall (security groups) Inf A security group is a set of firewall instance.	o rules that control the traffic for your instance. Add ru	les to allow specific traffic to reach your	Firewall (security group) New security group	
• Create security group	Select existing security g	jroup	Storage (volumes) 1 volume(s) - 10 GiB	
Security group name - require	d			
launch-wizard-2			Free tier: In your first year includes ×	
	o all network interfaces. The name can't be edited aft z, A-Z, 0-9, spaces, and:/()#,@[]+=&;(]!\$*	er the security group is created. Max length is	750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is	
	al transfer al al al analogia analogia (fillingen al			
Inbound Security Group Rules				
Security group rule 1 (TCP, 2		Remove	Software Image (AMI)	
Security group rule 1 (TCP, 2	2, 0.0.0.0/0/	Remove	Provided by Red Hat, Inc. ami-02b8534ff4b424939	
Type Info	Protocol Info	Port range Info	Virtual server type (instance type)	
ssh	▼ ТСР	22	t2.micro	
Source type Info	Source Info	Description - optional Info	Firewall (security group)	
Anywhere	 Add CIDR, prefix list or security 	e.g. SSH for admin desktop	New security group	
	0.0.0.0/0 ×		Storage (volumes) 1 volume(s) - 10 GiB	
	0.0.0/0 allow all IP addresses to access your in allow access from known IP addresses only.	istance. We recommend setting $$ $$ $$ $$ $$	Free tier: In your first year includes X 750 hours of t2.micro (or t3.micro in	
Add security group rule]		the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS	
Advanced network config	uration		storage, 2 million IOs, 1 GB of snanshots and 100 GB of bandwidth	

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85. Leave everything as-is and click **Launch instance**.

▼ Configure storage Info	Advanced	New security group Storage (volumes)
1x 10 GiB gp2 The Root volume (Not encrypted) Image: Comparison of the second se	ie X Edit	1 volume(s) - 10 GIB
0 x File systems Advanced details Info	Edit	Cancel Launch instance Review commands
2) CloudShell Feedback Language		© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

86. You will be brought to a Next Steps page. Here, click **Connect to instance**.

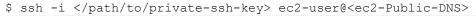
S 7	Services Q	Search	[Option+S]		ව 🗘 🕐 🕲 Ohio ▼ 🕛
EC2	G VPC 🔂 RDS				
	EC2 > Instances	> Launch an instance			
	⊘ Success	i .			
	Successfully in	nitiated launch of instance (<u>i-08d</u>	107ab77e1ee2513)		
	Launch log				
	Next Steps				
	Q What would	1 you like to do next with this inst	tance, for example "create alarm" or "create backup"		< 1 2 3 4 5 6 >
	Create billing alerts	g and free tier usage	Connect to your instance	Connect an RDS database	Create EBS snapshot policy
		and avoid surprise bills, set	Once your instance is running, log into it from your local computer.	Configure the connection between an EC2 instance and a database to allow traffic flow	Create a policy that automates the creation, retention, and deletion of EBS snapshots
	up email notifica tier usage thresh	ations for billing and free	Connect to instance	between them.	Create EBS snapshot policy
				Connect an RDS database [乙	
	Create billin	g alerts 🖸	Learn more 🖸	Create a new RDS database	

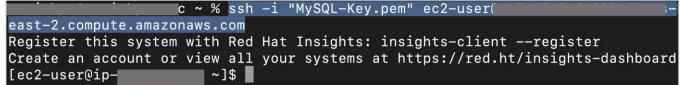
87. If you are using the SSH client to connect to your EC2, copy the **Example** SSH command and login to your EC2 instance.

aws	services Q Search [Option+S]	D.	¢	0	0	Ohio 🔻	•
0 EC2	: 😚 VPC 💀 RDS 📴 IAM 🔁 S3						
=	EC2 > Instances > i-08d07ab77e1ee2513 > Connect to instance						
	Connect to instance Info						
	Connect to your instance i-08d07ab77e1ee2513 (MySQL-EC2) using any of these options						
	EC2 Instance Connect Session Manager SSH client EC2 serial console						
	Instance ID						
	i-08d07ab77e1ee2513 (MySQL-EC2)						
	1. Open an SSH client.						
	2. Locate your private key file. The key used to launch this instance is MySQL-Key.pem						
	3. Run this command, if necessary, to ensure your key is not publicly viewable.						
	4. Connect to your instance using its Public DNS:						
	- east-2.compute.amazonaws.com						
	O Command copied						
	□ ssh -i "MySQL-Key.pem" ec2-user@e						



88. You can SSH into EC2 using the below command:





Note: after running the above SSH command, if prompted **Are you sure you want to continue connecting** (yes/no/[fingerprint])?, type yes.

- 89. We are now successfully connected to the EC2 instance.
- 90. After making a connection to the EC2 instance, go to the below website and download MySQL Shell 8.1 on your EC2 instance. From the MySQL Shell download page, ensure 8.1.x Innovation or higher is selected under Select Version. MySQL Shell 8.1 is fully compatible with MySQL 8.1, 8.0, and 5.7. For Operating System and OS Version pick the appropriate option depending on the OS and the OS Version that you are running. Click Download.

https://dev.mysql.com/downloads/shell/

MySQL Shell	ads			
General Availability (GA) Releases Archives	4)			
MySQL Shell 8.1.1 Innovation				
Select Version:				
8.1.1 Innovation	~			
Select Operating System:				
Red Hat Enterprise Linux / Oracle Linux	\sim			
Select OS Version:				
Red Hat Enterprise Linux 9 / Oracle Linux 9 (x86, 6	4-bit) 🗸			
RPM Package	8.1.1	23.4M	Download	
(mysql-shell-8.1.1-1.el9.x86_64.rpm)		MD5:86884e81bd1cf56	cabced6aef083b4bcb	
RPM Package, Debug Information	8.1.1	501.6M	Download	
(mysql-shell-debuginfo-8.1.1-1.el9.x86_64.rpm)		MD5: a0b5bb6f3ddbdc	96807c91a04cb04aa6	

Note: for this guide, we will show you how to install MySQL Shell on a Linux environment. For other environments, see <u>Installing MySQL Shell on Windows</u>, <u>Installing MySQL Shell on Linux</u>, and <u>Installing MySQL</u> <u>Shell on macQS</u>.

