

Migration Guide: Amazon Aurora 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 Aurora 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 Aurora 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 Aurora MySQL instance, use an admin/root user.
- You do not need to make any configuration changes to your Amazon Aurora MySQL for this migration.
- If you have MySQL replication configured in your current Amazon Aurora MySQL environment, you can perform the migration steps shown in this guide from either your source or replica instance.
- The Overview section of this downtime migration guide contains all the steps that are needed to finish the database migration from Amazon Aurora MySQL to HeatWave MySQL on OCI.
- In the Walkthrough section of this migration guide, 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 Aurora 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 Aurora MySQL to HeatWave MySQL. When following the guide, make changes along the way to your AWS and OCI environment 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 Aurora 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 Aurora MySQL to connect to HeatWave MySQL on OCI and it also ensures that your data in transit while it is being migrated is encrypted.]

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 Aurora MySQL.

[MySQL Shell on EC2 will be used to copy DDL and data from Amazon Aurora 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 Aurora 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 Aurora 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 Aurora 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 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.

1. Below is the Amazon Aurora 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 Aurora MySQL instance used for this does not have public access.

MySQL database-1-instance-1. world SQL > SELECT @@VERSION;
@@VERSION
++
5.7.12
++ 1 row in set (0.0025 sec)
MySQL database-1-instance-1. world SQL > SHOW SCHEMAS;
++
Database
information_schema
mysql
performance_schema
sys world
++
<u>5 rows</u> in set (0.0010 sec)
MySQL database-1-instance-1. world SQL > SHOW TABLES IN world;
++ Tables_in_world
++
city
country
countrylanguage ++

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

Resource map Info			
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	rtb-01a84fbdc75e7c5e6	MySQL-igw
	MySQL-subnet-public1-us-east-2a	MySQL-rtb-private2-us-east-2b	
	MySQL-subnet-private1-us-east-2a	MySQL-rtb-public	
	us-east-2b	MySQL-rtb-private1-us-east-2a	
	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**.

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Networking	Virtual Clo	ud Networks	in (root)	Compar	tment		
Overview	A Virtual Cloud Netw gateways that you ca		vork that you set up in Oracle o	lata centers. It clos	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
DNS management				No item:	s found.		
Customer connectivity							Showing 0 items < 1 of 1
P management							
Network Command Center							

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

E ORACLE Cloud	Search resources, services, documentation, and Marketplace	US East (Ashburn) 🗸 🕢 🗇 🤀 🙎
Networking Overview	A Virtual Of Start VCN Wizard	 Helo 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)	Create VCN with Internet Connectivity Add Internet Oconectivity and Site- to-Site VPN to a VCN Creates a VCN with a public subnet that content also creates a private subnet that content that content also creates a private subnet that content also creates a private subnet that content also creates a	t can connect to the internet v connect to the Oracle anet, internet gateway (IG),
Filters State Terminating	Start VCN Wizard Cancel	
Service logs Manage Resources: 2 (2 total logs) () Terms of Lise and Privacy Cookie Prefe		Convribit @ 2023. Oracle and/or its affiliates. All rights reserved.



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	
	Resource availability checked successfully. Ck	
	Basic information VCN name ① MySQL-VCN	
	Compartment ① Compartment ① Cont	VCN Includes: VCN Includes: VCN Public subnet VCN
	Configure VCN VCN IPv4 CIDR block ① 10.0.0.0/16	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 i	nternet connectivity		Help
Configuration Review and create	DNS resolution Use DNS hostnames in this VCN Required for instance hostname assignment if you plan to use VCN D	IS or a third-party DNS. This choice cannot be changed after the VCN is created. Learn more.	
	Configure public subnet		
	IP address type	IPv4 CIDR block	
	IPv4 CIDR block	10.0.0.0/24	
		Example: 172.16.0.016. (Maximum number of items added) + Another IP address type	
	Configure private subnet		
	IP address type		
	IPv4 CIDR block	10.0.1.0/24	
		Example: 172.16.0.0/16.	
		(Maximum number of items added) + Another IP address type	A
	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 networks	» Virtual Cloud Network Details								
	MySQL-VCN								
VON	Move resource Add tags	Delete							
VCN	VCN Information Tags								
	Compartment: root)			OCID:qsiv	ya <u>Show</u> <u>Copy</u>				
	Created: Tue, Sep 19, 2023, 16	:17:24 UTC		DNS Resolve	er: MySQL-VCN				
AVAILABLE	IPv4 CIDR Block: 10.0.0.0/16			Default Rout	te Table: default route table f	or MySQL-VCN			
	IPv6 Prefix: -			DNS Domair	n Name: mysqlvcn.oraclevcn	com			
Resources	Subnets in r	(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, 202	3, 16:17:26 UTC	G	=
Internet Gateways (1)								Q	
Dynamic Routing Gateways	public subnet-MySQL-VCN	Available	10.0.0/24	-	Public (Regional)	Tue, Sep 19, 202	3, 16:17:26 UTC	Ŀ	
Attachments (0)						S	howing 2 items	< 1 of 1	>
Network Security Groups (0)									
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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 Aurora 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							
	Edit Move resource Add tags Cre	ate path analysis 👻	Terminate						
	Subnet Information Tags								
	OCID:6xni2a Show Copy		Compartment	Compartment (root)					
	IPv4 CIDR Block: 10.0.1.0/24		DNS Domain Name:	DNS Domain Name: sub09191617221 Show Copy					
AVAILABLE	IPv6 Prefix: -		Subnet Access: Priva	Subnet Access: Private Subnet					
	Virtual Router MAC Address: 00:00:17:2D	:45:1A	DHCP Options: Defau	DHCP Options: Default DHCP Options for MySQL-VCN					
	Subnet Type: Regional		Route Table: route tab	Route Table: route table for private subnet-MySQL-VCN					
Resources	Security Lists								
Security Lists (1)	Add Security List						C	2	
Logs	Name	State	Compartment	Created			::	:	
IPv6 Prefixes (-)	security list for private subnet-MySQL-VCN	(root)	Tue, Sep 19, 202	3, 16:17:26 U	ITC		:		
Tag filters add I cl	ear				Showing 1 ite	em <	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
	security list for private subnet-MySQL-VCN											
	Instance traffic is controlled by firewall rules on each Instance in addition to this Security List											
SL >	Move resource Add 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		<u>Help</u>
Customer connectivity Overview Site-to-Site VPN FastConnect Dynamic routing gateway Customer-premises equipment List scope Compartment (Dynamic routing Dynamic routing gateways (DRGs) Create dynamic routing gatewa Name	Name MySQL-DRG Create in compartment (root)		\$
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

Attachment.								
					US East (As	shburn) 🗸 🔿	\$ ⑦	•
Networking > Customer connectivity >	Dynamic routing gateways > MyS	GQL-DRG						
	MySQL-DRG							
	Edit Add tags Mo	ove resource Terminate						
DRG	Dynamic routing gat	teway information	Tags					
	Compartment:	(root)		OCID:fx4nt5ypqq	Show Copy			
	Oracle redundancy sta	atus: —		Created: Tue, Sep 1	9, 2023, 16:28:53 UTC			
AVAILABLE								
Resources	VCN attachm		(root) Compartr		te table. Learn more			
VCN attachments (0)		ind by an addemicin with	n the volv type. Tou can comigue		ite table. <u>Learn more</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 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 state of the s			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	3, 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)									
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- 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 	MILESTI		s III E					
	MySQL-VCN								
	Move resource Add tags	Delete							
VCN	VCN Information Tags								
	Compartment: r (root)			OCID:qsiv	ya <u>Show Copy</u>				
	Created: Tue, Sep 19, 2023, 16:17:24 UTC DNS Resolver: My			er: MySQL-VCN					
AVAILABLE	IPv4 CIDR Block: 10.0.0/16			Default Rout	te Table: default route table f	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, 202	3, 16:17:26 UTC	;	
Internet Gateways (1)	public subnet-MySQL-VCN	Available	10.0.0/24	-	Public (Regional)	Tue, Sep 19, 202	3, 16:17:26 UTC	; (0
		-			(····			
Dynamic Routing Gateways Attachments (1)						S	howing 2 items	< 1 of 1	>
						SI	howing 2 items	< 1 of 1	>



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.

				US East (Ashburn) 🗸	
Networking > Virtual cloud networks > M	lySQL-VCN > Route Table Details				
	route table for private subnet-N	IySQL-VCN			
рт	Move resource Add tags Terminate				
(RT)	Route Table Information Tags				
	OCID:2ffena <u>Show</u> <u>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 by <u>Network Path Analyzer</u> to check your connections.	default. Intra-VCN routing al	lows you more control over routing betwe	en subnets. <u>Learn more.</u> I	f 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				Showing 2 items < 1 of 1 >
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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 Sea	arch resources, services, documentation	n, and Marketplace US East (Ashburn) 🗸 😨 🗍	€ €
Networking > Virtual cloud networks > My	/SQL-VCN > Route Table Details	Add Route Rules	<u>Help</u>
	route table for pri	① Important:	
RT	Move resource Add tags	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 assigned to.	ed
	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	0
	Traffic within the VCN is handled b	Destination CIDR Block	
Route Rules (2)	Network Path Analyzer to check yo	10.1.0.0/16	
noute nules (2)		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 Preferences	3	Copyright © 2023, Oracle and/or its affiliates. All rights r	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>**.

E ORACLE Cloud	Search resources, services, documentation, and N	larketplace		US East (Ashburn) 🗸 🚺 🗍	⑦ ⊕ (
Networking > Virtual cloud networks >	Virtual Cloud Network Details > Route Tables	动机机机		57)))),((((G.)))				
	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 UTC			now <u>Copy</u> ISQL-VCN				
AVAILABLE	IPv4 CIDR Block: 10.0.0.0/16		Default Route Table: default	ble: default route table for MySQL-VCN				
	IPv6 Prefix: -		DNS Domain Name: mysqlvc	n.oraclevcn.com				
Resources	Route Tables in	(root) Compart	ment					
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 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 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
Terms of Use and Privacy Cookie Prefi	erences			Copyright @ 2023	8, Oracle and/or its affiliates. Al	Il rights reserved.

