

Azure Data Service Fundamentals

Microsoft azure government (MAG) edition v.9

Scott Larson, Binh Cao | Azure Data Service Fundamentals | 11/29/2016

# Introduction

## Goal of this Course

This is a foundational, 101 level introductory course to using data services in the Azure Cloud platform. Some basic knowledge of Microsoft Azure is helpful but not required.

The goal of this course is to familiarize a technical audience, particularly database administrators and developers, on how to build, deploy, and manage relational databases in the Azure environment.

## Use of this training material

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Due to the rapid and fluid nature of the Microsoft Azure Cloud platform, the contents of this workbook may be different at the time of writing than compared to when the course based on the material is delivered. If you notice discrepancies, please help us keep the content up to date by providing feedback to your Microsoft Account Team.

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# Create A Resource Group

References:

* [*https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-overview*](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-overview)

1. Click on Resource Groups on left menu, Click Add
2. Name the Resource Group, select a subscription, and resource group location  
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# Create an Azure Virtual Machine SQL Server 2016 SP1 Gallery Image

Task:

* Create a Virtual Machine from a “Gallery Image”. This image will have SQL Server 2016 SP1 already installed.

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3. Select 2- Size, Browse the various options and note the # of cores and Memory. These are simply virtual machines hosted in the Microsoft Cloud. Select A6.  
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4. Select *3- Settings* For purposes of this lab, accept the default settings.

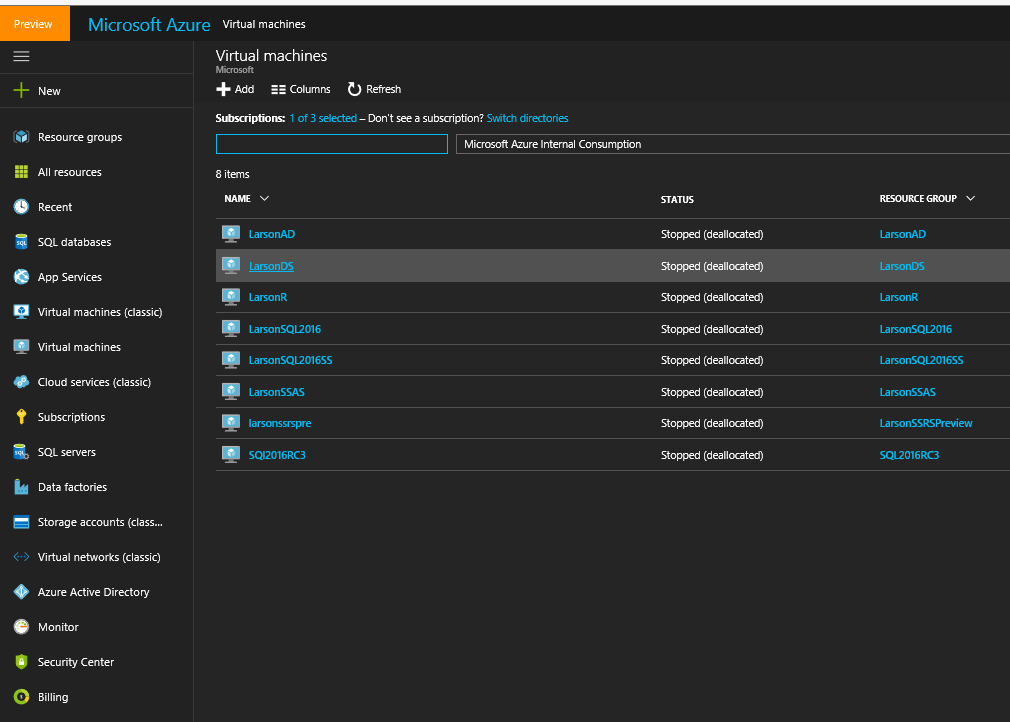
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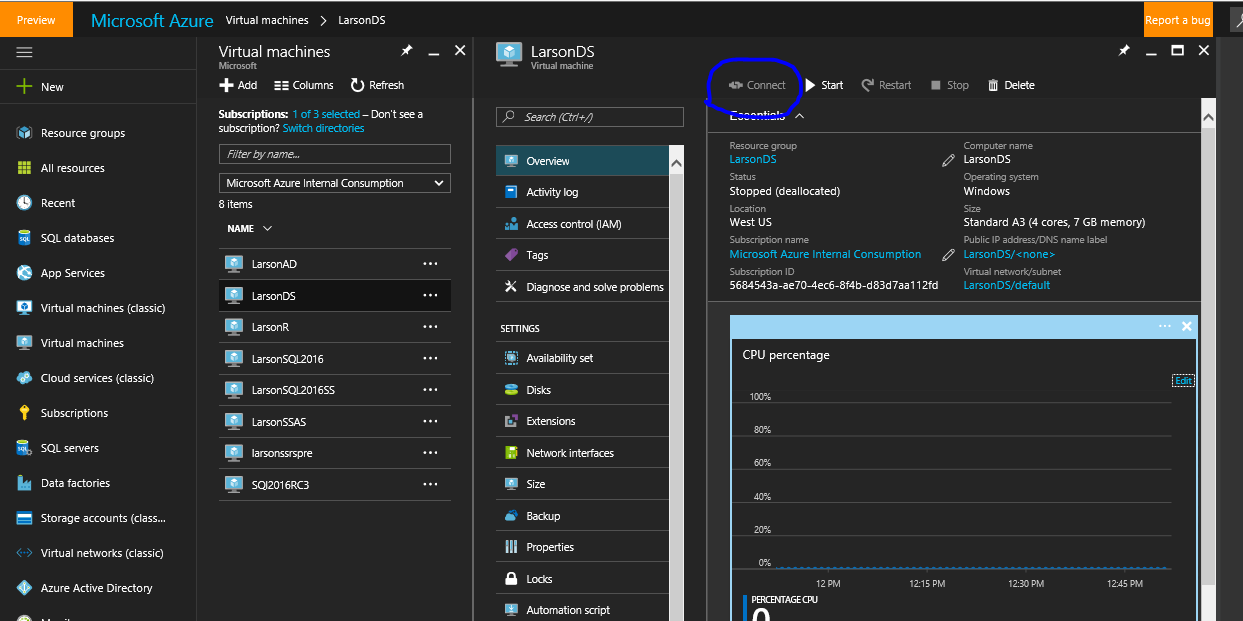
1. Select *4- SQL Server Settings* For purposes of this lab. Note the options and accept the defaults, Click Summary=>Create

