

Lab7. Implementing TencentDB for MySQL

1. 목적

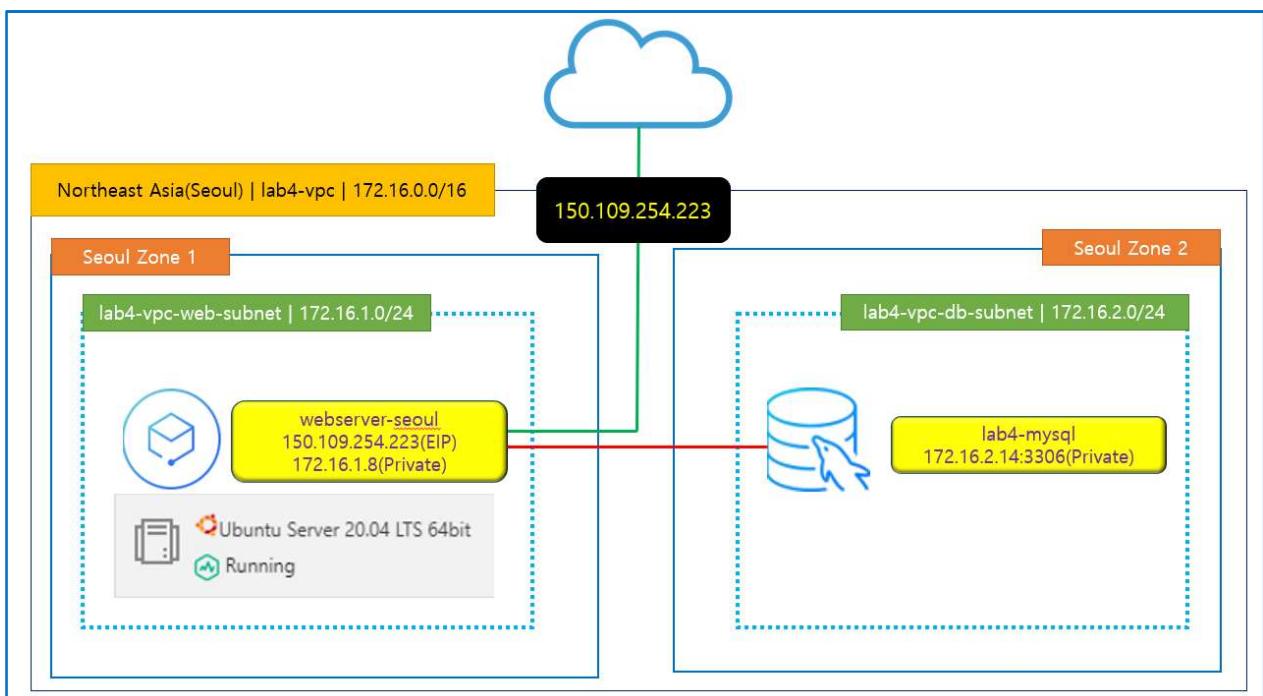
- 이번 Lab에서는 Tencent Cloud에서 제공하는 Database Service 중 TencentDB for MySQL을 설치하고 이용하는 방법을 다룬다. MySQL Database Server는 새로운 Subnet 생성 후 설치한다. 설치 후 Web Server의 Private Network를 이용해서 연결하는 방법을 다룬다. 또한 MySQL 연결계정을 생성하고, 이 계정을 통해 Database를 생성하고 그 안에 TABLE을 생성한 후, CSV 파일을 업로드하여 데이터 Import를 수행한다.

2. 사전 준비물

- Tencent Cloud Account

3. 목차

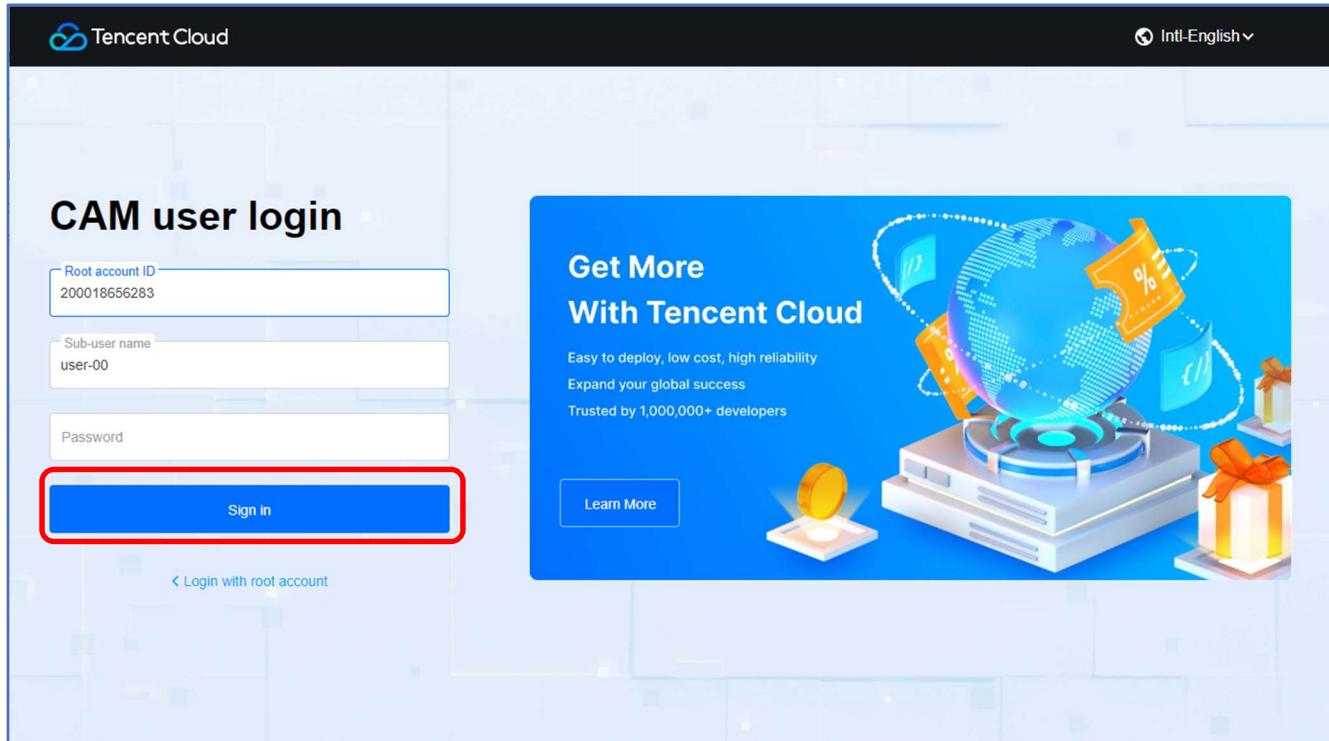
- Task1. VPC(Virtual Private Cloud)와 Subnet 생성하기
- Task2. Web Server CVM 설치하기
- Task3. TencentDB for MySQL 설치하기
- Task4. MySQL Database Server에 직접 연결하기
- Task5. Web Server에서 Private Network으로 Database Server에 연결하기
- Task6. TencentDB for MySQL Data 관리하기



Task1. VPC(Virtual Private Cloud)와 Subnet 생성하기

1. Tencent Cloud CAM User Sing in 페이지를 방문한다.

<https://intl.cloud.tencent.com/login/subAccount/200018656283?type=subAccount>



2. Sub-user name과 Password는 교육 당일 교육 진행요원 혹은 Trainer로부터 부여 받는다. 부여 받은 Sub-user name과 Password를 입력하고 [Sing in] 파란색 버튼을 클릭한다. 로그인 후 [Improve information] 페이지 또는 [Complete information] 페이지에서, 다음 그림처럼 [Improve related mobile phone information] 창의 **the information next time** 링크를 또는 [Add mobile number] 창의 **[Next time]**을 클릭하여 전화번호 입력을 생략한다.

Improve information

In order to ensure that you can receive important news notifications in a timely manner, you have been requested by the Root account or CAM administrator to associate the mobile phone, please complete and verify the mobile phone.

Common problem

Why do I need to improve the information? ▾

Where can I modify my information in the future? ▾

Can I refine the information next time? ▾

Improve related mobile phone information

+86 Please enter your phone number

Please enter the verification code

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Complete information

Please add a mobile number and verify the number so that you won't miss important messages from Tencent Cloud.

FAQs

Why do I need to complete my information? ▾

What if I want to change the information later? ▾

Can I complete the information next time? ▾

Add mobile number

+93 Enter your mobile number

Enter the verification code

3. 다음 그림은 로그인 과정을 모두 수행하면 나타나는 화면이다. 페이지 우측 상단에는 로그인한 **Sub-user name**이 나오고, 또한 페이지 상단에서 **Hello**, 다음에 **Sub-user name**이 나오게 된다.

The screenshot shows a cloud service dashboard with a top navigation bar. On the left is a user profile icon with the text "Hello, user-00" and "Account Id: 200029337219". To the right are three status indicators: "Security Center" (0), "Alarms" (0), and "Pending Tickets" (0). Below the top bar is a search bar with placeholder text "Please enter the name of the product, e.g. CVM" and a magnifying glass icon. Underneath the search bar are two sections: "Recently Visited" and "Currently in Use". "Recently Visited" includes "Cloud Object Storage" and "Cloud Block Storage". "Currently in Use" includes "Cloud Object Storage", "Cloud Block Storage", and "Cloud Virtual Machine". To the right of these sections is a sidebar titled "Product Documentation" with a "View More" link, listing several services: Cloud Object Storage, Cloud Block Storage, Cloud Virtual Machine, Cloud Block Storage, and Content Delivery Network. The main content area is titled "All Products" and contains a grid of service categories:

Compute	Data Migration	Network Security	Relational Database
Cloud Virtual Machine Tencent Cloud Lighthouse Auto Scaling Batch Compute	Migration Service Platform	Anti-DDoS Anti-DDoS Advanced Cloud Firewall Tencent Cloud EdgeOne	Cloud Native Database TDSQL-C TencentDB for MySQL TencentDB for MariaDB TencentDB for SQL Server TencentDB for PostgreSQL
Container Services	Data Development & Governance	Endpoint Security	Enterprise Distributed DBMS
Tencent Kubernetes Engine	Data Development and Governance Platform	Cloud Workload Protection Platform	
CDN & Acceleration			

4. VPC를 생성하기 위해 상단 메뉴 [Products] > [Networking] > [Virtual Private Cloud]를 클릭한다.

The screenshot shows the "Products" menu under the "Cloud" tab. The menu is organized into several categories: Compute, Container Services, Serverless, Middleware, Management & Audit, Basic Storage Service, Data Processing, Video Service, Networking, Relational Database, Data Security, Endpoint Security, Cloud Connect Network, Instant Messaging, Tencent Push Notification ..., Short Message Service, Simple Email Service, Telecommunication, NoSQL Database, Game Service, Anti-DDoS, Network Security, Cloud Load Balancer, Direct Connect, Cloud Connect Network, Elastic Network Interface, NAT Gateway, Peering Connection, VPN Connection, Enterprise Distributed DBMS, Tencent Distributed SQL, Game Multimedia Engine, Game Server Elastic-scaling, Endpoint Security, Cloud Workload Protection, Domains & Websites, Database SaaS Tool, TencentDB for DBbrain, Data Transfer Service, Monitoring & OPS, Data Security, Secrets Manager, Key Management Service, Cloud Resource Management, Big Data Platform, Elastic MapReduce, Elasticsearch Service, Security Management, API Explorer, and Optical Character Recognition. The "Virtual Private Cloud" option under the Networking category is highlighted with a red box and a cursor icon pointing at it.

5. [Virtual Private Cloud] 페이지로 이동했다. VPC가 생성될 Region이 Seoul임을 확인하고 새로 생성하기 위해 [Create] 파란색 버튼을 클릭한다.

The screenshot shows the VPC management interface. At the top, there's a dropdown menu set to 'Seoul'. Below it, a large blue 'Create' button is highlighted with a red box. The main area lists one VPC entry: 'vpc-jpt0erk0' (Default-VPC) with an IPv4 CIDR Block of '172.29.0.0/16'. The table has columns for ID/Name, IPv4 CIDR Block, Subnet, Route table, NAT gateway, VPN gateway, CVM, and Direct conn... . A message at the bottom says 'Total items: 1'.

6. [Create VPC] 창이 나타난다. 먼저 [VPC information] 섹션에서 다음의 각 값을 설정한다.

- ① [Region] : Northeast Asia(Seoul)
- ② [Name] : lab7-vpc-XX(여기서 XX는 계정번호를 의미)
- ③ [IPv4 CIDR Block] : 172.16.0.0/16

The screenshot shows the 'Create VPC' dialog box. In the 'VPC information' section, the 'Region' is set to 'Northeast Asia(Seoul)'. The 'Name' field contains 'lab7-vpc-00'. The 'IPv4 CIDR Block' field shows '172 . 16 . 0 . 0 / 16'. A note below the CIDR block says 'Cannot be modified after creation'. A tooltip for the CIDR block says 'For better usage of VPC, it's recommended to have a proper network structure.'

7. 다음은 [Subnet Information] 섹션이다. 다음의 각 값을 설정하고 [OK] 파란색 버튼을 클릭한다.

- ① [Subnet Name] : lab7-vpc-web-subnet-XX(여기서 XX는 계정번호를 의미)
- ② [IPv4 CIDR Block] : 172.16.1.0/24
- ③ [Availability Zone] : Seoul Zone 1

Subnet information

Subnet name	lab7-vpc-web-subnet-00
IPv4 CIDR Block	172.16.1.0 / 24
Remaining IPs: 253	
Availability zone	Seoul Zone
Associated route table	Default
Advanced options	
OK Close	

8. VPC가 생성되었다.

VPC Seoul

ID/Name	IPv4 CIDR Block	Subnet	Route table	NAT gateway	VPN gateway	CVM	Direct conn...	Default VPC
vpc-b96kr8ru lab7-vpc-00	172.16.0.0/16	0	0	0	0	0	0	No
vpc-jpt0erk0 Default-VPC	172.29.0.0/16	0	0	0	0	0	0	Yes

Total items: 2

9. 또 하나의 Subnet을 생성하기 위해 웹 페이지 좌측 메뉴 중 [Subnet]을 클릭한다. 새로 Subnet을 생성하기 위해 [Create] 파란색 버튼을 클릭한다.

The screenshot shows the 'Virtual Private Cloud' interface with the 'Subnet' section selected. On the left sidebar, 'Subnet' is also highlighted. The main area displays a table of existing subnets. A red box highlights the 'Create' button at the top left of the table area.

ID/Name	Network	CIDR	Availability z...	Associated ro...	CVM	Available IPs	Default subnet
subnet-kzowtp3l lab7-vpc-web-subnet-00	vpc-b96kr8ru lab7-vpc-00	172.16.1.0/24	Seoul Zone 1	rtb-ohskb0w7 default	0	253	No
subnet-n4h1p26t Default-Subnet	vpc-jpt0erk0 Default-VPC	172.29.0.0/20	Seoul Zone 2	rtb-gw8r2i6f default	0	4093	Yes

10. 다음의 각 값을 설정하고 [Create] 파란색 버튼을 클릭한다.

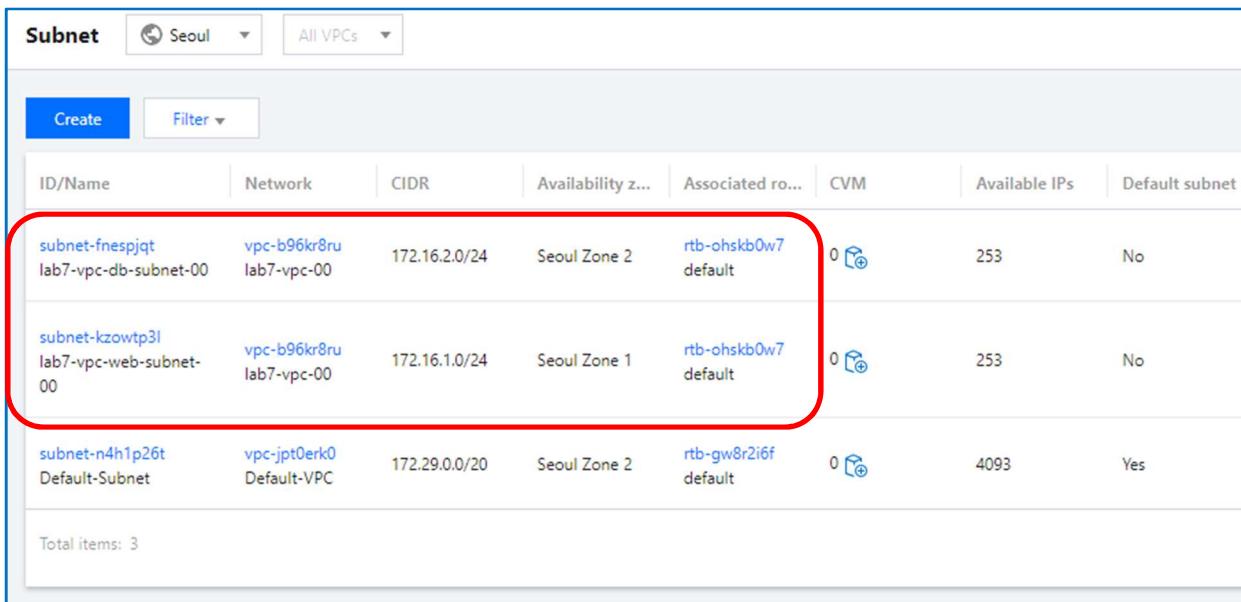
- ① [Network] : lab7-vpc-XX(여기서 XX는 계정번호를 의미) | 172.16.0.0/16
- ② [Subnet Name] : lab7-vpc-db-subnet-XX(여기서 XX는 계정번호를 의미)
- ③ [VPC IP Range] : 172.16.0.0/16
- ④ [CIDR] : 172.16.2.0/24
- ⑤ [Availability Zone] : Seoul Zone 2

The screenshot shows the 'Create a subnet' dialog. It includes fields for Network (set to 'vpc-b96kr8ru(lab7-vpc-00 | 172.16.0.0/16)'), Subnet name ('lab7-vpc-db-subnet-00'), VPC IP range ('172.16.0.0/16'), CIDR ('172.16.2.0/24'), and Availability zone ('Seoul Zone 2'). A red box highlights the 'Subnet name' field and the CIDR input field.

Create a subnet

Network	vpc-b96kr8ru(lab7-vpc-00 172.16.0.0/16)	1 existing subnets	
Subnet name	VPC IP range	CIDR	Availability zone
lab7-vpc-db-subnet-00	21/60 172.16.0.0/16	172.16.2.0/24	Seoul Zone 2
+ New line			
Advanced options		<input type="button" value="Create"/> <input type="button" value="Cancel"/>	

11. 지금까지 2개의 Subnet이 lab7-vpc-XX(여기서 XX는 계정번호를 의미) 아래 생성되었다.