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, documentatio	n, and Marketplace	US East (Ashburn) 🗸	
Networking > Virtual cloud networks	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.	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	S336	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		
		Name: MySQL-DRG		
MILE 2000 MAN	Destination	Compartment: (root)		
	0.0.0/0	Description Optional		
	0 selected			
		Maximum 255 characters		
		Add Route Rules Cancel		
Terms of Use and Privacy Cookie Prefe	erences		Copyright @ 2023, Oracle an	nd/or its affiliates. All rights reserved.



28. Login to <u>AWS</u> to modify the VPC security groups for the Aurora MySQL instance which will allow Aurora 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 Aurora instance**. Click **Connectivity & security**, under the **Security** section, look for **VPC security groups** and click on **the security group**. For this guide, our Aurora instance only uses one security group - **default**.

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🗗 EC2 🕼 VPC 🔯 RDS 📴 IAM	🔁 S3						
Amazon RDS ×	RDS > Databases > database-1 > database-1 > database-1-instance-1				C	Modify	Actions v
Databases Query Editor Performance insights Snapshots	Related					<	1 > @
Exports in Amazon S3	DB identifier	Status ⊽ Role ⊽ B	Engine 🔻	Region & AZ 🛛	Size ⊽	Actions ⊽	CPU 🔻
Automated backups	O 🖃 <u>database-1</u>	⊘ Available Regional cluster	Aurora MySQL	us-east-2	1 instance	4 Actions	
Reserved instances Proxies	• database-1-instance-1	O Available Writer instance	Aurora MySQL	us-east-2a	db.t3.small	-	11.23%
Subnet groups Parameter groups Option groups Custom engine versions	Connectivity & security Monitorin	ng Logs & events Configuration	Maintenan	ce & backups Tag	IS		
Zero-ETL integrations New	Endpoint & port	Networking	Security				
Events Event subscriptions	Endpoint database-1-instance- 1. east- 2.ros.amazonaws.com	Availability Zone us-east-2a VPC	VPC securit default (sg- Ø Active	y groups ·0c73e605a2c7a8178)			
Recommendations 4	Port 3306	MySQL-vpc (vpc-032ea973bfa7fd681) Subnet group	Publicly acc	essible 023, Amazon Web Services,		Privacy Ter	ms Cookie preference

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

EC2 Dashboard X Sect	🕞 s3 rurity Groups (1/1) Info								
EC2 Global View	urity Groups (1/1) Info								
EC2 Global View		C	Actions Export security groups	s to CSV 🔻 Cre	ate security group				
Events	Filter security groups arch: sg-0c73e605a2c7a8178 X	lear filters	View details Edit inbound rules Edit outbound rules		< 1 > ©				
Instances	Name \bigtriangledown Security gr	oup ID $ abla ext{Security group name} $	Manage tags V D	Description \bigtriangledown	Owner				
Instance Types	- sg-0c73e60	5a2c7a8178 default	vpc-032ea973bfa7fd681 🗹 🛛 d	lefault VPC security gr	528770944777				
Launch Templates Spot Requests									
Savings Plans Reserved Instances Dedicated Hosts	= a a a								
Capacity Reservations De	tails Inbound rules Outbound	rules Tags							
AMIs									
AMI Catalog Elastic Block Store Contemport	etails								
Volumes Sec	curity group name	Security group ID	Description	VPC ID					
Snapshots 🗗	default	D sg-0c73e605a2c7a8178	default VPC security group	vpc-032ea973bf	a7fd681 🖸				
Lifecycle Manager Ow	vner	Inbound rules count	Outbound rules count						
▼ Network & Security	528770944777	1 Permission entry	1 Permission entry						
Security Groups									
Elastic IPs									

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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	¢	0	۲	Ohio 🔻	Y	
ø	EC2 🏠 VPC 🔯 RDS 🛅 14	AM 🔁 S3											
Ē	C2 > Security Groups > sg-Oc	:73e605a2c7a8178 - default 💙 Edit	inbound rules									٤)
	Edit inbound rule	S lafe											
		traffic that's allowed to reach the ins	tance.										
	Inbound rules Info												
	Security group rule ID	Type Info	Protocol Info	Port range	Source Info		Description	1 - optio	nal Info				
				Info									
	sgr-098c11c6446045863	All traffic 🔹	All	All	Custom 🔻	Q					Delete		
						sg- X							
						0c73e605a2c7a8178							
	_	MYSQL/Aurora 🔹	ТСР	3306	Custom 🔻	Q	AWS VPC				Delete		
				5500		10.1.0.0/16 ×	Anstre				Delete		
						10.1.0.0/10							
	-	MYSQL/Aurora 🔹	ТСР	3306	Custom 🔻	Q	OCI VCN				Delete		
						10.0.0/16 🗙							
	Add rule												
							Cancel	Previ	ew chan	ges	Save rules		
R o	oudShell Feedback					© 2023, Amazon V	Veb Services, Inc.	or its affili	iates.	Privacy	Terms Cook	ie 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 **v** once you have landed on the appropriate Cı

|--|

aws Services Q Searc	h [Option+S]	D 🔶 ⑦ Ohio ▼ 🗤 🔻
🗗 EC2 😚 VPC 🔯 RDS 🧕	3 IAM 🔁 53	
 Virtual private network (VPN) 	Customer gateways 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 ASN	▽ IP address ♡ Type
connections		No customer gateways found
Client VPN endpoints		



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**.

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EC2 🏠 VPC 🔯 RDS 🛅	IAM 🔁 53	
 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 \bigtriangledown Virtual private gateway ID \triangledown State \bigtriangledown Type	▽ VPC ▽ Amazon
connections	No virtual private gateways fo	und
Client VPN endpoints		



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

Image: Contract of the state		<u>(</u>
VPC > Virtual private gateways > Create virtual private gateway		١
Create virtual private actovery		
Create virtual private gateway Info		
A virtual private gateway is the VPN concentrator on the Amazon side of the site-to-site VPN connection.		
Details		
Name tag - optional Creates a tag with a key of 'Name' and a value that you specify.		
MySQL-VPG		
Value must be 256 characters or less in length.		
Autonomous System Number (ASN)		
Amazon default ASN		
Custom ASN		
Tags		
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs. Name tag helps you track your resources more easily. We recommend adding Name tag.		
Key Value - optional		
Q. Name X Q. MySQL-VPG X Remove		
Add new tag		
You can add 49 more tags.		
Cancel Create virtual private gateway		
CloudShell Feedback Language O 2023, Amazon Web Services, Inc. or its affiliates.	Privacy Term	ns 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 Searc	[Option+5]	D 4 0 0	Ohio 🔻
🙋 EC2 🛛 VPC 🔯 RDS 🧕	ам 🔁 53		
VPC dashboard X	⊘ You successfully created vgw-0bd51186a4c7d98d5 / MySQL-VPG.		× 3
EC2 Global View 🗹 New Filter by VPC:	Virtual private gateways (1/1) Info	C Actions A Create virtu	al private gateway
Select a VPC 🔍	Q Filter virtual private gateways	Attach to VPC	< 1 > ©
	Virtual private gateway ID: vgw-0bd51186a4c7d98d5 X Clear filters	Detach from VPC	
Virtual private cloud		Manage tags	
Your VPCs New	Name ∇ Virtual private gateway ID ∇ State ∇ Type	Delete virtual private gateway	
Subnets	● MvSQL-VPG vqw-0bd51186a4c7d98d5		64512
Route tables	• Hysel-vro vgw-obds Hosa4c/d98ds (Detached Ipsel.)	-	64512

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

aws	Services	Q Search		[Option+S			۶.	\$ Ø	Ohio	•	
🩋 EC2	С С С	🔯 RDS 📴 IAM	1 🔁 S3								
<u>VPC</u>	> <u>Virtual pr</u>	ivate gateways 义	vgw-0bd51186a4c7d98d5 > Attach to VPC								١
At	tach to	VPC Info									
D	Details										
v	irtual private	gateway ID									
ć	vgw-0bd51	186a4c7d98d5									
	vailable VPCs ttach the virtual	private gateway to th	iis VPC.								
[vpc-032ea973	6bfa7fd681 / MyS0	QL-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 Search	•		[Option+S]			D	\$ @	۲	Ohio 🔻	
ල් EC2	🕜 VPC 🔯	RDS 🛅	ам 🔁 53									F
▼ Virtual	private cloud		Route tables (4) Info					C	Actions v	C	reate route table	
Your VP	PCs New		Q Find resources by attribute	ortaa			ו					
Subnet	ts											
Route t	tables		VPC = vpc-032ea973bfa7fd68	1 X Clear filt	ters						< 1 > 💿	
Internet	t gateways		Name	⊽ Ro	ute table ID	▼ Explicit sub	onet associati Edge a	ssociations	Main	⊽ V	/PC	
Egress- gatewa	only internet		-	rtt	-01a84fbdc75e7c5e6	-	-		Yes	v	pc-032ea973bfa7fd681	1
-	option sets		MySQL-rtb-private2-us	east-2b rtt	-03949f3d7ed6444c8	subnet-02a	1a4ea52a51a –		No	v	pc-032ea973bfa7fd681	1
Elastic I	IPs		MySQL-rtb-public	rtt	-06e11417f5ca8842d	2 subnets	-		No	v	pc-032ea973bfa7fd681	1
Manage	ed prefix lists		MySQL-rtb-private1-us-	east-2a rtt	-0dc5a6890234bad39	subnet-00e			No	v	pc-032ea973bfa7fd681	1

38. For this guide, the main route table (rtb-01a84fbdc75e7c5e6 - 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 Aurora). 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 Sear	ch	[Optio	n+S]		Þ.	¢	⑦ ③ Ohi	o 🔻 🛛
🙋 EC2 🏾 🏠 VPC 🔯 RDS 🛛	🛐 IAM 😽 S3							
 Virtual private cloud 	Route tables (1/4)	Info			C	Action	is 🔺 Create	route table
Your VPCs New	Q Find resources by a	tribute or tag				View d	etails	
Subnets Route tables	VPC = vpc-032ea973b	PC = vpc-032ea973bfa7fd681 X Clear filters						1 > 💿
Internet gateways	Name		ble ID	bnet associati Edge asso	ciations	Edit ec	lge associations	
Egress-only internet gateways		rtb-01a8-	4fbdc75e7c5e6 –	-		Edit ro	ute propagation	ea973bfa7fd681
DHCP option sets	MySQL-rtb-priva	te2-us-east-2b rtb-0394	9f3d7ed6444c8 subnet-02a	a1a4ea52a51a –		Edit ro	utes	ea973bfa7fd681
Elastic IPs	MySQL-rtb-publ	c rtb-06e1	1417f5ca8842d 2 subnets	-		Manag	e tags	ea973bfa7fd681
Managed prefix lists	MySQL-rtb-priva	te1-us-east-2a rtb-0dc5a	a6890234bad39 subnet-00	e772dc2694cf –		Delete	route table	ea973bfa7fd681