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[SLIDES]

# Connecting to your Azure VM

1. Select Virtual Machines on the left menu, Select the VM you created in the previous step  
   
2. Click Connect, When Prompted Click “Open”. This will open a remote desktop session to your Virtual Machine in Azure



1. We will need to access the internet to download some assets. From Server Manager on your VM, Select IE Enhanced Security Configuration. Toggle Administrators to “Off”

Machine generated alternative text:
Server Manager Local Server 
Dashboard 
i Local Server 
ii All Servers 
File and Storage Services 
PROPERTIES 
For LarsonTempSQL 
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Windows Firewall 
Remote management 
Remote Desktop 
NIC Teaming 
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Operating system version 
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WORKGROUP 
Public: On 
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Microsoft Windows Server 2016 Datacenter 
Microsoft Corporation Virtual Machine 
Internet Explorer Enhanced Security Configuration 
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More about Internet Explorer Enhanced Security Confiauraton 
11/29/2016 PM 
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1. From your new Virtual Machine, Navigate to https://github.com/sslarson/titanic

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1. Click on Titanic.bak and Download to the C drive

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1. Click the Start Menu and Type “Management” to bring up Microsoft SQL Management Studio, and login using administrator credentials (it should just connect via Windows Security, since we used an administrator password)  
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   File and Storage Services 
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   Print Management 
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2. Right Click on Database and select Restore Database

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Import Data-tier Application... 
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Reports 
Refresh 