91. Right-click on No thanks, just start my download and click Copy link address.

-	nity Down	loaus	
Login Now or Sign Up for a fre	ee account.		
An Oracle Web Account provides you	with the following	advantages:	
 Fast access to MySQL software dow 	vnloads		
Download technical White Papers a	and Presentations		
• Post messages in the MySQL Discu	ssion Forums		
 Report and track bugs in the MySQ 	L bug system		
	ogin » racle Web account	Sign Up » for an Oracle Web account	
	racle Web account	for an Oracle Web account	nt, click
using my Or	f Open Link in New	for an Oracle Web account	nt, click
using my Or MySQL.com is using Oracle SSO	racle Web account Open Link in New	for an Oracle Web account Tab Window	nt, click
using my or MySQL.com is using Oracle SSO the Login link. Otherwise, you ca	racle Web account f Open Link in New al Open Link in New	for an Oracle Web account Tab Window	nt, click
using my or MySQL.com is using Oracle SSO the Login link. Otherwise, you ca following the instructions.	acle Web account	for an Oracle Web account Tab Window gnito Window	nt, click
using my or MySQL.com is using Oracle SSO the Login link. Otherwise, you ca	acle Web account	for an Oracle Web account Tab Window gnito Window	nt, click

- 92. Go back to the EC2 instance that can connect to your Amazon RDS MySQL and execute the below command to download MySQL Shell:
 - \$ wget <MySQL-Shell-Download-Link>

Replace the link with what you have.

\$ wget https://dev.mysql.com/get/Downloads/MySQL-Shell/mysql-shell-8.1.1-

1.el9.x86 64.rpm [ec2-user0 ~]\$ wget https://dev.mysql.com/get/Downloads/MySQL-She ll/mysgl-shell-8.1.1-1.el9.x86 64.rpm --2023-09-20 15:45:58-- https://dev.mysql.com/get/Downloads/MySQL-Shell/mysqlshell-8.1.1-1.el9.x86_64.rpm Resolving dev.mysql.com (dev.mysql.com)... 23.8.77.254, 2600:1407:b800:488::2e3 1, 2600:1407:b800:484::2e31 Connecting to dev.mysql.com (dev.mysql.com)|23.8.77.254|:443... connected. HTTP request sent, awaiting response... 302 Moved Temporarily Location: https://cdn.mysgl.com//Downloads/MySQL-Shell/mysgl-shell-8.1.1-1.el9. x86_64.rpm [following] --2023-09-20 15:45:58-- https://cdn.mysgl.com//Downloads/MySQL-Shell/mysgl-she ll-8.1.1-1.el9.x86_64.rpm Resolving cdn.mysql.com (cdn.mysql.com)... 23.60.78.219, 2600:1407:b800:4ae::1d 68, 2600:1407:b800:4b1::1d68 Connecting to cdn.mysgl.com (cdn.mysgl.com)|23.60.78.219|:443... connected. HTTP request sent, awaiting response... 200 OK Length: 24542157 (23M) [application/x-redhat-package-manager] Saving to: 'mysql-shell-8.1.1-1.el9.x86_64.rpm' in 0.8s 2023-09-20 15:46:00 (28.0 MB/s) - 'mysql-shell-8.1.1-1.el9.x86_64.rpm' saved [2 4542157/24542157]

Note: to install wget on the EC2, execute:

\$ sudo yum install wget

93. After downloading the MySQL Shell rpm, install MySQL Shell:

y sudo yum rocarris	stall mysql-shell*							
[ec2-user@) yum localinstal	l mysql-shell*					
Updating Subscription Management repositories.								
Unable to read c	onsumer identity							
This system is not registered with an entitlement server. You can use subscript ion-manager to register.								
	Last metadata expiration check: 0:00:30 ago on Wed 20 Sep 2023 03:54:28 PM UTC. Dependencies resolved.							
Package	Architecture	Version	Repository	Size				
Package ====================================	Architecture	Version	Repository	======== Size ========				
=======================================		Version 	Repository 	Size 23 M				
<pre>Installing:</pre>	x86_64							

94. You can now verify if MySQL Shell has successfully installed on your EC2 instance by executing the below command:

\$ mysqlsh -versi	on							
[ec2-user@ip-		~]\$ mysc	ılshveı	sion				
mysqlsh Ver er (GPL))	8.1.1 for	Linux on	x86_64 -	for MySQL	8.1.0	(MySQL	Community	Serv
[ec2-user@ip-		~]\$						