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.

aws 🛛 🏭 Services 🔍 Search 🙋 EC2 🖓 VPC 🔯 RDS 🔤 IAM 😽	[Option+S]	Ū	D	Dhio 🔻
VPC > Route tables > rtb-03949f3d7ec Edit routes	16444c8 > Edit routes			
Destination	Target	Status	Propagated	
10.1.0.0/16	local	▼ ⊘ Active	No	
	Q local	×		
Q 10.0.0/16	X Virtual Private Gateway	v -	No	e
	Q vgw-0bd51186a4c7d98d5	×		
Add route				
			Cancel Preview	Save changes



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

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🙋 EC2 🛛 VPC 🔯 RDS 🧕	53 IAM 🔁 S3					
VPC dashboard	Route tables (1/4) Info		C	Actions A Create	route table)
EC2 Global View 🗹 New	Q. Find resources by attribute or tag			View details		
Filter by VPC:	VPC = vpc-032ea973bfa7fd681 X	Clear filters		Set main route table	1 > @	
Select a VPC 🔹				Edit subnet associations	1 / 0	
	Name		bnet associati Edge associations	Edit edge associations		
 Virtual private cloud 	□ -	rtb-01a84fbdc75e7c5e6 -	-	Edit route propagation	ea973bfa7fd681	
Your VPCs New	MySQL-rtb-private2-us-east-2b	rtb-03949f3d7ed6444c8 subnet-02	a1a4ea52a51a –	Edit routes	ea973bfa7fd681	
Subnets	MySQL-rtb-public	rtb-06e11417f5ca8842d 2 subnets	-	Manage tags	ea973bfa7fd681	
Route tables	MySQL-rtb-private1-us-east-2a	rtb-0dc5a6890234bad39 subnet-00	e772dc2694cf –	Delete route table	ea973bfa7fd681	
Internet gateways						

	Services Q Search	_	[Option+S]			۶.	¢	0	0	Ohio 🔻	
EC2	🕜 VPC 🤯 RDS 🛅 IAM	<mark>छि</mark> ऽउ									
VPC >	Route tables > rtb-06e1141	7f5ca8842d > Edit routes									
Edit	t routes										
Des	tination		Target		Status	Propag	jated				
10.1	1.0.0/16		local	•	⊘ Active	No					
			Q, local	×							
Q	0.0.0.0/0	×	Internet Gateway	•	⊘ Active	No			Rem	iove	
			Q, igw-045a280cb0e50b712	×							
Q	10.0.0/16	×	Virtual Private Gateway	•	-	No			Rem	iove	
			Q vgw-0bd51186a4c7d98d5	×							
	Add route										
						c	ancel	Р	review	Sav	e changes
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🗗 EC2 🏠 VPC 🔯 RDS 🛅	IAM 🔁 S3				
VPC dashboard X	Route tables (1/4) Info		C	Actions Create View details	route table
EC2 Global View 🖾 New	Q Find resources by attribute or tag VPC = vpc-032ea973bfa7fd681 X	Clear filters		Set main route table	1 > ©
Select a VPC 🛛 🔻	Name	▼ Route table ID ▼ Explicit s	ubnet associati Edge associations	Edit subnet associations	. / 0
Virtual private cloud	-	rtb-01a84fbdc75e7c5e6 –	-	Edit edge associations Edit route propagation	ea973bfa7fd681
Your VPCs New	MySQL-rtb-private2-us-east-2b	rtb-03949f3d7ed6444c8 subnet-0	2a1a4ea52a51a –	Edit routes	ea 973 bfa7fd 681
Subnets Route tables	MySQL-rtb-public	rtb-06e11417f5ca8842d 2 subnets	-	Manage tags	ea973bfa7fd681
Internet gateways	MySQL-rtb-private1-us-east-2a	rtb-0dc5a6890234bad39 subnet-0	0e772dc2694cf –	Delete route table	ea973bfa7fd681

EC2 🔞 VPC 🔯 RDS 🔟 MM 🕞 S3 VPC > Route tables > rtb=Odc5a6890234bad39 > Edit Edit routes	: routes		
	: routes		
dit routes			
Destination	Target	Status	Propagated
10.1.0.0/16	local	▼ ⊘ Active	No
	Q local	×	
Q 10.0.0/16	X Virtual Private Gateway	• -	No Remove
	Q vgw-0bd51186a4c7d98d5	×	
Add route			
			Cancel Preview Save changes
	/SOL on Oracle Cloud Infrastructure (O		ORACL

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.				
aws Services Q Searc	h	[Option+S]	کا اک	Ohio •
🗗 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 > ③
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.

C > VPN connections > Create VPN connection								Ġ
C > VPN connections > Create VPN connection								
reate VPN connection Info								
ect the resources and additional configuration options that you want to use for the si	ite-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								
O Not associated								
Virtual private gateway								
	•							
vgw-0bd51186a4c7d98d5	•							
Customer gateway Info								
• Existing								
O New								
Customer gateway ID								
cgw-06fe642a3e61d6e8d	•							
-3								
Pouting options Info		-			-			
idShell Feedback		© 2023 Amazon W	eb Services Inc. or	ts affiliates	Privacy	Terms	Cookie prefe	erences
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III Services Q. Search C2 Image: Root Search Routing options Info O Dynamic (requires BGP)	[Option+S]	© 2023, Amazon W	eb Services, Inc. or i					erences
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C2 PVC PVC PVC PVC PVC PVC PVC PVC	icate over the VPN tunnels. The default is	© 2023, Amazon W	eb Services, Inc. or i					erences
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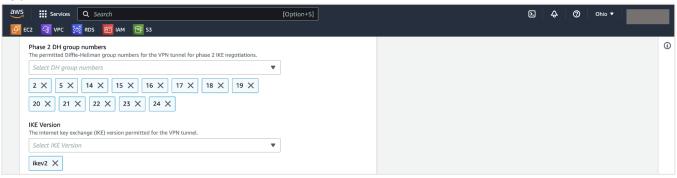
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- 43. While still on the Create VPN Connection page, expand the **Tunnel 1 options**. Choose a /30 CIDR from within the link local 169.254.0.0/16 range. Input the full CIDR in the Inside IPv4 CIDR for Tunnel 1 field. The guide uses the CIDR block of 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.

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▼ Tunnel 1 options - optional Info					
Inside IPv4 CIDR for tunnel 1					
169.254.6.0/30					
A size /30 IPv4 CIDR block from the 169.254.0.0/16 range	h.				
Pre-shared key for tunnel 1 The pre-shared key (PSK) to establish initial authentication	n between the virtual private gateway and customer gateway.				
Generated by Amazon					
The pre-shared key must have 8-64 characters. Valid chara	acters: A-Z, a-z, 0-9, _ and . The key cannot begin with a zero.				
Advanced options for tunnel 1					
 Use default options 					
Edit tunnel 1 options					
Phase 1 encryption algorithms The permitted encryption algorithms for the VPN tunnel f	or phase 1 IKE negotiations.				
Select encryption algorithms	▼				
AES128 X AES256 X AES128-GCM-16	6 X AES256-GCM-16 X				
Phase 2 encryption algorithms The permitted encryption algorithms for the VPN tunnel f	ins phase 2 IKE negotiations				
Select encryption algorithms					
	AES256-GCM-16 X				
AES128 X AES256 X AES128-GCM-16					
Phase 1 integrity algorithms					
AES128 X AES256 X AES128-GCM-16 Phase 1 integrity algorithms The permitted integrity algorithms for the VPN tunnel for Select integrity algorithms					

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**.

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	VPN logging	nfo							
	Tunnel activity lo	og							
	Tunnel activity log	captures log messages for IPsec	activity and DPD protocol messages.						
	Enable								
	Tunnel mainte	enance							
		lifecycle control Info							
	Tunnel endpoint lif	ecycle control provides control o	ver the schedule of endpoint replacements						
_									
	Tunnel 2 d	options - optional Info							
		options standard							
	Tags		Each tag consists of a key and an optional v		and the second second Place				
	your resources or tr	rack your AWS costs. Name tag h	elps you track your resources more easily. V	/e recommen	n use tags to search and filter nd adding Name tag.				
	Key		Value - optional						
	Q Name	×	Q MySQL-VPN	×	Remove				
	Add new tag	3							
	You can add 49 mo	ore tags.							
_									
			c	ancel	Create VPN connection				
-									
D. Clo	udShell Feedbac	ck Language				© 2023, Amazon Web Services, Inc.	or its affiliates. Privacy	Terms Cookie pref	erences

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	🖥 IAM 🔁 S3		
 Virtual private network (VPN) 	⊘ You successfully created vpn-05949336bf3a10755 / MySQL-VPN.		× (i)
Customer gateways	VPN connections (1/1) Info	C Actions Download configuration	Create VPN connection
Virtual private gateways Site-to-Site VPN	Q Filter VPN connections		< 1 > 💿
connections Client VPN endpoints	VPN ID: vpn-05949336bf3a10755 X Clear filters		
AWS Verified Access	Name \bigtriangledown VPN ID \bigtriangledown State	▽ Virtual private gateway ▽ Transit gateway	
Verified Access instances	• MySQL-VPN vpn-05949336bf3a10755 · Pending	ygw-0bd51186a4c7d98d5 –	cgw-06fe642a3



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

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 Virtual private network (VPN) 	VPN connections (1/1) Info	G Actions V Do	wnload confi	guration	1	reate VPN c	onnection
Customer gateways							
Virtual private gateways		Download configuration	×				
Site-to-Site VPN connections		Choose the sample configuration you wish to download based on your custo	mor				
Client VPN endpoints		gateway. Please note these are samples, and will need modification to use A					
AWS Verified Access		Algorithms, Certificates, and/or IPv6.					
Verified Access instances		Vendor The manufacturer of the customer gateway device (for example, Cisco Systems, Inc). 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 Aqnostic	•				
Transit gateways			•				
Transit gateway attachments		IKE version The IKE version you are using for your VPN connection.					
Transit gateway policy		ikev2	•				
tables							
Transit gateway route tables		Cancel	ownload				
Transit gateway multicast				Rem			
Traffic Mirroring CloudShell Feedback		@ 2023. Amazon We	bh Services Inc. r	ar its affili	ates Pr	ivacy Term	s 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.