1. Be sure to change the location of the database files to F:\Data and F:\Log   
     
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   Windows Multimedia Platform 
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   Windows Photo Viewer 
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## Create a new SQL Azure Database (Platform As a Service)

1. Select SQL Databases from the left menu and Click Add  
   Microsoft Azur 
   Resource groups 
   All resources 
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   App Services 
   Virtual machines (classic) 
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   Cloud services (classic) 
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2. Name the Database, Use Existing Resource Group, Select Sample Database (Adventure Works V12)
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4. Select Server, and Select “Create a new Server”

Note: This isn’t a “Server” like a Virtual Machine is. This is just a logical representation for management purposes.  
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# [SLIDES – SQL Azure Service Levels, DTU)

Brief Tour of SQL Azure Database Settings  
1. Select SQL Databases from the left menu, Select your database, Select Overview

You will use “Server Name” to connect from SQL Management Studio in a later step

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Monitoring 
Resource utilization 
Performance 

1. Click “Show database connection strings”

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Refresh 
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ADO.NET driver for SQL server 

1. Connect to your SQL Azure Database from SQL Management Studio

If your desktop has SQL Management Studio, use that. If not, use SQL Management Studio on the Virtual Machine you created

Hover over the Server Name and click on the right icon to copy.

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1. Paste into SQL Management Studio connection dialog

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SQL Server Authentication 
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Connect 

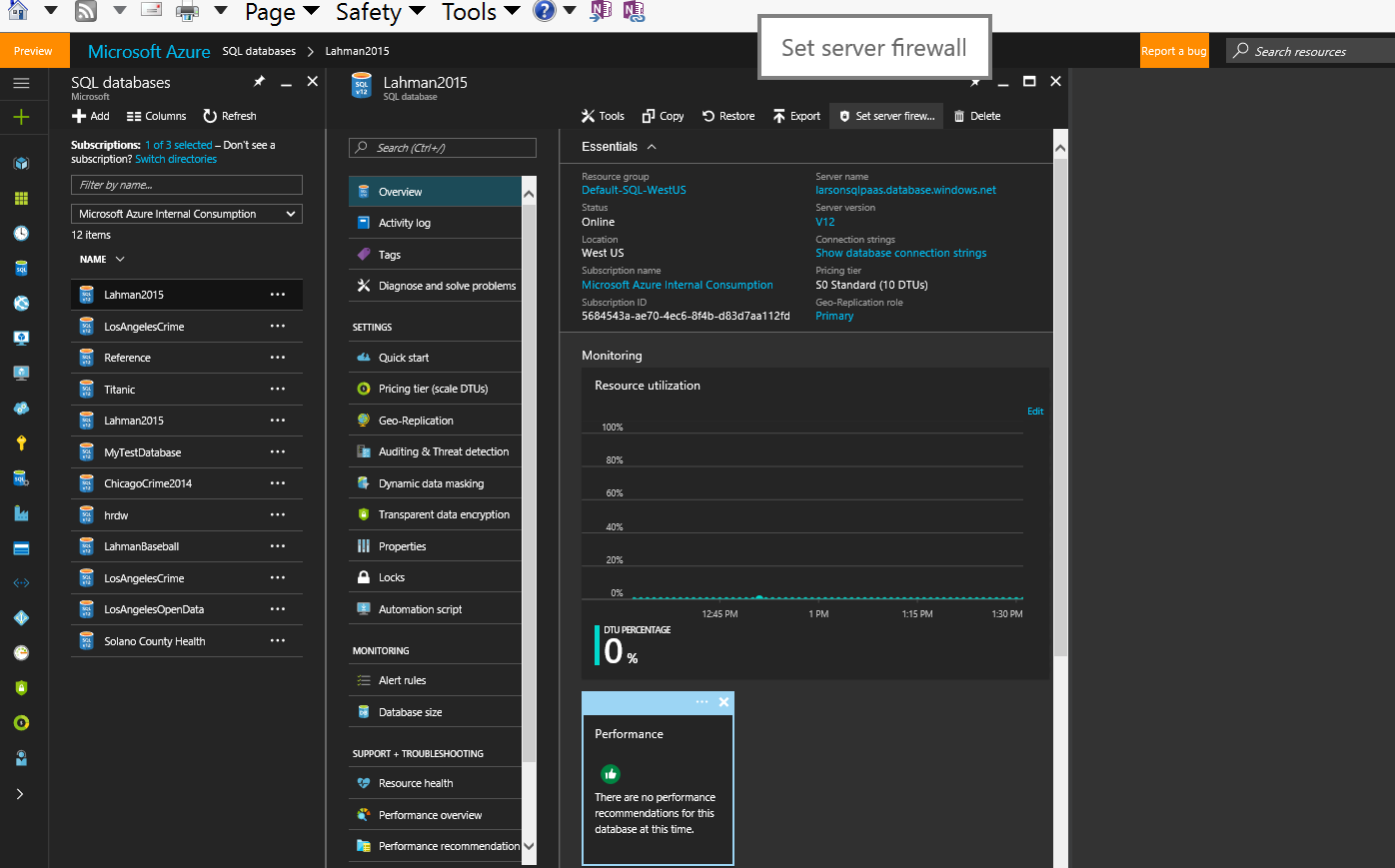
If you connected from your desktop you will probably get a firewall message. This is because, by default SQL Azure Database only allows access from resources within Azure.

