



# Deployment guide for AWS

Version 2.0

18 October 2024



## Deployment guide AWS

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BNS Group would like to thank the following people and organizations for making BNS Enterprise SMS Server a world class product:

- To all our staff and their families for working tirelessly to deliver world class products.
- Messaging and Collaboration team Suncorp Group
- Amazon Web Services ISV partner team for assisting BNS with technical foundation technical reviews and achieving the AWS RDS Service ready designation.

# SECTION 1 Introduction

BNS Enterprise SMS Server was previously known as msXsms Enterprise SMS server. Product rebranding in March 2023 was necessary as BNS re-engineered the software for the cloud. Significant re-engineering effort was focused on recovery with AWS RDS MS SQL Server in multi-AZ.

BNS Enterprise SMS Server is a scalable secure SMS text messaging software solution deployed in your own cloud tenancy or your own datacentre. The SMS Server uses SMS industry standards to send SMS messages to a variety of SMS service providers using industry standard SMPP\TLS encryption over the Internet.

Applications can send SMS using SQL or email as the interface to the SMS Server platform. Users can send SMS messages using internal email from their email client such as Microsoft Outlook.

Microsoft SQL Server is used to store SMS data for: data analytics, controls, compliance and audit.

A powerful Microsoft PowerBi data analytics module is provided to analyse meta-data provided by applications or simply provide insights into the use of SMS within the enterprise.

Receiving SMS messages is supported delivering SMS messages to applications and users via email or a SQL database. Routing of inbound SMS is based on the receiving SMS number at the SMS Server.

High availability is provided at all 3 layers of the solution including:

- Platform layer Azure\AWS (SQL High availability)
- Application layer (SMS server level)
- SMS service provider layer (SMS Delivery)

The solution allows a choice of SMS service providers allowing the best per SMS message rate from a list of tested SMS service providers. Changing providers is possible allowing you to negotiate the best possible rate. Without using a solution like BNS's enterprise SMS server means you would use a proprietary REST API from a single provider making it difficult to change and difficult to negotiate per message rates.

The solution allows for primary and backup SMS service providers allowing redundancy at service provider level. If the SMS server cannot reach the primary SMS service provider the SMS server will automatically failover to the backup SMS service provider for a period of time. Switching back to the primary SMS

service provider is also automatic after communication is restored to the primary SMS service provider.

Extensive testing and verification in AWS provides enterprise customers the confidence that the SMS Server software meets cloud high availability, security and design compliance.

The SMS Server software was awarded 2 software badges as part of the AWS ISV accelerate program. AWS Foundation Technical Review (AWS verified software) and AWS RDS service ready badge.



AWS ISV Partner path program is a set of useful tools, insightful resources, advanced technologies, and the best practices that may be used by development companies such as BNS in the process of creating cloud-based software for their customers.

BNS achieved the AWS qualified software badge in 2022 after extensive work with AWS to undertake a foundation technology review which is part of the AWS ISV Partner path program.

February 2023. BNS achieved the much higher technical designation for AWS RDS Service Ready.

The AWS Service Ready Program is designed to validate software products built by AWS Partners that work with specific AWS services. These software products are technically validated by AWS Partner Solution Architects for their sound architecture and adherence to AWS best practices, and market adoption including customer successes.

<https://aws.amazon.com/partners/programs/service-ready/>

## 1.1 Terminology

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### SMPP

[SMPP - Short Message Peer-to-Peer Protocol](#)

The SMPP (Short Message Peer-to-Peer) protocol is an open, industry standard protocol designed to provide a flexible data communications interface for the transfer of short message data between the SMS Server software and a Message Centres, hereinafter referred to as a SMS Service provider.

The SMS Server software implements version 3.4 of the SMPP standard and has been tested with a number of SMS Service providers. Not all SMS Service providers implement all options within the standard. It is important that the customer selects a supported SMS Service provider which implements the required options in the standard.

SMPP over TLS is used to encrypt communications of SMS messages between the customer's AWS tenancy and the SMS Service provider over the Internet.

### SMSC

SMS Message Centre. Is a SMS Service provider supporting SMPP and which has been tested by BNS.

### AWS AZ & Multi-AZ

Amazon Web Services availability zone. Availability Zones are distinct locations within an AWS Region that are engineered to be isolated from failures in other Availability Zones.

### AWS RDS

Amazon Web Services Relational Database Services

## 1.2 Features and use cases

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Enterprise customers who are modernising their applications for the cloud can implement a SQL Server based SMS interface for all business processes requiring a secure highly scalable solution from their cloud tenancy.

BNS Enterprise SMS server software is an enterprise-grade SMS solution that consolidates different messaging requirements across multiple companies and departments to a single robust, reliable and scalable messaging platform allowing better cost management, compliance and controls.

Customers like Suncorp Group implemented BNS's SMS software in 2009 as it re-engineered and consolidated multiple brands within the group. Brands such as: Suncorp Insurance, Suncorp Bank, AAMI, GIO, Vero and Shannons use the software because it provides multiple brands the ability to use shared infrastructure with high availability and a rich set of features.

All SMS communications are logged and stored within the customer's cloud tenancy using Microsoft SQL Server.

Applications simply write their SMS requests into a SQL Database (SMS-SQL-API) to send and receive SMS messages to/from mobile phones.

Applications periodically process confirmations of their SMS messages and process any incoming messages at the same time.

Multiple applications are supported using a single interface SQL database with row level security.

The SMS software uses industry standards SMPP protocol to communicate with SMS Service providers supporting industry standard version 3.4

Benefits of using the SMS software include:

- Easily on-board business applications with minimal coding.
- Your business applications use SQL server in cloud or on-premises to send and receive SMS.
- Avoids any future re-programming should the underlying SMS provider change.
- Avoids using proprietary REST APIs unique to a single SMS provider.
- Avoids developing high availability controls to multiple SMS service providers.
- Allows production to DR failover of SMS traffic within a region.
- Allows multiple SMS providers to be supported for high availability at the SMS provider level.

- Primary and backup SMS providers are switched automatically without any application changes if there is a loss of communications to a primary SMS service provider.
- Industry-standard SMPP implementation at the SMS server supports many SMS service providers allowing best possible contract rates to be negotiated.
- Controls such as checking for duplicate messages to the same mobile over a 24 hour period is configurable at a server level.

## 1.3 AWS deployment options

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### 1.3.1 Single-AZ

Deployment in a single AZ requires a minimum of 1 x SMS Server and 1 x AWS RDS service with either: Microsoft SQL Express or Microsoft SQL Server (Standard or Enterprise).

Multiple SMS Servers can be deployed in a single AZ providing high availability of the SMS server software in a single AZ.

For more information refer to section 4.3

### 1.3.2 Multi-AZ

Deployment in multiple AZ requires a minimum of 2 x SMS Server (1 in each AZ) and 1 x AWS RDS service with Microsoft SQL Server Enterprise.

For more information refer to section 4.4

### 1.3.3 Multiple VPC with EC2 instance in one VPC and Database in another VPC

When your DB instances are in a different VPC from the EC2 instance you are using to access it, you can use VPC peering to access the DB instance.

A VPC peering connection is a networking connection between two VPCs that enables you to route traffic between them using private IP addresses. Resources in either VPC can communicate with each other as if they are within the same network. You can create a VPC peering connection between your own VPCs, with a VPC in another AWS account, or with a VPC in a different AWS Region.

For more information refer to

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER\\_VPC.Scenarios.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_VPC.Scenarios.html)

### 1.3.4 Multi-Region

Multiple region design requires separate deployments of the platform with regional based SMS Service providers.

Key considerations for using a local SMS Service provider is lower latency for SMPP communications (SMS traffic).

## 1.4 AWS services used by the software

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The following AWS services are required as a minimum:

- EC2 windows server instance(s). OS only no SQL on the Windows Server.
- RDS MS SQL Server or MS SQL Express for a simple installation

### AWS Services

#### **Amazon EC2**

The Amazon Elastic Compute Cloud (Amazon EC2) service enables you to launch virtual machine instances with a variety of operating systems.

#### **Amazon RDS**

Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database such as Microsoft SQL Server in the cloud.

#### **Amazon VPC**

The Amazon Virtual Private Cloud (Amazon VPC) service lets you provision a private, isolated section of the AWS Cloud where you can launch AWS services and other resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.



# 1.5 Licensing and cost models

## 1.5.1 AWS Costs - getting started with a single-AZ

<https://aws.amazon.com/ec2/pricing/>

<https://aws.amazon.com/rds/pricing/>

### SMS Software hosted on EC2 instance

EC2 instance type t3.2xlarge is recommended to host the SMS software.

Cost per month with a 3 year reservation plan is USD279 per month.

The screenshot displays the AWS Pricing Calculator interface. At the top, it says 'aws pricing calculator' and 'Successfully added Amazon EC2 estimate.' The main section is titled 'My Estimate' and shows a summary of costs:

- Upfront cost: 0.00 USD
- Monthly cost: 279.08 USD
- Total 12 months cost: 3,348.96 USD (Includes upfront cost)

Below the summary is a table of resources:

Service Name	Status	Upfront cost	Monthly cost	Description	Region
Amazon EC2	-	0.00 USD	279.08 USD	-	Asia Pacific (Sydney)

## AWS RDS MS SQL Express

SQL Express in most cases will be sufficient for a startup business with a small deployment in a single-AZ.

**Cost per month without any savings plans = estimated without taxes USD82 per month.**

Successfully added Amazon RDS for SQL server estimate.