19 20	IPSec Tunnel #1	BUTCHER DESIGNATIONS DESIGNA
20 21 22	#1: Internet Key Exchange Configuration	
23	Configure the IKE SA as follows:	agegrav systems
24	Please note, these sample configurations are for the minimum requirement of AES128, SHA1, and DH Group 2.	
25	Category "VPN" connections in the GovCloud region have a minimum requirement of AES128, SHA2, and DH Group 14.	
26	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.	
27	NOTE: If you customized tunnel options when creating or modifying your VPN connection, you may need to modify these sample configurations to match the custom settings for your tunnels.	
28		North Action of the second sec
29 30 31	Higher parameters are only available for VPNs of category "VPN," and not for "VPN-Classic". The address of the external interface for your customer gateway must be a static address. Your customer gateway may reside behind a device performing network address translation (NAT).	NUMBER OF
32	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.	
34	- IKE version : IKEv2	
35	- Authentication Method : Pre-Shared Key	
36	- Pre-Shared Key :	
37 38	– Authentication Algorithm : sha1 – Encryption Algorithm : aes-128-cbc	
30 39	– Lifetime : 28800 seconds	
	acters selected Spaces: 2	Plain Te:



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 outside IP address** from the drop-down (you can find this in the AWS downloaded configuration file). Remove the period or underscore characters from your pro-shared key and click **Save changes**.

underscore characters from y	our pre-shared key an	id click Save changes.
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 Virtual private network (VPN) 	VPN connections (1/1) Info	C	Actions Download cor	figuration	Create VPN connection	
Customer gateways	Q Filter VPN connections		Edit static routes		< 1 > ©	
Virtual private gateways	VPN ID: vpn-05949336bf3a10755 X Clear filters		Modify VPN connection			
Site-to-Site VPN			Modify VPN tunnel certificate			
connections	Name \triangledown VPN ID \triangledown State	∇	Modify VPN connection options	ansit gateway		
Client VPN endpoints	MySQL-VPN vpn-05949336bf3a10755 O Available		Modify VPN tunnel options			
AWS Verified Access	MySQL-VPN vpn-05949336bf3a10755 Available		Replace VPN tunnel		cgw-06fe642a3	

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VP	PC > VPN conne	ections > vpn-05949336bf3a10755	> Modify VPN tunnel options						١
		N tunnel options							
Se	elect a VPN tunnel	based on the tunnels outside IP addre	ess to modify its ipsec options.						
	Details								
	VPN connection	ID							
	D vpn-0594933	36bf3a10755							
	VPN tunnel outsi	ide IP address							
	Select tunnel ou	ıtside IP address	▲						
	Q								
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	Down Ipsec is d	own							

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VPC	> VPN connections > vpn-05949336bf3a10755 > Modify VPN tunnel options						4
	odify VPN tunnel options Info t a VPN tunnel based on the tunnels outside IP address to modify its ipsec options.						
C	etails						
	PN connection ID Ø vpn-05949336bf3a10755						
	PN tunnel outside IP address	_					
	3 side IPv4 CIDR						
	side IPV4 CIDR size /30 IPv4 CIDR block from the 169.254.0.0/16 range.						
	Q 169 X						
	re-shared key ne pre-shared key must have 8-64 characters. Valid characters: A-Z, a-z, 0-9, _ and . The key cannot b	egin 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 Aws 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.

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Networking > Customer connectivity	» Customer-premises equipment							
Customer connectivity		mises equipment in	(root) Compartmen					
Overview	Configure your on-premises network (VCN).	device (the customer-premises equipment, or CPE) a	It your end of the Site-to-Site VPN so traffic can flo	w between your on-premise	is netwo	rk and virt	ual clou	bı
Site-to-Site VPN	Create CPE							
FastConnect Dynamic routing gateway	Name	IP address	Created					_
Customer-premises equipment			No items found.					
Showing 0 items < 1 of 1								
List scope								
Compartment								
(root)	0							



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**.

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Create CPE							I	Help
Name								
MySQL-CPE								
Create in compartment								
(root)								\$
Allow IPSec over FastConnect								
IP address								_
3								
This IP address will be used as your CPE IKE identifier.								
Cpe vendor information (i)								
Vendor (1)								
Other							\$	
Add tags to organize your resources. What can I do with taggin	<u>g?</u>							
Tag namespace		Tag key	Tag value					
None (add a free-form tag)	\$						1	
						A	dd tag	
Create CPE Save as stack Cancel								
Terms of Use and Privacy Cookie Preferences				Copyright © 2023, Oracle ar	nd/or its a	ffiliates. Al	rights res	erved.

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

earch resources, se	ervices, documentation, and Mar	ketplace	US East (Ashbur	n) 🗸 🕠	\$?)	0				
Site-to-Site VPN											
Create IPS	Create IPSec connection Start VPN wizard										
Name	Lifecycle state	Customer-premises equipment	Dynamic routing gateway	Cre	ated						
		No items found	i.								
				Showing	0 items	< 1 of 1	>				
	Site-to-Site VPN Site-to-Site VF If your users h Create IPS	Site-to-Site VPN Site-to-Site VPN in Site-to-Site VPN securely connects your on-pm If your users have client devices that need offsi Create IPSec connection Start VPN with	Site-to-Site VPN in (root) Compartment Site-to-Site VPN securely connects your on-premises corporate network to Oracle Cloud Infrastructure If your users have client devices that need offsite access to Oracle Cloud resources, you can also creat Image: Create IPSec connection Start VPN wizard Name Lifecycle state Customer-premises equipment	Site-to-Site VPN 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. If your users have client devices that need offsite access to Oracle Cloud resources, you can also create an OpenVPN access server. See their marketplac Create IPSec connection Start VPN wizard	Site-to-Site VPN 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. 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. Create IPSec connection Start VPN wizard Name Lifecycle state Customer-premises equipment Dynamic routing gateway Create No items found.	Site-to-Site VPN 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. 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. Create IPSec connection Start VPN wizard Name Lifecycle state Customer-premises equipment Dynamic routing gateway Created No items found.	Site-to-Site VPN 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. 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. Create IPSec connection Start VPN wizard Name Lifecycle state Customer-premises equipment Dynamic routing gateway Created No items found. Items found. Items found. Items found. Items found.				



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 (root) Customer-premises equipment in the front (Change compartment) MySQL-CPE (3. This CPE is behind a NAT device (i)
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) IKEv2				\$	
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
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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 of this information from the AWS VPN configuration file.

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Networking > Customer connectivity > Si	ite-to-Site VPN		Create IPSec connection					
Customer connectivity Overview Site-to-Site VPN FastConnect		I securely connect	Routing type ① 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	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-	Policy based routing Use this option for a policy based CPE device or If you require multiple encryp- tion domains.			
Dynamic routing gateway Customer-premises equipment List scope Compartment	Name	Lifecycle st	Petwork.	figure your CPE device with static routes to the VCN's subnets.				
Filters Dynamic routing gateway in Froot) (Change compartment)			Provide IPv4 CIDR block. Example: 10.0.0.030 IPv4 inside tunnel interface - Oracle () 169. //30 Provide IPv4 CIDR block. Example: 10.0.0.031 IPv6 addressing					
Any DRG Customer-premises equipment in froot (Change compartment)			Show advanced options					
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58. Configure your **Tunnel 2** by copying and pasting the same values from Tunnel 1 into Tunnel 2. Click **Create IPSec connection**.

					US East (Ashburn) 🗸	0 4 0	۲	0
Networking > Customer connectivity >	Site-to-Site VPN		Create IPSec connection				Hel	<u>lp</u>
Customer connectivity Overview Sterto-Site VPN	Site-to-Site VF	-Site VPN PN securely connect ave client devices th ec connection						
FastConnect Dynamic routing gateway Customer-premises equipment List scope Compartment	Name	Lifecycle st	Shared secret Only numbers, letters, and spaces are allowed. IKE version ① IKEv2 Routing type ①				\$	
Filters Dynamic routing gateway in (root) (Change compartment)			BGP dynamic routing The available routes are learned dy- nanically through BGR 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 subnets.	Policy based Use this option for a device or if you requ tion domains.	a policy based CPE)-	
Any DRG Customer-premises equipment in root (Change compartment) Terms of Use and Privacy Cockis Preferer			BGP ASN 64512 Create IPSec connection Cancel		Copyright @ 2023, Oracle an	d/or its affiliates. All riv	ahts reserv	

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.

E ORACLE Cloud						US East (Ashburn) 🗸	· 🖸 🗘 🕐	9
Networking > Customer connectivity	» Site-to-Site VPN »	MySQL-VPN						
	(i) Afte	er creating an IPSec connec	tion, your configuration in	formation will be available under	the CPE & tunnels information	n tab under IPSec connections	5.	Close
	MySQ	L-VPN	Confinition					
	Edit Cł	noose new compartment	Add tags Open CPE	E configuration helper	te			
	IPSec c	onnection information	CPE & tunnels infe	ormation Tags				
AVAILABLE	Static ro	ute CIDR block: Not in use	(all tunnels use BGP) She		ID:37qwiq Show Copy			
	Created:	Tue, Oct 17, 2023, 15:24:2	2 UTC	DR	G: MySQL-DRG			
	Site-to-S	ite VPN version: v2 (i)		CP	E: MySQL-CPE			
Resources	Tunnel	s in each (r	oot) Compan	tment				
Tunnels (2)	Name	Lifecycle state (i)	IPSec status (i)	Oracle VPN IP address	IPv4 BGP status (i)	IPv6 BGP status (i)	Routing type	
Dynamic routing gateway attachments (2)	Tunnel-2	Available	Down	150	-	-	BGP dynamic routir	g :
Logs	Tunnel-1	Available	Down	150	-	-	BGP dynamic routir	g
							Showir	ng 2 hema

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.

appropriate page.							
aws Services Q Searc	h [Option+S]		D & Ø	▶		
🙋 EC2 🛛 VPC 🔯 RDS 🧕	IAM 🔁 S3						
 Virtual private network (VPN) 	Customer gateways (1/1) Info		C	Actions v	ireate customer gateway		
Customer gateways	Q Filter customer gateways				< 1 > 💿		
Virtual private gateways							
Site-to-Site VPN	Name ∇ Customer gateway ID				⊽ Туре		
connections	• Temp-Gateway cgw-06fe642a3e61d6	e8d 🕢 Available	31898	1.1.1.1	ipsec.1		