95. To login to your Amazon RDS MySQL using MySQL Shell, use the below commands:

\$ mysqlsh <user>@<hostname>:<port-number>

-OR-

\$ mysqlsh -u <user> -p -h <hostname> -P <port-number></port-number></hostname></user>
[ec2-user@ip-: ~]\$ mysqlsh admin@database-1us-east-2.rd
s.amazonaws.com
Please provide the password for 'admin@database-1
azonaws.com': ******
Save password for 'admin@database-1us-east-2.rds.amazonaws.com'?
[Y]es/[N]o/Ne[v]er (default No): Y
MySQL Shell 8.1.1
Copyright (c) 2016, 2023, Oracle and/or its affiliates.
Oracle is a registered trademark of Oracle Corporation and/or its affiliates.
Other names may be trademarks of their respective owners.
Type '\help' or '\?' for help; '\quit' to exit.
Creating a session to 'admin@database-1
m'
Fetching schema names for auto-completion Press ^C to stop.
Your MySQL connection id is 288
Server version: 5.7.37 Source distribution
No default schema selected; type \use <schema> to set one.</schema>
MySQL database-1us-east-2.rds JS >

Note: you can interact with MySQL Shell using JavaScript, Python, or SQL mode. The default is JavaScript. To switch between the different modes, execute /js for JavaScript, /py for Python, and /sql for SQL mode inside MySQL Shell. To exit out of MySQL Shell, execute /q.



V) Connect to Amazon RDS MySQL using MySQL Shell on EC2. Afterwards, execute the MySQL Shell util.copyInstance() utility to export all schemas (including users, indexes, routines, triggers) from Amazon RDS MySQL to HeatWave MySQL on OCI.

- 96. Before connecting to Amazon RDS MySQL using MySQL Shell and proceeding with the below steps, it is highly recommended that you use a command like **screen** or **tmux**. These commands will allow you to reconnect to a dropped session in case your connection drops in the middle of performing the MySQL Shell export using util.copyInstance(). For small databases, the screen or tmux may not be necessary. For this guide, we will use tmux. To learn more about tmux, see <u>A beginner's guide to tmux</u>. Below are the basics of using the tmux command:
 - Install tmux on Linux: \$ sudo yum install tmux
 - Start a new tmux session, from your terminal execute: \$ tmux
 - List all the active tmux sessions: \$ tmux ls
 - Detach from a tmux session and leave it running in the background: \$ Ctrl+B d
 - Attach a tmux session running in the background: \$ tmux attach
 - End a tmux session: \$ Ctrl+B &
- 97. Start a tmux session and connect to your Amazon RDS MySQL using MySQL Shell on EC2.

\$ tmux

```
$ mysqlsh <user>@<hostname>:<port-number>
```

-OR-

```
$ mysqlsh -u <user> -p -h <hostname> -P <port-number>
```

[ec2-user@ [ec2-user@	~]\$ tmux ~]\$ mysqlsh admin@databa	se-1.(.us-east-2.rd
s.amazonaws.com		
MySQL Shell 8.1.1		
	3, Oracle and/or its affil:	
	emarks of their respective	ation and/or its affiliates. owners.
Type '\help' or '\?' for	r help: '\quit' to evit	
Creating a session to 'a		.us-east-2.rds.amazonaws.co
m'		
	or auto-completion Pres	s ^C to stop.
Your MySQL connection id		
Server version: 5.7.37 S	ource distribution	
	ted; type \use <schema<u>> to</schema<u>	
MySQL database-1.c	.us-east-2.rds JS	>

98. Change to the JavaScript mode of MySQL Shell and run the util.copyInstance() utility to export all Amazon RDS MySQL data into HeatWave MySQL on OCI.

```
MySQL JS> \js
MySQL JS> util.copyInstance('mysql://admin@10.0.1.39', {"compatibility":
["force_innodb", "skip_invalid_accounts", "strip_definers",
"strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants",
"strip_invalid_grants", "create_invisible_pks"], users: "true", threads: 4,
dryRun:"true"})
```

Note: replace the username (admin) and IP address (10.0.1.39) with your HeatWave MySQL username and IP address (not the Amazon RDS MySQL username and IP address).

MySQL database-1. .us-east-2.rds.amazonaws JS > util.copyInstance('mysgl://admin@ 10.0.1.39', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_definers", "str ip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip_invalid_grants", "create_invisible_pks"], users: "true", threads: 4, dryRun:"true"}) Please provide the password for 'admin@10.0.1.39': ******* Save password for 'admin@10.0.1.39'? [Y]es/[N]o/Ne[v]er (default No): Y Copying DDL, Data and Users from in-memory FS, source: ip :3306, target: klgbkf63cr stdaur:3306. SRC: dryRun enabled, no locks will be acquired and no files will be created. NOTE: SRC: Backup lock is not supported in MySQL 5.7 and DDL changes will not be blocked. The dump may fail with an error if schema changes are made while dumping. SRC: Acquiring global read lock WARNING: SRC: The current user lacks privileges to acquire a global read lock using 'FLUSH TAB LES WITH READ LOCK'. Falling back to LOCK TABLES... ERROR: SRC: The current user does not have required privileges to execute FLUSH TABLES WITH RE AD LOCK. Backup lock is not supported in MySQL 5.7 and DDL changes cannot be blocked. The gtid_mode system variable is set to OFF or OFF_PERMISSIVE. The log_bin system variable is set to OFF or the current user does not have required privi leges to execute SHOW MASTER STATUS. The consistency of the dump cannot be guaranteed. ERROR: SRC: Unable to acquire global read lock neither table read locks. SRC: Global read lock has been released Initializing - done Util.copyInstance: While 'Initializing': Unable to lock tables: Consistency check has failed. (MYSQLSH 52002)

99. Running the above step 98 command may generate Errors regarding table locks (see step 98 image). If you do encounter such problem (if and only if) run the same command as in step 98 but this time add an additional option: consistent: "false" and re-run the command.

```
MySQL JS> util.copyInstance('mysql://admin@10.0.1.39', {"compatibility":
["force innodb", "skip invalid accounts", "strip definers",
"strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants",
"strip invalid grants", "create invisible pks"], users: "true", threads: 4,
dryRun:"true", consistent: "false"})
```

Note: replace the username (admin) and IP address (10.0.1.39) with your HeatWave MySQL username and IP address (not the Amazon RDS MySQL username and IP address).