AWS Pricing Calculator > My Estimate

**My Estimate** [Edit](#) [Add service](#) [Add support](#) [Add group](#) [Clear estimate](#) [Export estimate](#) [Share](#)

**Estimate summary** [Info](#)

Upfront cost	Monthly cost	Total 12 months cost
0.00 USD	82.05 USD	984.60 USD

**Getting Started with AWS**

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Services (1)

**Amazon RDS for SQL server** [Edit](#) [Action](#)

Description: SQL Express single-az  
Region: Asia Pacific (Sydney)

**RDS for SQL server**

Storage for each RDS instance (General Purpose SSD (gp2)), Storage amount (10 GB), Number of nodes (1), Instance type (db.t5.medium), Utilization (On-Demand only) (100 %Utilized/Month), Deployment option (Single-AZ), License (License included), Database edition (Express), Pricing strategy (OnDemand), Additional backup storage (50 GB)

Monthly:	82.05 USD
Upfront:	0.00 USD

Acknowledgement  
AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services. [Learn more](#)

### 1.5.2 SMS server licensing from BNS Group

Enterprise licensing options are available from BNS group ([www.bnsgroup.com.au](http://www.bnsgroup.com.au)). A usage based model is typically used by enterprise to allow for unlimited scale of the SMS platform and monthly billing.

### 1.5.3 SMS Service provider costs

Usually this cost is an operational monthly cost based on usage with some fixed costs per month for items such as SMS Numbers for two-way SMS.

## 1.6 Time to complete deployment

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### 1.6.1 Single-AZ

Software setup can be performed on a single Windows Server EC2 instance in a few days if all aspects of the project are well organized.

Planning takes time to ensure a well architected design.

### 1.6.2 Multi-AZ

Software setup can be performed in a multi-AZ Windows Server EC2 instance in 5 days if all aspects of the project are well organized.

Planning takes time to ensure a well architected design.

## 1.7 AWS Regions supported

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BNS supports its software in Australia. Currently there are 2 regions:

- Sydney ap-southeast-2
- Melbourne ap-southeast-4

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ⓘ The software can run in other AWS regions with consideration to SMPP latency to SMS service providers in that region which have to be tested. Contact BNS if you would like to deploy in other regions.

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## 1.8 Administrator and Developer KB

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Refer to the public KB. <https://smskb.bnsgroup.com.au/admin-guides>

Refer to the public KB. <https://smskb.bnsgroup.com.au/sqlinterface>

## 1.9 Upgrading from previous releases

Version upgrades are documented in the SRN for each release.

Refer to <https://smskb.bnsgroup.com.au/release-notes>

Version history <https://smskb.bnsgroup.com.au/version-history> (1.7.33)

Version history [Version History \(version 2+\) \(bnsgroup.com.au\)](https://bnsgroup.com.au) (2.x)

## 1.10 Worksheet for New Installations

Item	Value / comments
SMS production server name	
SMS production IP address	
Active Directory Domain or workgroup	
SMS service provider SMPP Account login details	
SMS service provider IP Addressing	This is in the boot.ini file firewall rules for outgoing connections.
SMS service provider connection port number	This is in the boot.ini file firewall rules for outgoing connections.
SQL Server connection string including “,port number”	
SQL Port number	
SQL server login (Windows Authentication or Local SQL User)	
Office 365 or equivalent SMTP user credentials for delivery of error messages to administrators.	User email address =  If public DNS is not available in your zone the software can be configured to use an IP address of an internal SMTP server.
Email address for alerting IT staff	
Mobile numbers to be used for the in-built health service	
Servers to be used for bid control to the SMS-SQL-API database	Server1= Server2=

Provisioning guides for AWS EC2 and RDS SQL Server	See links below.
--	------------------

<https://aws.amazon.com/ec2/getting-started/>

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_GettingStarted.CreatingConnecting.SQLServer.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.CreatingConnecting.SQLServer.html)

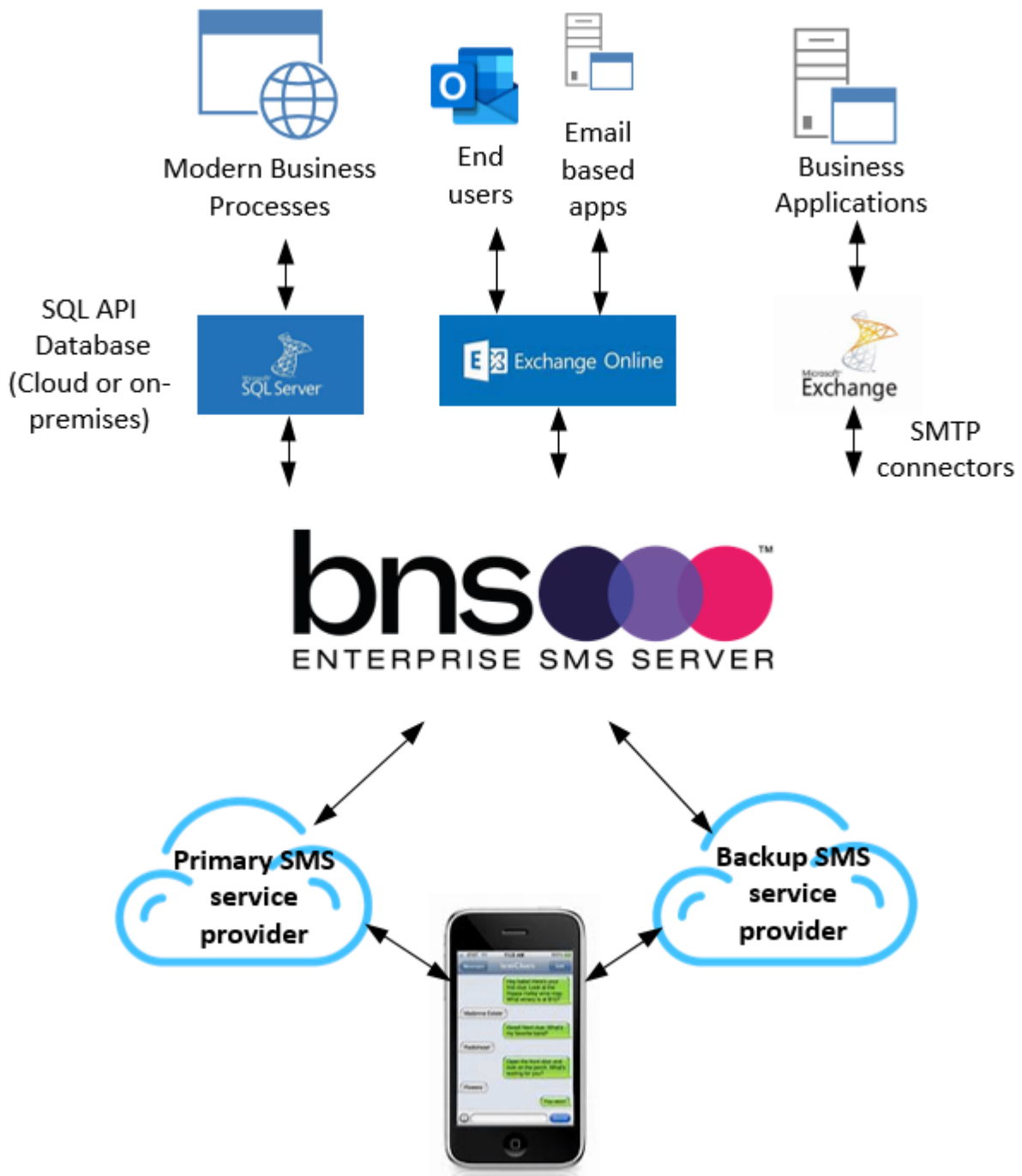
## 1.11 Checklist for New Installations

This checklist provides you with a list of tasks which must be completed by most customers installing the solution for the first time. Take a copy of this checklist and work your way through this deployment guide.

High level task list	Comments
Infrastructure requirements and firewall rules	
Obtain SMPP credentials from a certified SMS Service provider	
Preparing your SMS server	
Installation Folders	
Setup of SMS Databases in SQL Server	
Install SMS Console	
Installing the SMS Windows Services	
Starting Services	
Configuration in SMS Console	
Test Tool	
Health Service	
Establish your support internal and external support arrangements	
Review Knowledge base <a href="https://smskb.bnsgroup.com.au">https://smskb.bnsgroup.com.au</a>	

# SECTION 2 Overall architecture

## 2.1 Conceptual overview diagram



Refer to the public KB. <https://smskb.bnsgroup.com.au/admin-guides>

Refer to the public KB. <https://smskb.bnsgroup.com.au/sqlinterface>

## 2.2 SMTP Email based applications

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BNS Enterprise SMS Server continues to support customers with on-premises \in-tenancy Exchange based systems where applications and users send and receive via SMTP Connectors within the Exchange Email system.

As customers migrate their work loads to AWS, they are modernizing their approach to high availability and scalability in the cloud.

BNS recommends that customers using SMTP consider migrating to use the new SQL interface as the API rather than SMTP.

## 2.3 SQL API

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The solution supports an SQL as an application programming interface (API) allowing customers to use SQL as a method to send and receive SMS messages. SQL itself is the API.

Application developers probably use SQL already. SQL offers organisations a secure and high availability platform for fast processing of SMS content delivery.

SQL allows rich data analytics to be used leveraging meta data held in your database for every SMS transaction.

Using SQL is recommended for high performance large volume SMS transactions.

## 2.4 End users and Outlook

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Microsoft Outlook coupled with Office 365 Exchange online is popular for enterprise customers.