If you connected from a VM you will not get this message, since that VM is in your Azure environment.

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New Firewall Rule 
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Login: 
pa 
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an Azura account and create a nawfirawall n-Jle to anable access. 
Azura account 
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Sign ln. 
firewall rule 
my client 1108.225.58.175} 
Add my subnet IP range 
From 108.225.56.0 
To 108.225.56.255 
Cancel 
•ons 

Note your Client I.P.

1. From your SQL Azure Database, select “Set Server Firewall”



1. Type in your Client IP (as shown in the SSMS firewall error dialog). Name the Rule
2. Click Save

Machine generated alternative text:
larsonsqltemp - Firewall 
Search (Ctrl*" 
Activity log 
Access ccntrol 0.4M) 
Tags 
X Diagnose and solve problems 
Firewall 
Lorvterm backup retention 
& Threat detection 
Save 
+ dient IP 
X Discard 
Connections from Ps belcw prwides access to all the databases in 
I arsonsqltemp. 
Allcnv access to Azure services 
Chent IP addræs 
108225.56175 
START 
108255.56175 
108255.56175 

1. Compare Properties of SQL in a VM vs. SQL Azure
2. In SSMS connected to the SQL Instance created when you created the Virtual Machine, Right Click on a database and browse the properties

Machine generated alternative text:
d 
Server Properties 
Select a 
G an aral 
Memory 
Security 
Connections 
Database Settings 
Advanced 
LARSONTEMPSQL 
Scnpt Help 
DefauH index fill factor 
Backup and restore 
Specfy ho',v long SQL Server Rill natt for a ne',v tapa 
Watt indafinttaly 
@ Try once 
Try for 
DefauH backup media retention On days) 
minute(s) 

1. Do the same from SSMS connected to the SQL Azure database

Machine generated alternative text:
Database Properties - LarsonTempSQL 
Select a 
Script 
Ganaral 
Options 
Change Tracking 
Pamissions 
Quay Store 
x 
Halp 
[Habase 
Name 
Status 
Owner 
Date Creatad 
Size 
Space Available 
Number of users 
Mairtenance 
Collation 
Normal 
Scott 
I l/2S/2016 PM 
258000.00 MB 
MB 
4 

# Optional: Connect to SQL Azure From Power BI Desktop

# Deploying an existing database to SQL Azure Database

1. From SQL Management Studio in your Virtual Machine, connect to the SQL Instance that was created with the VM.
2. Right click on the Titanic Database (the one you restored earlier), Select “Deploy Database to Microsoft Azure SQL Database”