MySQL database-1
10.0.1.39', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_definers", "str
ip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip_invalid_grants",
"create_invisible_pks"], users: "true", threads: 4, dryRun:"true", consistent: "false"})
Copying DDL, Data and Users from in-memory FS, source: ip:3306, target: klgbkf63cr
stdaur:3306.
SRC: dryRun enabled, no locks will be acquired and no files will be created.
Initializing - done
SRC: 2 out of 6 schemas will be dumped and within them 3 tables, 0 views.
SRC: 2 out of 4 users will be dumped.
Gathering information - done
WARNING: SRC: The dumped value of gtid_executed is not guaranteed to be consistent
SRC: Checking for compatibility with MySQL Database Service 8.1.1
NOTE: SRC: MySQL Server 5.7 detected, please consider upgrading to 8.0 first.
SRC: Checking for potential upgrade issues.
SRC: The MySQL server at database-1us-east-2.rds.amazonaws.com:3306,
SRC: version 5.7.37 - Source distribution, will now be checked for compatibility
SRC: issues for upgrade to MySQL 8.1.1

```
[... output truncated]
```

TGT: Starting data load ?% (0 bytes / ?), 0.00 B/s, 0 / 3 tables done Recreating indexes - done TGT: Executing common postamble SQL TGT: No data loaded. TGT: 0 accounts were loaded TGT: 0 warnings were reported during the load.

Dump_metadata: Binlog_file: '' Binlog_position: 0 Executed_GTID_set: ''

MySQL database-1.(.us-east-2.rds.amazonaws JS >



Note:

- util.copyInstance(connectionData[, options]): MySQL instance copy utility enables copying of an entire instance to another server. By default, this utility includes all schemas, users, indexes, routines, and triggers. See <u>Copy Utilities</u>.
 - connectionData: Defines the connection details for the destination server you want to copy to.
- compatibility: Apply the specified requirements for compatibility with HeatWave MySQL for all tables in the dump output, altering the dump files as necessary.
 - o force_innodb: Change CREATE TABLE statements to use the InnoDB storage engine for any tables that do not already use it.
 - skip_invalid_accounts: You cannot export a user that has no password defined. This option skips any such users.
 - strip_definers: Remove the DEFINER clause from views, routines, events, and triggers, so these objects are created with the default definer (the user invoking the schema), and change the SQL SECURITY clause for views and routines to specify INVOKER instead of DEFINER. HeatWave MySQL requires special privileges to create these objects with a definer other than the user loading the schema. If your security model requires that views and routines have more privileges than the account querying or calling them, you must manually modify the schema before loading it.
 - strip_restricted_grants: Certain privileges are restricted in HeatWave MySQL.
 Privileges such as RELOAD, FILE, SUPER, BINLOG_ADMIN, and SET_USER_ID. You cannot create users granting these privileges. This option strips these privileges from dumped GRANT statements.
 - strip_tablespaces: Tablespaces have some restrictions in HeatWave MySQL. If you need tables created in their default tablespaces, this option strips the TABLESPACE= option from CREATE TABLE statements.
 - ignore_wildcard_grants: If enabled, ignores errors from grants on schemas with wildcards, which are interpreted differently in systems where the partial_revokes system variable is enabled.
 - strip_invalid_grants: If enabled, strips grant statements which would fail when users are copied. Such as grants referring to a specific routine which does not exist.
 - create_invisible_pks: Primary keys are required by High Availability and HeatWave. If you intend to export data for use in a highly available DB system or a HeatWave DB system, add primary keys as they are not defined on the tables. This compatibility flag adds invisible primary keys to each table that requires them.
- users: Include (true) or exclude (false) users and their roles and grants in the dump.
- threads: (Optional) The number of parallel threads to use to copy chunks of data from the MySQL instance. Each thread has its own connection to the MySQL instance. The default is 4. The copy utilities require twice the number of threads, one thread to copy and one thread to write. If threads is set to N, 2N threads are used.
- dryRun: Displays information about the copy with the specified set of options, and about the results
 of HeatWave MySQL Service compatibility checks, but does not proceed with the copy. Setting this
 option enables you to list out all the compatibility issues before starting the copy.

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- consistent: Enable (true) or disable (false) consistent data copies by locking the instance for backup during the copy.
- 100. Once you have run the command in step 98/99 and did not see any errors in the output (warnings are okay), run the same step 98/99 command but this time change the dryRun option to false.

```
MySQL JS> util.copyInstance('mysql://admin@10.0.1.39', {"compatibility":
    ["force_innodb", "skip_invalid_accounts", "strip_definers",
    "strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants",
    "strip_invalid_grants", "create_invisible_pks"], users: "true", threads: 4,
    dryRun:"false", consistent: "false"})
```

Note: replace the username (admin) and IP address (10.0.1.39) with your HeatWave MySQL username and IP address (not the Amazon RDS MySQL username and IP address).