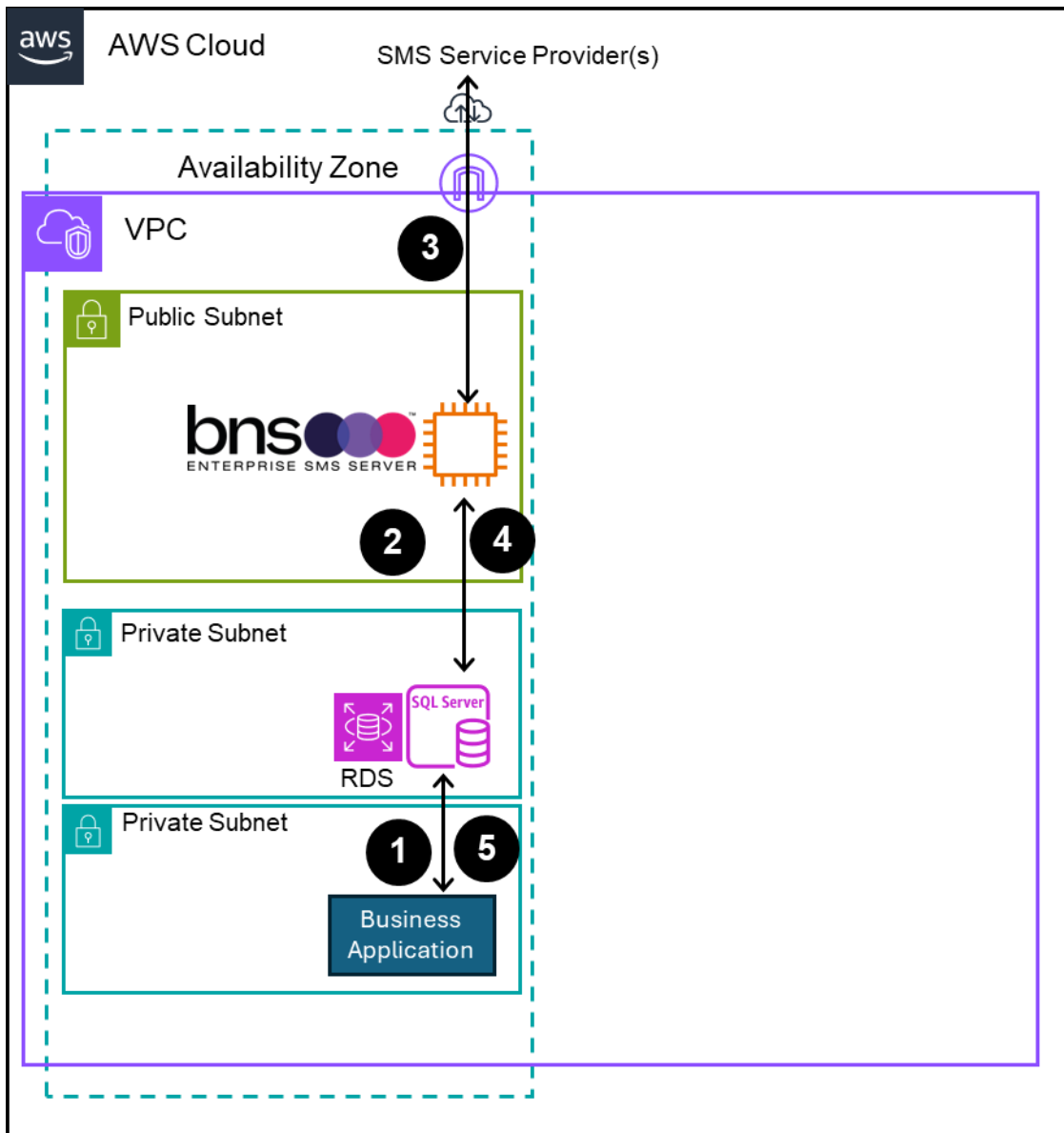
BNS Enterprise SMS Server supports Microsoft's recommendations to use the Microsoft Graph API when developing any application working with their cloud based solutions.



Selected end users or shared mailboxes can be offered one-way or two-way SMS messaging from Office 365.

# SECTION 3 Architectures – Email and SQL interfaces

## 3.1 Simple design SQL API Architecture



A simple design uses:

- 1 x AWS availability zone
- 1 x RDS Microsoft SQL Server. Version 2019 and 2022 has been tested.
- 1 x EC2 t3.2xlarge windows server in a public subnet. Windows server 2016, 2019, 2022 or better
- 1 x elastic fixed public IP is **optional** depending on SMS Service provider and your own security needs.

- 1 x SMPP Account with a SMS Service provider which BNS has tested with.
- 1 x AWS RDS Microsoft SQL Server Database Service
- License and service agreements with BNS Group and SMS Service provider

### AWS EC2 instance sizing

EC2 instances T3.2XLarge is recommended for large enterprise.

### AWS RDS SQL Server sizing

Refer to section 1.5.1 for sizing of RDS Database service.

### Windows Domain

EC2 SMS Windows server can be in an Active Directory domain or standalone server in a workgroup.

## SQL permissions

The SMS Server software can use Windows authentication or SQL Local user authentication to access Microsoft SQL Server.

Notes:

1. Business applications are pre-registered in the SMS platform.
2. Customer can use a single SMS service provider in this design.
3. Business applications are responsible for processing their own SMS data from the SMS-SQL-API Database. Each business application has its own ID to identify which transactions belong to their application. Microsoft SQL Server row level security is supported.

## Process Steps numbered 1 to 5

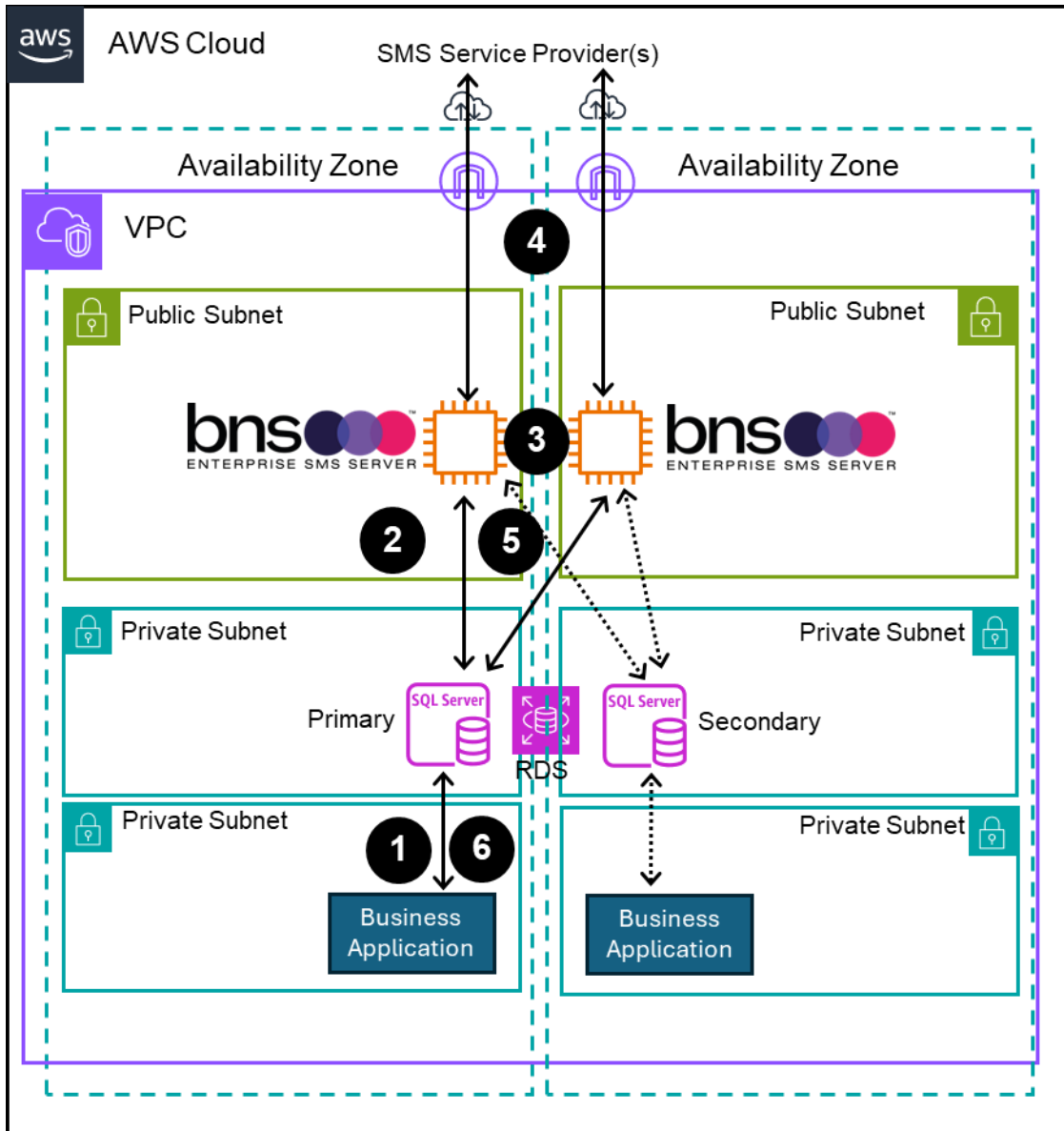
1. Business application writes a record into a database SMS-API-INTERFACE
2. SMS Server processes the application's request to send an SMS then deletes the request from the SMS-API-INTERFACE DB.
3. SMS Server sends to a primary SMS service provider or optional backup service provider if the primary is unavailable
  - a. TCP Protocol SMPP (Industry standard 3.4) in synchronous mode is used to send \ receive SMS messages along with delivery notifications to\from the SMS Service provider
4. SQL-API Interface DB is updated with results
5. Business Application(s) process the results and incoming SMS messages from the DB tables and deletes its records after processing them.
  - a. Security of the SQL-API interface uses Row Level Security (RLS) if more than one application is being used.
  - b. RLS was introduced into SQL Server 2016.

---

ⓘ This design above is a simple design.

---

### 3.2 High availability design SQL API interface



High availability design uses:

- 2 x AWS availability zone
- 2 x EC2 t3.2xlarge windows server in a public subnet. Windows server 2016, 2019, 2022 or better
- RDS Microsoft SQL Server configured for Multi-AZ. Version 2019 and 2022 has been tested.

High availability comments and considerations:

- Each EC2 instance SMS Server is deployed in separate AZ's.
- The customer should design their business applications for Multi-AZ
- Each SMS server is Multi-AZ aware for connection to AWS RDS SQL Server. SMS Servers will automatically detect a failover RDS SQL Server and reconnect within around 2 mins of a reboot or zone failure.
- If the primary availability zone (on the left of the diagram) is completely offline, the remaining SMS server will detect a failure with RDS SQL Server

and enter into a 4 phase reconnection attempt. DNS is used to connect to the Secondary RDS MS SQL Server when it is brought online.