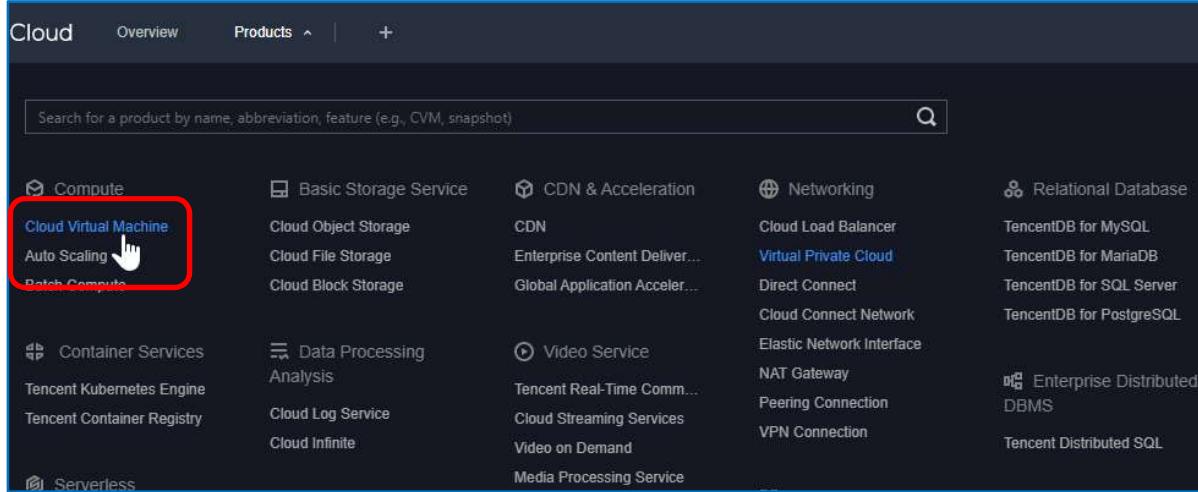
The screenshot shows the AWS Subnet list interface. At the top, there are filters for 'Seoul' and 'All VPCs'. Below the header, there are buttons for 'Create' and 'Filter'. The table has columns: ID/Name, Network, CIDR, Availability z..., Associated ro..., CVM, Available IPs, and Default subnet. Three subnets are listed:

ID/Name	Network	CIDR	Availability z...	Associated ro...	CVM	Available IPs	Default subnet
subnet-fnespjqt lab7-vpc-db-subnet-00	vpc-b96kr8ru lab7-vpc-00	172.16.2.0/24	Seoul Zone 2	rtb-ohskb0w7 default	0 	253	No
subnet-kzowtp3l lab7-vpc-web-subnet-00	vpc-b96kr8ru lab7-vpc-00	172.16.1.0/24	Seoul Zone 1	rtb-ohskb0w7 default	0 	253	No
subnet-n4h1p26t Default-Subnet	vpc-jpt0erk0 Default-VPC	172.29.0.0/20	Seoul Zone 2	rtb-gw8r2i6f default	0 	4093	Yes

Total items: 3

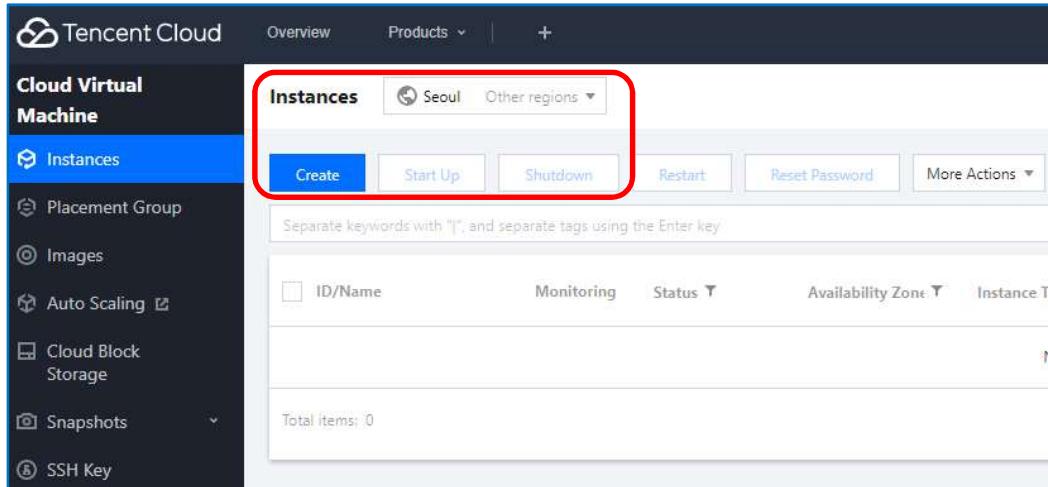
Task2. Web Server CVM 설치하기

1. Lab5 의 Task2 을 참조하여 lab7-vpc-web-subnet-XX(여기서 XX 는 계정번호를 의미)에 Web Server 역할을 할 CVM 을 생성하도록 한다. 먼저 CVM 을 생성하기 위해 페이지 상단의 메뉴 [Products] > [Compute] > [Cloud Virtual Machine]을 클릭한다.



The screenshot shows the Tencent Cloud interface under the 'Products' menu. In the 'Compute' section, the 'Cloud Virtual Machine' option is highlighted with a red box and a hand cursor icon, indicating it is the selected category. Other options like 'Auto Scaling' and 'Batch Compute' are also visible.

2. CVM Instance 를 생성하기 위해 먼저 Instance 가 생성될 Region 이 Seoul 임을 확인하고, [Create] 파란색 버튼을 클릭한다.



The screenshot shows the 'Instances' tab of the Cloud Virtual Machine section in the Tencent Cloud interface. The 'Create' button is highlighted with a red box and a hand cursor icon, indicating it is the next step to start creating a new instance. The region is set to 'Seoul'.

3. [Cloud Virtual Machine (CVM)] 페이지에 들어왔다. [Billing Mode]는 사용한 만큼 지불하는 [Pay as you go](종량제)를 선택한다.

Cloud Virtual Machine (CVM)

Custom configuration

1 Select basic configurations 2 Configure network and host 3 Confirm configuration

Instructions: Tencent Cloud launches 2C2G configuration for standard CVM instances in some regions. The same price is applied to the same instance with either 1C2G or 2C2G configuration in the same AZ.

Basic configurations

Billing mode

- Pay-as-you-go** Applicable to scenarios where the demands are fluctuated significantly
- Spot instances (新加坡低至0.5折) 最高可比按量计费节省95%，但实例有被自动释放风险

4. [Region]은 [Seoul]에 맞추고, [Availability zone]은 [Seoul Zone 1]을 선택한다.

Region	China	Asia Pacific	Europe and America
	Tokyo	Seoul	Singapore
	Bangkok	Jakarta	Mumbai

Tencent Cloud products in different regions cannot communicate via a private network. **The region cannot be changed after the creation.** Please select the region closest to your business needs.

Availability zone	Random	Seoul Zone 1	Seoul Zone 2

Tencent Cloud products in different AZs in the same region can communicate via a private network.

5. 두번째 [Instance configurations] 섹션에서는 CPU와 Memory등을 선택할 수 있다. 기본값은 Standard Model이다. [Instance] > [Instance family]는 [Standard]을 선택하고 [Model]에서는 [Standard S3] 선택한다.

Instance configurations

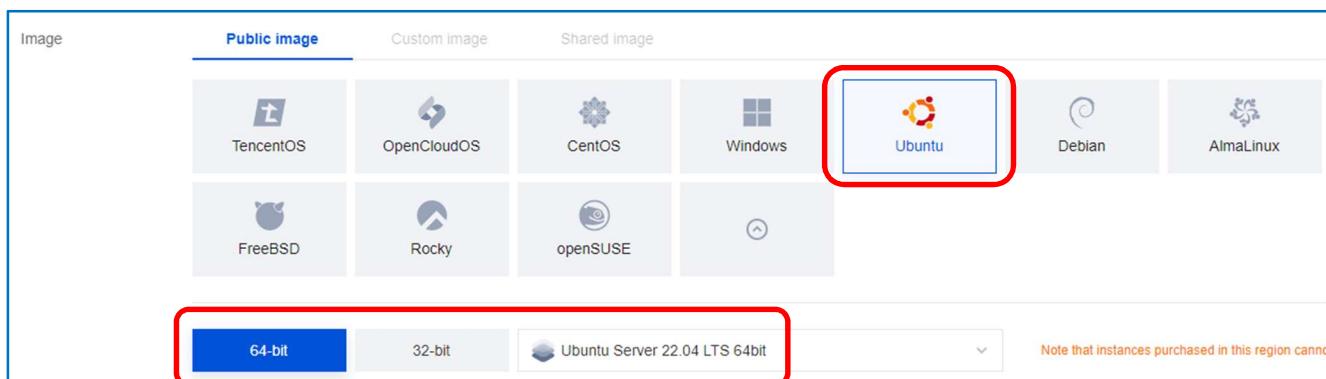
Instance	Filter	All CPU cores	All MEMs
Instance family	Standard	High IO	MEM-optimized
Model	All models	Standard S4	Standard S3
Selected model	Selected model: S3.MEDIUM2 (Standard S3, 2C2G)		

The current selected AZ is Seoul Zone 1. To increase the quota, please apply in the console.

6. 위에서 선택한 [Standard S3]는 기본적으로 2Core vCPU에 2GB의 메모리를 가진다.

Instance ⓘ	Specifications	vCPU ⓘ	MEM	Processor	Private network bandwidth	Packets in/out ⓘ	Supported AZs	Reference fee ⓘ
<input checked="" type="radio"/> Standard S3	S3.MEDIUM2	2Core	2GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	250K PPS	22 AZ(s) More	0.04USD/hour
<input type="radio"/> Standard S3	S3.MEDIUM4	2Core	4GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	250K PPS	15 AZ(s) More	0.08USD/hour
<input type="radio"/> Standard S3	S3.MEDIUM8	2Core	8GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	250K PPS	23 AZ(s) More	0.12USD/hour
<input type="radio"/> Standard S3	S3.LARGE4	4Core	4GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	450K PPS	6 AZ(s) More	0.12USD/hour
<input type="radio"/> Standard S3	S3.LARGE8	4Core	8GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	450K PPS	24 AZ(s) More	0.16USD/hour
<input type="radio"/> Standard S3	S3.LARGE16	4Core	16GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	450K PPS	23 AZ(s) More	0.23USD/hour
<input type="radio"/> Standard S3	S3.2XLARGE16	8Core	16GB	Intel Xeon Skylake 6133(2.5GHz)	1.5Gbps	850K PPS	23 AZ(s) More	0.31USD/hour

7. 서버 이미지를 선택하는 순서이다. [Public image]의 목록에서 Ubuntu, 64-bit, Ubuntu Server 22.04 LTS 64bit를 선택한다.



8. [Storage]에서 [Premium cloud disk]를 선택하고, 용량은 기본 용량 [50GB]를 사용하기로 한다.

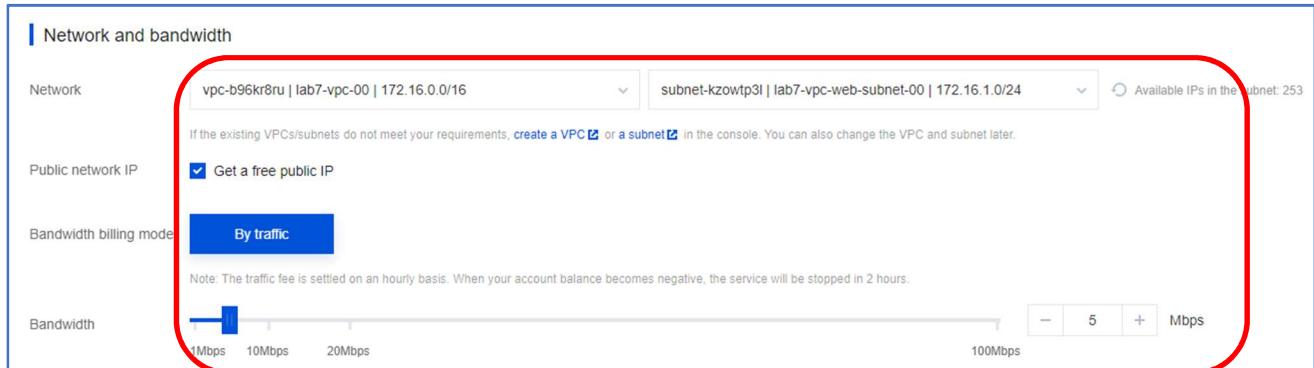
Storage	Usage	Model	Capacity	Quantity	数据备份点	Total performance
	System disk	Premium cloud disk	- 50 + GB	1	/	Basic performance: IOPS: 2200, bandwidth: 107.5 MB/s

[+ Add data disk](#) You can add 20 more data disk(s).

9. 페이지를 스크롤다운하여 첫번째 설정 단계를 확인한다. 그리고 [Next: Configure network and host] 파란색 버튼을 클릭한다.

Selected S3.MEDIUM2 (Standard S3, 2C2G)	Configuration fee 0.05USD/hour	Bandwidth fee 0.00USD/GB	Next: Configure network and host
Quantity - 1 +			

10. [Network and bandwidth] 섹션에서, [Network]는 Task1에서 생성한 [lab7-vpc-XX] (여기서 XX는 계정번호를 의미)와 [lab7-vpc-seoul-XX | 172.16.1.0/24] (여기서 XX는 계정번호를 의미)를 선택한다. 또한 [Public network IP] 역시 기본값 그대로 [Get a free public IP]가 체크되어 있는지 확인하고, [Bandwidth]는 최대 100Mbps로 설정한다.



11. [Security group] 섹션에서, [Existing security group]를 선택하고, 목록에서 이미 생성한 lab5-sgXX(여기서 XX는 계정번호를 의미)보안그룹을 선택한다. 그러면, 이미 보안그룹에서 설정해 놓은 [Inbound rules]에서 확인할 수 있다.

The screenshot shows the 'Security group' configuration page. It has tabs for 'New security group' and 'Existing security group', with 'Existing security group' selected. A red box highlights the 'Existing security group' tab and the list of existing groups ('sg-6ij3fu5 | lab5-sg00'). Below is a table of 'Inbound rules':

Source	Protocol + Port	Policy	Notes
0.0.0.0/0	ICMP	Allow	Ping service open.
::/0	ICMPV6	Allow	Ping service open.
0.0.0.0/0	TCP:80	Allow	Web service HTTP(80) open.
::/0	TCP:80	Allow	Web service HTTP(80) open.
0.0.0.0/0	TCP:22	Allow	TCP port 22 open for Linux CVMS.
::/0	TCP:22	Allow	TCP port 22 open for Linux CVMS.

12. [Other settings] 섹션에서, [Tag]는 관리 편의성을 위해 특정 문자열을 태깅하는 옵션이다. 이번 Lab에서는 태그 없이 진행하기로 한다.

The screenshot shows the 'Other settings' configuration page. It has a 'Tag' section with a 'Tag key' and 'Tag value' input field, both currently empty. A 'Delete' button is to the right. Below is a '+ Add' button.

13. [Instance name]은 영문으로 입력한다. 여기서는 예제로 **lab7-webserver-XX(여기서 XX는 계정번호를 의미)**으로 입력하기로 한다. 128자리까지 인스턴스 이름으로 지정할 수 있다.

The screenshot shows a form for creating a new instance. The 'Instance name' field is filled with 'lab7-webserver-00' and is highlighted with a red box. There are other fields like 'Region' and 'Image' which are not highlighted.

14. [Login methods]는 [Set password]를 선택한다. **Ubuntu Server**인 경우 [Login name]은 자동으로 **ubuntu**이다. 이 계정은 **Ubuntu Server**의 관리자 계정이다. [Password]와 [Confirm password]에 각각 **P@\$\$W0rd1234**를 입력한다.

The screenshot shows the configuration page for a new instance. The 'Set password' button is highlighted with a red box. Below it, the 'Password' and 'Confirm password' fields are also highlighted with a red box. To the right of these fields, there is a note about password requirements:

- 8-30 characters (12 and more characters recommended)
- 不能包含空格 (Cannot contain spaces)
- It should not start with "/"
- Includes at least three types
 - Lowercase letters a-z
 - Uppercase letters A-Z
 - Number 0-9
 - !`~!@#\$%^&*-+=_{}[]:;<>,?/

15. 무료로 사용할 수 있는 [Security Reinforcement]와 [Cloud Monitoring] 서비스를 설정한다. 이번 Lab에서는 기본사항을 그대로 체크된 상태로 사용하기로 한다. [Scheduled Termination] 역시 필요하지 않기 때문에 기본 해제 상태 그대로 진행한다.

The screenshot shows the configuration page for security and monitoring services. Several checkboxes are checked:

- Termination protection: Prevent instances from being accidentally terminated in the console or via API
- Security services: Enable for free
- Cloud Monitor: Enable for free
- Scheduled termination: Enable scheduled termination

16. [Advanced Settings] 링크를 클릭하면 숨겨진 여러가지 설정 화면이 나타난다. [Hostname]에 lab7-webserver-XX(여기서 XX는 계정번호를 의미)을 입력한다. 나머지 값들은 기본값 그대로 이용한다. [Placement group]은 재해복구를 위해 배치 방법을 설정하는 옵션이다. 재해복구가 필요하지 않으니 [Placement group] 체크박스는 해제하고 진행하기로 한다.

Hostname: lab7-webserver-00

Project: DEFAULT PROJECT

CAM role: Select a CAM role

Placement group: Add the instance to a placement group

If the existing placement groups are not suitable, please [create a new one](#).

17. [Custom data]에 다음의 내용을 복사하여 붙여 넣는다.

```
#!/bin/bash
sudo apt update
sudo apt install -y apache2
sudo a2enmod ssl
sudo a2ensite default-ssl.conf
sudo systemctl reload apache2
sudo mv /var/www/html/index.html /var/www/html/index.bak
sudo bash -c 'echo "<html><h1>Hello, Tencent Cloud!</h1></html>" > /var/www/html/index.html'
```

Custom data

```
#!/bin/bash
sudo apt update
sudo apt install -y apache2
sudo a2enmod ssl
sudo a2ensite default-ssl.conf
sudo systemctl reload apache2
sudo mv /var/www/html/index.html /var/www/html/index.bak
sudo bash -c 'echo "<html><h1>Hello, Tencent Cloud!</h1></html>" > /var/www/html/index.html'
```

The above input is encoded with base64.

18. 페이지를 스크롤다운하여 다음 그림에서 [Next: Confirm configuration] 파란색 버튼을 클릭하여 다음 단계를 진행한다.



19. [Confirm Configuration] 화면에서는 지금까지 선택한 옵션들을 일목요연하게 보여준다. 설정의 마지막 화면이다. 각각의 내용을 확인하고 수정이 필요하면 [Edit] 링크를 클릭하여 수정하면 된다.

Selected configurations

Basic and instance configurations

CVM billing mode	Pay-as-you-go	Region	Seoul	Availability zone	Seoul Zone 1
Instance	S3.MEDIUM2 (Standard S3, 2C2G)	Image	Public image Ubuntu img-487zeit5 64-bit Ubuntu Server 22.04 LTS 64bit 20GB	System disk	Premium cloud disk 50 GB
Data disk	Not set				

Network and security group

Network	vpc-b96kr8ru lab7-vpc-00 172.16.0.0/16	Subnet	subnet-kzowtp3l lab7-vpc-web-subnet-00 172.16.1.0/24	Public network IP	Purchase
Network billing mode	By traffic 5Mbps	Security group	sg-04cdujnd lab5-sg00		

Other settings Set password

20. 설정을 마치기 위해 [Terms and Agreement] 체크박스에 체크하고, [Enable] 파란색 버튼을 클릭한다.

Generate API Explorer best practice scripts

Terms and Agreement I have read and agree to "Tencent Cloud Service Terms"

Selected S3.MEDIUM2 (Standard S3, 2C2G)
Quantity - 1 +
Configuration fee 0.05USD/hour Bandwidth fee 0.12USD/GB
Back Enable

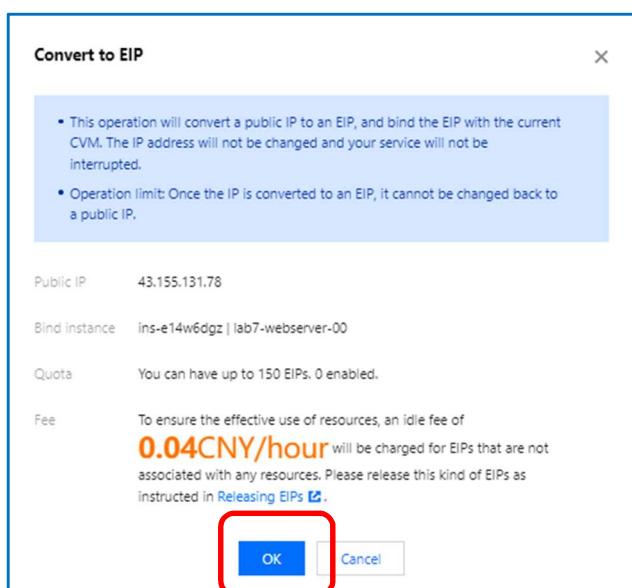
21. 잠시 시간이 흐른 뒤, 다음 그림과 같이 새로운 Instance가 만들어진 것을 볼 수 있다.

The screenshot shows the Alibaba Cloud Instances management interface. At the top, there are buttons for 'Create', 'Start Up', 'Shutdown', 'Restart', 'Reset Password', 'Terminate/Return', and 'More Actions'. A search bar at the top right contains the text 'Project:DEFAULT PROJECT'. Below the search bar is a table with columns: ID/Name, Monitoring, Status, Availability, Instance Type, Instance Configuration, Primary IPv4, Instance Billing, and Network Billing. One row in the table is highlighted with a red box, representing the newly created instance 'ins-e14w6dgz' with the ID 'lab7-webserver-00'. The instance details shown are: Status: Running, Location: Seoul Zone 1, Instance Type: Standard S3, Configuration: 2-core 2GB 100Mbps, Primary IP: 43.155.131.78 (Public), System disk: Premium, Cloud Disk: Network: lab7-vpc-00. To the right of the instance details, it says 'Pay-as-you-go' and 'Created at 2023-02-04 12:59:48'. Below the table, it says 'Total items: 1'.