Execute Debug 
Object Explorer 
Connect • 
LARSONTEMPSQL (SQL server 130.4001.0- LARSONTEMPSQL\Scott) 
D Databases 
System Databases 
Database Snapshots 
SQLQueryI .sql 
—SELECT 
Script for Select TopURows command from SSMS 
TOP Iøøø [Passengerld) 
, [Sut•.'ived) 
, CPcIass) 
, [Name) 
, [Sex) 
, [Age) 
, CSibSp) 
, [Parch) 
, [Ticket) 
, [Fare) 
itanic) 
Secui 
Server 
Repli 
Poly 
New Database... 
New Query 
Script Database as 
Tasks 
Policies 
Facets 
Start PowerSheII 
Reports 
Rename 
Delete 
Refresh 
Properties 
Detach... 
Take Offline 
Bring Online 
Stretch 
Encrypt Columns... 
Shrink 
Back Up... 
Restore 
Mirror... 
AlwaysOn High Availability 
Management 
Integration Services Catalogs 
SQL Server Agent (Agent XPs disabled) 
larsonsqltemp.database.windows.net (SQL Server 12.0 
Launch Database Mirroring Monitor... 
Ship Transaction Logs.. 
Generate Scripts... 
Generate In-Memory OLTP Migration Checklists 
Extract Data-tier Application... 
Deploy Database to Microsoft Azure SQL Database... 
Deploy Database to a Microsoft Azure VM... 
Export Data-tier Application... 
Register as Data-tier Application... 
Upgrade Data-tier Application... 
Delete Data-tier Application... 
Import Data... 
Export Data... 
Copy Database... 
Manage Database Encryption... 
8raund Mr Owen Hams 
Cumngs. MB John Bradley (Florence 8nggs Thay 
Haikkjnan. Miss Laina 
Futrelle. MB Jacques Heath (Lib' May Peel) 
Alan Mr William Henry 
Moran Mr James 
McCarthy Mr Timothy J 
Palsson. Master Gosta Leonard 
Johnson MB Oscar W (Eisabeth Vilhalmina Berg) 
Nasser. MB Nicholas (Adele Achem) 
Sandstrom. Miss Marguerite Rut 
80nneII Miss Elizabeth 
Saurdercock. Mr William Henry 
Andersson Mr Anders Johan 
Vestrom. Miss Hulda Amanda Adotfina 

1. At the dialog, click Connect and type in your credentials to the SQL Azure Server created earlier, click finish

Object Explorer 
Connect • 
LARSONTEMPSQL (SQL server 13.04001.0 
O [Z Databases 
System Databases 
D Database Snapshots 
Titanic 
D Database Diagrams 
Tables 
System Tables 
FileTabIes 
External Tables 
dbo.Titanic 
Views 
External Resources 
Synonyms 
Programmability 
Service Broker 
D Storage 
Security 
Security 
Server Objects 
Replication 
Poly8ase 
AlwaysOn High Availability 
Management 
Integration Services Catalogs 
SQL Server Agent (Agent XPs disabled) 
LARSONTEMPSQL\Scott) 
SQLQueryI .sql 
—SELECT 
F ROM 
Script for SelectTcpNRows command 
TOP Iøøø [Passengerld) 
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f rom 
ssms 
, [PCI 
, [Sex) 
, [Age) 
, [Sib 
c Tic 
, CFar 
, [Cab 
, (Emb 
Deploy Database 'Titanic' 
Deployment Settings 
Introduction 
Deployment Settings 
Summary 
Results 
Connect to Server 
Sarver type 
Server name 
SQL Server 
Database Engine 
larsonsqttamp database windows.nat 
SQL Server Authentication 
Remember password 
Passen garld 
larsonsqltemp.database.windows.net (SQL Server 12.0.2DDO.8 
- Scott) 
Service Objective 
Other settings 
Temporary file name: 
Help 
Database server 
k Connect to login 
Connect... 
Browse... Machine generated alternative text:
L Hassenger 
, [Sut•.'ived) 
, [PCI 
column Pclass(smallint, null) 
, [Age) 
, [Sib 
c Tic 
, CFar 
, [Cab 
, (Emb 
FROM [Tit 
Passen gerld 
Summary 
Introduction 
Deployment Settings 
Summary 
Results 
Help 
Verify Specified Settings 
To complete the operation using the specfied settings, click Finish. 
Source 
Name: LARSONTEMPSQL 
Connected as: LARSONTEMPSQL\Scott 
Database: Titanic 
Source Database Size: 16.0 MB (Note that the deployed database might be larger than 
[4 Target 
Name: larsonsqltemp 
Connected as: Scott 
Database: Titanic 
Edition: Basic 
Maximum Database Size: 2 G8 
Service Objective: Basic 
Environment 
Temporary File Location: 
Size available for temporary file: 98.8 G8 
Previous 
Finish 
Cancel 