High availability requires the following:

- 2 x EC2 windows server instance in a public subnet(s). Windows server 2016, 2019, 2022 or better
- 2 x elastic fixed public IP is optional depending on SMS Service provider and your own security needs.
- Minimum of 1 x SMPP Account with 1 x SMS Service provider which BNS has tested with.
- High availability AWS RDS Microsoft SQL Server multi-AZ.
- License and service agreements with BNS Group and at least 1 SMS Service provider.

The above diagram shows 2 SMS servers in different availability zones accessing AWS RDS Microsoft SQL Server in zone 1. Zone 2 has a secondary SQL server which can be automatically activated by the AWS RDS service within a few minutes.

BNS Enterprise SMS Server software automatically attempts to reconnect to the AWS RDS SQL Server end point connection string allowing the use of a secondary AWS RDS SQL Server in another zone.

## Windows Domain

EC2 SMS Windows server can be in an Active Directory domain or a standalone server in a workgroup.

## AWS EC2 instance sizing

EC2 instances T3.2XLarge is recommended for large enterprise.

## AWS RDS SQL Server sizing

Refer to section 1.5.1 for sizing of RDS Database service.

## SQL permissions

BNS Enterprise SMS Server software can use Windows authentication or SQL Local user authentication to access Microsoft SQL Server.

Notes:

4. Business applications are pre-registered in the SMS platform.
5. Customer can use a single SMS service provider in this design.
6. Business applications are responsible for processing their own SMS data from the SMS-SQL-API Database. Each business application has its own ID to identify which transactions belong to their application. Microsoft SQL Server

row level security is supported.

## Process Steps numbered 1 to 6

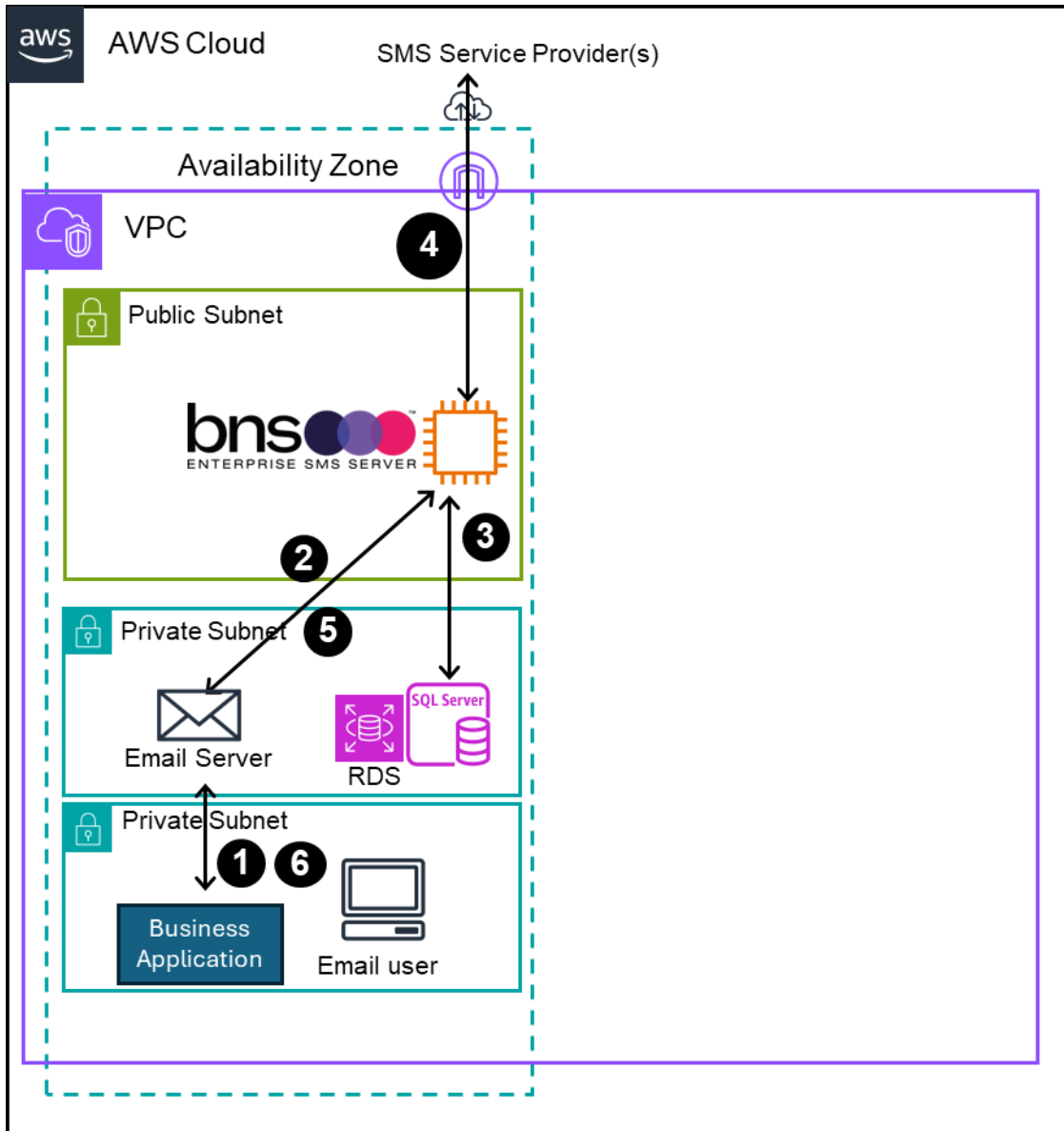
1. Business application writes a record into a database SMS-API-INTERFACE
2. SMS Server processes the application's request to send an SMS then deletes the request from the SMS-API-INTERFACE DB.
3. SMS Server load balances SMS requests across both SMS Servers
  - a. One of the SMS Servers is considered a master in terms of the SQL-API interface.
  - b. Both SMS Servers have a protocol in place between them to take over the role if the master SQL-API interface server process goes offline.
  - c. Each SMS server processes its own queues.
  - d. Each SMS server has intelligence to detect if the other server is offline and will move SMS traffic from the server which is down over to the remaining server.
  - e. A single SMPP account is used with up to 10 independent SMPP binds to the service provider
  - f. The architecture allows up to 20million SMS per 10 hour business window to be sent across 2 SMS Servers.
  - g. The SMS Server design is Active\Active across different AWS AZ's.
  - h. SMS Server Windows services handle Zone failures (including manual RDS reboots) and connect to the new RDS DNS updates within 2 mins.
4. Each SMS Server sends to a primary SMS service provider or optional backup service provider if the primary is unavailable
  - a. TCP Protocol SMPP (Industry standard 3.4) in synchronous mode is used to send \ receive SMS messages along with delivery notifications to\from the SMS Service provider
5. SQL-API Interface DB is updated with results by the master server
6. Business Application(s) process the results and incoming SMS messages from the DB tables and deletes its records after processing them.
  - a. Security of the SQL-API interface uses Row Level Security (RLS) if more than one application is being used.
  - b. RLS was introduced into SQL Server 2016.

---

**i** The design provides redundancy at all levels. The customer is responsible for designing its applications to operate in Multi-AZ.

---

### 3.3 Simple design email interface



In addition to the SQL Interface method of sending and receiving SMS messages, business applications and users can use the email interface method to send and receive SMS messages.

An example email server in this design is a Microsoft Exchange Server with the transport role installed. SMTP address space is used on Exchange SMTP connectors to send SMS messages. Any SMS messages received by the SMS Server or any confirmations are sent back to a registered email address belonging to the user or application.

If the customer does not have an internal email server such as Microsoft Exchange Server, the software supports the Microsoft Graph API to access Exchange online which is part of the Office 365 cloud service.

Note there are limitations with Exchange online. Refer to [Exchange Online limits - Service Descriptions | Microsoft Learn](#)



For high volume SMS messaging the SQL interface is recommended for business applications.

Each user or business application is pre-registered in the SMS platform.

A simple design uses:

- 1 x AWS availability zone
- RDS Microsoft SQL Server. Version 2019 and 2022 has been tested.
- 1 x EC2 t3.2xlarge windows server in a public subnet. Windows server 2016, 2019, 2022 or better
- 1 x elastic fixed public IP is **optional** depending on SMS Service provider and your own security needs.
- 1 x Microsoft Exchange Server with transport role service or Exchange online service. SMS Servers can whitelist Exchange Server IP addresses if required.
- 1 x SMPP Account with a SMS Service provider which BNS has tested with.
- 1 x AWS RDS Microsoft SQL Server Database Service
- License and service agreements with BNS Group and SMS Service provider

#### AWS EC2 instance sizing

EC2 instances T3.2XLarge is recommended for large enterprise.

#### AWS RDS SQL Server sizing

Refer to section 1.5.1 for sizing of RDS Database service.

#### Windows Domain

EC2 SMS Windows server can be in an Active Directory domain or standalone server in a workgroup.

## SQL permissions

The SMS Server software can use Windows authentication or SQL Local user authentication to access Microsoft SQL Server.