22. 방금 생성한 Web Server에 EIP를 적용한다. **lab7-webserver-XX(여기서 XX는 계정번호를 의미)**에서 [Primary IPv4]의 [Public] 오른쪽의 EIP 버튼 을 클릭한다.

This screenshot shows the same Instances page as above, but the Public IP column for the instance 'ins-e14w6dgz' has been modified. The original public IP '43.155.131.78' is now followed by a blue edit icon . The rest of the instance details remain the same: Status: Running, Location: Seoul Zone 1, Instance Type: Standard S3, Configuration: 2-core 2GB 100Mbps, System disk: Premium, Cloud Disk: Network: lab7-vpc-00. The 'Total items: 1' message is also present.

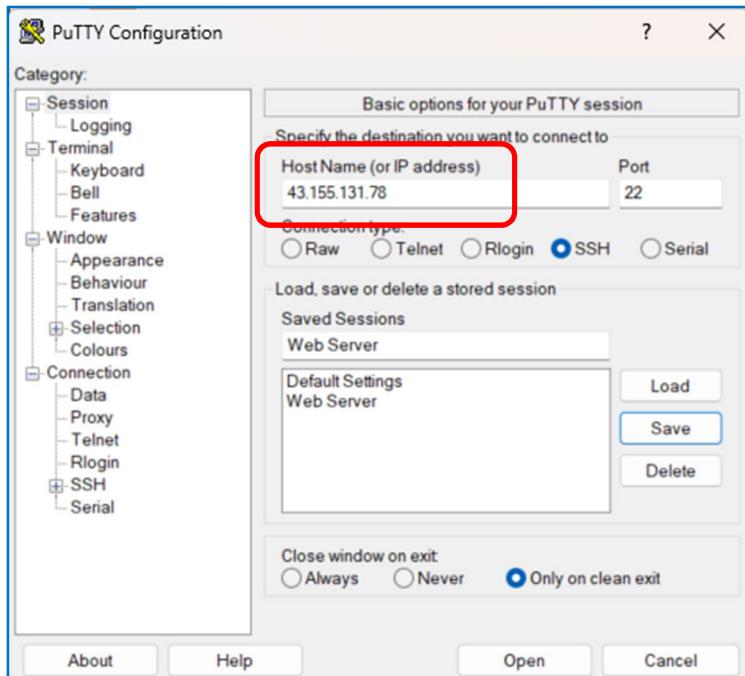
23. [Convert to EIP]창이 나타나면 [OK] 파란색 버튼을 클릭한다.



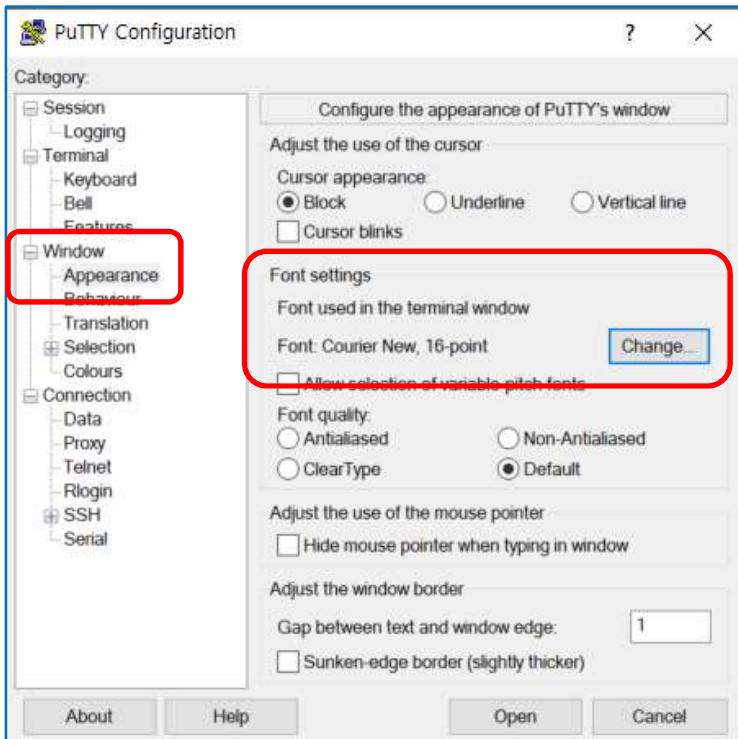
24. EIP 설정이 성공적으로 마쳐지면 방금 생성한 인스턴스의 [Primary IPv4]의 Public IP가 [EIP]로 변경된 것을 볼 수 있다.

ID/Name	Monitoring	Status	Availability	Instance Type	Instance Configuration	Primary IPv4
1 result found for "Project:DEFAULT PROJECT" Back to search						
ins-e14w6dgz New lab7-webserver-00			Seoul Zone 1	Standard S3	2-core 2GB 100Mbps System disk:Premium Cloud Disk Network:lab7-vpc-00	43.155.131.78 (EIP) 172.16.1.16 (Private)
Total items: 1						

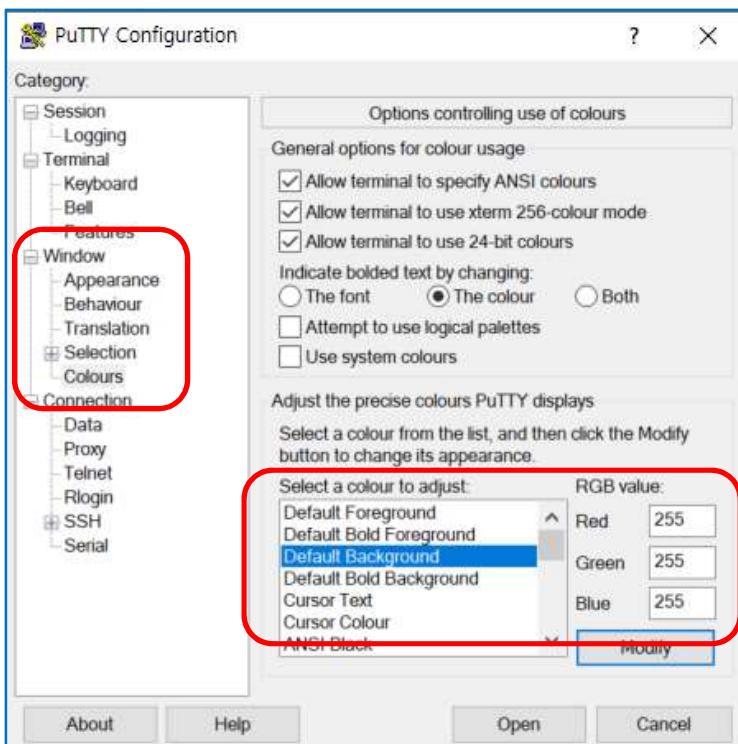
25. PuTTY 프로그램을 실행한다. PuTTY 메뉴 중 [Session] > [Host Name(or IP address)]에 위에서 설정한 lab7-webserver-XX(여기서 XX는 계정번호를 의미)의 EIP를 복사 후 붙여 넣는다.



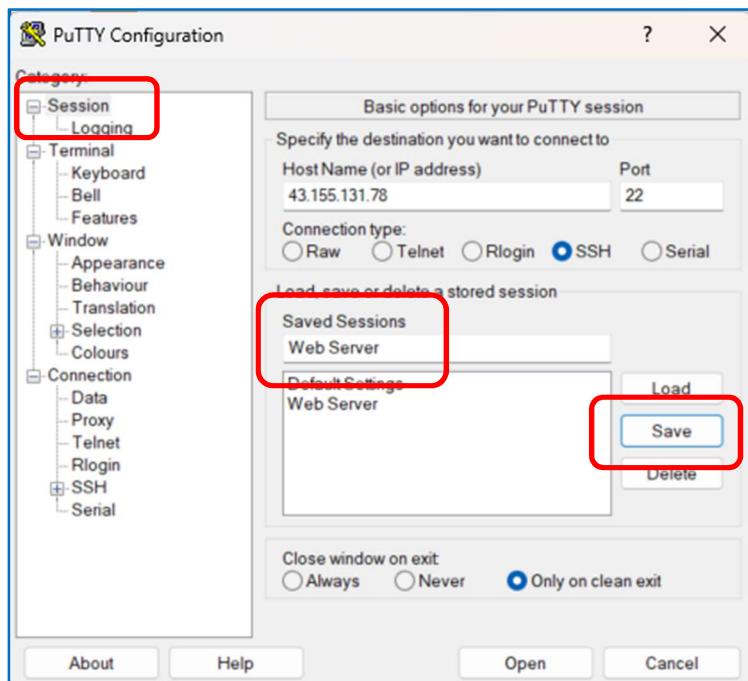
26. [Port]가 22번에 맞춰져 있고, 필요하다면 [Window] > [Appearance] > [Font settings]에서 [Change] 버튼을 클릭하여 본인이 선호하는 Font와 글자크기를 선택할 수 있다.



27. 또한 필요하다면, [Window] > [Colours] > [RGB value:]에서 잠시 뒤 연결할 터미널의 배경색과 전경색을 설정할 수 있다. 참고로 필자는 [Default Foreground] 색상은 검은색으로, [Default Background] 색상은 흰색으로 설정했다.



28. 이런 기타 설정을 모두 마치면 다음에 연결할 때 다시 설정하는 것을 반복하지 않기 위해 지금까지 설정한 내용들을 저장하면 편하다. 다시 [Session]으로 돌아가서 [Saved Sessions] 아래 텍스트 박스에 간단히 **Web Server**라고 입력하고 [Save] 버튼을 클릭한다.



29. 모든 설정을 마쳤다. 이제 [Open] 버튼을 클릭하여 위에서 생성한 **Web Server**에 연결해 보자. [PuTTY Security Alert]창이 나타난다. 여기서 [예(Y)]를 클릭한다.



30. 정상적으로 서버와 원격 연결이 되면 Login을 하기 위한 창이 나타난다. lab7-webserver-XX(여기서 XX는 계정번호를 의미)의 username은 ubuntu이고, 비밀번호는 P@\$\$W0rd1234 이다.

```
ubuntu@lab7-webserver-00: ~
login as: ubuntu
ubuntu@43.155.131.78's password:
Welcome to Ubuntu 22.04 LTS (GNU/Linux 5.15.0-56-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

System information as of Sat Feb  4 12:05:17 PM CST 2023

System load: 0.0615234375      Processes:           115
Usage of /:   7.3% of 49.10GB   Users logged in:     0
Memory usage: 14%              IPv4 address for eth0: 172.16.1.16
Swap usage:   0%

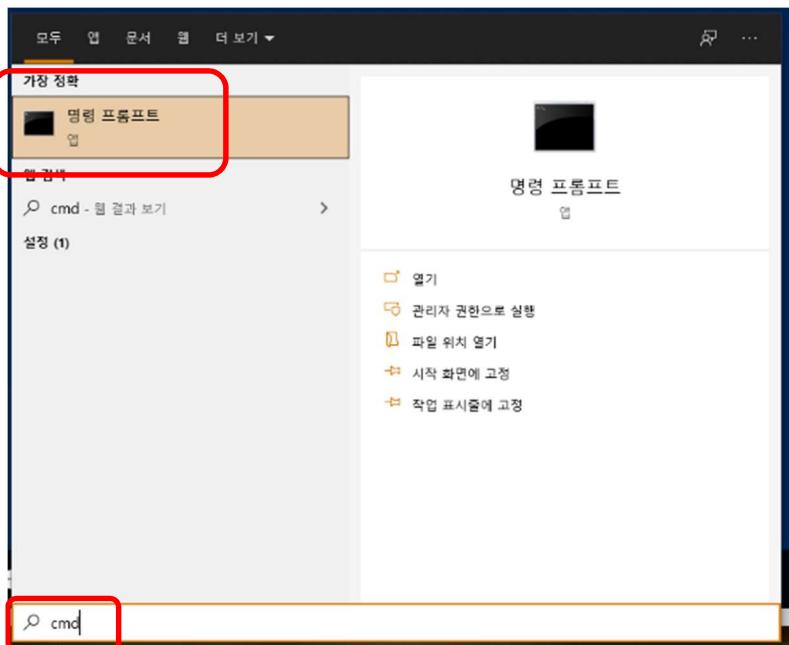
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

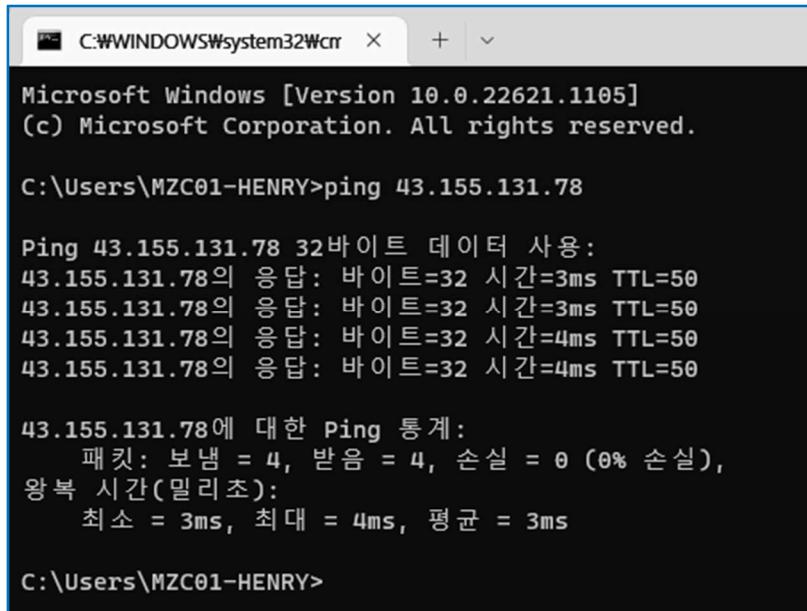
ubuntu@lab7-webserver-00:~$
```

31. 컴퓨터나 노트북에서 [시작] 버튼 오른쪽의 검색 창에서 cmd를 입력하여 [명령 프롬프트] 창을 실행한다.



32. [명령 프롬프트]창에서 다음과 같이 PING test를 한다. Ping 다음 주소는 방금 생성한 lab7-webserver-XX(여기서 XX는 계정번호를 의미)의 EIP이다.

ping {Your Server's Public IP}



```
C:\WINDOWS\system32\cmd + ▾

Microsoft Windows [Version 10.0.22621.1105]
(c) Microsoft Corporation. All rights reserved.

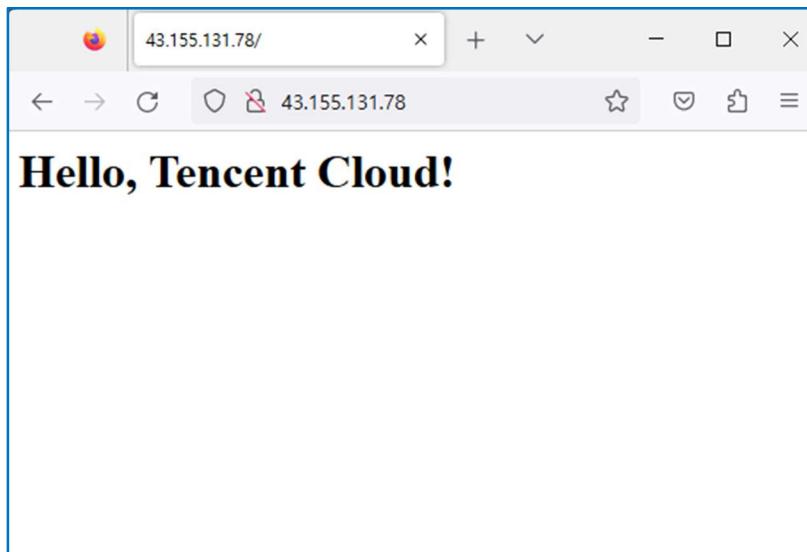
C:\Users\MZC01-HENRY>ping 43.155.131.78

Ping 43.155.131.78 32바이트 데이터 사용:
43.155.131.78의 응답: 바이트=32 시간=3ms TTL=50
43.155.131.78의 응답: 바이트=32 시간=3ms TTL=50
43.155.131.78의 응답: 바이트=32 시간=4ms TTL=50
43.155.131.78의 응답: 바이트=32 시간=4ms TTL=50

43.155.131.78에 대한 Ping 통계:
    패킷: 보냄 = 4, 받음 = 4, 손실 = 0 (0% 손실),
    왕복 시간(밀리초):
        최소 = 3ms, 최대 = 4ms, 평균 = 3ms

C:\Users\MZC01-HENRY>
```

33. 웹 브라우저를 통해 lab7-webserver-XX(여기서 XX는 계정번호를 의미)의 EIP를 통해 성공적으로 웹 서비스 실행을 확인한다.



Task3. TencentDB for MySQL 설치하기

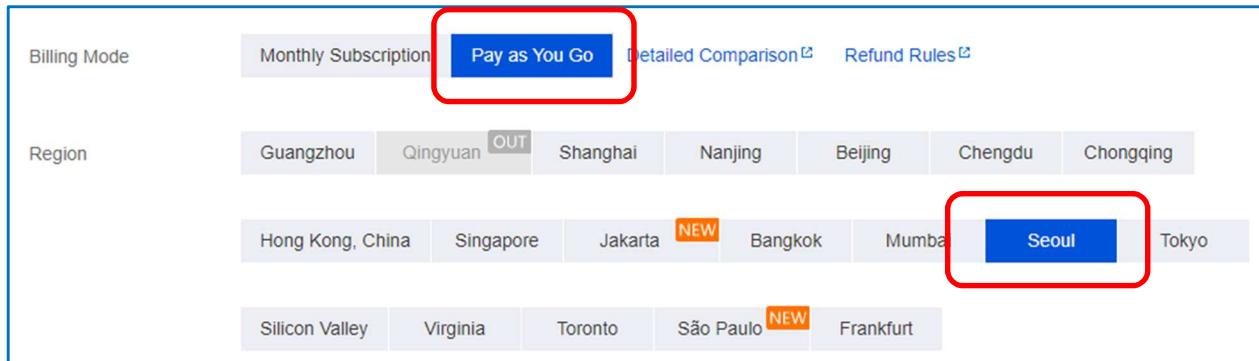
- [TencentDB for MySQL]을 생성하기 위해 상단 메뉴 [Products] > [Relational Database] > [TencentDB for MySQL] 을 클릭한다.

The screenshot shows the Tencent Cloud interface under the 'Cloud' tab. In the 'Products' menu, 'Relational Database' is selected. The 'Relational Database' section contains several services: Basic Storage Service, CDN & Acceleration, Networking, and Relational Database. Within 'Relational Database', 'TencentDB for MySQL' is highlighted with a red box and a cursor icon pointing to it. Other options like 'TencentDB for SQL Server' and 'TencentDB for PostgreSQL' are also listed.

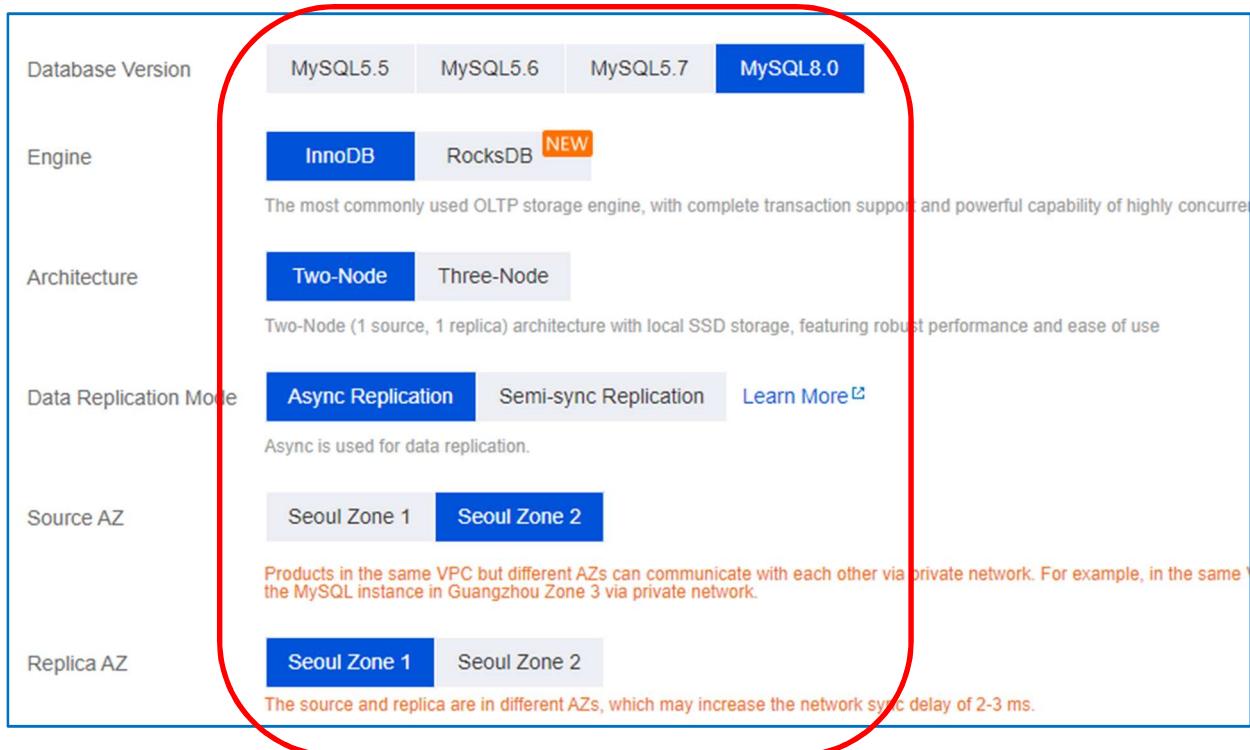
- [MySQL – Instance List] 페이지로 들어왔다. MySQL을 생성할 Region은 [Seoul]이다. MySQL Instance를 생성하기 위해 [Create] 파란색 버튼을 클릭한다.