# Manually scaling Virtual Machines and SQL Azure Databases

1. Virtual Machine: Select your virtual machine, Select Size, and choose a new size. It will scale on the fly.

Machine generated alternative text:
v page v 
Virtual machines > 
Safety v Tools v 
LarsonTempSQL > Choose a size 
Home (Alt+M) 
56 6B 
Reportabug 
p Search resources 
LarsonT... 
Search (CM+D 
Availability set 
Network interfacæ 
Backup 
SQ_ Server configuration 
P ropertiæ 
a Locks 
Automation script 
SCHEDULES 
Alert rulæ 
settings 
X 
Choose a size 
Prices presented are estimates in ya_jr local curreng that include only Azure infrastructure costs and 
any discounts for the subscription and location. The prices indude any software 
Notifications 
scottlar@microsoft.co... 
ismiss al 
(0) 
Virtual machines 
+ Add 
Columns C.) Refresh 
I of 3 selected — see a 
subscriptim? 9.'Jitch directories 
filter by namem 
Microsoft Azure Internal Consumption 
9 items 
LarsonSCU016 
LarsonSCU016SS 
LarsonTempSQ_ 
SQ2016RC3 
Resizing virtual machine Runnirg 
Resizing virtual machine • LarsonTempSQL' to size ' Standard 
updated server firewall rul.„ 9:55 
Successfully updated firewall rules for server. larsonsqlternp 
Successfully updated server firewall rul.„ 9:54 
Successfully updated firewall rules for server. larsonsqlternp 
3.5 
8 
28 
Data disks 
sso 
98.95 
usDNONTH (ESTIMATED) 
Chta disks 
Max lops 
sso 
2 
7 
16 
Core 
MM ops 
100 
ssD 
Load balancing 
197.90 
uso,'MCNTH 
Cores 
lops 
800 
ssD 
Load balancing 
4 
14 
2 
14 
Chta disks 
Max lops 
sso 
395.06 
usDNONTH (ESTIMATED) 
63 
Chta disks 
4x5m 
Max lops 
sso   
  
2. SQL Azure: Select your SQL Database, Select Pricing Tier, click Select.

Machine generated alternative text:
X 
(0) 
databases 
Columns 
Refresh 
I of 3 selected — see a 
jscriptim? 9.'Jitch directories 
"Iter by name 
licroson Azure Internal Consumption 
items 
LosAngeIesCrim e 
Titanic 
MyTestDatabase 
Titanic 
ChicagoCrime2014 
Lahman3asebaII 
LosAngeIesCrim e 
LosAngeIesOEk•n Data 
Solano Health 
LarsonT... 
SQL data 
Search (CM+D 
Activity 
Tags 
solve problerns 
Quick start 
Pricing tier (scale DTUs) 
Geo-Replicati&l 
Auditing & Threat detection 
Dynamic data masking 
Transparent data encyption 
P ropertiæ 
a Locks 
Automation script 
Alert rules 
Database size 
suppcRT + TRCRJBLESHCOTING 
Resource health 
Perfumance met-view 
Perfumance recommendabon 
Change your pricing 
up a 
ce witin 
3,720.00 
uso,voNTH ESTIMATED 31 PO 
SO Stand 
7,000.11 
I Standar 
15,999.97 
uso,voNTH ESTIMATED 31 
Standa 
10 
DTUs 
up to 250 
Geo - Rea ication 
Point In Tink Restore... 
15.00 
20 
5 
DTUs 
up to 250 G 
Replication 
Point In Time Restorem 
Auditing 
30.00 
DTUs 
up to 263 
Replication 
Point In Time Restorem 
Auditing 
4.99 
50 
DTUs 
up to 250 
Geo - Rea ication 
Point In Tink Restore... 
75.02 
usDNONTH ESTIMATED 31 
S3 Standard 
usDNONTH ESTIMATED 31 sa 
100 
DTUs 
up to 250 
Geo - Rea ication 
Point In Tink Restore... 
Avilable only for latem 
150.00 
usDNONTH ESTIMATED 31 S3 