My<mark>SQL</mark> database-1. 10.0.1.39', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_definers", "str ip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip_invalid_grants", "create_invisible_pks"], users: "true", threads: 4, dryRun:"false", consistent: "false"}) Copying DDL, Data and Users from in-memory FS, source: ip-:3306, target: klgbkf63cr stdaur:3306. Initializing - done SRC: 2 out of 6 schemas will be dumped and within them 3 tables, 0 views. SRC: 2 out of 4 users will be dumped. Gathering information - done WARNING: SRC: The dumped value of gtid_executed is not guaranteed to be consistent SRC: Checking for compatibility with MySQL Database Service 8.1.1 NOTE: SRC: MySQL Server 5.7 detected, please consider upgrading to 8.0 first. SRC: Checking for potential upgrade issues. SRC: The MySQL server at database-1. .us-east-2.rds.amazonaws.com:3306, SRC: version 5.7.37 – Source distribution, will now be checked for compatibility SRC: issues for upgrade to MySQL 8.1.1...

```
[... output truncated]
```

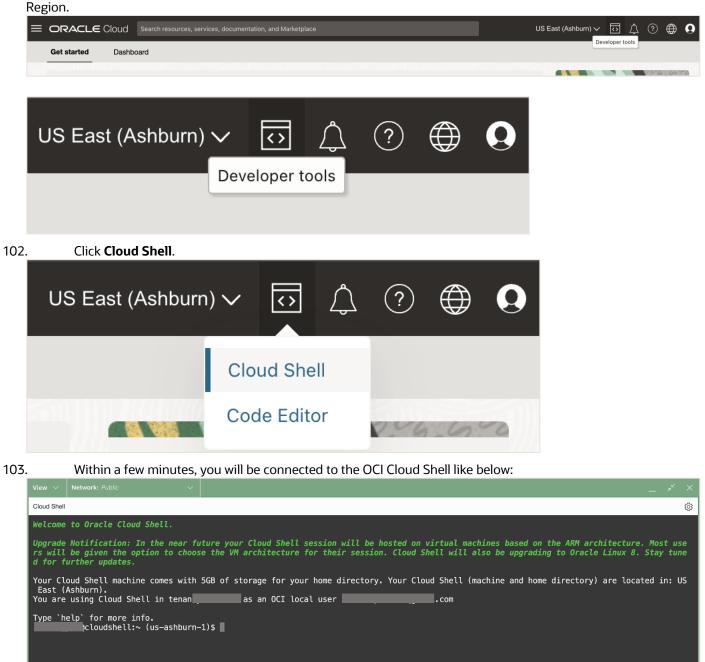
100% (5.30K rows / ~5.27K rows), 0.00 rows/s, 0.00 B/s SRC: Dump duration: 00:00:01s SRC: Total duration: 00:00:02s SRC: Schemas dumped: 2 SRC: Tables dumped: 3 SRC: Data size: 194.61 KB SRC: Rows written: 5302 SRC: Bytes written: 194.61 KB SRC: Average throughput: 169.78 KB/s TGT: Executing common postamble SQL 100% (194.61 KB / 194.61 KB), 0.00 B/s, 3 / 3 tables done Recreating indexes - done TGT: 3 chunks (5.30K rows, 194.61 KB) for 3 tables in 2 schemas were loaded in 1 sec (avg thro ughput 194.61 KB/s) TGT: 1 accounts were loaded TGT: 0 warnings were reported during the load. Dump_metadata: Binlog_file: '' Binlog_position: 0 Executed_GTID_set: '' MySQL database-1. .us-east-2.rds.amazonaws JS >

Note: once the MySQL Shell copy utility finishes, all your data will be copied over from Amazon RDS MySQL to HeatWave MySQL on OCI. This completes the migration process. You can end your tmux session.

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VI) (Optional) On OCI, use the Cloud Shell to verify whether the data was migrated successfully from Amazon RDS MySQL to HeatWave MySQL on OCI.

101. Login to <u>OCI</u>, navigate to the top right corner and click on **Developer tools** right next to your OCI



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View V Network: Public V	Private	Private network definition list						
Welcome to Oracle Cloud Shell. Upgrade Notification: In the near future your C rs will be given the option to choose the VM ard d for further updates.		are using public network. a maximum of 5 favorite private netwo	rk definitions. They are listed in th	ie private network list.				
Your Cloud Shell machine comes with 5GB of stor East (Ashburn). You are using Cloud Shell in tenancy and as								
Type `help` for more info.			No items found.		Showing 0 items \langle 1 of 1 \rangle			



106. Enter a private network definition name. From the VCN in <compartment-name> dropdown, select the VCN associated with HeatWave MySQL. For Subnet in <compartment-name> dropdown, select the private subnet. Leave the Network security groups as-is and check the box where it says Use as active network. Click Create.

Name	
MySQL-HW-CS	
VCN in (root) (Change compartm	<u>ent)</u>
MySQL-VCN	
Subnet in rest (root) (Change compar	<u>(ment)</u>
Subnet in reference (Change compared private subnet-MySQL-VCN	
private subnet-MySQL-VCN	Optional)
private subnet-MySQL-VCN Network security groups (Network security groups in	Optional)
private subnet-MySQL-VCN Network security groups (Network security groups in (Change compartment)	Optional)
private subnet-MySQL-VCN Network security groups (Network security groups in (Change compartment)	Optional) nt) \$



Click Close.

	on, and Marketpla	ce		US East (Ashburn) ∽	\bigcirc	Â	? ∉	€ €
View V Network: MySQL-HW-CS (Connecting) Details V	Private	network definition list						<u>Help</u>
Cloud Shell								
Welcome to Oracle Cloud Shell.	i You a	re using private network "MySQL-HW-CS".						
Upgrade Notification: In the near future your Cl rs will be given the option to choose the VM are d for further updates.	You can have	a maximum of 5 favorite private network defii	nitions. They are listed in the private r	network list.				
Your Cloud Shell machine comes with 5GB of stora East (Ashburn).	Create priv	ate network definition			Q Sea	arch by	name	
You are using Cloud Shell in tenancy as	Favorite	Name	Subnet	Last used				
Type `help` for more info. /cloudshell:~ (us-ashburn-1)\$ []	☆	MySQL-HW-CS	yciry4ma Show Copy	-				:
					Showing	1 item	< 1 of	1 >
	Default ne	atwork						
	Select defau	It network description						
	Public							\$
	Close							
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108. Within a few minutes, you will be able to access your private subnet (where HeatWave MySQL resides) from the Cloud Shell. You should see the **Network** change from Public to the **private network definition name** that you entered in step 106.