The screenshot shows the 'MySQL - Instance List' page. On the left, there's a sidebar with 'Database' and 'MySQL' sections, where 'Instance List' is currently selected. The main area has a header with 'Seoul' and 'Other regions 0'. Below the header are buttons for 'Create' (highlighted with a red box), 'Comparative Monitoring', 'Restart', and 'Renew'. A search bar is present with the placeholder 'Separate keywords with ";" press Enter to separate filter tags'. At the bottom, there's a table header with columns: Instance ID/Name, Monitoring/Status/Tas, AZ, Configuration, Database Version, Engine, and Private Network Address. A message at the bottom says 'No database instances in this region. Please select another region or Buy Now'.

3. [TencentDB for MySQL] 생성 페이지이다. [Billing Mode]는 [Pay as You Go]를 선택한다. 설치 [Region]은 [Seoul]이다.



4. [Version]은 [MySQL8.0]으로, [Engine]은 [InnoDB]로, [Architecture]는 [Two-node]로, [Data Replication Mode]는 [Async Replication]으로, [Source AZ]는 [Seoul Zone 2]에 원본 서버를 놓고, [Replica AZ]을 [Seoul Zone 1]에 맞춤으로 복제서버는 [Seoul Zone 1]에 놓기로 한다.



5. [Instance Specification]은 목록에서 제일 스펙이 작은 [General-1core1000MB]를 선택하고, [Hard Disk]는 기본값 그대로 [200GB]를 선택한다.



6. MySQL Database Server가 위치할 VPC와 Subnet 설정이다. 이 실습의 목적에 맞게 VPC는 lab7-vpc-XX(여기서 XX는 계정번호를 의미)로, Subnet은 이전 Task에서 생성한 lab7-vpc-db-subnet-XX(여기서 XX는 계정번호를 의미)을 선택한다.

The screenshot shows the 'Network' configuration section. A red box highlights the dropdown menu where 'lab7-vpc-00' is selected. Another red box highlights the dropdown menu where 'lab7-vpc-db-subnet-00 | 172.16.2.0/24' is selected. Below these dropdowns, there is a note: 'If the existing networks do not meet your requirements, go to [Create VPCs](#) or [Create Subnets](#). After the TencentDB modified in the console.' There is also a message: 'In the current network environment, only devices in "lab7-vpc-00VPC" can access this database instance. In lab7-vpc-00 in SeoulRegion, 1 CVM(s) can be accessed over the private network.' A link 'View Details' is provided.

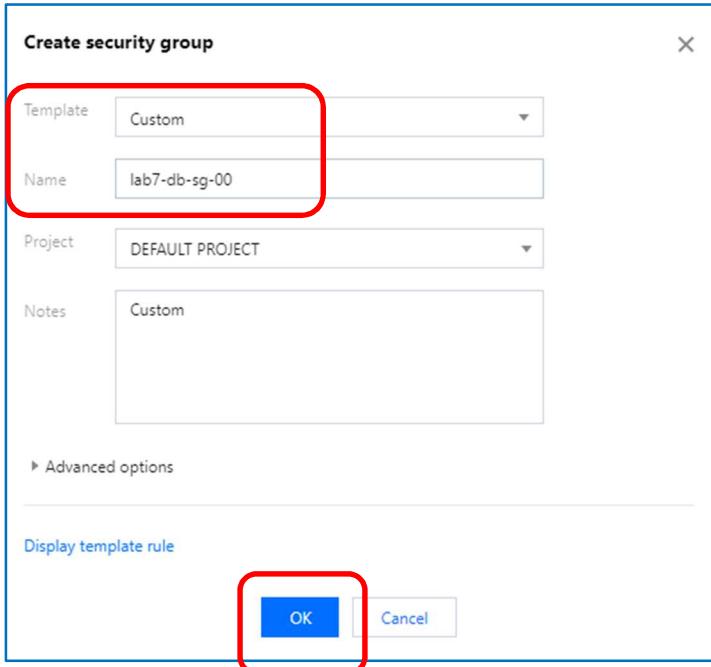
7. [Security Group]은 기존의 Security Group과 다르기 때문에 [Create Security Group] 링크를 클릭하여 새 Security Group을 생성한다.

The screenshot shows the 'Create Security Group' form. It has fields for 'Custom Port' (3306) and 'Security Group' (lab5-sg00). A red box highlights the 'Create Security Group' button at the bottom of the form.

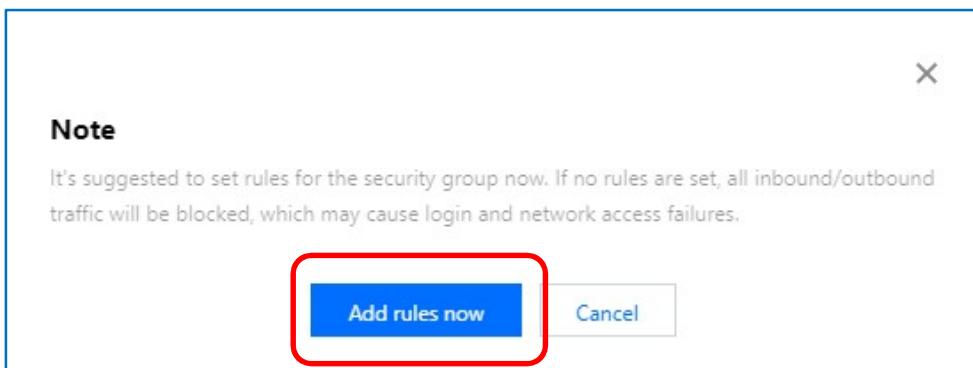
8. [Security Group] 페이지로 들어왔다. 새 Security Group을 생성하기 위해 [Create] 파란색 버튼을 클릭한다.

The screenshot shows the 'Virtual Private Cloud' dashboard with the 'Security groups' tab selected. A red box highlights the 'Create' button in the top left corner of the list table. The table lists three existing security groups: 'sg-04cdlujnd lab5-sg00', 'sg-d61995z1 Custom template-20...', and 'sg-ke6lbmib Custom template-20...'. The table includes columns for ID/Name, Associated instances, Notes, Type, Update at, and Creation time.

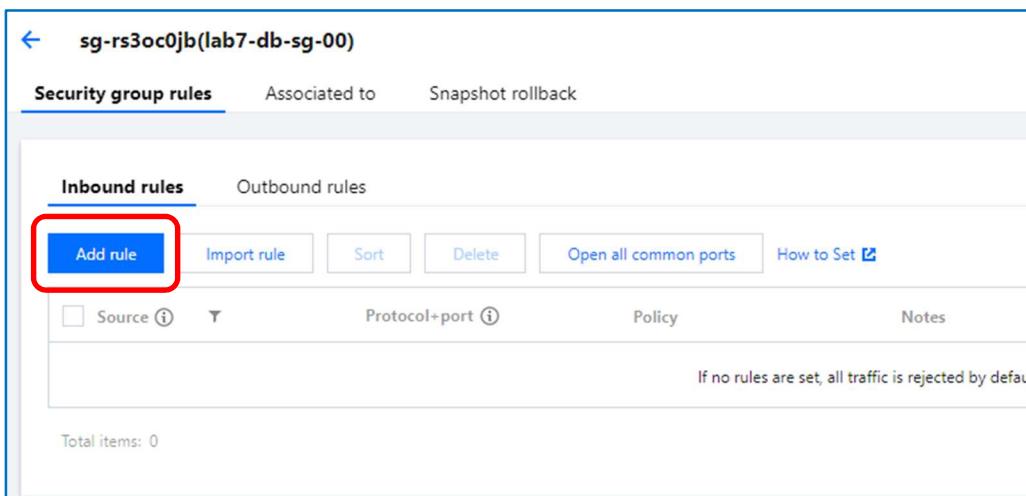
9. [Create security group]창이다. 다음 그림과 같이 [Template]는 [Custom]으로, [Name]은 lab7-db-sg-XX(여기서 XX는 계정번호를 의미)라고 명명하고 나머지 값은 기본값 그대로 놓고, [OK] 파란색 버튼을 클릭하여 생성한다.



10. [Add rules now] 파란색 버튼을 클릭하여 새로 생성하는 Security Group에 Port를 추가하자.



11. 아직 [Inbound rule]이 없다. [Add Rule] 파란색 버튼을 클릭하여 [Inbound rule]을 추가한다.



12. MySQL Database Server Instance는 [Ping]과 [MySQL port(3306)]만 추가한다. 더 포트를 추가하려면 [+New Line] 링크를 클릭하여 추가하면 된다. 필요한 포트를 추가했으면 [Complete] 파란색 버튼을 클릭하여 페이지를 닫는다.

Add inbound rule

Type	Source ①	Protocol+port ①	Policy	Notes
Ping	all	ICMP	Allow	Ping service open.
MySQL(3306)	all	TCP:3306	Allow	MySQL service(3306) open

+ New line

Complete Cancel

13. 방금 추가한 포트 목록이다. Ping을 위한 ICMP와 MySQL Port인 TCP:3306을 확인할 수 있다.

sg-rs3oc0jb(lab7-db-sg-00)

Security group rules Associated to Snapshot rollback

Inbound rules Outbound rules

Add rule	Import rule	Sort	Delete	Open all common ports	How to Set ②
<input type="checkbox"/> Source ①	Protocol+port ①	Policy	Notes		
<input type="checkbox"/> 0.0.0.0/0	ICMP	Allow	Ping service open.		
<input type="checkbox"/> ::/0	ICMPv6	Allow	Ping service open.		
<input type="checkbox"/> 0.0.0.0/0	TCP:3306	Allow	MySQL service(3306) open		
<input type="checkbox"/> ::/0	TCP:3306	Allow	MySQL service(3306) open		

Total items: 4

14. 이번에는 메뉴 중 [Outbound rules]를 클릭하여 Outbound rule을 추가한다. [Add rule] 버튼을 클릭한다.

The screenshot shows the AWS Management Console interface for managing security groups. The top navigation bar shows the security group name: sg-ggk0n9i7(lab7-db-sg-00). Below it, there are tabs for 'Security group rules' (selected), 'Associated to', and 'Snapshot rollback'. Under the 'Security group rules' tab, there are two main sections: 'Inbound rules' and 'Outbound rules'. A red box highlights the 'Outbound rules' tab. Below these sections are several buttons: 'Add rule' (highlighted by a red box), 'Import rule', 'Sort', 'Delete', 'Open all common ports', and 'How to Set'. There are also columns for 'Target', 'Protocol+port', 'Policy', and 'Notes'. A note at the bottom states: 'If no rules are set, all traffic is rejected by default.' The total number of items is 0.

15. [Add outbound rule] 팝업창에서, [Type]은 Custom으로, [Target]은 172.16.1.0/24로, [Protocol+port]는 TCP:3306, 그리고 마지막으로 [Policy]는 Allow를 선택하고 [Complete] 파란색 버튼을 클릭한다.

The screenshot shows a modal dialog box titled 'Add outbound rule'. It has five input fields: 'Type' (set to 'Custom'), 'Target' (set to '172.16.1.0/24'), 'Protocol+port' (set to 'TCP:3306'), 'Policy' (set to 'Allow'), and 'Notes' (empty). A red box highlights the entire row of these four fields. At the bottom of the dialog are 'Complete' and 'Cancel' buttons.

16. 다음 그림과 같이 Outbound rule도 설정되었다.

The screenshot shows the 'Outbound rules' section of the AWS Security Groups page again. The newly added rule is highlighted with a red box. The rule details are: Target: '172.16.1.0/24', Protocol+port: 'TCP:3306', Policy: 'Allow'. The table also includes columns for 'Modification time' (2023-02-04 12:43:16) and a dropdown for 'Separate keywords with' (set to '10').

17. 다시 MySQL 설정페이지로 돌아와서 방금 생성한 **Security Group**으로 설정을 맞춘다.

The screenshot shows a dropdown menu titled "Security Group" with a red box highlighting the option "lab7-db-sg-00". Below the dropdown, there is a preview section with "Preview Rules Instruction" and a link to "Create Security Groups". A note at the bottom says "To open other ports, go to Create Security Groups".

18. 나머지 설정 값은 그대로 기본값을 사용하기로 한다.

The screenshot shows the "Parameter Template" configuration page. It includes sections for "Character Set" (selected: UTF8), "Collation" (selected: UTF8_GENERAL_CI), "Table Name Case Sensitivity" (selected: Disable), and "Password Complexity" (selected: Enable). There is also a note about case sensitivity in MySQL 8.0.

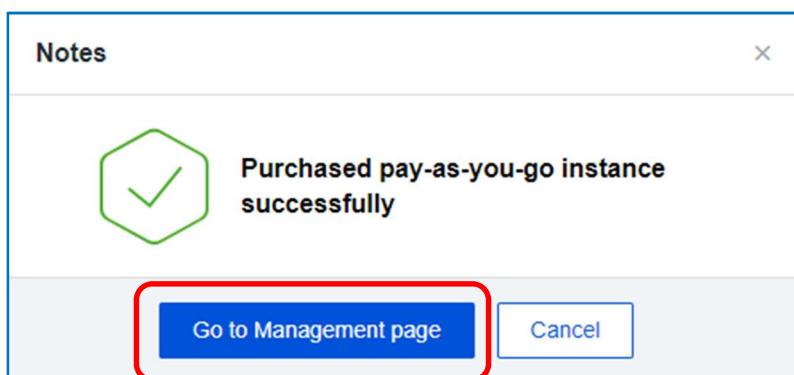
19. [Root Password]에서는 [Set Now]를 선택하고, **TencentDB for MySQL**의 관리자인 **root** 계정의 패스워드를 입력한다. Lab에서는 **P@\$\$W0rd1234**를 사용하기로 한다. 동일한 값으로 **Confirm Password**도 입력한다. 나머지 값들은 기본값 그대로 사용하기로 한다.

The screenshot shows the "Root Password" setup section. The "Set Now" button is highlighted with a red box. Below it are two password input fields: "Enter the password" and "Confirm the password", both containing the value "P@\$\$W0rd1234". Other configuration options include "Alarm Policy" (selected: Default Alarm Policy) and "Project" (selected: Default Project). The "Tag" section shows a single tag entry: "Tag key" and "Tag value" both set to "x".

20. [Instance Name]을 입력하기 위해 [Name It Now]를 선택하고, lab7-mysql-XX(여기서 XX는 계정번호를 의미)로 넣는다. 이제 모든 설정을 마쳤다. [Buy Now] 버튼을 클릭한다.

The screenshot shows the configuration page for creating a MySQL instance. The 'Instance Name' field contains 'lab7-mysql-00' and the 'Name It Now' button is highlighted with a red box. The 'Quantity' field is set to 1. In the 'Fees' section, 'Configuration Fees' is listed as 0.10277956 USD/hour (After 15 days of use, it will be reduced to 0.07500178 USD/hour). 'Backup Fees' is listed as 0.000127 USD/GB/hour (Excess space beyond free limit will be charged). 'Traffic Fees' is listed as 0.00 USD/GB. The 'Buy Now' button at the bottom is also highlighted with a red box.

21. 잠시 후, 아래 그림과 같이 설치 성공 다이얼로그가 나타나면 [Go to Management Page] 버튼을 클릭하여 MySQL – Instance List 페이지로 이동하자.



22. [Seoul] Region에 MySQL Instance가 생성되었다.

The screenshot shows the MySQL - Instance List page. The top navigation bar includes 'Seoul 1' and 'Other regions 0'. Below the navigation are buttons for 'Create', 'Comparative Monitoring', 'Restart', 'Renew', and 'More'. A search bar allows filtering by keywords. The main table lists the instance details:

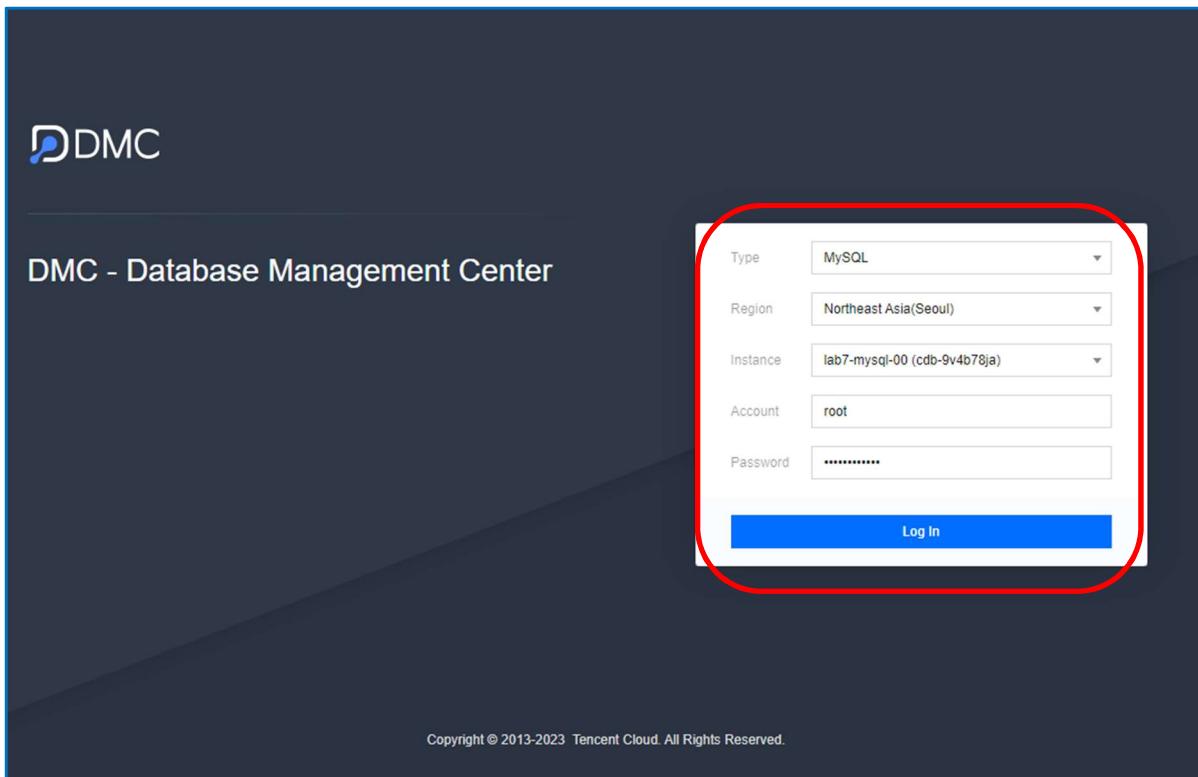
Instance ID/Name	Monitoring/Status/Tas k	AZ	Configuration	Database Version	Engine	Private Network Address	Region
cdb-ej2brb30 lab7-mysql-00	Running	Seoul Zone 2	Two-Node(Local Disk) General-1core1000M... Network: lab7-vpc-00 - lab7-vpc-db-subnet-00	MySQL8.0	InnoDB	172.16.2.2:3306	Seoul

Task4. TencentDB for MySQL Database Server에 직접 연결하기

- 방금 생성한 **lab7-mysql-XX(여기서 XX는 계정번호를 의미)**에 연결하기 위해 [MySQL – Instance List]에서 해당 **Server**를 클릭한다. 해당 **Server**의 정보를 알 수 있다. 우측 상단의 **[Log In]** 파란색 버튼을 클릭해보자.