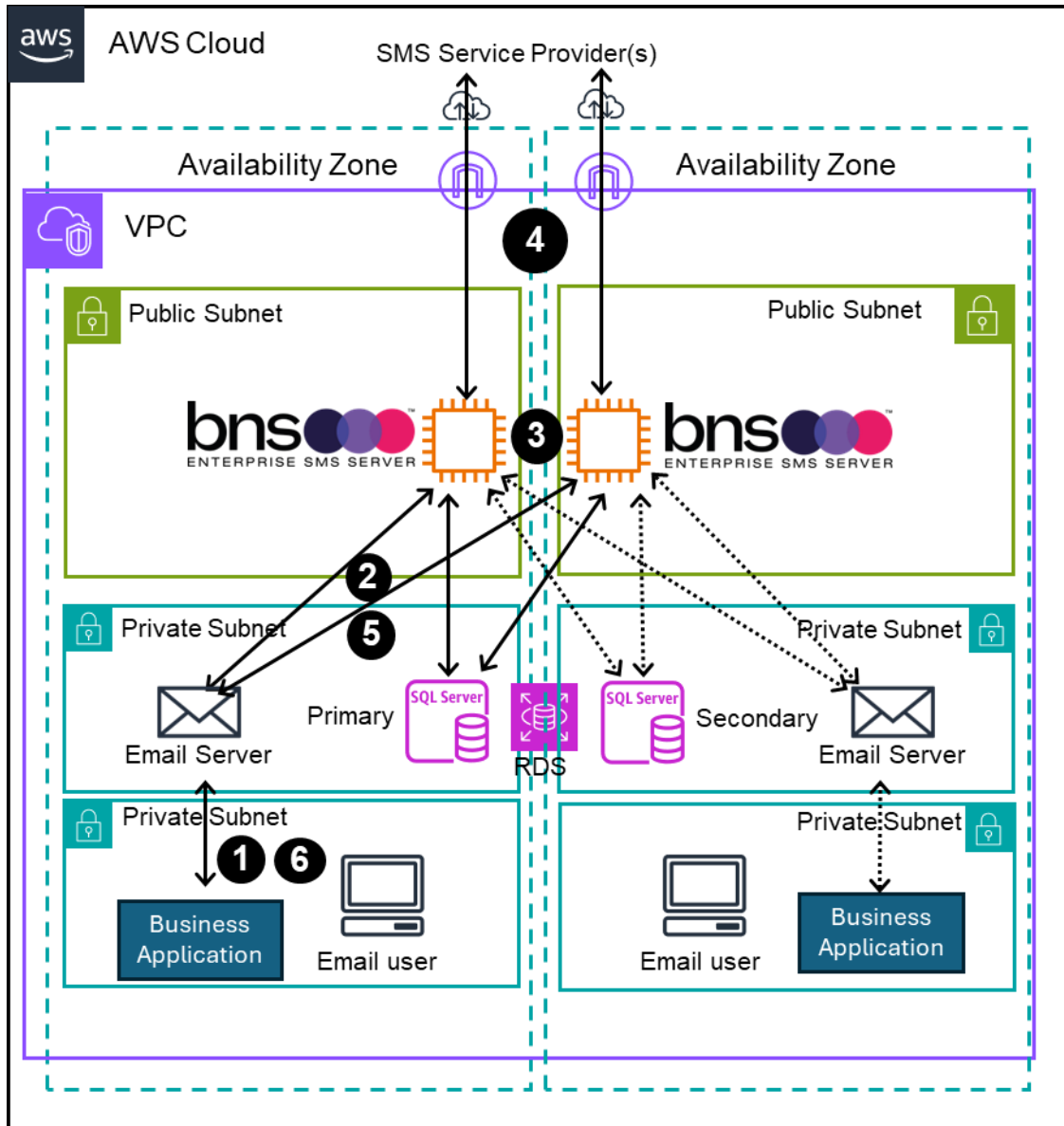
### Process Steps numbered 1 to 5

- 
- ❗ This design assumes that the customer has Exchange Server with the transport role in their tenancy. If the customer does not have that available then Exchange Online can be used.
  - ❗ Exchange online solution uses a combination of a mailbox for each SMS Server and a transport rule in Exchange online to redirect SMS requests to the mailbox of the SMS Server.
  - ❗ If a customer does not have any of the above then a pure SMTP solution using any SMTP server can be used.
  - ❗ Australian Government customers should discuss their specific requirements with BNS if Email Protective Marking standards are to be implemented within the SMS platform. Email protective marking standards allow gateways such as this software to block email sourced messages from traversing the gateway onto other networks such as the public SMS network.
- 

1. Business application or user sends an email to Exchange Server (Preferred) or Exchange online.
2. Exchange Server sends SMTP message directly to the SMS Server. (SMS Server has a built-in smart host SMTP Service).
  - a. If Exchange online is used the SMS Server uses a mailbox in Exchange online and a transport rule to collect outgoing SMS requests.
3. SMS Server records the SMS request into its database.
4. SMS Server sends to a primary SMS service provider or optional backup service provider if the primary is unavailable
  - a. TCP Protocol SMPP (Industry standard 3.4) in synchronous mode is used to send \ receive SMS messages along with delivery notifications to\from the SMS Service provider
5. SMS Server sends an email to the sending application\user if the SMS failed. The SMS platform can be configured to send confirmation emails for successful SMS messages on a per user\application basis.
6. Business Application \ user processes emails from the SMS Server.

- 
- ❗ This design above is a simple design.
-

### 3.4 AWS High Availability Architecture – email interface



In addition to the SQL Interface method of sending and receiving SMS messages, business applications and users can use the email interface method to send and receive SMS messages.

An example email server in this design is a Microsoft Exchange Server with the transport role installed. Exchange server would be deployed across both AZ's. SMTP address space is used on Exchange SMTP connectors to send SMS messages. Any SMS messages received by the SMS Server or any confirmations are sent back to a registered email address belonging to the user or application.

If the customer does not have an internal email server such as Microsoft Exchange Server, the software supports the Microsoft Graph API to access Exchange online which is part of the Office 365 cloud service.

Note: there are limitations with Exchange online. Refer to [Exchange Online limits - Service Descriptions | Microsoft Learn](#)

For high volume SMS messaging the SQL interface is recommended for business applications.

Each user or business application is pre-registered in the SMS platform.

A high availability design uses:

- 2 x AWS availability zone
- RDS Microsoft SQL Server **Multi-AZ**. Version 2019 and 2022 has been tested.
- 2 x EC2 t3.2xlarge windows server in a public subnet across 2 x AZ's.  
Windows server 2016, 2019, 2022 or better
- 1 x elastic fixed public IP per AZ is **optional** depending on SMS Service provider and your own security needs.
- 2 x Microsoft Exchange Server with transport role service across 2 x AZ.  
Exchange online service can be used noting its limitations.
- 1 x SMPP Account with a SMS Service provider which BNS has tested with.
- License and service agreements with BNS Group and SMS Service provider

Design considerations

- SMS servers accept SMTP messages from both Exchange Servers or can read mailboxes in Exchange online. Exchange server SMTP based solution is preferred.
- SMS Servers can whitelist Exchange Server IP addresses if required.
- Business applications should use DNS to send SMTP emails to Exchange Server. Business applications should be designed for high availability across AZ's.
- SMS Servers automatically and intelligently detect a zone \ SMS server failure after a period of time and will move any messages queued to the other SMS Server after a configured period of time.

#### AWS EC2 instance sizing

EC2 instances T3.2XLarge is recommended for large enterprise.

#### AWS RDS SQL Server sizing

Refer to section 1.5.1 for sizing of RDS Database service.

#### Windows Domain

EC2 SMS Windows servers can be in an Active Directory domain or standalone server in a workgroup.

## SQL permissions

The SMS Server software can use Windows authentication or SQL Local user authentication to access Microsoft SQL Server.

## Process Steps numbered 1 to 5

- 
- ❗ This design assumes that the customer has Exchange Server with the transport role in their tenancy. If the customer does not have Exchange Server available then Exchange Online can be used.
  - ❗ Exchange online solution uses a combination of a mailbox for each SMS Server and a transport rule in Exchange online to redirect SMS requests to the mailbox of the SMS Server.
  - ❗ If a customer does not have any of the above then a pure SMTP solution using any SMTP server can be used.
  - ❗ Australian Government customers should discuss their specific requirements with BNS if Email Protective Marking standards are to be implemented within the SMS platform. Email protective marking standards allow gateways such as this software to block email sourced messages from traversing the gateway onto other networks such as the public SMS network.
- 

1. Business application or user sends an email to Exchange Server (Preferred) or Exchange online.
2. Exchange Server sends SMTP message directly to the SMS Server. (SMS Server has a built-in smart host SMTP Service).
  - a. If Exchange online is used the SMS Server uses a mailbox in Exchange online and a transport rule to collect outgoing SMS requests.
3. SMS Server records the SMS request into its database.
4. SMS Server sends to a primary SMS service provider or optional backup service provider if the primary is unavailable
  - a. TCP Protocol SMPP (Industry standard 3.4) in synchronous mode is used to send \ receive SMS messages along with delivery notifications to\from the SMS Service provider
5. SMS Server sends an email to the sending application\user if the SMS failed. The SMS platform can be configured to send confirmation emails for successful SMS messages on a per user\application basis.
6. Business Application \ user processes emails from the SMS Server.