View \checkmark	Network: MySQL-HW-CS Details 🗸 🗸
Cloud Shell	
Welcome	to Oracle Cloud Shell.

109. From the Cloud Shell terminal, login to your HeatWave MySQL instance (by providing the username and private IP of HeatWave MySQL) using MySQL Shell to validate whether the migration was successful:

\$ mysqlsh <user>@<hostname>:<port-number>

-OR-

\$ mysqlsh -u <user> -p -h <hostname> -P <port-number>

cloudshell:~ (us-ashburn-1)\$ mysqlsh admin@10.0.1.39 Please provide the password for 'admin@10.0.1.39': ******** Save password for 'admin@10.0.1.39'? [Y]es/[N]o/Ne[v]er (default No): Y MySQL Shell 8.0.34-commercial Copyright (c) 2016, 2023, Oracle and/or its affiliates. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. Type '\help' or '\?' for help; '\quit' to exit. Creating a session to 'admin@10.0.1.39' Fetching schema names for auto-completion... Press ^C to stop. Your MySQL connection id is 346 (X protocol) Server version: 8.0.34-u3-cloud MySQL Enterprise - Cloud No default schema selected; type \use <schema> to set one. MySQL 10.0.1.39:33060+ ssl JS >



110. Change to the SQL mode of MySQL Shell and run the below commands:

MySQL JS> \sql MySQL SQL> SHOW SCHEMAS; MySQL SQL> SHOW TABLES IN <schema-name>; MySQL 10.0.1.39:33060+ ssl JS > \sql Switching to SQL mode... Commands end with ; Fetching global names for auto-completion... Press ^C to stop. MySQL 10.0.1.39:33060+ ssl SQL > SHOW SCHEMAS; Database information_schema innodb mysql mysql_audit performance_schema sys world 7 rows in set (0.0010 sec) MySQL 10.0.1.39:33060+ ssl SQL > SHOW TABLES IN world; Tables_in_world city country countrylanguage 3 rows in set (0.0019 sec)

111. You can run the below query on every table that you have for your Amazon RDS MySQL and OCI HeatWave MySQL to ensure that the row count matches on both sides:

MySQL SQL> SELECT COUNT(*) FROM <schema-name>.<table-name>;

112. Here is our row count comparison for Amazon RDS MySQL and OCI HeatWave MySQL:

Amazon RDS MySQL row count:			
MySQL database-1.	.us-east-2.rds.amazonaws SQL >	USE world;	
Default schema set to `world`			
Fetching global names, object	names from `world` for auto-comp	letion Press ^C to	stop.
MySQL database-1.	.us-east-2.rds.amazonaws world	<pre>SQL > SELECT COUNT(*)</pre>	FROM city;
++			
COUNT(*)			
++			
4079			
++			
1 row in set (0.0013 sec)			
My <mark>SQL</mark> database-1.	.us-east-2.rds.amazonaws world	SQL > SELECT COUNT(*)	FROM country;
++			
COUNT(*)			
++			
239			
++			
1 row in set (0.0008 sec)	.us-east-2.rds.amazonaws world		EDOM country]on
MySQL database-1.	1.us-east-2.ius.amazonaws woriu	SQL > SELECT COUNT(*)	FROM COUNTRYIAN
guage;			
COUNT(*)			
COONT(*)			
984			
++			
1 row in set (0.0390 sec)			

Amazon RDS MvSOL row count:

OCI HeatWave MySQL row count:

MySQL 10.0.1.39:33060+ ssl SQL > USE world; Default schema set to `world`.
Fetching global names, object names from `world` for auto-completion Press ^C to stop.
MySQL 10.0.1.39:33060+ ssl world SQL > SELECT COUNT(*) FROM city;
COUNT(*)
++
4079
++
1 row in set (0.0027 sec)
MySQL 10.0.1.39:33060+ ssl world SQL > SELECT COUNT(*) FROM country;
++
239
++
<u>1 row i</u> n set (0.0050 sec)
<pre>MySQL 10.0.1.39:33060+ ssl world SQL > SELECT COUNT(*) FROM countrylanguage;</pre>
COUNT(*)
++
1 row in set (0.0094 sec)
MySQL 10.0.1.39:33060+ ssl world SQL >

113. After validating, you can have your application/s point to the new OCI HeatWave MySQL instance.

VII) (Optional) On OCI, if the HeatWave option was enabled during HeatWave MySQL DB creation, add the HW Cluster and load data from the MySQL InnoDB storage engine into the HW Cluster using automation.