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.

aws	Services Q Search	[Option+S]	2	\$ @	Ohio 🔻	
🧿 EC	🕝 VPC 💀 RDS 🔠 IAM 🕞 S3					
	> Customer gateways > Create customer gateway					0
Cr	eate customer gateway Info					
A cu netv	tomer gateway is a resource that you create in AWS that represents the customer ga ork.	teway device in your on-premises				
I	etails					
	ame 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 ertificate ARN e ARN of a private certificate provisioned in AWS Certificate Manager (ACM).					
	Select certificate ARN					
	evice - optional ter a name for the customer gateway device.					
	Enter device name					
D. Cloud	Shell Feedback Language	© 2023, Amazon Web Sen	rices, Inc. or its affi	liates. Priva	cy Terms	Cookie preferences

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**.

aws Services Q Searc	h [Option+\$]	∑	
🙋 EC2 🖓 VPC 🔯 RDS 🧕	ам 🔁 S3		
 Virtual private network (VPN) 	VPN connections (1/1) Info	C Actions A Download configuration Create VPN connection	(i)
. ,	Q Filter VPN connections	Edit static routes < 1 > @	
Customer gateways		Modify VPN connection	
Virtual private gateways	VPN ID: vpn-05949336bf3a10755 X Clear filters	Modify VPN tunnel certificate	
Site-to-Site VPN connections	Name \triangledown VPN ID \triangledown State	✓ Modify VPN connection options ansit gateway	
Client VPN endpoints	MySQL-VPN vpn-05949336bf3a10755	e Modify VPN tunnel options caw-06fe642a3	
		Replace VPN tunnel	
AWS Verified Access		Manage tags	
Verified Access instances		Delete VPN connection	



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**.

aws	Services Q Search	[Option+S]			D & 0	۲	Ohio 🔻	
ල් EC	2 🕝 VPC 💀 RDS 📴 IAM 🔁 S3							
VP	C > VPN connections > vpn-05949336bf3a10755 > Modify VPN connection							١
	lodify VPN connection Info ect a target type and the resource you would like to use.							
	Details							
	VPN connection ID ✿ vpn-05949336bf3a10755							
	Current VPN gateway D vgw-0bd51186a4c7d98d5							
	Current customer gateway							
	Change target							
	Target type							
	Customer gateway	7						
	Target customer gateway							
	cgw-078130a4e2d25454f	•						
		Cancel	Save changes					
🔈 Clou	idShell Feedback			© 2023, Amazon W	eb Services, Inc. or its affiliates.	Privacy	Terms	Cookie preferences

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

aws Services Q Searc	h [Option+S]	▷ 🔶 ⑦ 🙆 Ohio ▼				
🙋 EC2 🖓 VPC 🔯 RDS 🧧	3 IAM 🕞 S3					
 Virtual private network (VPN) 	⊘ You successfully updated vpn-05949336bf3a10755 / MySQL-VPN.	× 0				
Customer gateways	VPN connections (1/1) Info	C Actions ▼ Download configuration Create VPN connection				
Virtual private gateways						
Site-to-Site VPN	Q Filter VPN connections	< 1 > @				
connections Client VPN endpoints	VPN ID: vpn-05949336bf3a10755 X Clear filters					
AWS Verified Access	Name \bigtriangledown VPN ID \bigtriangledown State	▽ Virtual private gateway ♡ Transit gateway ♡ Customer gate				
Verified Access instances	MySQL-VPN vpn-05949336bf3a10755 O Ava	ailable vgw-0bd51186a4c7d98d5 – cgw-078130a4				



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).

aws Services Q Searc	h [Option+S]	घ Q @	Ohio 🔻
🗗 EC2 🖓 VPC 🔯 RDS 🧕	I IAM 🔁 53		
 Virtual private network (VPN) 	⊘ You successfully updated vpn-05949336bf3a10755 / MySQL-VPN.		× ©
Customer gateways Virtual private gateways Site-to-Site VPN connections	VPN connections (1/1) Info Q. Filter VPN connections	C Actions Download configuration Create	e VPN connection
Client VPN endpoints	VPN ID: vpn-05949336bf3a10755 X Clear filters		
▼ AWS Verified Access	Name \triangledown VPN ID \triangledown State	▽ Virtual private gateway ▽ Transit gateway	
Verified Access instances	● MySQL-VPN vpn-05949336bf3a10755 ④ Available	vgw-0bd51186a4c7d98d5 –	cgw-078130a4
Verified Access trust providers <u>New</u>	vpn-05949336bf3a10755 / MySQL-VPN Info		
Verified Access groups <u>New</u> Verified Access endpoints <u>New</u>	Details Tunnel details Tags		
 Transit gateways Transit gateways 	A This VPN connection is not using both tunnels. This mode of operation is not highl	y available and we strongly recommend you configure your second tunnel.	×
Transit gateway attachments	Tunnel state		
Transit gateway policy tables	Tunnel number	Pv6 CIDR ∇ Status ∇ Last status change ∇	Details ∇
Transit gateway route tables	Tunnel 1 : 169. –	October 17, 2023, 11:55:31 (UTC-04:00)	2 BGP ROUTES
Transit gateway multicast	Tunnel 2 169. –	October 17, 2023, 11:51:58 (UTC-04:00)	IPSEC IS DOWN
Traffic Mirroring	Tunnel 1 options info		
CloudShell Feedback		© 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**.

Cloud			US East (Ashburn) 🗸		⊕ (
Networking » Customer connectivity »	Site-to-Site VPN »	MySQL-VPN	The Distance					
	MySQ	L-VPN						
	Edit Ch	noose new compartment	Add tags Open	CPE configuration helper	erminate			
	IPSec co	onnection information	CPE & tunnels	s information Tags				
		ute CIDR block: Not in use) <u>Show</u> (i)	OCID:37qwiq Show Copy			
AVAILABLE		Tue, Oct 17, 2023, 15:24:2	2 UTC		DRG: <u>MySQL-DRG</u> CPE: <u>MySQL-CPE</u>			
Resources	Tunnel	s in (r	oot) Comp	artment				
Tunnels (2)	Name	Lifecycle state (i)	IPSec status (i)	Oracle VPN IP address	IPv4 BGP status (i)	IPv6 BGP status (i)	Routing type	
Dynamic routing gateway attachments (2)	Tunnel-2	Available	Down	150.	Down	Down	BGP dynamic routing	:
Logs	Tunnel-1	Available	🔵 Up	150.	• Up	Down	BGP dynamic routing	:
							Showing 2	2 items

- 67. We are now ready to perform the migration.
- **34** Migration Guide: Amazon Aurora to HeatWave MySQL on Oracle Cloud Infrastructure (OCI) Copyright © 2024, Oracle and/or its affiliates. Public



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

reate DB Syste						_	10 5		
E ORACLE Clou	IC Search resou	rces, services					US Eas	t (Ashburn) 🗸 🗔	△ ⑦ ⊕
MySQL DB Systems		Syster	3900	(root) (Compartmen	ıt.			
Backups	Cre	ate DB Syste	m Actions 👻						
Channels		Name	DB System State	Crash Recovery	Delete Protected	High Availability	HeatWave Cluster	HeatWave State	Created
Configurations				No DB sy	vstems were found using	the selected compartm	ent and filters		
	0 sel	ected						Showing	0 items < 1 of 1
.ist 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) 🗸 👩 🕀 🔮
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	
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.	<i></i>



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) > 🖸 🎊 ? 🌐 9									
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 workloads. The default data storage size is 1,024 GB.									
Create administrator credentials Username ③ admin									
Password									
Confirm password									
Configure networking Oreate Save as stack Cancel	Collaose								

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, documentation, and I	Marketplace	US East (Ashburn) ∨	
Create DB system			
Configure networking			Collapse
The VCN and subnet where the DB system endpoint will be attached. The DB system VCN, create a VCN,	m endpoint uses a private IP address and is not directly accessible from	n the internet. <u>How do I connect to a DB syste</u>	em? If you do not have a
Virtual cloud network in (Change compartment)			
MySQL-VCN			\$
Subnet in (Change compartment)			
private subnet-MySQL-VCN (Regional)			\$
Configure placement			Collapse
The availability domain/fault domain in which the DB system endpoint will be physic	ally placed. It is recommended to allow Oracle to choose the best plac	ement for the fault domain.	
Availability domain			
AD-1 AD-	2	AD-3	
QDfL:US-ASHBURN-AD-1 V QDfL:	US-ASHBURN-AD-2	DfL:US-ASHBURN-AD-3	
Choose a fault domain			
If you do not select a fault domain, Oracle will choose the best placement for you.			
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				Collapse	
Select a shape					
MySQL.HeatWave.VM.Standard					
CPU core count: 16		_		_	
Memory size: 512 GB		Cha	nge shap	be	
Max network bandwidth: 16Gbps					
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 cont advanced options. See supported shaces. Data storage size (GB)	figurations, which you can select ir	the Configur	ation tab u	nder 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					
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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.

ORACLE Cloud Search resources, services, documentation, and Marketplace	US East (Ashburn) 🗸	Ω () ()	۲	0
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 🛈					
7					
The retention period defines how long to store the backups, in days.					
Enable point in time restore (i)					
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.					
				ſ	-
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 options								
Deletion plan Configuration	Connections	Crash recovery	Maintenance	Data import	Tags			
Select a configuration Optional								
Using default configuration	on for selected sha	pe MySQL.VM.Sta	ndard.E4.4.64GE	3		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 rights	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's 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**.

Hide advanced of the second	options							
Deletion plan	Configuration	Connections	Crash recovery	Maintenance	Data import	Tags		
Select a configura	tion Optional							
Using def	ault configuration	for selected shar	be MySQL.VM.Sta	ndard.E4.4.64GE	3			
eeg					-		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)							ſ
8.0.30 - Bug fix	(Deprecated)							
8.1.0 - Innovatio	n							Ĺ
Create Save as	stack Cancel							
ms of Use and Privacy	Cookie Preferences						Copyright © 2023, Oracle	e and/or its affiliates. All rights re

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.E4.4.64GE	3		Select configuration	Reset configuration	
MySQL version								
8.0.34 - Bug fix								
Create Save as stack Cancel								
Terms of Use and Privacy Cookie Preferences						Copyright © 2023, Oracle	and/or its affiliates. All right	s reserved.