# Deleting everything we just created

1. From left menu, select “Resource Groups”, select your resource group, select Delete. You must type in the resource group name to confirm. You can NOT undo deleting a resource group.

Machine generated alternative text:
Microsoft Azure 
Resource groups 
ion'tsee a 
(0) 
Resource groups 
All resources 
Recent 
SQL databases 
App Services 
Virtual machines (classic) 
Virtual machines 
Cloud services (classic) 
Subscriptions 
SQL servers 
Data factories 
Storage accounts (class.„ 
Virtual networks (classic) 
Azure Active Directory 
Monitor 
Security Center 
Billing 
Help + support 
More services 
> Larson TempRG 
> Are you sure you want to delete "LarsonTempRG" . 
LarsonTempRG 
port a 
Search rescwrces 
x 
Noti 
+ Add 
Essentials 
C&umns 
Delete 
Refresh 
Move 
p Search CM D 
0 
Activib' log 
Access control (I AM) 
Tags 
SETTI'GS 
u ickstart 
Deploym ents 
Properties 
Locks 
Automation script 
MCNTCRING 
Alert rules 
logs 
Application insights 
Log analytics (OMS) 
Log search 
suppcRT TROUBLESHOOTI% 
New support request 
Microsoft Azure Internal Consumption 
2 Succeeded 
Filter name. 
12 items 
I arsmsqltemp 
LarsonTempSQL 
TitaNc 
I arsontemprgdiag411 
I arsontemprgd isks164 
LarsonTempRG 
LarsonTempSQL 
aasExtension 
I arsontempsq1743 
LarsonTempSQL- ip 
LarsonTempSQL-nsg 
s hutdown-conv utevm - LarsonTempS• 
5684543a-ae70-4ec6-8f4b-d83d7aa 1 1 2fd 
west US 
SQ_ database 
SQ_ database 
Storage account 
Storage account 
Virtual netv.ork 
Virtual machine 
Microsoft. Co m pute„. 
Network interface 
Public IP 
Network security gr... 
Microsoft. k'TestL„ . 
Are you sure you want to delete "LarsonTempRG"? 
Waming! Deleting the •LarsonTempRG" resource group is irreversible. The action you •re 
about to take cant undone. further Will delete this resource group and all the 
resources in it permanently. 
TYPE THE RESOURCE GROUP NAME. 
LarsonTem pRG4 
Affected resources 
There are 12 resources in this group that be deleted. 
west US 
west US 
west US 
west US 
LarsonTempSQL 
Sq' la as Extension 
sh utdown-computevm - LarsonTernpS( 
I arsontempsq1743 
La rsonTem pSQI— nsg 
La rsonTem ip 
La rsonTemøRG-vnet 
I arsonsqltemp 
LarsonTempSQL 
larsontemprgdiag411 
larsontemprgdisks 164 
VI 2.0,user 
VI 2.0,user 
Virtual machi„. 
Microsoft. De.. 
Network inte... 
Network sec... 
Public IP add.„ 
Virtual netw... 
SQL database 
SQL database 
Storage acco. 
Storage acco. 