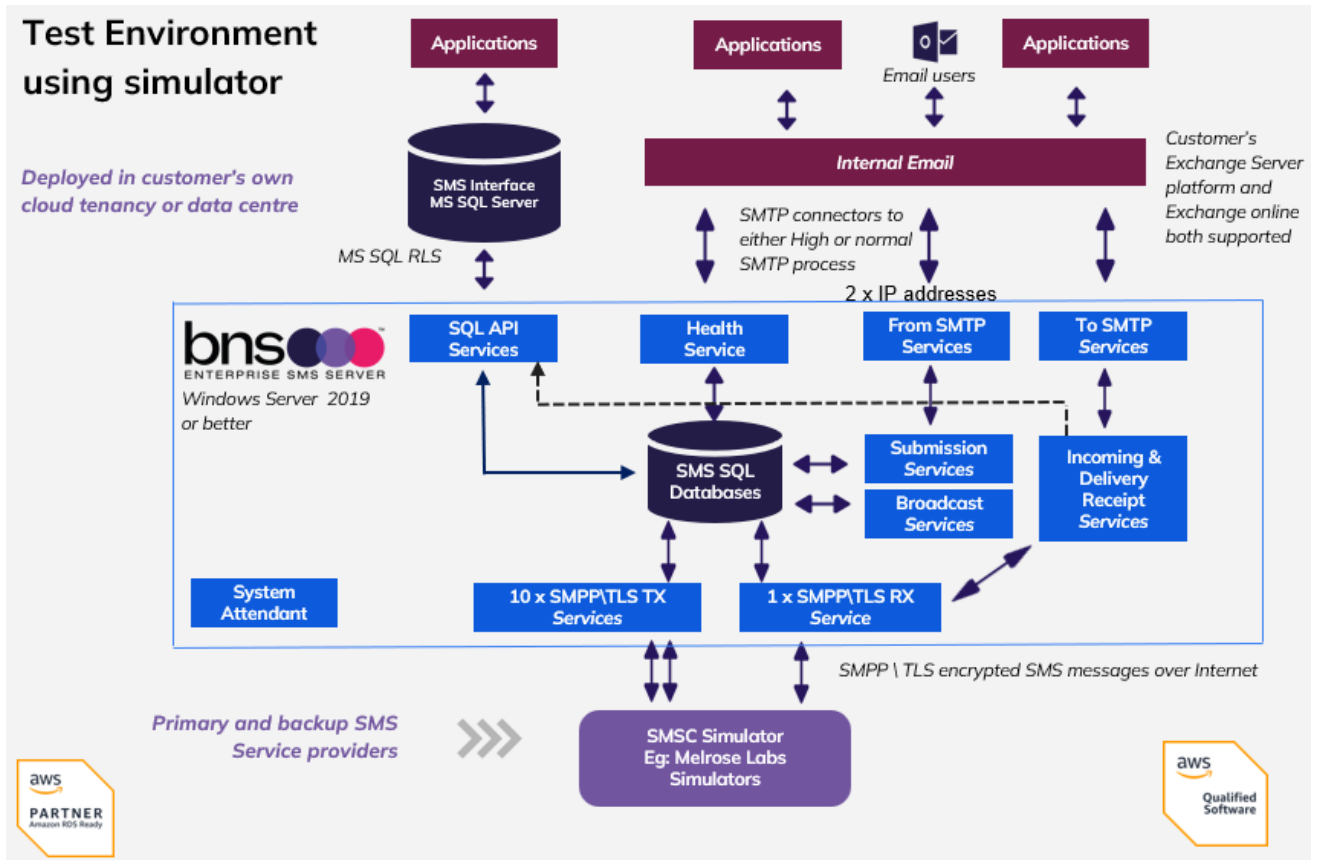
- 
- ❗ The design provides redundancy at all levels. The customer is responsible for designing its applications to operate in Multi-AZ.
-

# SECTION 4 Infrastructure

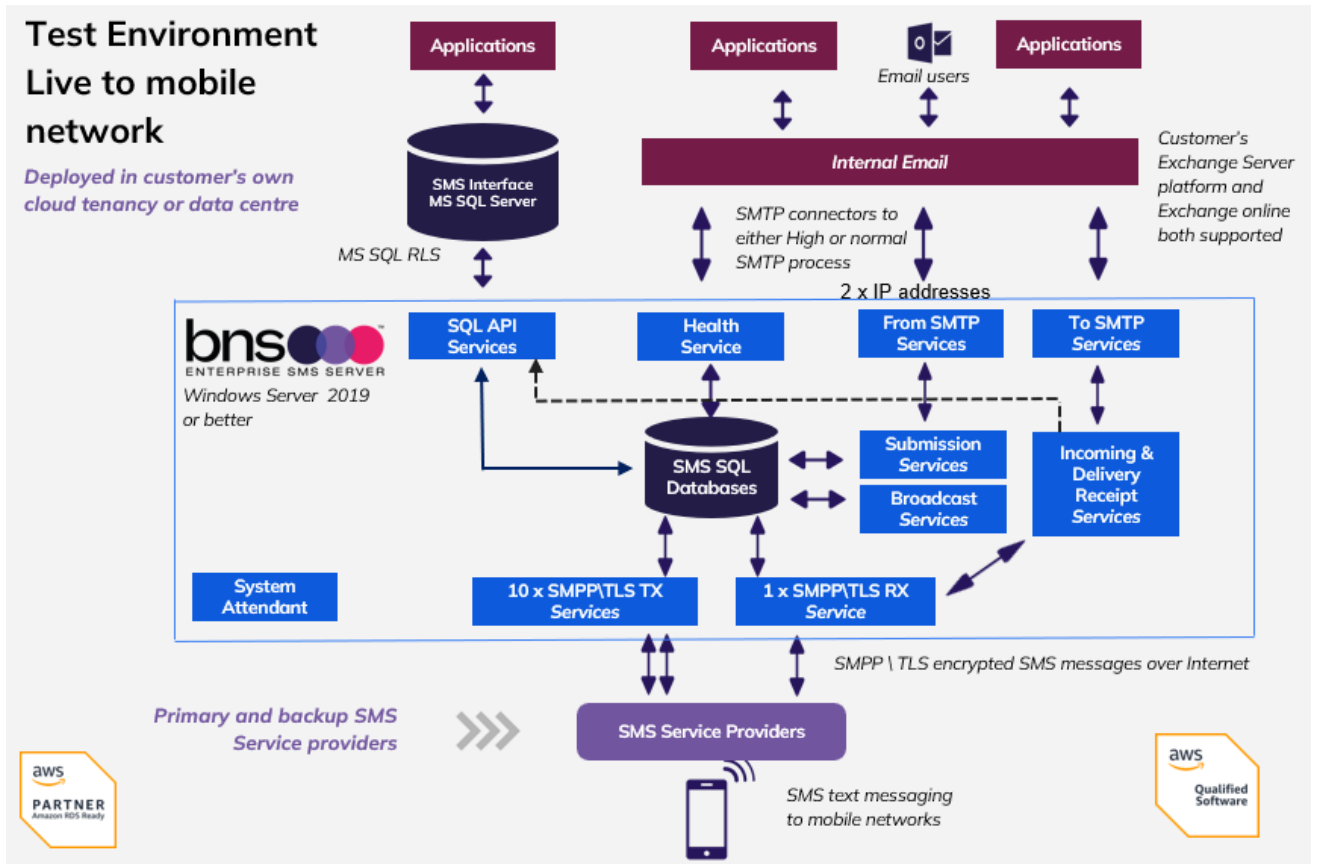
## 4.1 Test environment design

Testing usually involves sending to a simulator and/or live mobile network. For security and potential cost reasons, the best practice is to have 2 discrete test environments one for simulation and one for live network testing.

### 4.1.1 Test environment with a SMSC simulator

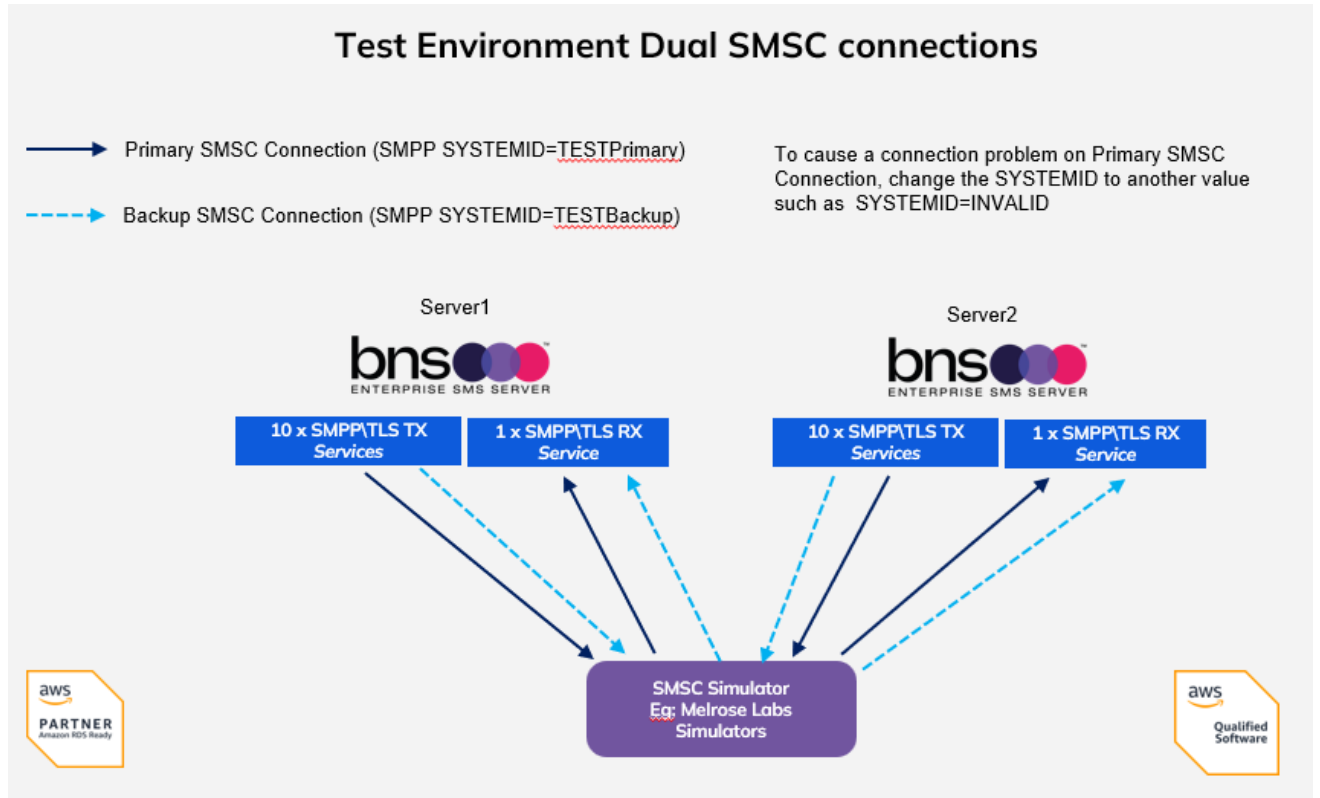


4.1.2 Test environment live to network



### 4.1.3 Test environment with multiple SMS Servers

Designing a test environment with dual SMS Servers like production with dual SMSC connections (Primary and Backup) would be as shown below.