77. Your HeatWave MySQL DB system will start **CREATING**.

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tem details							
MySQL-HW							
Edit Start Stop Restart More actions	•						
DB system information Connections	Tags						
General information	High availability						
OCID:yInguu7k5q Show Copy	High availability: Enabled (i)						
l	stem details MySQL-HW Edit Start Stop Restart More actions DB system information Connections General information	MySQL-HW Edit Start DB system information Connections Ceneral information High availability OCID:ylnguu7k5q Show Copy	stem details MySQL-HW Edit Start DB system information Connections Ceneral information High availability OCID:ylinguu7KSq Show Cottp:ylinguu7KSq Show Cottp:ylinguu7KSq Show Cottp:ylinguu7KSq Show Cottp:ylinguu7KSq Show Cottp:ylinguu7KSq Show	stem details MySQL-HW Edit Start DB system information Connections Ceneral information High availability OCID:ylnguu7k5q Show Copy	stem details MySQL-HW Edit Start DB system information Connections Tags General information High availability OCID:ylnguu7K5q Show Copy High availability: Enabled ()	stem details MySQL-HW Edit Stop DB system information Connections Tags General information High availability OCID:ylnguu7k5q Show Copy High availability: Enabled ()	stem details MySQL-HW Edit Start DB system information Connections Ceneral information High availability OCID:ylnguu7k5q Show Copy High availability: Enabled ()

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

ORACLE Cloud	Search resources, services, documentation, and Marketplace		US East (Ashburn) 🗸	\bigcirc	۵	?	٢	0
MySQL HeatWave » DB systems » [DB system details							
	MySQL-HW							
DDC	Edit Start Stop Restart More actions -							
DD9	DB system information Connections Tags							
	General information	High availability						
1111	OCID:bfcj5nxrka Show Copy	High availability: Enabled Disable)					
ACTIVE	Description: - Edit	High availability type: Multi-AD						

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) 🗸	\bigcirc		? ₿	9 0
MySQL HeatWave » DB systems »	DB system details						
	MySQL-HW						
DDO	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 <u>I connect?</u>	g a MySQL client/connector via	the endp	oint belo	ow. <u>How c</u>	do
	Subnet: private subnet-MySQL-VCN Subnet type: Regional	Private IP address: 10.0.1.4 G	CORY (i)				
	oublier type, negional	Internal FQDN: -					
		MySQL port: 3306					
		MySQL X protocol port: 33060	<u> </u>				

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.

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

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

aws Services Q Searc	ch [Option+S]	ව 🔶 🧿 👰 Ohio ▼ 🔤
🙋 EC2 🏾 🏠 VPC 🔯 RDS 🚦	ам 🔁 53	
▼ 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 type ∇ Status check Alarm status Availability Zone ∇ Public IPv4 DN Constant Constant
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.

ollowing the sim			es, or instances, t	that run on the	e AWS Cloud. Q	uickly get started by	▼ Summary		
Name and	tags info						Number of instances Info		
Name MySQL-EC2					A	dd additional tags	Software Image (AMI) Provided by Red Hat, Inc. ami-02b8534ff4b424939		
▼ Applicat	ion and OS	lmages (Am	azon Machir	ie Image)	Info		Virtual server type (instance type) t2.micro Firewall (security group)		
							New security group		
			are configuration e. Search or Brow			on server, and /hat you are looking for	Storage (volumes) 1 volume(s) - 10 GiB		
applications) n below	equired to launc	ch your instance		se for AMIs if			Storage (volumes)		
applications) n below Q. Search ou	equired to launc	ch your instance	e. Search or Brow	se for AMIs if			Storage (volumes) 1 volume(s) - 10 GiB		



83. For **Instance type**, choose an instance type you think is appropriate. If you have large amounts of data - provisioning an EC2 instance 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.

Services Q. Search Image: Comparison of the state o	[Option+S]		2	¢	0 0	Ohio 🔻	
Instance type Info		▼ Summary					
Instance type		Number of instances Info					
t2.micro Free Family: t2: 1 vCPU 1 GiB Memory Current generation: true On-Demand Linax base pricing: 0.0116 USD per Hour On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand Windows base pricing: 0.0116 USD per Hour On-Demand MikEl base pricing: 0.0116 USD per Hour	tier eligible All generations Compare instance types	1 Software Image (AMI) Provided by Red Hat, Inc. ami-020854fdHd2439					
Additional costs apply for AMIs with pre-installed software		Virtual server type (instance type) t2.micro					
▼ Key pair (login) Info		Firewall (security group) New security group					
You can use a key pair to securely connect to your instance. Ensure t before you launch the instance.	hat you have access to the selected key pair	Storage (volumes) 1 volume(s) - 10 GiB					
Key pair name - required							

84. Under Network settings, ensure that the correct VPC (the VPC that is associated with your Aurora instance) and Subnet are selected. For this guide - we have decided to deploy the EC2 instance inside a public subnet. For Auto-assign 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.

aws	Services Q Search	[Option+S]	D 4 0	Ohio •
EC2	😚 VPC 🔞 RDS 🔠 IAM 🤁 S3			
=	▼ Network settings Info		▼ Summary	3
	VPC - required Info		Number of instances Info	
	vpc-0e70c2c402d3ceb74 (MySQL-vpc) 10.1.0.0/16	C		
	Subnet Info		Software Image (AMI)	
	subnet-0e8e28c5ae0c364d8 MySQL-subnet-public1-us-east-2a VPC: vpc-0e70c2c402d3ceb74 Owner: 528770944777 Availability Zone: us-east-2a IP addresses available: 4090 CIDR: 10.10.0/20 Availability Zone: us-east-2a	C Create new subnet 🖸	Provided by Red Hat, Inc. ami-02b8534ff4b424939	
	Auto-assign public IP Info		Virtual server type (instance type)	
	Enable	•	t2.micro	
	Firewall (security groups) info A security group is a set of firewall rules that control the traffic for your instance. Add rules to al instance.	low specific traffic to reach your	Firewall (security group) New security group	
	• Create security group		Storage (volumes) 1 volume(s) - 10 GiB	
	Security group name - required			
	launch-wizard-2		Free tier: In your first year includes ×	
	This security group will be added to all network interfaces. The name can't be edited after the s 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and:/0#,@[]+=&;[]!\$*	ecurity group is created. Max length is	750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is	



Inbound Security Group Rule Security group rule 1 (TCP)		Remove	Software Image (AMI) Provided by Red Hat, Inc. ami-02b8534f4b424939
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	▼ Q Add CIDR, prefix list or sec	curity e.g. SSH for admin desktop	New security group
	0.0.0.0/0 ×		Storage (volumes)
			1 volume(s) - 10 GiB
	0.0.0.0/0 allow all IP addresses to access yo o allow access from known IP addresses or		Free tier: In your first year includes × 750 hours of t2.micro (or t3.micro in
			the Regions in which t2.micro is
Add security group rule	·		unavailable) instance usage on free

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

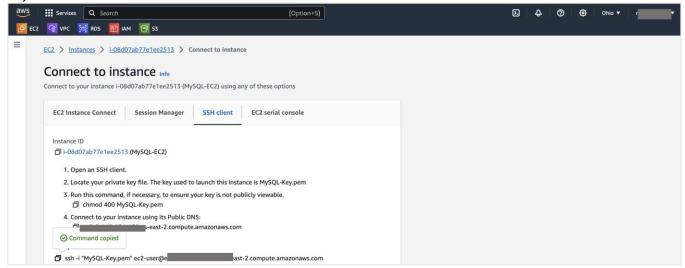
▼ Configure storage Info	Advanced	New security group Storage (volumes)
1x 10 GiB gp2 Root volume (Not encrypted) Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storation Add new volume 	ge X	1 volume(s) - 10 GiB
0 x File systems	Edit	IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
► Advanced details Info		Cancel Launch instance Review commands
CloudSheil 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**.

Services Q Search	[Option+S]		Σ & ⑦ ۞ Ohio ▼
🌀 VPC 🙀 RDS 🛅 IAM 🔁 S3			
EC2 > Instances > Launch an instance			
 Success Successfully initiated launch of instance (i-08c 	107ab77e1ee2513)		
Launch log			
Next Steps			
	tance, for example "create alarm" or "create backup"		< 1 2 3 4 5 6 >
	tance, for example "create alarm" or "create backup"		< 1 2 3 4 5 6 >
Q. What would you like to do next with this inst	Connect to your instance	Connect an RDS database	Create EBS snapshot policy
Q. What would you like to do next with this inst	Connect to your instance Once your instance is running, log into it	Connect an RDS database Configure the connection between an EC2 instance and a database to allow traffic flow	Create EBS snapshot policy Create a policy that automates the creation,
Q What would you like to do next with this inst Create billing and free tier usage alerts To manage costs and avoid surprise bills, set up email notifications for billing and free	Connect to your instance Once your instance is running, log into it from your local computer.	Configure the connection between an EC2	Create EBS snapshot policy Create a policy that automates the creation, retention, and deletion of EBS snapshots
Q What would you like to do next with this inst Create billing and free tier usage alerts To manage costs and avoid surprise bills, set	Connect to your instance Once your instance is running, log into it	Configure the connection between an EC2 instance and a database to allow traffic flow	Create EBS snapshot policy Create a policy that automates the creation,
Q What would you like to do next with this inst Create billing and free tier usage alerts To manage costs and avoid surprise bills, set up email notifications for billing and free	Connect to your instance 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 between them.	Create EBS snapshot policy Create a policy that automates the creation, retention, and deletion of EBS snapshots

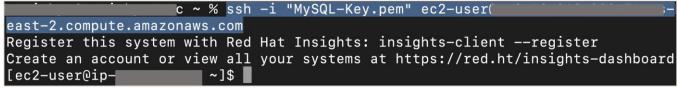
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87. If you are using the SSH client to connect to your EC2 instance, copy the **Example** SSH command and login to your EC2 instance.