The screenshot shows the 'Instance Details' page for the instance 'lab7-mysql-00'. On the right side, there is a 'Log In' button highlighted with a red box. Below it are other buttons for 'Restart', 'Manual Backup', 'Roll Back', and 'Exception Alarms'. The left side displays the 'Basic Info' of the instance, including its name, ID, status, region, project, and network settings. An 'Instance Architecture Diagram' is also present, showing the instance's current state and replication details.

- [DMC]창이 나타난다. [Account]는 root로, [Password]는 이미 설정한 P@\$\$W0rd1234를 입력하고 **[Log In]** 파란색 버튼을 클릭하여 로그인하자.



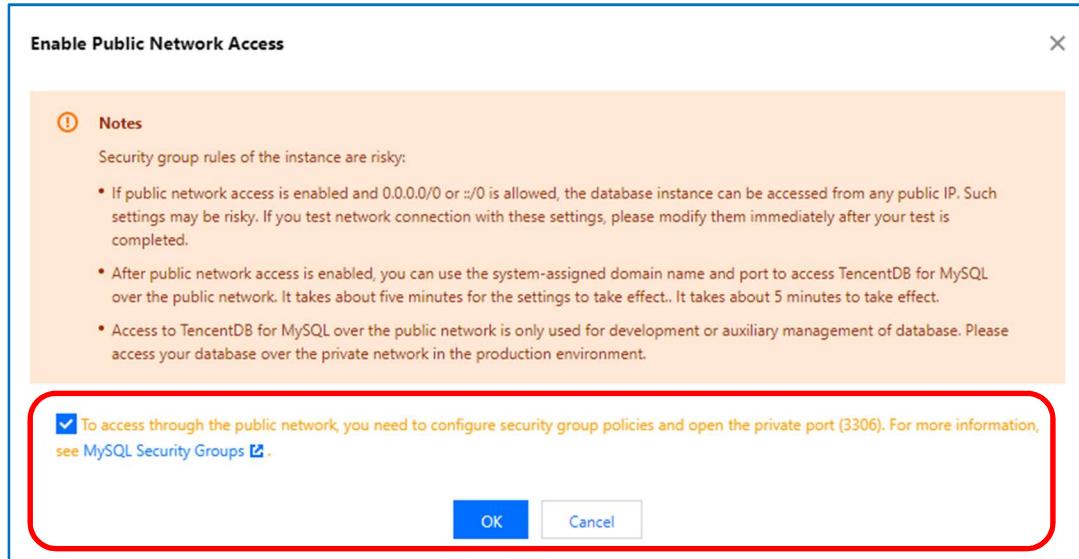
3. 연결에 성공했다. 아직 어떤 Table도 어떤 Data도 없는 것을 확인할 수 있다.

The screenshot shows the DMC interface with the 'information_schema' database selected. On the left, there's a sidebar with navigation links: Table (highlighted with a red box), View, Stored procedure, Function, Trigger, and Event. The main area displays 'Instance Status' with a collection time of 02-02 16:22:09 and an update after 4min43sec. It features three circular dashboards: 'Health Score' (Healthy, min), 'CPU' (0%, Running well), and 'Connection Count' (0%, Running well). Below these are 'Storage Space' (0%, 0.000/200 GB) and 'Basic Instance Info'. A search bar at the top allows for 'Fuzzy match table name'.

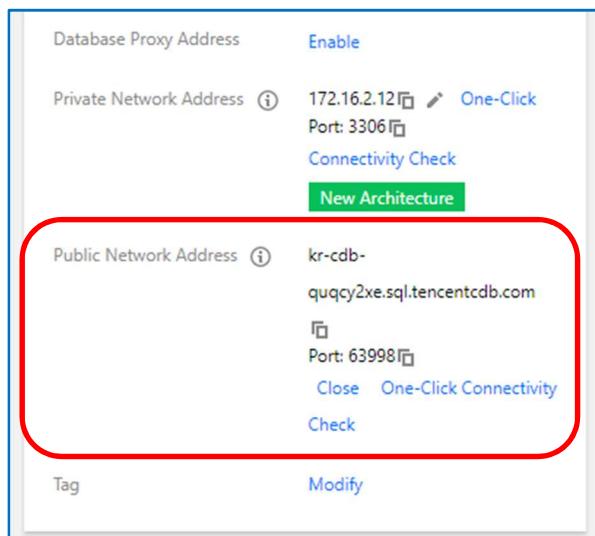
4. 이번에는 일반 개발자들이 연결할 수 있도록 MySQL을 Public Network를 통해 연결하는 방법을 사용하도록 한다. 앞에서 생성한 MySQL Instance의 상세 페이지의 [Basic Info] 섹션에서 [Public Network Address]를 보면 현재 [Enable]로 확인된다.

This screenshot shows the 'Basic Info' section of a MySQL instance. It includes settings for GTID (Enabled), Character Set/Collation (UTF8 / UTF8_GENERAL_CI), Network (lab7-vpc-00 - lab7-vpc-db-subnet-00, Change Network), Database Proxy Address (Enable), Private Network Address (172.16.2.12, Port: 3306, One-Click Connectivity Check, New Architecture button), and Public Network Address (172.16.2.12, Enable, Modify button). A red box highlights the 'Public Network Address' row.

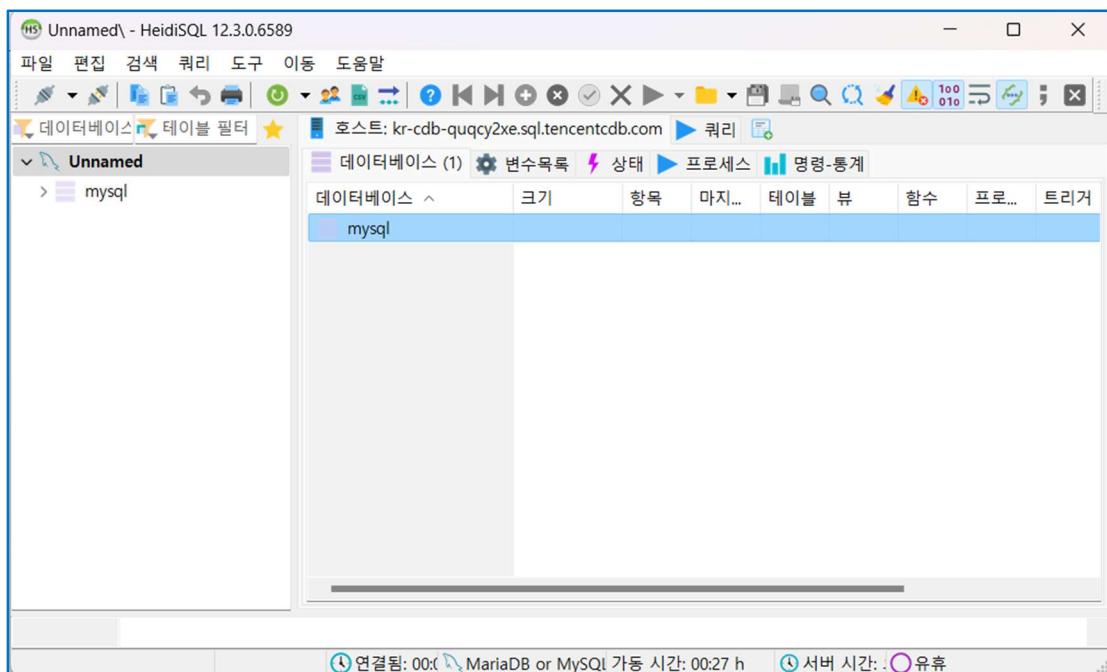
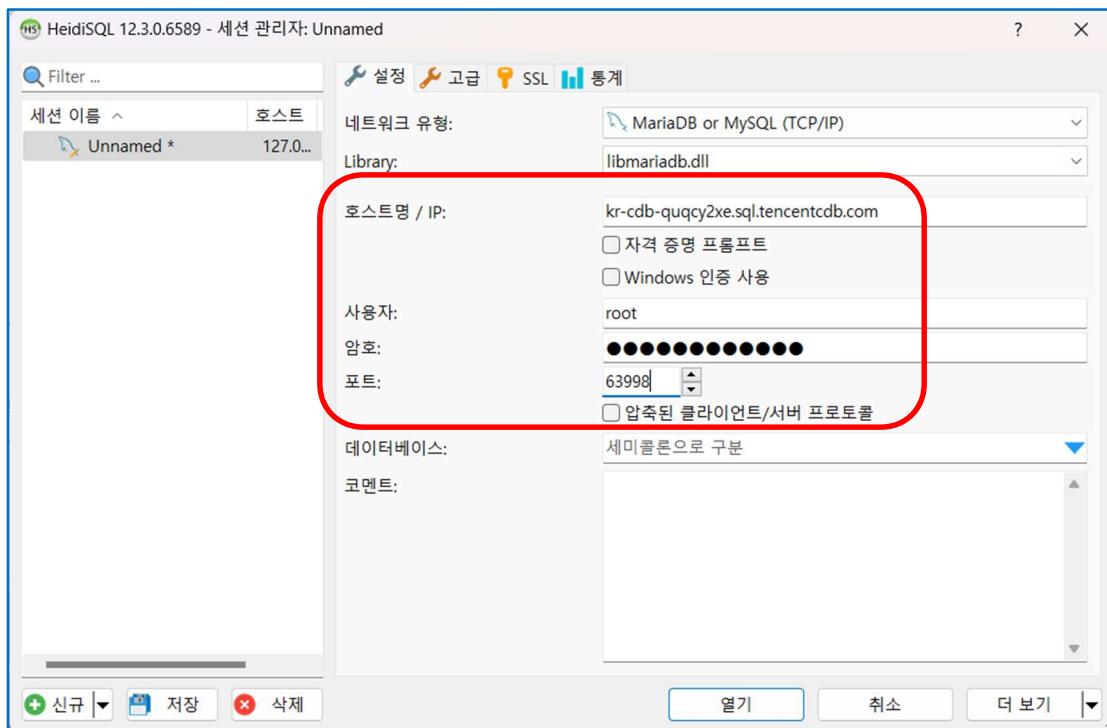
5. [Enable] 링크를 클릭하면, [Enable Public Network Access] 팝업창이 나온다. 계속 진행하려면 체크 후, [OK]를 클릭한다.



6. 외부에서 Public으로 접근할 수 있는 주소와 포트가 설정되었다.



7. 다음 그림은 Database 연결 프로그램 중 하나인 HeidiSQL로 연결하는 방법을 보여주고 있다. 이렇게 MySQL 인스턴스의 Public Network Address를 사용하면 Database 연결 프로그램을 통해 Hostname과 포트를 가지고 쉽게 연결할 수 있다.



Task5. Web Server에서 Private Network으로 Database Server에 연결하기

1. CVM 인스턴스를 사용하여 MySQL 인스턴스에 연결하려면 CVM 인스턴스의 보안 그룹에서 **Outbound rule**을 구성해야 한다. MySQL 인스턴스를 **Private Network**으로 접근하려는 **Web Server**는 현재 lab5-sgXX(여기서 XX는 계정번호를 의미)을 사용하고 있다. 먼저, lab5-sgXX(여기서 XX는 계정번호를 의미) 설정페이지로 이동한다.

The screenshot shows the AWS Management Console interface for managing security group rules. The top navigation bar includes back, forward, and search functions. Below the header, there are tabs for "Security group rules", "Associated to", and "Snapshot rollback".
The main content area has two tabs: "Inbound rules" (selected) and "Outbound rules". Below these tabs are several buttons: "Add rule" (highlighted in blue), "Import rule", "Sort", "Delete", "Open all common ports", and "How to Set".
The "Inbound rules" table lists the following entries:

Source	Protocol+port	Policy	Notes
0.0.0.0/0	ICMP	Allow	Ping service open.
::/0	ICMPv6	Allow	Ping service open.
0.0.0.0/0	TCP:22	Allow	TCP port 22 open for Linux CVMs.
::/0	TCP:22	Allow	TCP port 22 open for Linux CVMs.
0.0.0.0/0	TCP:80	Allow	Web service HTTP(80) open.
::/0	TCP:80	Allow	Web service HTTP(80) open.
0.0.0.0/0	TCP:443	Allow	Web service HTTPS(443) open.
::/0	TCP:443	Allow	Web service HTTPS(443) open.

Total items: 8

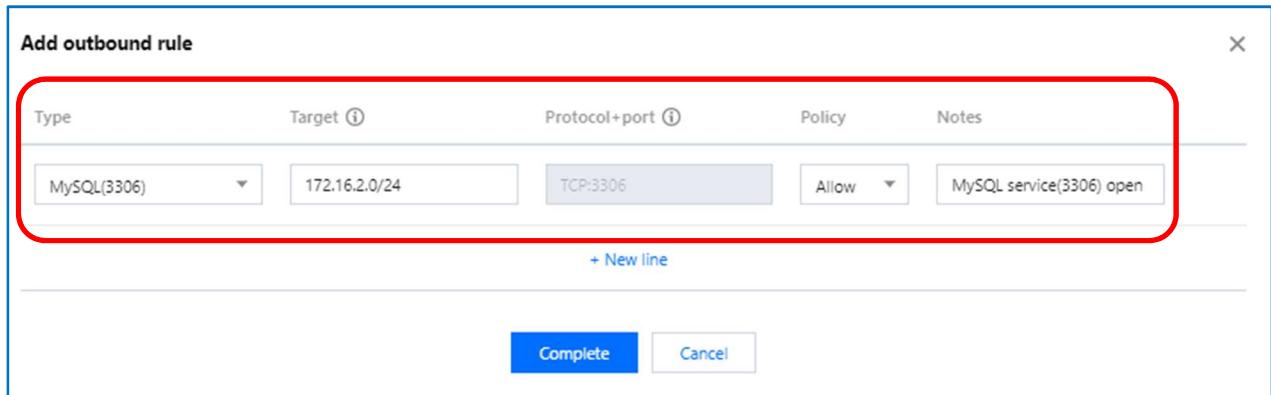
2. [Outbound rules] 탭의 [Add rule] 파란색 버튼을 클릭한다.

The screenshot shows the AWS Management Console interface for managing security group rules. The top navigation bar includes back, forward, and search functions. Below the header, there are tabs for "Security group rules", "Associated to", and "Snapshot rollback".
The main content area has two tabs: "Inbound rules" and "Outbound rules" (highlighted in red). Below these tabs are several buttons: "Add rule" (highlighted in red), "Import rule", "Sort", "Delete", "Open all common ports", and "How to Set".
The "Outbound rules" table lists the following entry:

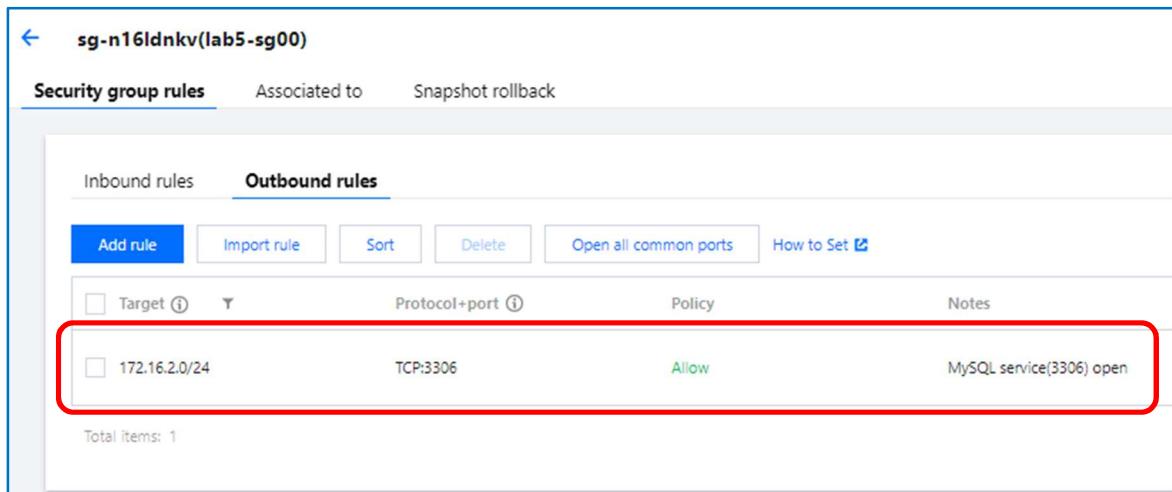
Target	Protocol+port	Policy	Notes
			If no rules are set, all traffic is rejected by default.

Total items: 0

3. [Add outbound rule] 팝업창에서, [Type]은 MySQL(3306)을 선택하고, [Target]은 MySQL 인스턴스 Subnet 주소인 172.16.2.0/24를 입력하고 [Policy]는 Allow를 선택한 후, [Complete] 파란색 버튼을 클릭한다.



4. 다음 그림과 같이 Outbound 규칙이 설정되었다.



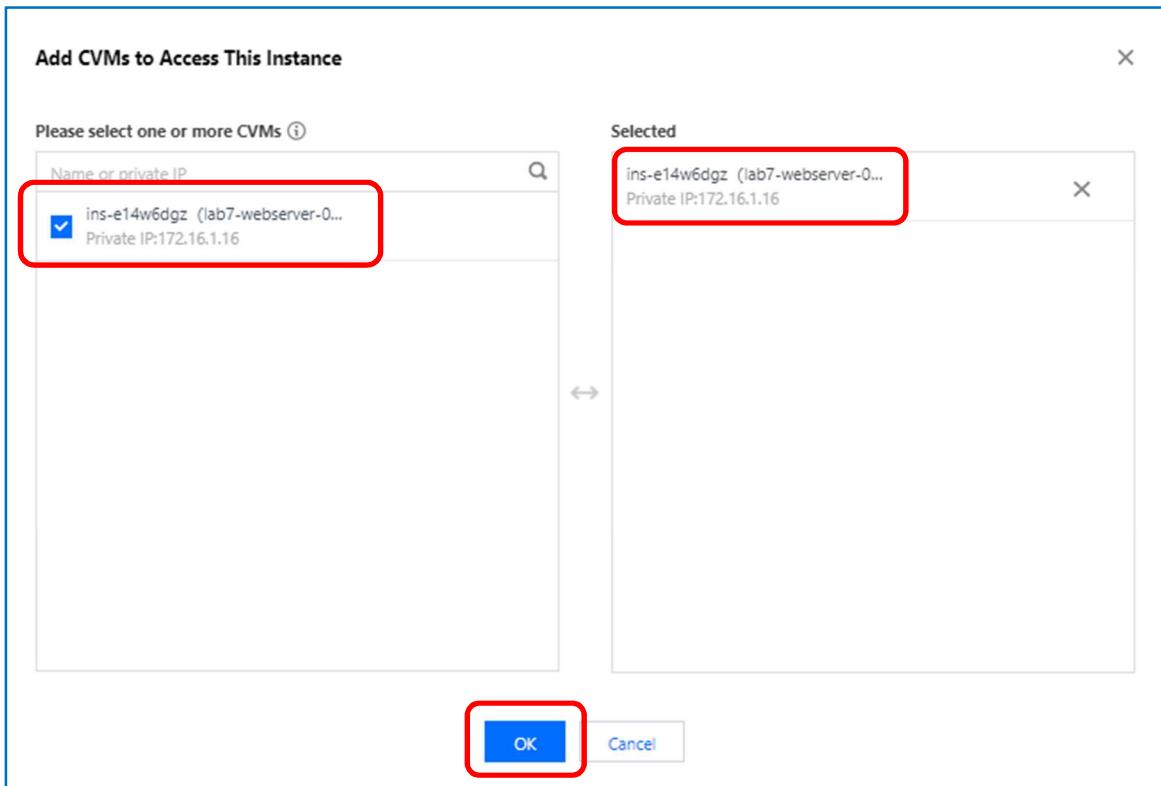
5. 이전 Task에서 생성한 MySQL 인스턴스의 상세 페이지로 이동한다. [Basic Info] 섹션에서 [Private Network Address]에 보면 MySQL 인스턴스의 Private IP가 확인된다. Private IP 옆에 있는 [One-Click Connectivity Check] 링크를 클릭한다.