- 114. Login to OCI. Click on the navigation menu, go to Databases, and click HeatWave MySQL.
- 115. Click on the name of your HeatWave MySQL instance to go to the **DB System Details** page. ORACLE Cloud Search resources, services, documentation, and Marketplace US East (Ashburn) 🗸 👩 🏠 🕐 関 MySQL HeatWave DB systems in (root) Compartment DB systems Create DB system Actions -Backups Name DB system state Crash recovery Delete protected High availability HeatWave cluster HeatWave state Created -Channels MySQL-HW Active Enabled Enabled Disabled Disabled Tue, Aug 15, 2023, 16:19:42 UTC Configurations Showing 1 item < 1 of 1 > 0 selected ORACLE Cloud Search resources, services, documentation, and Marketplace US East (Ashburn) 🗸 MySQL HeatWave » DB systems » DB system details MySQL-HW Edit Start Stop Restart More actions -DB system information Connections Tags General information High availability OCID: ...xfzg4pgbqq Show Copy High availability: Disabled Enable (i) ACTIVE Description: - Edit **HeatWave** Comp n HeatWave cluster: Disabled Edit (i) Created: Tue, Aug 15, 2023, 16:19:42 UTC 116. Click More actions and click Add HeatWave cluster. ORACLE Cloud Search resources, services, documentation, and Marketplace US East (Ashburn) 🗸 🕢 🕜 🌐 🧕 MySQL HeatWave » DB systems » DB system details MySQL-HW Edit Start Stop Restart More actions 👻 Restore to a new DB system DB system information Co Edit backup plan Create manual backup General information High availability OCID: ...xfzg4pgbqq Show Copy Enable high availability High availability: Disabled Enable (i) ACTIVE Description: - Edit Disable crash recovery **HeatWave**

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Compartment

Created: Tue, Aug 15, 2023, 16:19:

Last updated: Fri, Aug 25, 2023, 12 Create channel

Add HeatWave cluster



HeatWave cluster: Disabled Edit (i)

117.	Click Estimate node.					
	ORACLE Cloud Search resources, services, docum			US East (Ashburn) 🗸		• •
	Add HeatWave cluster					
	Add a HeatWave cluster to the DB system MySQL-HW with sh	ape MySQL.HeatWave.VM.Standard.	hapes support HeatWave?			
	Configure HeatWave cluster					
	Select a shape					
	HeatWave.512GB					
	CPU core count: 16 Memory size: 512 GB				Change shape	
	Max network bandwidth: 16Gbps				Change shape	
	Node					
	1					
	Specify a number between 1 and 64.					
	MySQL HeatWave Lakehouse () Enables you to use data from Object Storage.					
	Memory: 512 GB					
	Estimate node					
	This operation can take several minutes to complete.					
	Add HeatWave cluster Cancel					
	Terms of Use and Privacy Cookie Preferences			Copyright © 2023, Oracle an	d/or its affiliates. All righ	ts reserved.

118. Click **Generate estimate**. This step will estimate the number of HeatWave nodes required by selecting the schemas or tables you want to analyze with HeatWave.

Add HeatWave cluster Estimate node Image:
Add a HeattWave cluster to the DB system MySQL-HW with shape N complete. (i) Configure HeatWave cluster Generate estimate Select a shape No schema information available.
Select a shape HeatWave.512GB
HeatWave.512GB
Memory size: 512 GB Max network bandwidth: 16Gbps
Node
1
Specify a number between 1 and 84. MySQL HeatWave Lakehouse ① Enables you to use data from Object Storage.
Memory: 512 GB Estimate node This operation can take several minutes to complete.
Add HeatWave cluster Cancel Apply estimated node Cancel
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119. Within a few minutes, the list of your schemas that are in the MySQL InnoDB storage engine will be listed. **Check the box** next to the schema or table name that you wish to load in HeatWave for query acceleration and to run OLAP and ML workloads - alongside OLTP.

	on, and Marketplace		US East (Ashburn) 🗸		?	0
Add HeatWave cluster	Estimate no	ode				
Add a HeatWave cluster to the DB system MySQL-HW with shape N	complete. (i) Regenerate estimate		It to analyze with HeatWave. This operatio	n takes few mi	inutes to	
Configure HeatWave cluster	Last estimate was generated Name	i on Fri, Aug 25, 2023, 12:33:20 UTC. Memory estimate	Information		~	
Select a shape	world	9 MB	Number of tables: 3		\sim	
HeatWave.512GB CPU core count: 16 Memory size: 512 GB Max network bandwidth: 16Gbps	Total memory selected: 0 Bytes HeatWave.512GB Summary No schema or table selected.					\$
1	Select the schema	s and tables to use for the node estimate.				
Specify a number between 1 and 64. MySQL HeatWave Lakehouse Enables you to use data from Object Storage. Memory: 512 GB Estimate node This operation can take several minutes to complete.						
Add HeatWave cluster Cancel	Apply estimated not	e <u>Cancel</u>				
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120.

After selecting the schemas or tables, scroll down on that page until you see the **Load command**. Copy the **CALL sys.heatwave_load** command and save it. Click **Apply estimated node**.

ORACLE Cloud Search resources, services, documentation				US East (Ashburn) 🗸 🚺	Ĵ (?	٢	0
Add HeatWave cluster	Est	imate node	•				
Add a HeatWave cluster to the DB system MySQL-HW with shape N	compl	te number of required (i)	nodes by selecting the schemas or tables you	want to analyze with HeatWave. This operation takes fe	w minutes	to	
Configure HeatWave cluster	Last esti	mate was generated on Fri, Name	Aug 25, 2023, 12:33:20 UTC. Memory estimate	Information	~		
HeatWave.512GB CPU core count: 16 Memory size: 512 GB Max network bandwidth: 16Gbps		world nemory selected: 9 M Wave.512GB ary	9 MB	Number of tables: 3	~	;	•
Node 1 Specify a number between 1 and 64. MySQL HeatWave Lakehouse Enables you to use data from Object Storage.	CP Me Ma	eatWave.512GB U core count: 16 mory size: 512 GB x network bandwidtl de: 1 (į)	n: 16Gbps			_	
Memory: 512 GB Estimate node This operation can take several minutes to complete. Add HeatWave cluster Cancel	Tot	al memory required: al memory: 512 GB	9 MB Cancel				
Terms of Use and Privacy Cookie Preferences				Copyright © 2023, Oracle and/or its affii	liates. All rig	nts reser	ved.