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

\$ ssh -i </path/to/private-ssh-key> ec2-user@<ec2-Public-DNS>



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/

General Availability (GA) Releases Archives				
MySQL Shell 8.1.1 Innovation				
Select Version:				
8.1.1 Innovation	~			
Select Operating System:				
Red Hat Enterprise Linux / Oracle Linux	~			
Select OS Version:				
Red Hat Enterprise Linux 9 / Oracle Linux 9 (x86, 64-b	it) ~			
RPM Package	8.1.1	23.4M	Download	
(mysql-shell-8.1.1-1.el9.x86_64.rpm)		MD5:86884e81bd1cf5c	abced6aef083b4bcb	
RPM Package, Debug Information	8.1.1	501.6M	Download	
			6807c91a04cb04aa6	

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 Shell on macOS</u>.

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

ogin Now or Sign Up for a fre	e account.	
n Oracle Web Account provides you	with the following advantages:	
 Fast access to MySQL software dow Download technical White Papers a Post messages in the MySQL Discus Report and track bugs in the MySQI 	nd Presentations ssion Forums	
	gin » Sign Up » for an Oracle Web account	
	acle Web account for an Oracle Web account	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 Open Link in New Tab Open Link in New Window	nt, click

92. Go back to the EC2 instance that can connect to your Amazon Aurora 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-user@ ~]\$ wget https://dev.mysql.com/get/Downloads/MySQL-She ll/mysql-shell-8.1.1-1.el9.x86_64.rpm --2023-09-20 15:45:58-- https://dev.mysgl.com/get/Downloads/MySQL-Shell/mysglshell-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.mysql.com//Downloads/MySQL-Shell/mysql-shell-8.1.1-1.el9. x86_64.rpm [following] --2023-09-20 15:45:58-- https://cdn.mysql.com//Downloads/MySQL-Shell/mysql-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.mysql.com (cdn.mysql.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

Note: to install wget on EC2, execute: \$ sudo yum install wget

4542157/24542157]

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

y suuo yum rocarris	stall mysql-shell*			
[ec2-user@) yum localinstal	l mysql-shell*	
Updating Subscri	· •	repositories.		
Unable to read c	onsumer identity			
This system is notion-manager to re		h an entitlement	: server. You can use	subscript
Last metadata ex Dependencies res		:00:30 ago on We	ed 20 Sep 2023 03:54:2	8 PM UTC.
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-		🛛 ~]\$ mysq	lshver	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 Aurora 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-user0 > ~]\$ mysqlsh admin@database-1-instance-1us
-east-2.rds.amazonaws.com
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-instance-1.cus-east-2.rds.a
mazonaws.com'
Fetching schema names for auto-completion Press ^C to stop.
Your MySQL connection id is 22204
Server version: 5.7.12 MySQL Community Server (GPL)
No default schema selected; type \use <schema> to set one</schema>
My <mark>SQL</mark> database-1-instance-1

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 Aurora 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 Aurora MySQL to HeatWave MySQL on OCI.

- 96. Before connecting to Amazon Aurora 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 Aurora MySQL using MySQL Shell on EC2.

\$ tmux

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

```
-OR-
$ mysqlsh -u <user> -p -h <hostname> -P <port-number>
[ec2-user@ip-
                        ~]$ tmux
[ec2-user@ip-
                        ~]$ mysqlsh admin@database-1-instance-1.c
                                                                              .us
-east-2.rds.amazonaws.com
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-instance-1.
                                                                .us-east-2.rds.a
mazonaws.com'
Fetching schema names for auto-completion... Press ^C to stop.
Your MySQL connection id is 22210
Server version: 5.7.12 MySQL Community Server (GPL)
No default schema selected; type \use <schema> to set one.
MySQL database-1-instance-1.
                                          .us-east-2 JS >
```