## 4.2 Infrastructure requirements

### 4.2.1 Minimum requirements (Single-AZ)

AWS service	Size \ type	Comments
EC2 instance type	T3.2xLarge	1 x 32GB RAM with 8 vcpu Min 200gb C Drive Min 100gb App Drive
AMI type	AWS AMI Windows Server 2016\2019\2022 standard or enterprise	
RDS MS SQL	AWS RDS Microsoft SQL Server (Standard or Enterprise). Version support: 2016, 2017, 2019 and 2022	SQL Express can be used for proof of concepts only
Subnets	Public subnet for EC2 instance SMS Server Private subnet for RDS MS SQL Server	
SMPP SMS protocols	SMPP\TLS from EC2 SMS Server to Internet based SMS Service provider	TLS 1.2 encryption. . Refer firewall rules below.
Directory services	Active Directory (optional)	If not available, a local user service account can be used
Firewall rules	Allow outgoing SMPP protocol on specific ports for bi-directional SMS communications	Firewall team will be required to allow outgoing SMPP protocol on a specified port from internal IP addresses to external IP addresses. Contact BNS for further information.

4.2.1 Requirements (Multi-AZ)

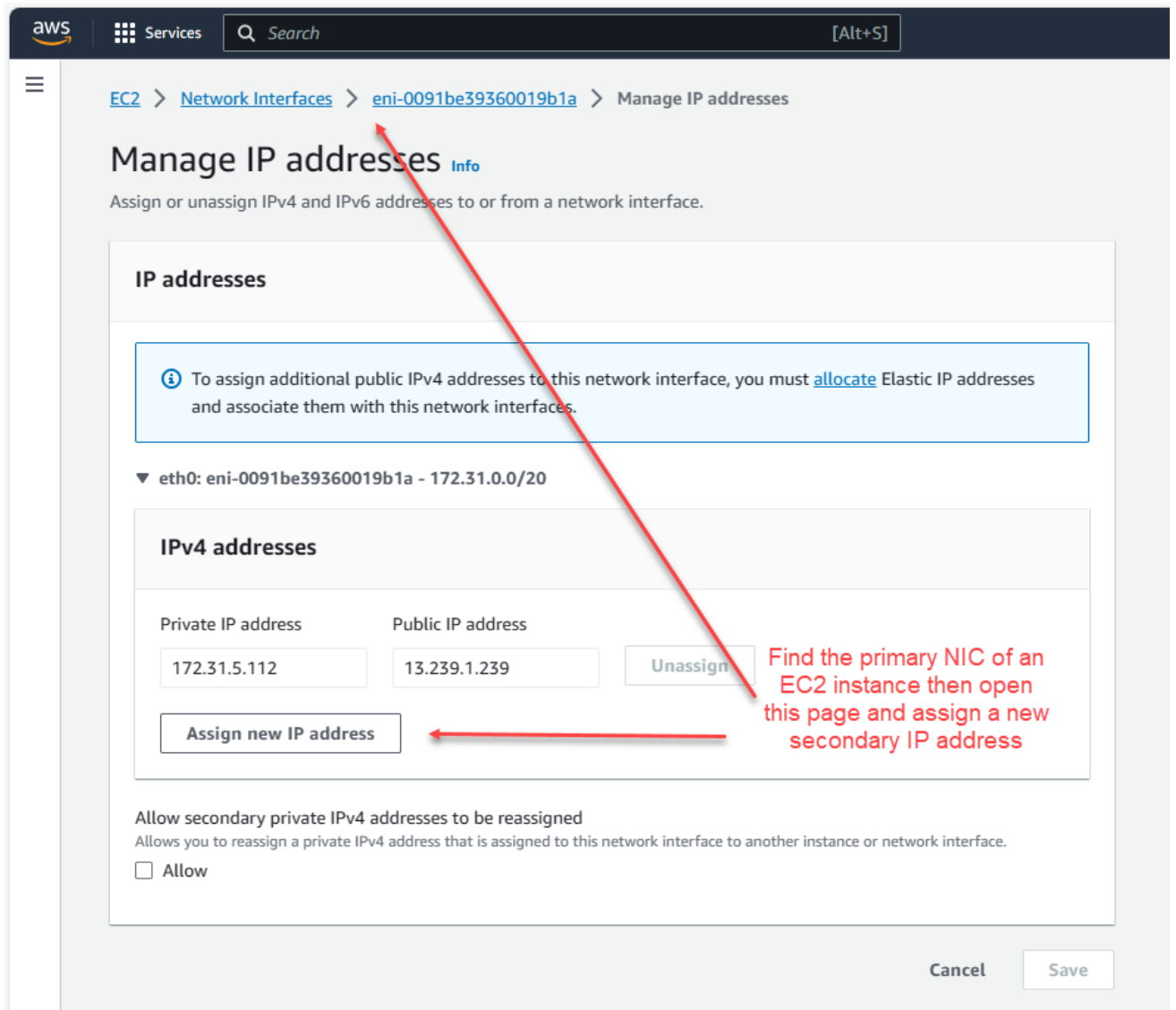
AWS service	Size \ type	Comments
EC2 instance type	2 x T3.2xLarge	32GB RAM with 8 vcpu Min 200gb C Drive Min 100gb App Drive Deploy EC2 instances in different availability zones in a region.
EC2 AMI type	AWS AMI Windows Server 2016\2019\2022 standard or enterprise	
RDS MS SQL	AWS RDS Microsoft SQL Server. (Standard or Enterprise). Version support: 2016, 2017, 2019 and 2022	Multi-AZ deployment
Subnets	Public subnet for EC2 instance SMS Server Private subnet for RDS MS SQL Server	Multi-AZ deployment
SMPP SMS protocols	SMPP\TLS from EC2 SMS Server to Internet based SMS Service provider	TLS 1.2 encryption. Refer firewall rules below.
Directory services	Active Directory (optional)	If not available, a local user service account can be used
Firewall rules	Allow outgoing SMPP protocol on specific ports for bi-directional SMS communications	Firewall team will be required to allow outgoing SMPP protocol on a specified port from internal IP addresses to external IP addresses. Contact BNS for further information.

### 4.2.2 Second Network Interface

If Microsoft Exchange Server is used to send SMS requests via SMTP connectors, 2 x private IP addresses are required. There are 2 x SMTP smart host SMS services on each SMS Server. One is for high priority and one for normal priority. Priority in this context means the priority of the connector itself.

ⓘ Note that if you add a second NIC, then AWS will not assign a public IP address to the primary nic or second nic so you wont be able to access the internet.

To add a second private IP address refer to this link [Multiple IP addresses - Amazon Elastic Compute Cloud](#)



Having assigned a second private IP address you then have to go into windows and change from DHCP to Manual assignment in order to assign a secondary IP address on the OS itself. You also have to assign the existing private IP address manually in the process below.

[Configure a secondary private IPv4 address for your Windows instance - Amazon Elastic Compute Cloud](#)

## 4.3 SQL Server Requirements

---

### 4.3.1 Minimum AWS RDS MS SQL Server requirement

RDS MS SQL Express is the minimum requirement for a single-AZ deployment ideal for proof of concepts only.

RDS MS SQL Server (standard or enterprise) is required for production deployments in a single-AZ.

### 4.3.2 AWS RDS SQLServer best practices on how Multi AZ works

- RDS Multi-AZ deployments provide high availability and automatic failover support for DB instances
- Multi-AZ helps improve the durability and availability of a critical system, enhancing availability during planned system maintenance, DB instance failure, and Availability Zone disruption.
- RDS automatically creates a primary DB Instance and synchronously replicates the data to a standby instance in a different AZ.
- RDS performs an automatic failover to the standby, so that database operations can be resumed as soon as the failover is complete.
- RDS Multi-AZ deployment maintains the same endpoint for the DB Instance after a failover, so the application can resume database operation without the need for manual administrative intervention.
- **Multi-AZ is a High Availability feature and NOT a scaling solution for read-only scenarios; a standby replica can't be used to serve read traffic. To service read-only traffic, use a Read Replica.**
- For more information refer to [https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER\\_SQLServerMultiAZ.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_SQLServerMultiAZ.html)

#### 4.3.3 AWS RDS SQL Server version support

The solution supports currently available versions (2016, 2017, 2019, 2022) of Amazon RDS Microsoft SQL Server

([https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_SQLServer.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_SQLServer.html))

BNS tested AWS RDS SQL Server 2022 when AWS released it in November 2023.

Newer versions of RDS Microsoft SQL Server will be tested as soon as possible after released by AWS.

#### 4.3.4 Deploying RDS SQL Server

To deploy RDS SQL Server, the high level steps are -

1. Navigate to RDS console in the AWS Management console and hit Create Database
2. Choose Microsoft SQL Server, Amazon RDS and appropriate SQL Server edition. The software works well with the Express edition.
3. Choose SQL Server version and provide a name in the DB instance identifier.
4. Provide credential information and choose a suitable instance class. Choose storage type and the allocated storage.
5. Software Server supports both single-AZ as well as Multi-AZ RDS instance. Choose the deployment type as per your preference.
6. Keep Public access as 'No' as per security best practice. The RDS instance do not need to be accessible from the Internet.
7. Choose the VPC and the Security groups.

Do not use RDS Proxy

8. Enable Performance Insights to monitor the database load
9. Validate rest of the options and hit Create Database to launch RDS instance.

For step by steps to launch RDS instance, refer to the AWS tutorial -

<https://aws.amazon.com/getting-started/hands-on/create-microsoft-sql-db/>.

For additional details on RDS SQL server, please refer to the AWS public documentation -

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_SQLServer.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_SQLServer.html)

#### 4.3.5 RDS Connectivity from SMS Servers

BNS Enterprise SMS Server SQL drivers supports both - Single-AZ as well as Multi-AZ RDS SQL Server.

BNS Enterprise SMS Server uses the RDS SQL Server endpoint in the connection string.

BNS Enterprise SMS Server SQL driver doesn't support MultiSubnetFailover for

RDS Multi-AZ but retries the connection during the database failover and re-connects automatically post failover.

#### 4.3.6 AWS RDS SQL Database monitoring

The RDS SQL Server can be monitored using AWS CloudWatch or any other 3<sup>rd</sup> party tool of your preference. As a best practice, you should monitor and create alarms for the following events -

- Availability - The availability of the RDS SQL server and any event of failover, reboot, deletion or maintenance.
- Configuration Change - Any change in the configuration like instance class change, security group or parameter group change should be monitored
- Low Storage - The storage should be monitored to avoid any disruption
- Performance - The performance must be monitored using Cloudwatch metrics like CPU utilization, Freeable memory, IOPS and latency.