Basic Info	
Instance Name	lab7-mysql-00
Instance ID	cdb-ej2brb30
Status/Task	Running / --
Region/AZ	Northeast Asia(Seoul)/ Seoul Zone 2 Migrate to New AZ
Project	Default Project Switch to Another Project
GTID	Enabled
Character Set/Collation	UTF8 / UTF8_GENERAL_CI
Network	lab7-vpc-00 - lab7-vpc-db-subnet-00 Change Network
Database Proxy Address	Enable
Private Network Address	172.16.2.2 Edit One-Click Connectivity Check Port: 3306 Edit Check New Architecture
Public Network Address	kr-cdb-ej2brb30.sql.tencentcdb.com Edit Port: 63998 Edit Close One-Click Connectivity Check
Tag	Modify

6. MySQL 인스턴스의 [Connection Check] 페이지이다. [Private Network Check] 메뉴에서 [Add CVMs to Access This Instance] 파란색 버튼을 클릭하여 MySQL 인스턴스에 연결할 Web Server를 지정하기로 한다.

lab7-mysql-00		Log In	Restart	Manual Backup	Roll Back	Exception Alarms			
Instance Details	Instance Monitoring	Database Management	Security Group	Backup and Restoration	Operation Log	Read-Only Instance	Database Proxy	Data Security	Connection Check
Private Network Check Public Network Check									
Instance ID: cdb-ej2brb30 Instance Name: lab7-mysql-00 Private IP: 172.16.2.2 Private Port: 3306 Network: lab7-vpc-00 - lab7-vpc-db-subnet-00									
<p>You have not added a CVM to access this instance</p> <p>The connection check will help you in detecting potential database connection and access problems. After the check, solutions will be suggested to ensure that your database can be accessed properly.</p> <p>Start Check</p> <p>Add CVMs to Access This Instance</p>									
CVM Name:	Private IP	Network	Status	Operation					
No records yet									

7. [Add CVMs to Access This Instance] 팝업창에서 [Please select one or more CVMs] 목록에서 앞 Task에서 생성한 Web Server인 lab7-webserver-XX(여기서 XX는 계정번호를 의미)를 체크한다. 체크한 Web Server가 [Selected] 목록에 있는 것을 확인하고 [OK] 버튼을 클릭한다.



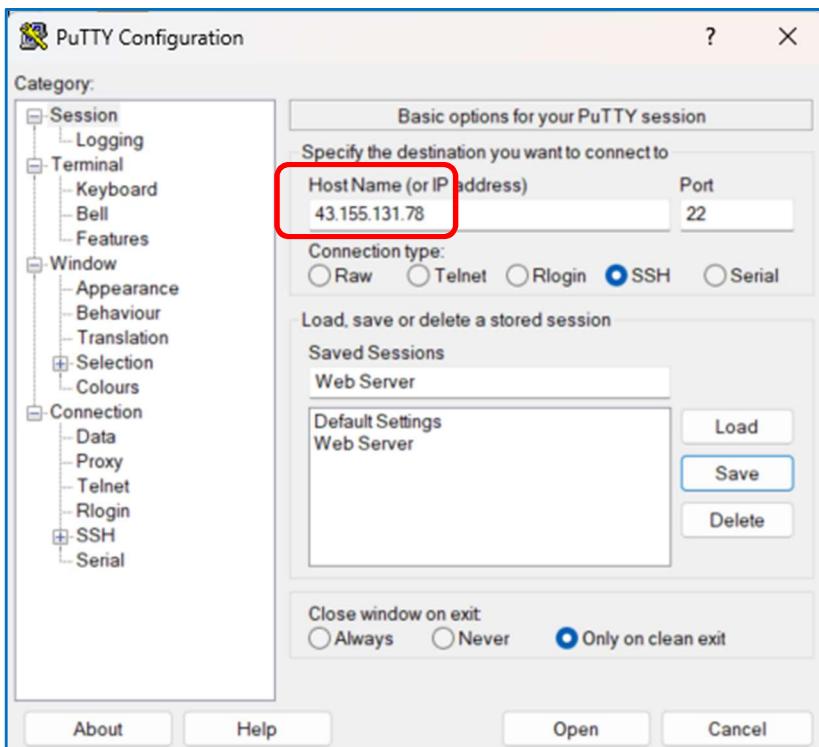
8. 목록에 Web Server가 등록되었다. 이제 [Start Check] 파란색 버튼을 클릭한다.

9. 정상적으로 연결할 수 있음을 확인할 수 있다.

The screenshot shows the 'Private Network Check' tab selected. At the top, it displays the Instance ID (cdb-ej2brb30), Instance Name (lab7-mysql-00), Private IP (172.16.2.2), Private Port (3306), and Network (lab7-vpc-00 - lab7-vpc-db-subnet-00). Below this, a large green circle with the word 'Normal' is highlighted with a red border. To its right, the text 'No problem found' is displayed, along with a brief description of the connection check's purpose. A blue 'Start Check' button is visible, and the last check time is listed as 2023-02-04 13:08:35. Below this section, there is a button labeled 'Add CVMs to Access This Instance'. The main area then lists CVM details:

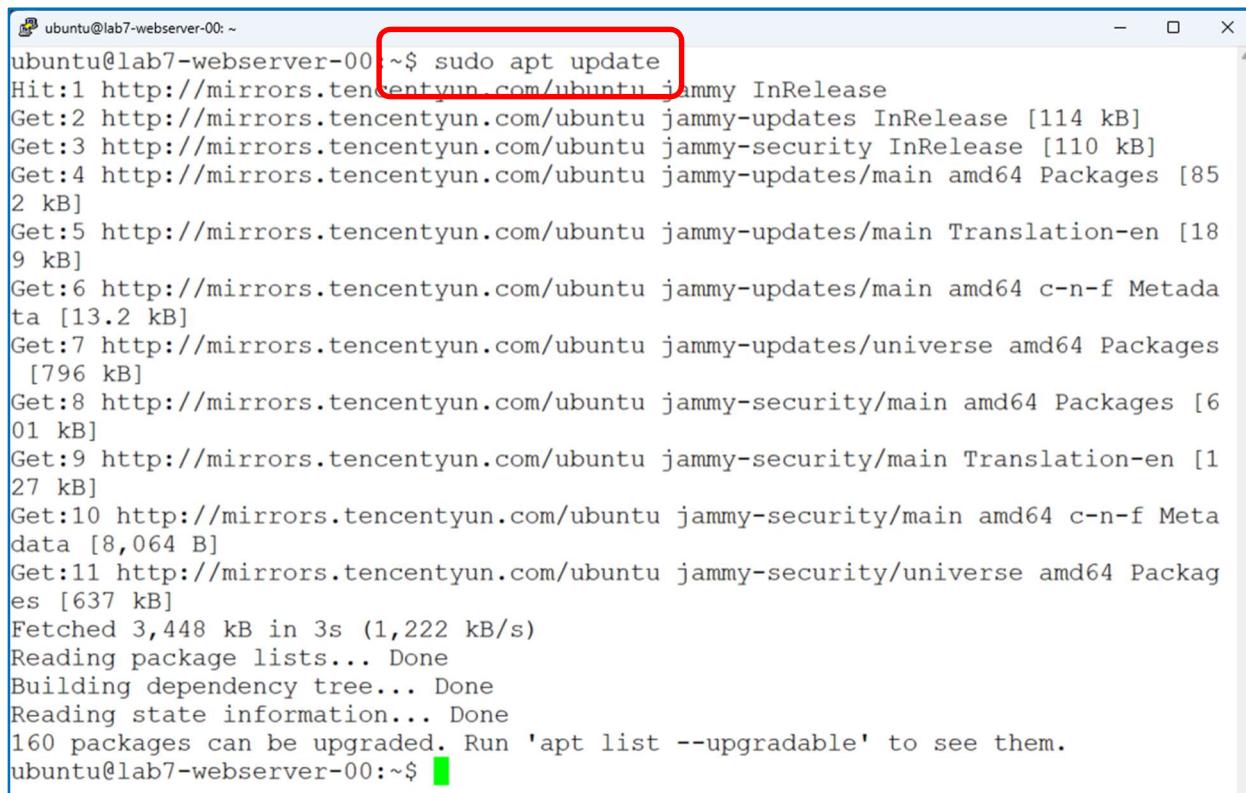
CVM Name	Private IP	Network	Status	Operation
ins-e14w6dgz lab7-webserver-00	172.16.1.16	lab7-vpc-00 - lab7-vpc-web-subnet-00	Normal	Delete View Report

10. PuTTY를 열고 SSH를 통해 lab7-webserver-XX(여기서 XX는 계정번호를 의미)에 연결한다.



11. lab7-webserver-XX(여기서 XX는 계정번호를 의미)에 연결 후, 먼저 **apt list update**부터 시작한다.

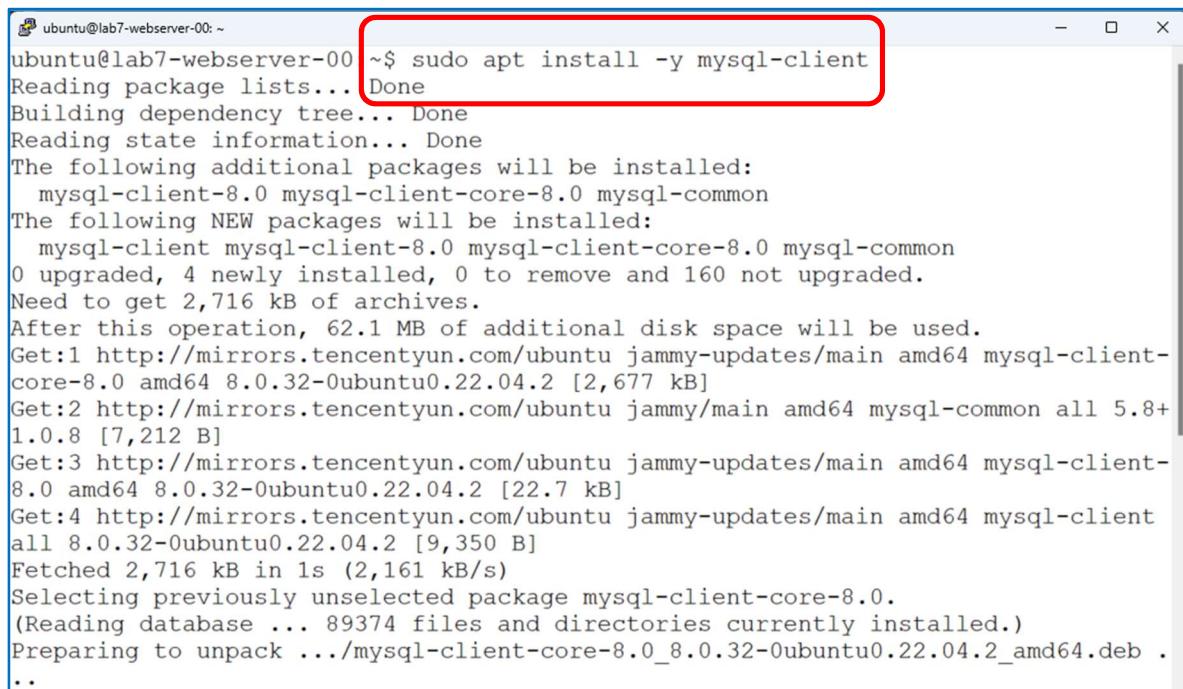
```
$ sudo apt update
```



```
ubuntu@lab7-webserver-00: ~$ sudo apt update
Hit:1 http://mirrors.tencentyun.com/ubuntu jammy InRelease
Get:2 http://mirrors.tencentyun.com/ubuntu jammy-updates InRelease [114 kB]
Get:3 http://mirrors.tencentyun.com/ubuntu jammy-security InRelease [110 kB]
Get:4 http://mirrors.tencentyun.com/ubuntu jammy-updates/main amd64 Packages [85
2 kB]
Get:5 http://mirrors.tencentyun.com/ubuntu jammy-updates/main Translation-en [18
9 kB]
Get:6 http://mirrors.tencentyun.com/ubuntu jammy-updates/main amd64 c-n-f Meta
data [13.2 kB]
Get:7 http://mirrors.tencentyun.com/ubuntu jammy-updates/universe amd64 Packages
[796 kB]
Get:8 http://mirrors.tencentyun.com/ubuntu jammy-security/main amd64 Packages [6
01 kB]
Get:9 http://mirrors.tencentyun.com/ubuntu jammy-security/main Translation-en [1
27 kB]
Get:10 http://mirrors.tencentyun.com/ubuntu jammy-security/main amd64 c-n-f Meta
data [8,064 B]
Get:11 http://mirrors.tencentyun.com/ubuntu jammy-security/universe amd64 Packag
es [637 kB]
Fetched 3,448 kB in 3s (1,222 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
160 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@lab7-webserver-00:~$
```

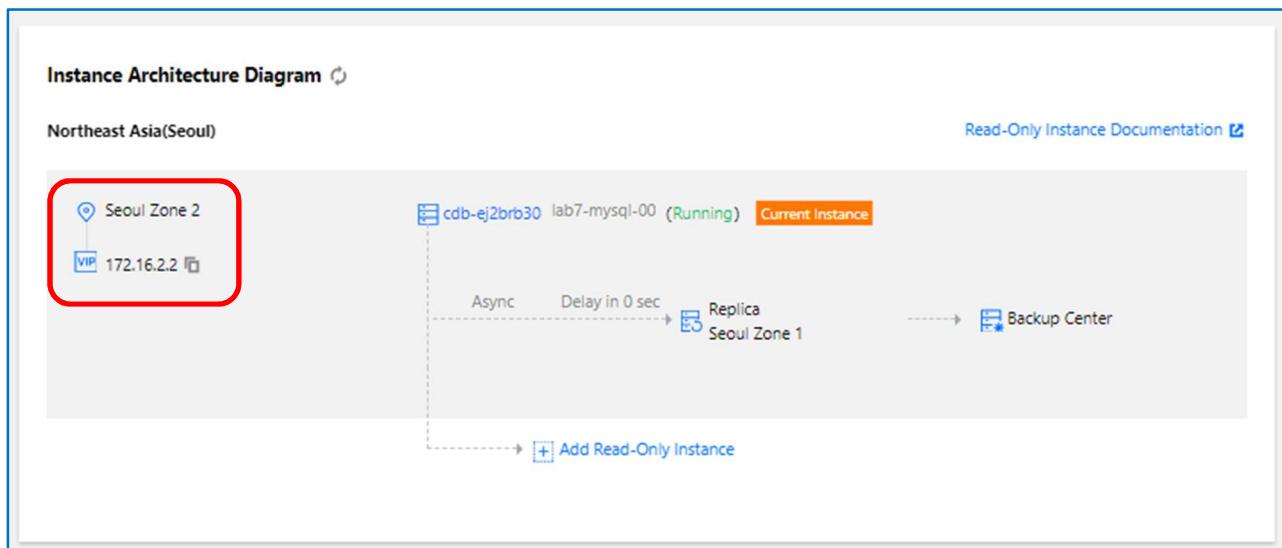
12. lab7-webserver-XX(여기서 XX는 계정번호를 의미)에서 lab7-mysql-XX(여기서 XX는 계정번호를 의미)에 연결하기 위해 **MySQL Client Tool**을 설치한다.

```
$ sudo apt install -y mysql-client
```



```
ubuntu@lab7-webserver-00: ~$ sudo apt install -y mysql-client
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  mysql-client-8.0 mysql-client-core-8.0 mysql-common
The following NEW packages will be installed:
  mysql-client mysql-client-8.0 mysql-client-core-8.0 mysql-common
0 upgraded, 4 newly installed, 0 to remove and 160 not upgraded.
Need to get 2,716 kB of archives.
After this operation, 62.1 MB of additional disk space will be used.
Get:1 http://mirrors.tencentyun.com/ubuntu jammy-updates/main amd64 mysql-client-
core-8.0 amd64 8.0.32-0ubuntu0.22.04.2 [2,677 kB]
Get:2 http://mirrors.tencentyun.com/ubuntu jammy/main amd64 mysql-common all 5.8+
1.0.8 [7,212 kB]
Get:3 http://mirrors.tencentyun.com/ubuntu jammy-updates/main amd64 mysql-client-
8.0 amd64 8.0.32-0ubuntu0.22.04.2 [22.7 kB]
Get:4 http://mirrors.tencentyun.com/ubuntu jammy-updates/main amd64 mysql-client
all 8.0.32-0ubuntu0.22.04.2 [9,350 B]
Fetched 2,716 kB in 1s (2,161 kB/s)
Selecting previously unselected package mysql-client-core-8.0.
(Reading database ... 89374 files and directories currently installed.)
Preparing to unpack .../mysql-client-core-8.0_8.0.32-0ubuntu0.22.04.2_amd64.deb .
..
```

13. 이제 PuTTY에서 MySQL Client Tool을 통해 lab7-webserver-XX(여기서 XX는 계정번호를 의미)에서 lab7-mysql-XX(여기서 XX는 계정번호를 의미)에 연결해 보자. 현재 이 실습에서의 lab7-mysql-XX(여기서 XX는 계정번호를 의미)의 Private IP는 172.16.2.2이다.



14. 비밀번호 P@\$\$W0rd1234를 입력하면 lab7-webserver-XX(여기서 XX는 계정번호를 의미)에서 lab7-mysql-XX(여기서 XX는 계정번호를 의미)에 접속되는 것을 볼 수 있다.

```
$ mysql -h 172.16.2.2 -u root -p
```

```
ubuntu@lab7-webserver-00:~$ mysql -h 172.16.2.2 -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 2600
Server version: 8.0.22-txsql 20220831

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> 
```

15. Database를 조회하니까 root권한으로 볼 수 있는 Database 목록이 보인다.

```
mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
4 rows in set (0.00 sec)

mysql> █
```

Task6. TencentDB for MySQL Data 관리하기

- MySQL 인스턴스의 상세 페이지로 들어간다. 그리고 페이지 상단 메뉴 중 [Database Management] 메뉴를 클릭한다.

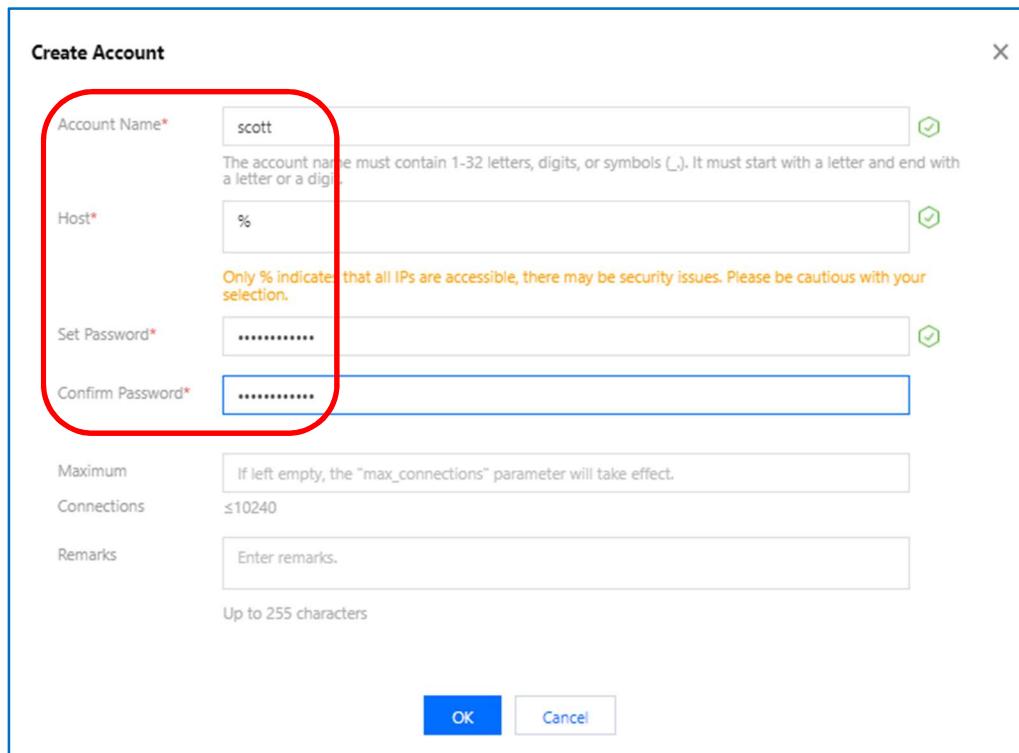
The screenshot shows the 'Instance Details' page for an instance named 'lab7-mysql-00'. The 'Database Management' tab is highlighted with a red box. On the left, there's a 'Basic Info' section with various configuration details like Instance Name, Instance ID, Status/Task, Region/AZ, Project, GTID, Character Set/Collation, Network, and Database Proxy Address. On the right, there's an 'Instance Architecture Diagram' for 'Northeast Asia(Seoul)' showing the internal structure of the database instance.

- 계정정보를 보기 위해 [Account Management] 메뉴를 클릭한다. root 계정을 확인할 수 있다. 새 계정을 생성하기 위해 [Create Account] 파란색 버튼을 클릭한다.