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

```
MySQL JS> \js
MySQL JS> util.copyInstance('mysql://admin@10.0.1.4', {"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 (10.0.1.4) with your HeatWave MySQL username and IP address (not the Amazon Aurora MySQL username and IP address).

MySQL database-1-instance-1us-east-2 JS > util.copyInstance('mysql://adm
in@10.0.1.4', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_definer
s", "strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip_inv
alid_grants", "create_invisible_pks"], users: "true", threads: 4, dryRun:"true"})
Please provide the password for 'admin@10.0.1.4': *******
Save password for 'admin@10.0.1.4'? [Y]es/[N]o/Ne[v]er (de <u>fault No): Y</u>
Copying DDL, Data and Users from in-memory FS, source: ip3306, target: w7gp
26pewjjmqlaw: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 'FLU
SH TABLES WITH READ LOCK'. Falling back to LOCK TABLES
ERROR: SRC: The current user does not have required privileges to execute FLUSH TABLES W
ITH READ 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
privileges 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 fa
iled. (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@10.0.1.4', {"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 (10.0.1.4) with your HeatWave MySQL username and IP address (not the Amazon Aurora MySQL username and IP address).

MySQL database-1-instance-1us-east-2.rds JS > util.copyInstance('mysql:/
/admin@10.0.1.4', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_def
iners", "strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip
_invalid_grants", "create_invisible_pks"], users: "true", threads: 4, dryRun:"true", con
sistent: "false"})
Copying DDL, Data and Users from in-memory FS, source: ip :3306, target: w7gp
26pewjjmqlaw:3306.
SRC: dryRun enabled, no locks will be acquired and no files will be created.
Initializing — done
SRC: 1 out of 5 schemas will be dumped and within them 3 tables, 0 views.
SRC: 2 out of 3 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
SRC: database-1-instance-1
SRC: 5.7.12 - MySQL Community Server (GPL), 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 accounts were reported during the load. ----Dump_metadata: Binlog_file: '' Binlog_position: 0 Executed_GTID_set: '' MySQL database-1-instance-1. .us-east-2.rds 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 the 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 that would fail when users are copied, such as grants referring to a specific routine that 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.

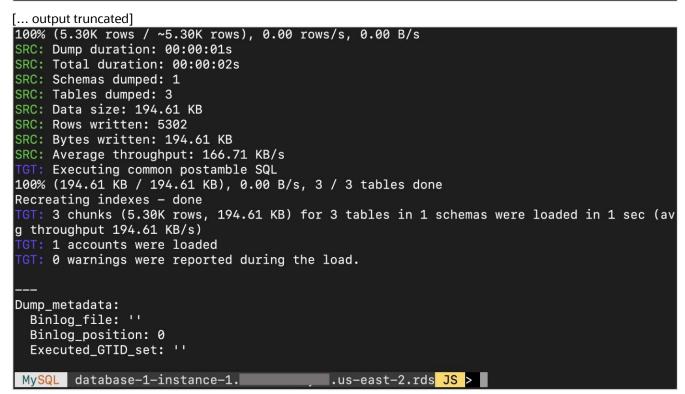
• consistent: Enable (true) or disable (false) consistent data copies by locking the instance for backup during the copy.

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@10.0.1.4', {"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 (10.0.1.4) with your HeatWave MySQL username and IP address (not the Amazon Aurora MySQL username and IP address).

MySQL database-1-instance-1. .us-east-2.rds JS > util.copyInstance('mysql:/ /admin@10.0.1.4', {"compatibility": ["force_innodb", "skip_invalid_accounts", "strip_def iners", "strip_restricted_grants", "strip_tablespaces", "ignore_wildcard_grants", "strip _invalid_grants", "create_invisible_pks"], users: "true", threads: 4, dryRun:"false", co nsistent: "false"}) Copying DDL, Data and Users from in-memory FS, source: ip 26pewjjmqlaw:3306. Initializing - done SRC: 1 out of 5 schemas will be dumped and within them 3 tables, 0 views. SRC: 2 out of 3 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

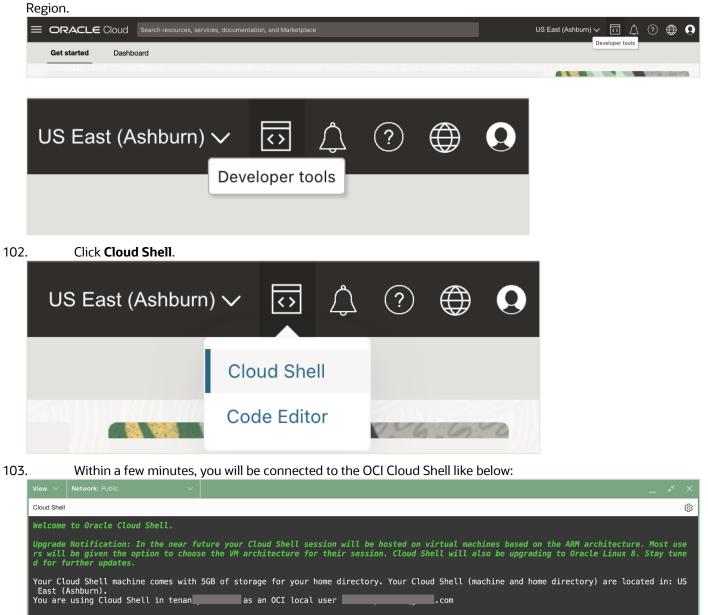


Note: once the MySQL Shell copy utility finishes, all your data will be copied over from Amazon Aurora MySQL to HeatWave MySQL on OCI. This completes the migration process. You can end your tmux session.

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

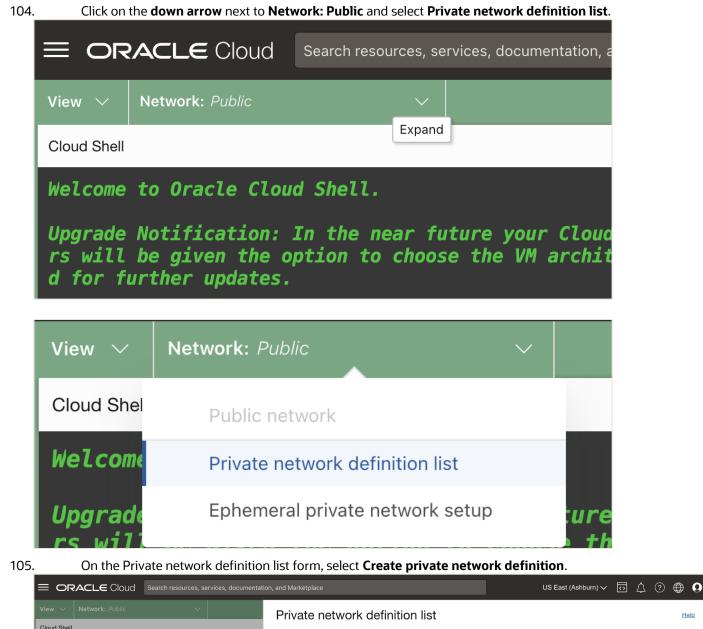
101. Login to <u>OCI</u>, navigate to the top right corner and click on **Developer tools** right next to your OCI



Type `help` for more info. cloudshell:~ (us-ashburn-1)\$

Terms of Use and Privacy Cookie Preferences





 View ×
 Network: Public
 Private network definition list
 Here

 Cloud Shell
 Welcome to Oracle Cloud Shell.
 Image: Cloud Shell or further updates.
 Image: Cloud Shell or further updates.
 Image: Cloud Shell in tenancy image: Cloud Shell in tenancy image: Cloud Shell in tenancy image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell in tenancy image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell image: Cloud Shell image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell image: Cloud Shell image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell:
 Image: Cloud Shell image: Cloud Shell image: Cloud Shell image: Cloud Shell:
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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 compared)	rtment)
MySQL-VCN	
Subnet in record (root) (Change com	<u>partment)</u>
Subnet in reference (Change com private subnet-MySQL-VCN Network security group:	
private subnet-MySQL-VCN	
private subnet-MySQL-VCN Network security groups Network security groups in	s (Optional)
private subnet-MySQL-VCN Network security groups Network security groups in (Change compartment)	s (Optional)
private subnet-MySQL-VCN Network security groups Network security groups in (Change compartment)	s (Optional) (root)

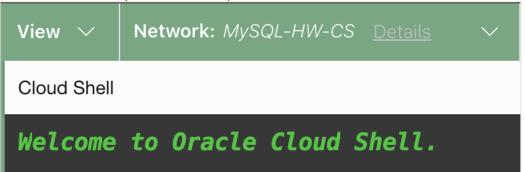


Click Close.

ORACLE Cloud Search resources, services, documentation	on, and Marketpla			US Ea	ist (Ashburn) 🗸	\bigcirc	۵	?€	€ 9
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	are 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 de	finitions. They are listed in the pri	vate networ	< list.				
Your Cloud Shell machine comes with 5GB of stora East (Ashburn).	Create priv	vate network definition				Q Sea	irch by	name	
You are using Cloud Shell in tenancy as	Favorite	Name	Subnet		Last used				
Type `help` for more info. n → cloudshell:~ (us-ashburn-1)\$ □	☆	MySQL-HW-CS	yciry4ma Show Copy		-				:
					5	Showing	1 item	< 1 of	1 >
	Default ne	etwork							
	Select defau	It network description							
	Public								\$
	Close								
Terms of Use and Privacy Cookie Preferences				Copyr	ght © 2023, Oracle a	and/or its a	affiliates.	All rights n	eserved.



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.



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@10.0.1.4 Please provide the password for 'admin@10.0.1.4': ******* Save password for 'admin@10.0.1.4'? [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@10.0.1.4' Fetching schema names for auto-completion... Press ^C to stop. Your MySQL connection id is 180 (X protocol) Server version: 8.0.34-u3-cloud MySQL Enterprise - Cloud No default schema selected; type \use <schema> to set one. MySQL 10.0.1.4:33060+ 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 10.0.1.4:33060+ ssl JS > \sql Switching to SQL mode... Commands end with ; Fetching global names for auto-completion... Press ^C to stop. MySQL 10.0.1.4:33060+ ssl SQL > SHOW SCHEMAS; Database information_schema mysql mysql_audit performance_schema sys world 6 rows in set (0.0009 sec) MySQL 10.0.1.4:33060+ ssl SQL > SHOW TABLES IN world; Tables_in_world city country countrylanguage rows in set (0.0018 sec) 3 MySQL 10.0.1.4:33060+ ssl SQL >

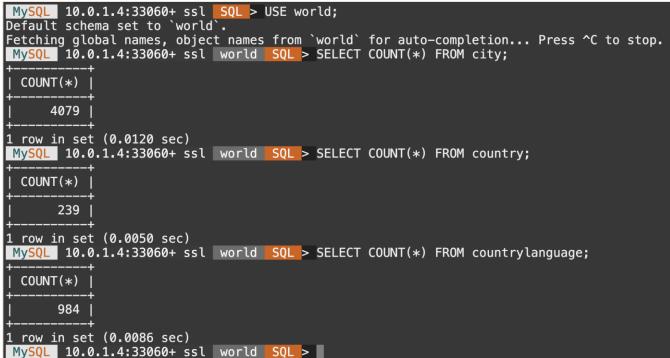
111. You can run the below query on every table that you have for your Amazon Aurora MySQL and HeatWave MySQL on OCI to ensure that the row count matches on both sides: MySQL SQL> SELECT COUNT (*) FROM <schema-name>.<table-name>;

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

AMAZON AUFORA MYSQL FOW COUNT:
MySQL database-1-instance-1us-east-2.rds SQL > USE world;
Default schema set to `world`.
Fetching global names, object names from `world` for auto-completion Press ^C to stop.
MySQL database-1-instance-1us-east-2 world SQL > SELECT COUNT(*) FROM city;
COUNT(*)
++
1 row in set (0.0019 sec)
MySQL database-1-instance-1
, ++
COUNT(*)
++
239
++
1 row in set (0.0008 sec)
MySQL database-1-instance-1
language;
COUNT(*)
1 row in set (0.0011 sec)

Amazon Aurora MySQL row count:

HeatWave MySQL row count:



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

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

- 114. Login to <u>OCI</u>. 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

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Edit Start

ACTIVE

DB system information

Description: - Edit

Compartment

General information

OCID: ...xfzg4pgbqq Show Copy

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

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

Stop Restart

Co

More actions

Restore to a new DB system

Edit backup plan Create manual backup

Enable high availability

Disable crash recovery

Add HeatWave cluster

High availability

HeatWave

High availability: Disabled Enable (i)

HeatWave cluster: Disabled Edit (i)



117.	Click Estimate node.					
	ORACLE Cloud Search resources, services, documentation, an			US East (Ashburn) 🗸	0 ¢ ?	• •
	Add HeatWave cluster					
	Add a HeatWave cluster to the DB system MySQL-HW with shape MySQL.	HeatWave.VM.Standard. What shapes support HeatWav	<u>e?</u>			
	Configure HeatWave cluster					
	Select a shape					
	HeatWave.512GB					
	CPU core count: 16 Memory size: 512 GB				Change shape	
	Max network bandwidth: 16Gbps				onange snape	
	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					
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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 HeatWave cluster to the DB system MySQL-HW with shape N complete. (i) Configure HeatWave cluster Generate estimate Select a shape No schema information available. HeatWave.512GB OPU core count: 16 Memory size: 512 GB Generate estimate
Select a shape HeatWave.512GB CPU core count: 16 Memory size: 512 GB
HeatWave.512GB CPU core count: 16 Memory size: 512 GB
CPU core count: 16 Memory size: 512 GB
Node
1
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.
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 ¢	?	0			
Add HeatWave cluster	Estimate n	ode							
Add a HeatWave cluster to the DB system MySOL-HW with shape N	Estimate number of required nodes by selecting the schemas or tables you want to analyze with HeatWave. This operation takes few minutes to complete. Regenerate estimate Last estimate was generated on Fri, Aug 25, 2023, 12:33:20 UTC.								
Configure HeatWave cluster	Name	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 selecte HeatWave.512GB Summary No schema or tat					\$			
Node 1	Select the schem	as and tables to use for the node estimate.							
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.									
Add HeatWave cluster Cancel	Apply estimated no	de <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				
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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); Copy.
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 the HeatWave cluster creation process.

	US East (Ashburn) 🗸 🕢 💮 🔂
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 Cancel	
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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**.

ORACLE Cloud	Search resources, services, documentation, and Marketplace		US East (Ashburn) 🗸	$\overline{\mathbf{O}}$	۵	?	٢	0
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	em details							50)
	MySQL-HW							
	Edit Start Stop Restart More actions -							
(DBS)	DB system information Connections Tags							
	General information	High availability						
		0	_					
ACTIVE	OCID:xfzg4pgbqq Show Copy	High availability: Disabled Enable (9					
	Description: - <u>Edit</u> Compartmen	HeatWave						
	Created: Tue, Aug 15, 2023, 16:19:42 UTC	HeatWave cluster: Details Edit (i)						
	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@10.0.1.4 Please provide the password for 'admin@10.0.1.4': ******* Save password for 'admin@10.0.1.4'? [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@10.0.1.4' Fetching schema names for auto-completion... Press ^C to stop. Your MySQL connection id is 180 (X protocol) Server version: 8.0.34-u3-cloud MySQL Enterprise - Cloud No default schema selected; type \use <schema> to set one. MySQL 10.0.1.4:33060+ 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.

Note. replace the sys. heatwave		innunu with	what your	uvc.		
MySQL 10.0.1.4:33060+ ssl world Switching to SQL mode Commands e MySQL 10.0.1.4:33060+ ssl world	nd with ;	sys.heatwave	e_load(JSON_/	ARRAY('worl	.d'), NULL);	
INITIALIZING HEATWAVE AUTO PARALL	EL LOAD					
Version: 2.20						
 Load Mode: normal Load Policy: disable_unsupported_ Output Mode: normal 	columns 					
6 rows in set (1.2477 sec)	·			+		
OFFLOAD ANALYSIS				ŧ		
<pre>/ Verifying input schemas: 1 / User excluded items: 0</pre>						
SCHEMA OFFL	OADABLE (TABLES	OFFLOADABLE COLUMNS	SUMMARY	OF		
 `world`	· 3	24				
 Total offloadable schemas: 1						
[output truncated]						
+ LOADING TABLE	+ 					
<pre>TABLE (3 of 3): `world`.`countryl Commands executed successfully: 3 Warnings encountered: 0 Table loaded successfully! Total columns loaded: 4 Table loaded using 1 thread(s) Elapsed time: 213.26 ms</pre>	anguage` of 3 					
*8 rows in set (1.2477 sec)	+					
LOAD SUMMARY						
т SCHEMA Т	ABLES	TABLES	COLUMNS	LOAD		
	OADED	FAILED	LOADED	DURATION		
`world`	3	0	24	1.16 s		
+6 rows in set (1.2477 sec)				+		

Query OK, 0 rows affected (1.2477 sec) MySQL 10.0.1.4:33060+ ssl world SQL

125. You now have a complete HeatWave MySQL cluster.

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



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