Specify a number between 1 and 64. MySQL HeatWave Lakehouse ① Enables you to use data from Object Storage. Memory: 512 GB Estimate node This operation can take several minutes to complete.	Load command The following command loads the selected schemas or tables into HeatWave. Connect to the DB system using the MySQL client of your choice, and run the command after the HeatWave cluster is provisioned. () CALL sys.heatwave_load(JSON_ARRAY('world'), NULL); CORY.
Add HeatWave cluster Cancel	Apply estimated node Cancel
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121. Executing the previous step will change the HeatWave node count depending on the data you have selected to load into HeatWave's in-memory engine. Click **Add HeatWave cluster** to finish adding the HeatWave cluster creation process.

ORACLE Cloud Search resources, services, documentation, and Marketplace	US East (Ashburn) 🗸	⊡ <u>(</u> ?	• •
Add HeatWave cluster			
Add a HeatWave cluster to the DB system MySQL-HW with shape MySQL.HeatWave.VM.Standard. <u>What shapes support HeatWave?</u>			
Configure HeatWave cluster			
Select a shape			
HeatWave.512GB			
CPU core count: 16			
Memory size: 512 GB		Change shape	
Max network bandwidth: 16Gbps			
Node			
1			
Specify a number between 1 and 64.			
MySQL HeatWave Lakehouse ()			
Enables you to use data from Object Storage.			
Memory: 512 GB			
Estimate node			
This operation can take several minutes to complete.			
Add HeatWave cluster Gancel			
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122. The HeatWave cluster will be ready within a few minutes. You should see the HeatWave state change from Creating to **Active**.

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MySQL HeatWave » DB systems » D	B system details							
	MySQL-HW							
DDC	Edit Start Stop Restart More actions							
DBS	DB system information Connections Tags							
	General information	High availability						
	OCID:xfzg4pgbqq Show Copy	High availability: Disabled Enable (i)					
ACTIVE	Description: - Edit	11						
	Compartment:	HeatWave						
	Created: Tue, Aug 15, 2023, 16:19:42 UTC	HeatWave cluster: Details (i)						
	Last updated: Fri, Aug 25, 2023, 12:36:14 UTC	State: Creating						
		Lakehouse: Disabled (i)						

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MySQL HeatWave » DB systems » DB syste	m details							\tilde{j}
	MySQL-HW							
DBS	Edit Start Stop Restart More actions							
	DB system information Connections Tags							
	General information	High availability						
ACTIVE	OCID:xfzg4pgbqq Show Copy	High availability: Disabled Enable (i)					
ACTIVE	Description: - <u>Edit</u> Compartmen	HeatWave						
	Created: Tue, Aug 15, 2023, 16:19:42 UTC	HeatWave cluster: Details Edit						
	Last updated: Fri, Aug 25, 2023, 12:36:14 UTC	State: Active						

123. Connect to your HeatWave MySQL system using MySQL Shell via Cloud Shell.

\$ mysqlsh <user>@<hostname>:<port-number>

-OR-

\$ mysqlsh -u <user> -p -h <hostname> -P <port-number>

cloudshell:~ (us-ashburn-1)\$ mysqlsh admin@10.0.1.39 Please provide the password for 'admin@10.0.1.39': ******* Save password for 'admin@10.0.1.39'? [Y]es/[N]o/Ne[v]er (default No): Y MySQL Shell 8.0.34-commercial Copyright (c) 2016, 2023, Oracle and/or its affiliates. Oracle is a registered trademark of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners. Type '\help' or '\?' for help; '\quit' to exit. Creating a session to 'admin@10.0.1.39' Fetching schema names for auto-completion... Press ^C to stop. Your MySQL connection id is 346 (X protocol) Server version: 8.0.34-u3-cloud MySQL Enterprise - Cloud No default schema selected; type \use <schema> to set one. MySQL 10.0.1.39:33060+ ssl JS > 124. Switch to the SQL mode of MySQL Shell and execute the Load command that we had copied earlier to load data into HeatWave from the MySQL InnoDB storage.

```
MySQL JS> \sql
MySQL SQL> CALL sys.heatwave load(JSON ARRAY('world'), NULL);
```

Note: replace the sys.heatwave_load command with what you have.

MySQL 10.0.1.39:33060 Switching to SQL mode MySQL 10.0.1.39:33060	. Commands end with ;		ve_load(JSON_AF	RAY('worl	d'), NULL);	
INITIALIZING HEATWAVE	AUTO PARALLEL LOAD					
Version: 2.20 						
Load Mode: normal Load Policy: disable_ Output Mode: normal 	 unsupported_columns 					
<pre>+ 6 rows in set (1.5581 s .</pre>	+ ec)					
OFFLOAD ANALYSIS				-+ -+		
Verifying input schem User excluded items:						
I SCHEMA I NAME	OFFLOADABLE TABLES	OFFLOADABLE COLUMNS	SUMMARY OF ISSUES			
 `world`	3	24		ļ		
[output truncated]						
TABLE (3 of 3): `worl Commands executed suc Warnings encountered: Table loaded successf Total columns loade Table loaded using Elapsed time: 327.0	cessfully: 3 of 3 0 ully! d: 4 1 thread(s)					
+8 rows in set (1.5581 s	ec)	÷				
+ LOAD SUMMARY +				+ 		
I SCHEMA	TABLES	TABLES	COLUMNS	LOAD		
NAME 	LOADED	FAILED		JRATION 		
`world` 	3	0	24	1.44 s		
+6 rows in set (1.5581 s	ec)			+		
Query OK, 0 rows affect MySQL 10.0.1.39:33060						

125. You now have a complete HeatWave MySQL cluster.

To learn more about using HeatWave, please visit our documentation.



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