The screenshot shows the 'Database Management' page for the same instance. The 'Account Management' tab is highlighted with a red box. Below it, there are buttons for 'Create Account' (highlighted with a red box), 'Export Account List', 'Password Complexity: [Disable]', and 'Use Dynamic Credentials'. A table below lists the accounts, showing one account named 'root' with host '%' and maximum connections set to '--'. A message at the bottom indicates '1 in total'.

3. [Create Account] 창이 나타난다. 다음의 각 값을 설정한 후, [OK] 파란색 버튼을 클릭한다.

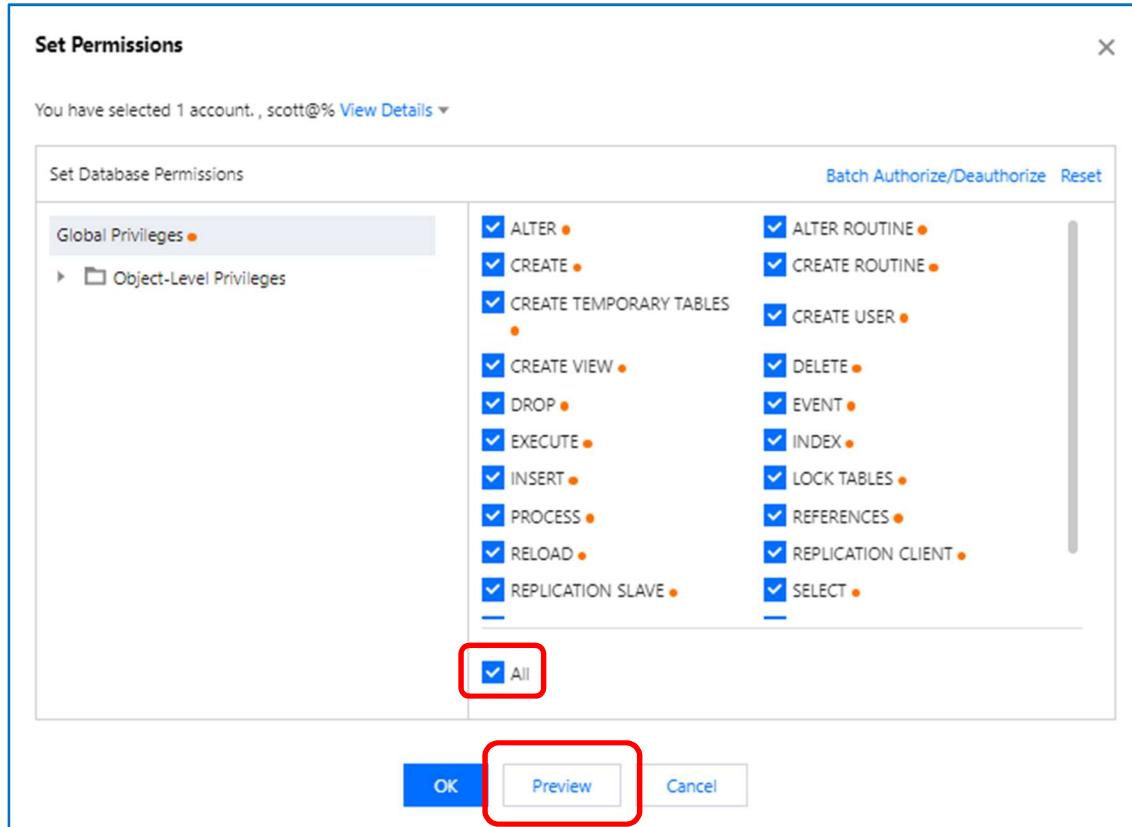
- ① [Account Name] : scott
- ② [Host] : %
- ③ [Set Password] : P@\$\$W0rd1234
- ④ [Confirm Password] : P@\$\$W0rd1234



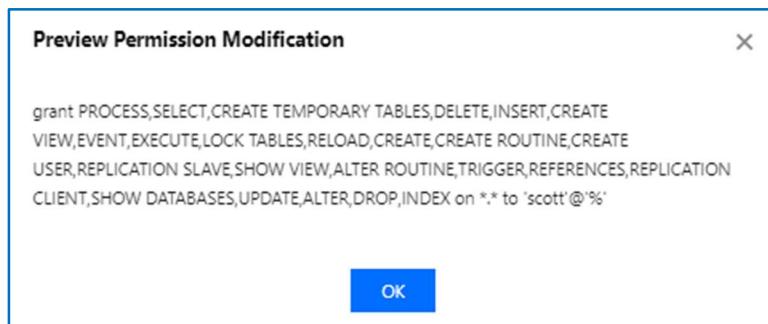
4. 방금 생성한 계정을 확인할 수 있다. 권한 설정을 위해 해당 scott 계정의 제일 오른쪽 메뉴인 [Operation] > [Modify Permissions]를 클릭한다.

Account Management				
Create Account	Export Account List	Password Complexity: [Disable]	Use Dynamic Credentials ⓘ	Enter account name <input type="text"/>
Account Name	Host	Maximum Connections	Remarks	Operation
root	%	--	--	Reset Password Reset Permissions
scott	%	--	--	Modify Permissions Clone Account More ▾
2 in total				
10 / page <input type="button" value="«"/> <input type="button" value="«"/> 1 <input type="button" value="»"/> <input type="button" value="»"/> <input type="button" value="»»"/>				

5. [Set Permissions] 창이 나타난다. 필요한 권한을 설정할 수 있는데, 실습 목적상 ALL 을 선택한다. 그리고 [Preview] 버튼을 클릭한다.



6. [Preview permission Modification] 팝업창에서 GRANT Query 를 확인할 수 있다.

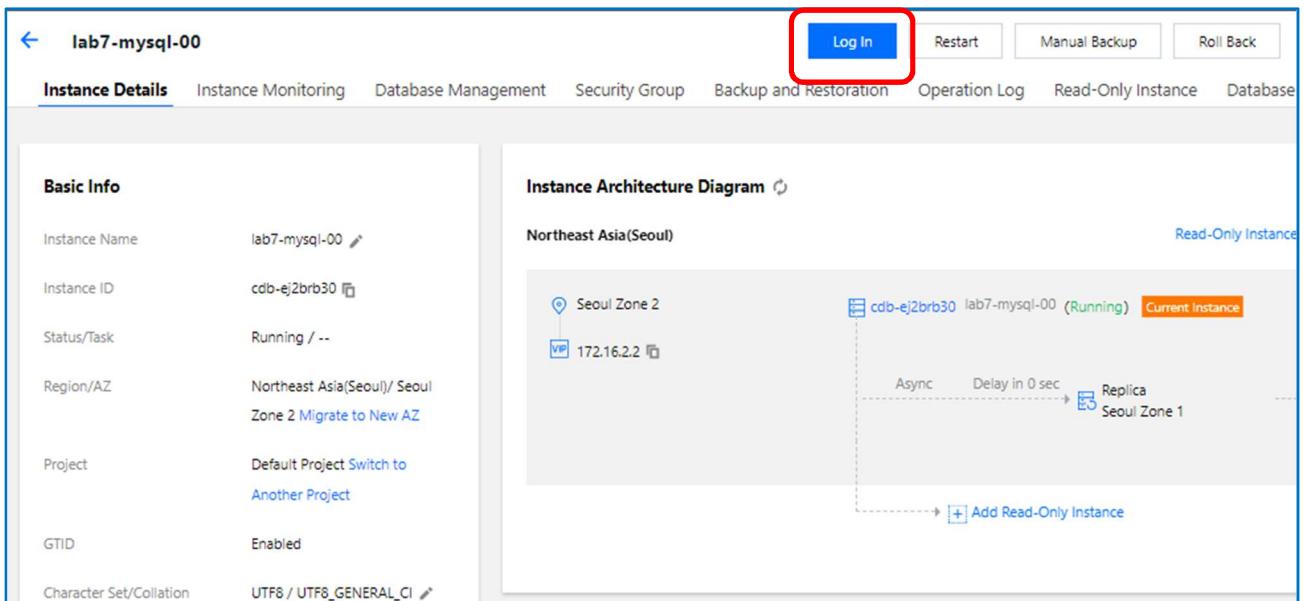


7. 그리고 [OK] 파란색 버튼을 클릭하여 [Set Permissions] 창을 닫는다. PuTTY 창으로 돌아와서, 다음의 명령을 통해 방금 생성한 scott 계정을 확인한다.

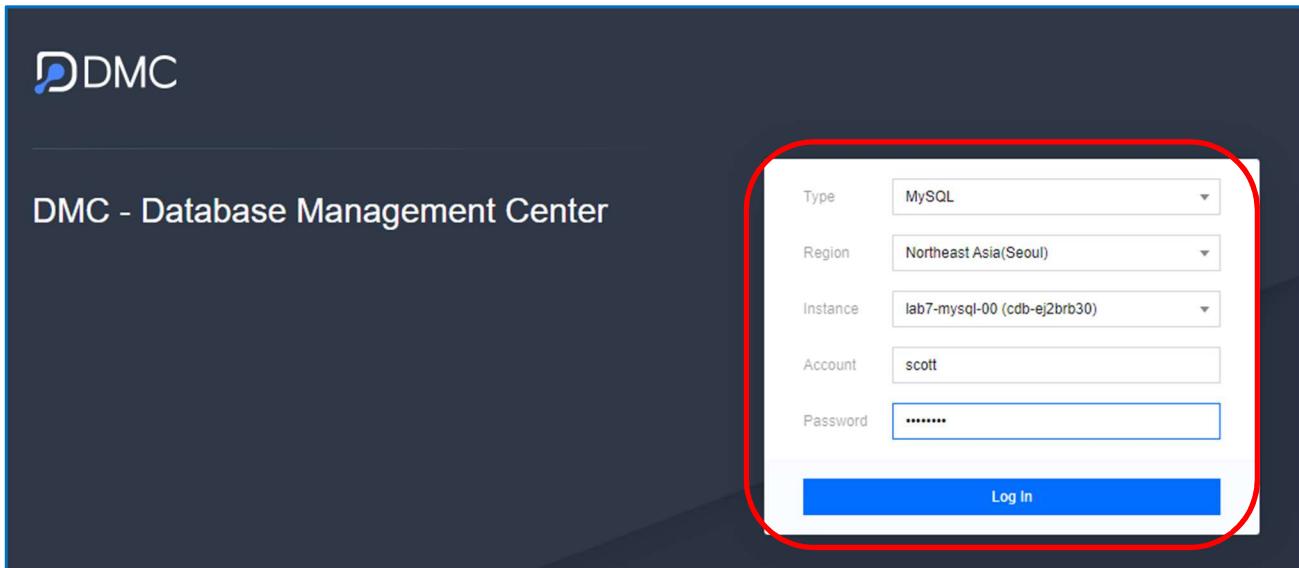
```
mysql>use mysql;  
mysql>show tables;  
mysql>SELECT host, user FROM user;
```

```
mysql> SELECT host, user FROM user;  
+-----+-----+  
| host | user |  
+-----+-----+  
| % | root |  
| % | scott |  
| localhost | mysql.infoschema |  
| localhost | mysql.session |  
| localhost | mysql.sys |  
+-----+-----+  
5 rows in set (0.01 sec)  
  
mysql> █
```

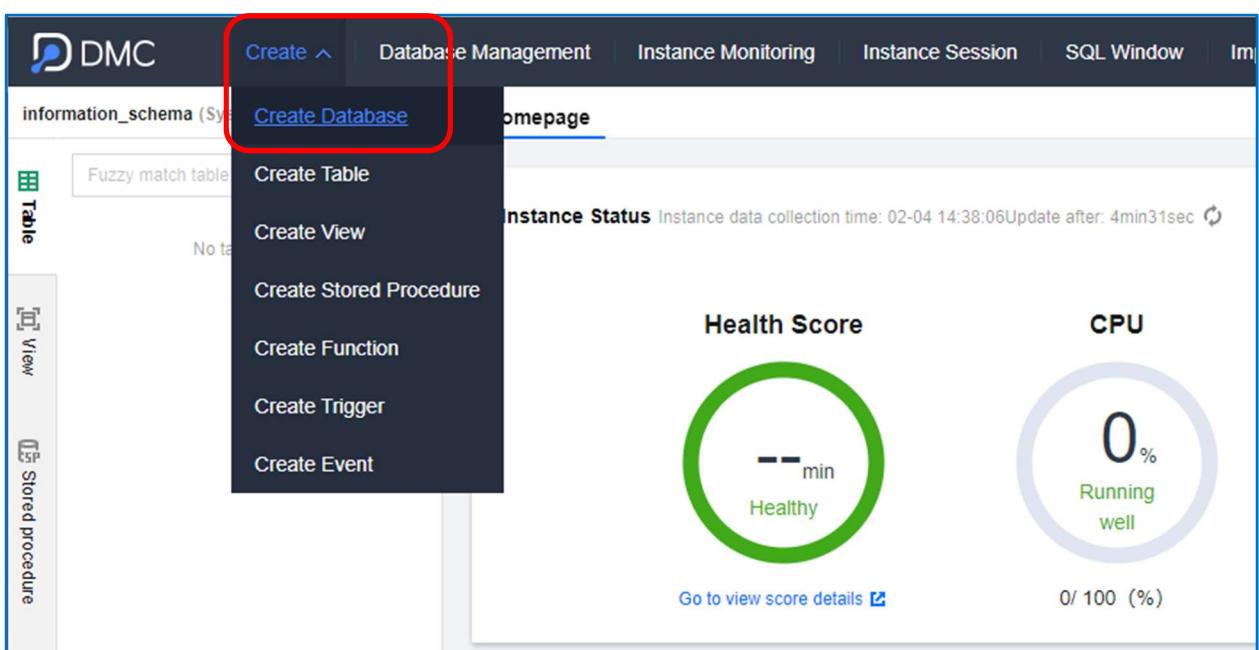
8. MySQL 인스턴스 상세 페이지에서 Database Server에 접속하기 위해 [Login] 버튼을 클릭한다. 앞에서 이미 연결되어 있는 창이 있다면 창을 닫고 다시 연결한다.



9. [DMC]창에서 방금 생성한 계정인 **scott** 의 비밀번호 **P@\$\$W0rd1234** 로 [**Log In**] 파란색 버튼을 클릭하여 로그인해보자.



10. **scott** 계정으로 로그인에 성공한 다음, 먼저 새 Database 를 생성하기 위해 상단 메뉴 중 [**Create**] > [**Create Database**] 메뉴를 클릭한다. 또는 상단 메뉴 중 [**Database Management**] 메뉴를 직접 클릭한다.



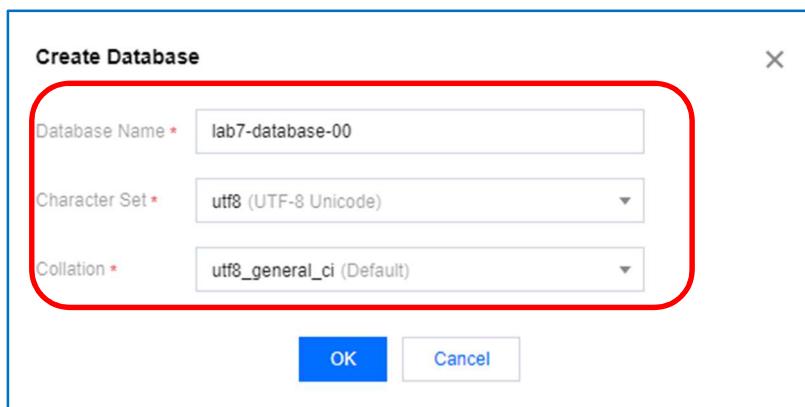
11. 현재 Database는 여러 개 보인다. 새 Database를 생성하기 위해 [Create Database] 파란색 버튼을 클릭한다.

The screenshot shows the 'Database Management' section of a MySQL interface. At the top, there are tabs for 'Homepage' and 'Database Management'. Below them are two buttons: 'Create Database' (highlighted with a red box) and 'Space Analysis'. A search bar on the right says 'Please enter database name'. The main area lists several system databases with their character sets and collations:

Database Name	Character Set	Collation
information_schema (System database)	utf8 (UTF-8 Unicode)	utf8_general_ci (Default)
performance_schema (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)
mysql (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)
sys (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)
_cdb_recycle_bin_ (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)

12. [Create Database] 창이 나타난다. 다음의 각 값을 설정한 후, [OK] 파란색 버튼을 클릭한다.

- ① [Database Name] : lab7-database-XX(여기서 XX는 계정번호를 의미)
- ② [Character Set] : utf8
- ③ [Collation] : utf8_general_ci(Default)



13. 새 Database lab7-database-XX(여기서 XX는 계정번호를 의미) 생성되었다.

The screenshot shows the 'Database Management' interface again. The newly created database 'lab7-database-00' is now listed at the bottom of the table, highlighted with a red box. The table columns are 'Database Name', 'Character Set', 'Collation', and 'Operation'. The 'Operation' column for the new database shows 'Edit' and 'Delete' links.

Database Name	Character Set	Collation	Operation
information_schema (System database)	utf8 (UTF-8 Unicode)	utf8_general_ci (Default)	--
performance_schema (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)	--
mysql (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)	--
sys (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)	--
_cdb_recycle_bin_ (System database)	utf8mb4 (UTF-8 Unicode)	utf8mb4_0900_ai_ci (Default)	--
lab7-database-00	utf8 (UTF-8 Unicode)	utf8_general_ci (Default)	Edit Delete

14. 새 TABLE 을 생성하기 위해 먼저 현재의 Database 인 information_schema 를 변경해야 한다. Database 드롭다운을 클릭해서 목록 중 lab7-database-XX(여기서 XX는 계정번호를 의미)를 선택한다.

The screenshot shows the DMC interface with the 'Database Management' tab selected. On the left, there's a dropdown menu for 'Fuzzy match database name' and a list of databases. The 'information_schema (System database)' is currently selected. Below it, 'lab7-database-00' is listed and has a red box drawn around it. To the right, there's a form to 'Create Database' with fields for 'Database Name' and a list of available names.

15. 현재의 Database 가 lab7-database-XX(여기서 XX 는 계정번호를 의미)임을 확인하고, 페이지 상단 메뉴 중 [Create] > [Create Table] 메뉴를 클릭한다.

The screenshot shows the DMC interface with the 'Create' dropdown menu open. The 'Create Database' option is selected. Below it, the 'Create Table' option is highlighted and circled in red. Other options like 'Create View', 'Create Stored Procedure', and 'Create Function' are also visible.

16. [Create Table] 페이지의 [Basic Info]에서 다음의 각 값을 설정한다.

- ① [Table name] : Employees
- ② [Storage engine] : InnoDB
- ③ [Character Set] : utf8
- ④ [Check Rules] : utf8_general_ci

Homepage Database Management **Create Table**

Database: lab7-database-00

Basic Info Column Info Index Foreign Key Partition

Basic Info

Table name * Employees

Remarks

Storage engine InnoDB

Character Set utf8

Check Rules utf8_general_ci

17. 다음으로 [Column Info] 탭을 클릭하여 [Add] 버튼을 클릭하여 다음의 각 값을 설정 후, [Submit] 파란색 버튼을 클릭하여 새 TABLE 을 생성한다.

- ① [Column Name] : empno, [Type] : smallint, [Length] : 2, Primary Key
- ② [Column Name] : ename, [Type] : varchar, [Length] : 10, [Set to Null] : Uncheck, [Character Set] : utf8, [Check Rules] : utf8_general_ci
- ③ [Column Name] : job, [Type] : varchar, [Length] : 9, [Set to Null] : Uncheck, [Character Set] : utf8, [Check Rules] : utf8_general_ci
- ④ [Column Name] : mgr, [Type] : smallint, [Length] : 2, [Set to Null] : Check
- ⑤ [Column Name] : hiredate, [Type] : date, [Set to Null] : Uncheck
- ⑥ [Column Name] : sal, [Type] : float, [Length] : 7, [Decimal Place] : 2, [Set to Null] : Uncheck
- ⑦ [Column Name] : comm, [Type] : float, [Length] : 7, [Decimal Place] : 2 [Set to Null] : Check
- ⑧ [Column Name] : deptno, [Type] : tinyint, [Length] : 1, [Set to Null] : Uncheck

Homepage Database Management **Create Table** Exception alert

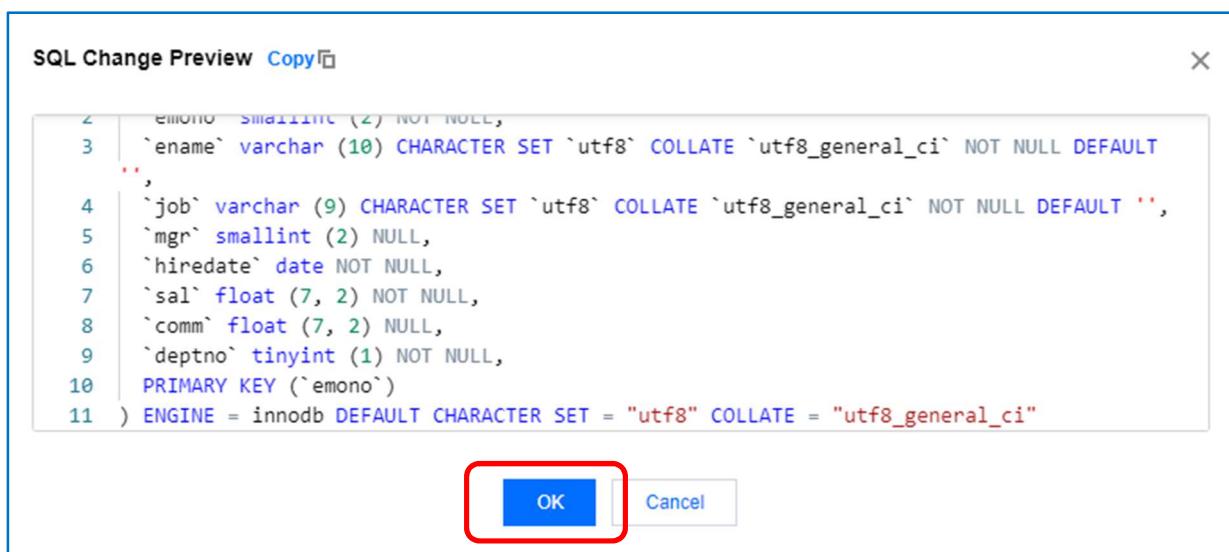
Basic Info **Column Info** Index Foreign Key Partition

Add Delete Insert Move up Move down

	Column Name	Type	Length	Remarks	Set to Null	Primary Key	Index
1	emono	smallint	2		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	ename	varchar	10		<input type="checkbox"/>	<input type="checkbox"/>	
3	job	varchar	9		<input type="checkbox"/>	<input type="checkbox"/>	
4	mgr	smallint	2		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	hiredate	date			<input type="checkbox"/>	<input type="checkbox"/>	
6	sal	float	7		<input type="checkbox"/>	<input type="checkbox"/>	
7	comm	float	7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8	deptno	tinyint	1		<input type="checkbox"/>	<input type="checkbox"/>	

18. [Submit] 파란색 버튼을 클릭하면 [SQL Change Preview] 창이 나타난다. Query 확인 후 이상이 없으면 [OK] 파란색 버튼을 클릭한.

```
CREATE TABLE `Employees` (
  `empno` smallint (2) NOT NULL,
  `ename` varchar (10) CHARACTER SET `utf8` COLLATE `utf8_general_ci` NOT NULL DEFAULT '',
  `job` varchar (9) CHARACTER SET `utf8` COLLATE `utf8_general_ci` NOT NULL DEFAULT '',
  `mgr` smallint (2) NULL,
  `hiredate` date NOT NULL,
  `sal` float (7, 2) NOT NULL,
  `comm` float (7, 2) NULL,
  `deptno` tinyint (1) NOT NULL,
  PRIMARY KEY (`empno`)
) ENGINE = innodb DEFAULT CHARACTER SET = "utf8" COLLATE = "utf8_general_ci"
```



19. TABLE 이 정상적으로 생성되면 좌측 프레임에서 테이블을 확인할 수 있고, [Employees| Table Structure] 탭도 생성된다.

The screenshot shows the MySQL Workbench interface. On the left, there's a sidebar with tabs for Table, View, Stored procedure, and Func. The 'Table' tab is selected. In the main area, there's a search bar with 'Fuzzy match table name' and a '+' button. Below it, a tree view shows a folder containing 'employees'. A red box highlights this entry. At the top right, there are tabs for Homepage, Database Management, and 'Employees | Table Structure' (which is highlighted with a red box). Below these are buttons for Basic Info, Column Info (which is selected), Index, Foreign Key, and Partition. Underneath are buttons for Add, Delete, Insert, Move up, and Move down. The main content area displays the 'employees' table structure with 8 columns:

	Column Name	Type	Length	Remarks	Set to Null	Primary Key	Index
1	emono	smallint			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	ename	varchar	10		<input type="checkbox"/>	<input type="checkbox"/>	
3	job	varchar	9		<input type="checkbox"/>	<input type="checkbox"/>	
4	mgr	smallint			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	hiredate	date			<input type="checkbox"/>	<input type="checkbox"/>	
6	sal	float	7		<input type="checkbox"/>	<input type="checkbox"/>	
7	comm	float	7		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8	deptno	tinyint	1		<input type="checkbox"/>	<input type="checkbox"/>	

20. PuTTY 를 이용해서 lab7-webserver-XX(여기서 XX 는 계정번호를 의미)에서도 방금 생성한 Database 와 Table 을 확인해 보자.

```
mysql> show databases;
```

```
mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| lab7-database-00   |
| mysql          |
| performance_schema |
| sys            |
+-----+
5 rows in set (0.00 sec)

mysql> 
```

```
mysql> use lab7-database-XX(여기서 XX는 계정번호를 의미);
```

```
mysql> show tables;
```

```
mysql> DESC Employees;
```

```
mysql> use lab7-database-00
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_lab7-database-00 |
+-----+
| employees
+-----+
1 row in set (0.00 sec)

mysql> DESC employees;
+-----+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| emono | smallint | NO   | PRI | NULL    |       |
| ename | varchar(10) | NO  |     |          |       |
| job   | varchar(9)  | NO  |     |          |       |
| mgr   | smallint  | YES  |     | NULL    |       |
| hiredate | date   | NO  |     | NULL    |       |
| sal   | float(7,2) | NO  |     | NULL    |       |
| comm  | float(7,2) | YES |     | NULL    |       |
| deptno | tinyint(1) | NO  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

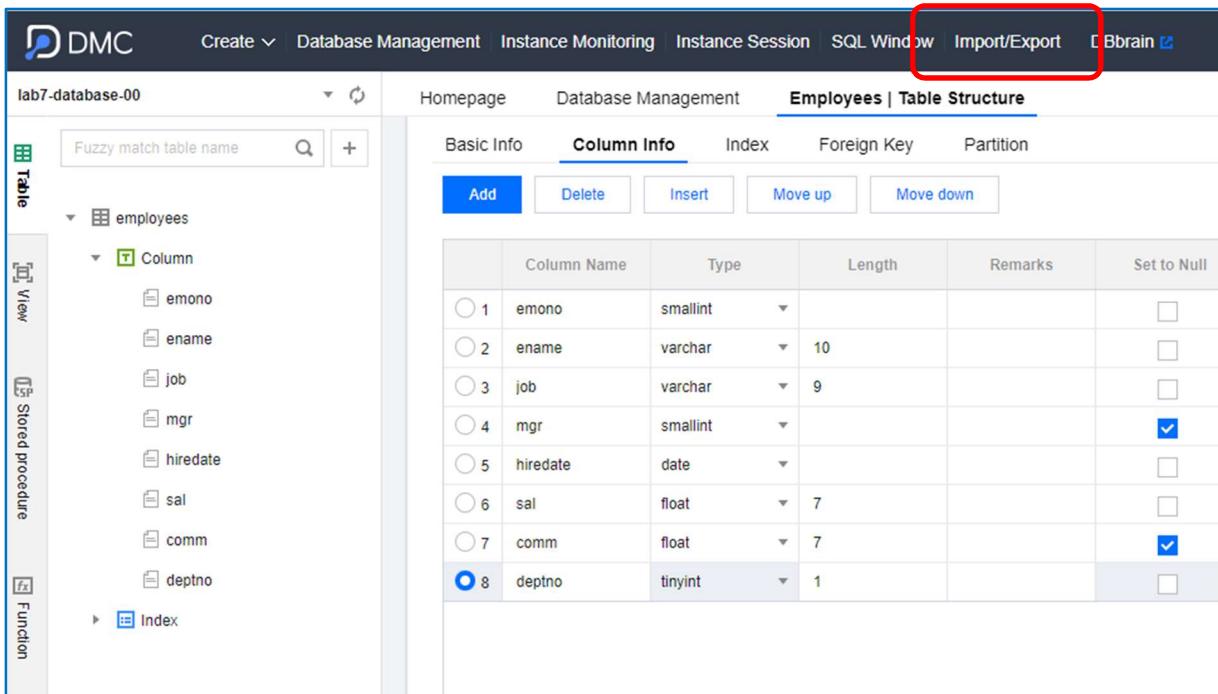
mysql>
```

21. 다시 [DMC] 페이지로 돌아와서, 좌측의 [Table] 탭에서 **Employees Table**을 클릭한다. 그러면 오른쪽 프레임에 **[Employees | Edit Table]** 탭이 나타난다.

The screenshot shows the DMC interface with the 'lab7-database-00' database selected. On the left, there is a sidebar with tabs for Table, View, Stored procedure, and Function. Under the Table tab, the 'employees' table is expanded, showing its columns: emono, ename, job, mgr, hiredate, sal, comm, and deptno. The 'Column Info' tab is currently selected in the main content area. A red box highlights the 'Employees | Table Structure' tab at the top of the content area. Below it, there are buttons for Add, Delete, Insert, Move up, and Move down. A table displays the column details:

	Column Name	Type	Length	Remarks	Set to Null
1	emono	smallint			<input type="checkbox"/>
2	ename	varchar	10		<input type="checkbox"/>
3	job	varchar	9		<input type="checkbox"/>
4	mgr	smallint			<input checked="" type="checkbox"/>
5	hiredate	date			<input type="checkbox"/>
6	sal	float	7		<input type="checkbox"/>
7	comm	float	7		<input checked="" type="checkbox"/>
8	deptno	tinyint	1		<input type="checkbox"/>

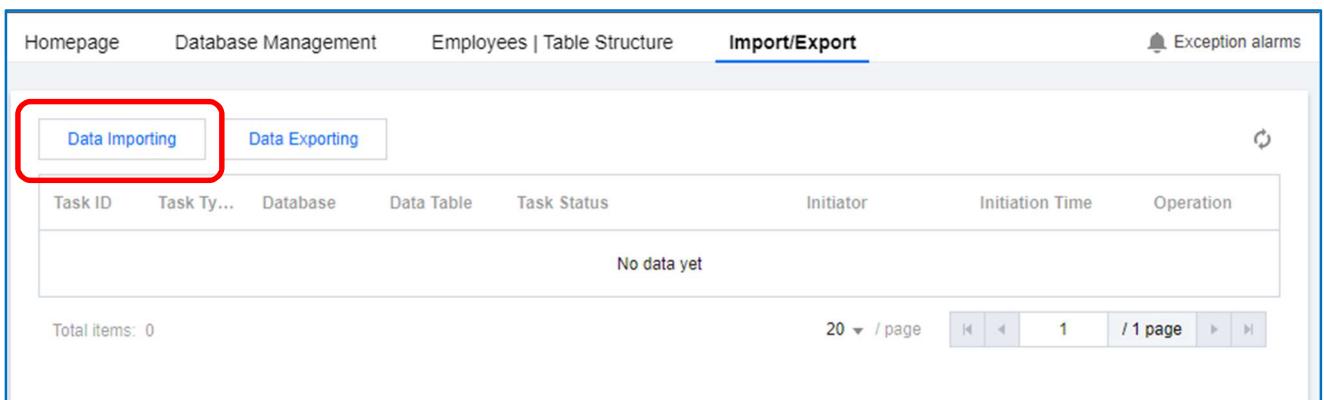
22. 페이지 상단의 메뉴 중 [Import/Export]를 클릭한다.



The screenshot shows the DMC (Data Management Center) interface. The top navigation bar includes 'Create', 'Database Management', 'Instance Monitoring', 'Instance Session', 'SQL Window', 'Import/Export' (which is highlighted with a red box), and 'Dbbrain'. Below the navigation bar, the title 'lab7-database-00' is displayed. The main content area is titled 'Employees | Table Structure' and shows the 'Column Info' tab selected. On the left sidebar, there are tabs for 'Table', 'View', 'Stored procedure', and 'Function', with 'Table' currently selected. Under 'Table', the 'employees' table is expanded, showing columns: emono, ename, job, mgr, hiredate, sal, comm, and deptno. The 'Index' tab is also visible under 'employees'. At the top of the main content area, there are buttons for 'Add', 'Delete', 'Insert', 'Move up', and 'Move down'. To the right is a table listing column details:

	Column Name	Type	Length	Remarks	Set to Null
1	emono	smallint			<input type="checkbox"/>
2	ename	varchar	10		<input type="checkbox"/>
3	job	varchar	9		<input type="checkbox"/>
4	mgr	smallint			<input checked="" type="checkbox"/>
5	hiredate	date			<input type="checkbox"/>
6	sal	float	7		<input type="checkbox"/>
7	comm	float	7		<input checked="" type="checkbox"/>
8	deptno	tinyint	1		<input type="checkbox"/>

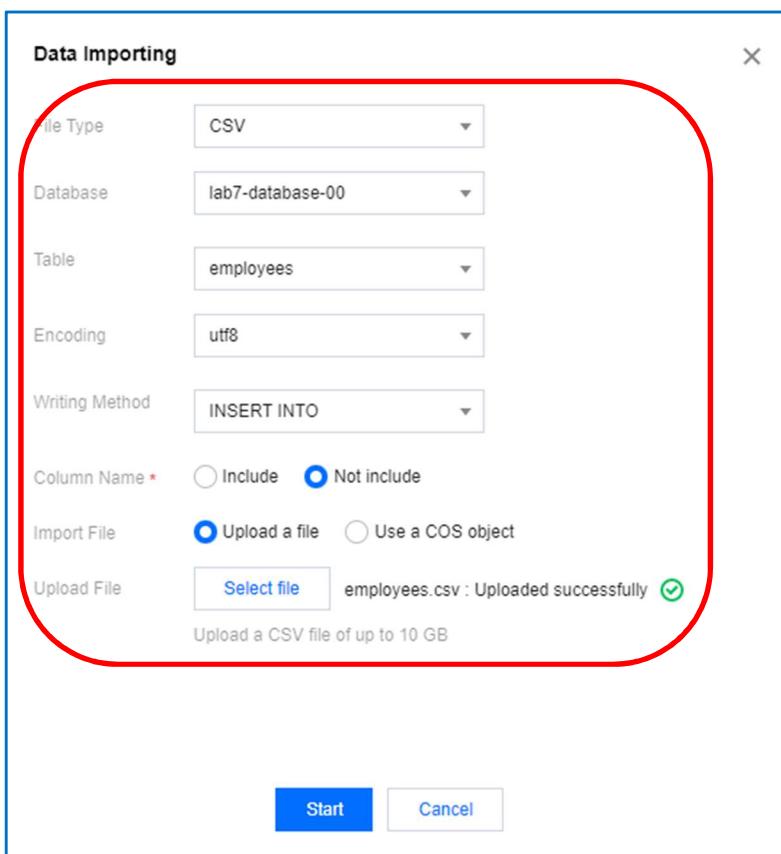
23. [Data Importing] 버튼을 클릭한다.



The screenshot shows the DMC interface with the 'Import/Export' tab selected. Below it, the 'Data Importing' button is highlighted with a red box. The main content area displays a table with columns: Task ID, Task Ty..., Database, Data Table, Task Status, Initiator, Initiation Time, and Operation. The message 'No data yet' is centered in the table. At the bottom, it shows 'Total items: 0', '20 / page', and a pagination control with pages 1 and 2.

24. [Data Importing] 창이 나타난다. 다음의 각 값을 설정하고 [Start] 링크를 클릭한다.

- ① [File Type] : CSV
- ② [Database] : lab7-database-XX(여기서 XX는 계정번호를 의미)
- ③ [Table] : employees
- ④ [Encoding] : utf8
- ⑤ [Writing Method] : INSERT INTO
- ⑥ [Column name] : Not include
- ⑦ [Import File] : Upload a file
- ⑧ [Upload File] : [Select file]을 클릭하여 employees.csv 파일을 선택한다.



25. 파일에 있던 데이터들이 정상적으로 Employees TABLE에 Import 되었다.

The screenshot shows the 'employees' table structure in the Data Modeler. The table has columns: empno, ename, job, mgr, and hiredate. The data consists of 14 rows:

empno	ename	job	mgr	hiredate
7369	SMITH	CLERK	7902	1980-12-17
7499	ALLEN	SALESMAN	7698	1981-02-20
7521	WARD	SALESMAN	7698	1981-02-03
7566	JONES	MANAGER	7839	1981-03-02
7654	MARTIN	SALESMAN	7698	1981-10-22
7698	BLAKE	MANAGER	7839	1981-05-01
7782	CLARK	MANAGER	7839	1981-09-06
7788	SCOTT	ANALYST	7566	1982-12-08
7839	KING	PRESIDENT	0	1981-11-17
7844	TURNER	SALESMAN	7698	1984-10-08
7876	ADAMS	CLERK	7788	1983-01-12
7900	JAMES	CLERK	7698	1981-12-03
7902	FORD	ANALYST	7566	1981-12-13
7934	MILLER	CLERK	7782	1982-01-25

26. 간단하게 Query 스크립트를 작성할 수 있다. 좌측의 Employees 테이블 오른쪽 [Operation] > [SQL operation] 을 클릭한다.

The screenshot shows the context menu for the 'Employees' table in the Data Modeler. The 'Operation' dropdown is open, and the 'SQL operation' option is highlighted with a red box. Other options in the menu include 'Edit table structure', 'View Table Info', 'View Table Creation Statement', 'Drop Table', 'Truncate Table', 'Rename', and 'Create'. The left sidebar shows the table structure with fields like empno, ename, job, mgr, hiredate, sal, comm, deptno, and indexes like PRIMARY.

27. 다음과 같이 Query 스크립트를 작성하고 [Execute] 파란색 버튼을 클릭하여 스크립트를 실행한다.

```
SELECT empno, ename, hiredate, sal  
FROM employees  
WHERE deptno IN(10, 20);
```

The screenshot shows the Oracle SQL Developer interface. At the top, there are tabs for 'Homepage', 'Import/Export', 'employees | Table Structure', 'employees | Edit Table', and 'lab7-database-00 | SQL'. A red box highlights the 'Execute' button, which is blue and has the text 'Execute' in white. To the right of the execute button are other buttons: 'Format Optimization', 'Execution Plan', 'Save', and a dropdown menu set to 'lab7-database-00'. On the far right, there are 'Recommended' and 'SQL Optimization' buttons, along with a bell icon for 'Exception alarms'.

In the main area, the SQL editor contains the following code:

```
1 SELECT empno, ename, hiredate, sal  
2 FROM employees  
3 WHERE deptno IN(10, 20);
```

To the right of the SQL editor is a sidebar titled 'My Template' with a search bar and a note 'No data'.

Below the SQL editor, there is a table titled 'Execution Result 1'. It has two tabs: 'Info' (disabled) and 'Execution Result 1' (selected). Underneath the tabs are 'Export data' and 'Refresh' buttons. The table itself has columns: 'empno', 'ename', 'hiredate', and 'sal'. The data rows are:

empno	ename	hiredate	sal
7369	SMITH	1980-12-17	800.00
7566	JONES	1981-03-02	2975.00
7782	CLARK	1981-09-06	2450.00
7788	SCOTT	1982-12-08	3000.00
7839	KING	1981-11-17	5000.00
7876	ADAMS	1983-01-12	1100.00
7902	FORD	1981-12-13	3000.00
7934	MILLER	1982-01-25	1300.00

At the bottom of the result pane, it says 'Page 1' and '10 条 / 页' with navigation arrows.

28. PuTTY 프로그램 즉 **lab7-webserver-XX(여기서 XX는 계정번호를 의미)**에서 연결한 터미널에서도 결과가
같게 나온다.

```
mysql> SELECT empno, ename, hiredate, sal
-> FROM employees
-> WHERE deptno IN(10, 20);
+-----+-----+-----+-----+
| empno | ename  | hiredate | sal    |
+-----+-----+-----+-----+
| 7369  | SMITH  | 1980-12-17 | 800.00 |
| 7566  | JONES  | 1981-03-02 | 2975.00|
| 7782  | CLARK  | 1981-09-06 | 2450.00|
| 7788  | SCOTT  | 1982-12-08 | 3000.00|
| 7839  | KING    | 1981-11-17 | 5000.00|
| 7876  | ADAMS  | 1983-01-12 | 1100.00|
| 7902  | FORD   | 1981-12-13 | 3000.00|
| 7934  | MILLER | 1982-01-25 | 1300.00|
+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

```
mysql> █
```