For Database load monitoring, Performance insights should be enabled and monitored.

For details on the monitoring tools & the event notification provided by AWS, please refer to the AWS public documentation -

<https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/MonitoringOverview.html>

#### 4.3.7 AWS RDS SQL Database troubleshooting

In an unlikely event of disruption to the service both the Database and Application should be checked and troubleshooted. High level steps to troubleshoot the RDS SQL Server instance are -

- Check for RDS events related to availability, reboot or failure
- Try connecting to the RDS instance manually
- Check performance metrics and performance insights to rule out heavy load issue
- Check the events related to security group to make sure that the security groups haven't changed.

Refer to the AWS troubleshooting guide to troubleshoot common scenarios -

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_Troubleshooting.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Troubleshooting.html)

#### 4.3.8 To launch EC2 instance Windows Server

BNS Enterprise SMS Server software will be installed on the Virtual server. Launch 2 x EC2 servers to deploy the solution in high availability configuration. The high level steps to launch EC2 server are - as below -

➤ SMS Servers must have high speed low latency connections to SQL Server databases and the Internet

- Open the Amazon EC2 console in AWS Management console
- In the navigation bar at the top of the screen, the current AWS Region is displayed . Make sure it is displaying the correct region.
- From the Amazon EC2 console dashboard, choose Launch instance.
- Under Name and tags, for Name, enter a descriptive name for your instance.
- Under Application and OS Images (Amazon Machine Image), choose Quick Start, and then choose the windows operating system (OS) for your instance.
- Under Key pair (login), for Key pair name, choose an existing key pair or create a new one.
- Set the network settings and firewall security group and other security settings

➤ ROOT volume must be a minimum of 200GB to ensure virtual memory page space is sufficient for this the solution.

- Add a second volume = min 100GB to install the SMS software on.
- Choose the relevant Advance settings such as Domain join directory, capacity reservations and so on. Use your organization standards for deployment.
- In the Summary panel, choose Launch instance.

For further details on launching EC2, please refer to AWS Public documentation - <https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-launch-instance-wizard.html>

## 4.4 SQL Server Database creation

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This is documented in section 7 of this guide. Section 6 installs the software on the SMS Windows server which makes available the SQL DDL scripts required by the SQL admin to create the databases.

## 4.5 Availability zone support

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BNS Enterprise SMS Servers can be deployed in a single availability zone or across multiple availability zones (Multi-AZ).



High performance access to RDS MS SQL Server is required.

Deployment across multiple regions is not supported due to latency.

## 4.6 Connectivity to SMS Network Service providers

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### 4.6.1 Encryption of SMS data over the Internet

The software uses SMPP\TLS to encrypt the data. TLS version 1.2 min is used.

## 4.7 SMS Service Account

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- Create a unique user account for each SMS server using Active Directory or for a non-active directory implementation create a local user using computer management.
- This service account must be added to the local administrator's group on all SMS servers.

---

ⓘ Note: this service account is used only for accessing the resources of the Windows Server. A separate SQL local user account is used to access the resources of SQL Server.

---

## 4.8 Deployment effort & resources

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Depending on the complexity of your design and security determines the amount of time required to deploy a full solution.

A simple test environment deployment with 1 SMS Server in 1 availability zone could be setup within 1 to 2 weeks including contract negotiation with a SMS Service provider.

AWS links for provisioning <https://aws.amazon.com/ec2/getting-started/>  
[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_GettingStar  
ted.CreatingConnecting.SQLServer.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.CreatingConnecting.SQLServer.html)

Enterprise designs for production typically take a long time for many reasons.

Skills and Resources required:

- General AWS cloud administration skills
- AWS networking skills
- Amazon EC2 skills
- Amazon RDS database skills

- Windows Server administrator skills
- Windows Active Directory knowledge (if AD is used)
- AWS network security skills
- Firewall team

Summary:

- SQL Administrator to setup 3 databases on Microsoft SQL Server. Standard DDL scripts are provided for the SQL admin to execute when the databases have been created.
- Windows server deployment team to deploy 1 or more SMS Servers. For example EC2 instance in AWS using Windows Server 2022 Base AMI.
- Security team - to understand what outgoing port rules are required for internal SMS Windows servers to communicate with SMS Service providers.
- Security team to implement network security groups for placement of SMS Server(s) and RDS MS SQL.
- Procurement team - to contract with BNS and SMS Service providers.

## 4.9 SMS Service providers

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The SMS software has been fully tested with a variety of SMS Service providers including:

- Sinch
- Sinch MessageMedia
- Modica Group\Optus

The SMS software uses industry standard SMPP 3.4 with TLS encryption. Most SMS Service providers support the standard but testing must be performed by BNS.

SMPP version 3.4 is an industry standard. However, there are many considerations regarding inter-operability and optional implementations within the standard.

BNS has tested with many service providers. For more information contact our support team.

## 4.10 AWS Security

---

### 4.10.1 IAM roles

**To deploy an EC2 Windows Server instance will require an IAM role with the least privilege permissions policy.** The policy is documented in section 4.9.3 below.

You may already have an IAM role already configured for this purpose. If not create an IAM role called "Deploy EC2 Instance for SMS Server".

For more information on IAM Roles refer to this link

[https://docs.aws.amazon.com/IAM/latest/UserGuide/id\\_roles.html](https://docs.aws.amazon.com/IAM/latest/UserGuide/id_roles.html)

**To deploy the associated AWS RDS MS SQL Database will require an IAM role with the least privilege permissions policy.** The policy is documented in section 4.9.5 below.

You may already have an IAM role already configured for this purpose. If not create an IAM role called "Deploy RDS MS SQL Server for SMS Server".

- 
- ❗ EC2 Windows administration is performed using Windows local or Active Directory user logins to the Windows Server.
  - ❗ RDS MS SQL Database administration is managed using Microsoft SQL Management Studio. SQL Server authentication is required.
- 

### 4.10.2 AWS Managed policies

AWS recommend using policies that [grant least privilege](#), or granting only the permissions required to perform a task. The most secure way to grant least privilege is to write a custom policy with only the permissions needed by your team. You must create a process to allow your team to request more permissions when necessary. It takes time and expertise to [create IAM customer managed policies](#) that provide your team with only the permissions they need.

There are two AWS managed policies AdministratorAccess and DatabaseAdministrator which are documented in this link

[https://docs.aws.amazon.com/IAM/latest/UserGuide/access\\_policies\\_job-functions.html](https://docs.aws.amazon.com/IAM/latest/UserGuide/access_policies_job-functions.html)

These two AWS managed policies can be used as a base to create new policies customising them for least privileges for managing EC2 instances and RDS MS SQL databases.

### 4.10.3 To launch EC2 instance Windows Server

To complete a launch successfully, users must be given permission to use the `ec2:RunInstances` API action, and at least the following API actions:

- `ec2:DescribeImages`: To view and select an AMI.
- `ec2:DescribeInstanceTypes`: To view and select an instance type.
- `ec2:DescribeVpcs`: To view the available network options.
- `ec2:DescribeSubnets`: To view all available subnets for the chosen VPC.
- `ec2:DescribeSecurityGroups` or `ec2:CreateSecurityGroup`: To view and select an existing security group, or to create a new one.
- `ec2:DescribeKeyPairs` or `ec2:CreateKeyPair`: To select an existing key pair, or to create a new one.
- `ec2:AuthorizeSecurityGroupIngress`: To add inbound rules.

For more information refer to

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/iam-policies-ec2-console.html#ex-launch-wizard>

### 4.10.4 JSON Policy to launch EC2

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ec2:DescribeInstances",
        "ec2:DescribeImages",
        "ec2:DescribeInstanceTypes",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeVpcs",
        "ec2:DescribeSubnets",
        "ec2:DescribeSecurityGroups",
        "ec2:CreateSecurityGroup",

```

```

        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:CreateKeyPair"
    ],
    "Resource": "*"
},
{
    "Effect": "Allow",
    "Action": "ec2:RunInstances",
    "Resource": "*"
}
]
}

```

For more information refer to [Example policies for working in the Amazon EC2 console - Amazon Elastic Compute Cloud](#)

#### 4.10.5 Policy to grant permission to create a RDS DB instance and isn't Multi-az

```

{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AllowMSSQLCreate",
            "Effect": "Allow",
            "Action": "rds:CreateDBInstance",
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "rds:DatabaseEngine": "mssql"
                }
            },
        },
    ],
}

```

```
"Bool": {  
    "rds:MultiAz": false  
}  
}  
}  
]  
}
```

#### 4.10.6 Other security considerations

The only permissions required are those permissions required to create SQL Databases and EC2 instances.

- **SMS Software does not require AWS root privileges for deployment or operation.**
- SMS Software requires the permissions described in this document which include SQL Access and access by its windows services to access the Windows Server files and folders.
- No public resources such as S3 buckets
- No keys are required other than the initial EC2 instance for windows which the EC2 customer administrator has and secures.
- RDS SQL local user credentials are required during the installation. These are provided by the RDS SQL administrator to the installation team.
- No specific outgoing network security group rules are required if the default policy allowing ALL outgoing traffic from the public subnet NSG is allowed.
- No specific incoming network security group rules for the public subnet are required for the SMS software to operate.
- Sensitive data is secured within SQL Server databases
- SMS Software encrypts data in transit between AWS and SMS Service providers using SMPP\TLS. TLS version 1.2 and 1.3 is supported, however, many SMS Service providers only support 1.2.



#### 4.10.7 AWS Encryption EC2 - SMS Windows Server

Amazon EBS encryption is a straight-forward encryption solution for your EBS resources associated with your EC2 instances. With Amazon EBS encryption, you aren't required to build, maintain, and secure your own key management infrastructure. Amazon EBS encryption uses AWS KMS keys when creating encrypted volumes and snapshots.

For more information refer to AWS documentation at the link below:

<https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSEncryption.html>

#### 4.10.8 AWS Encryption RDS - SMS Data stored in Microsoft SQL Server

All customer data is stored in Amazon RDS MS SQL Server.

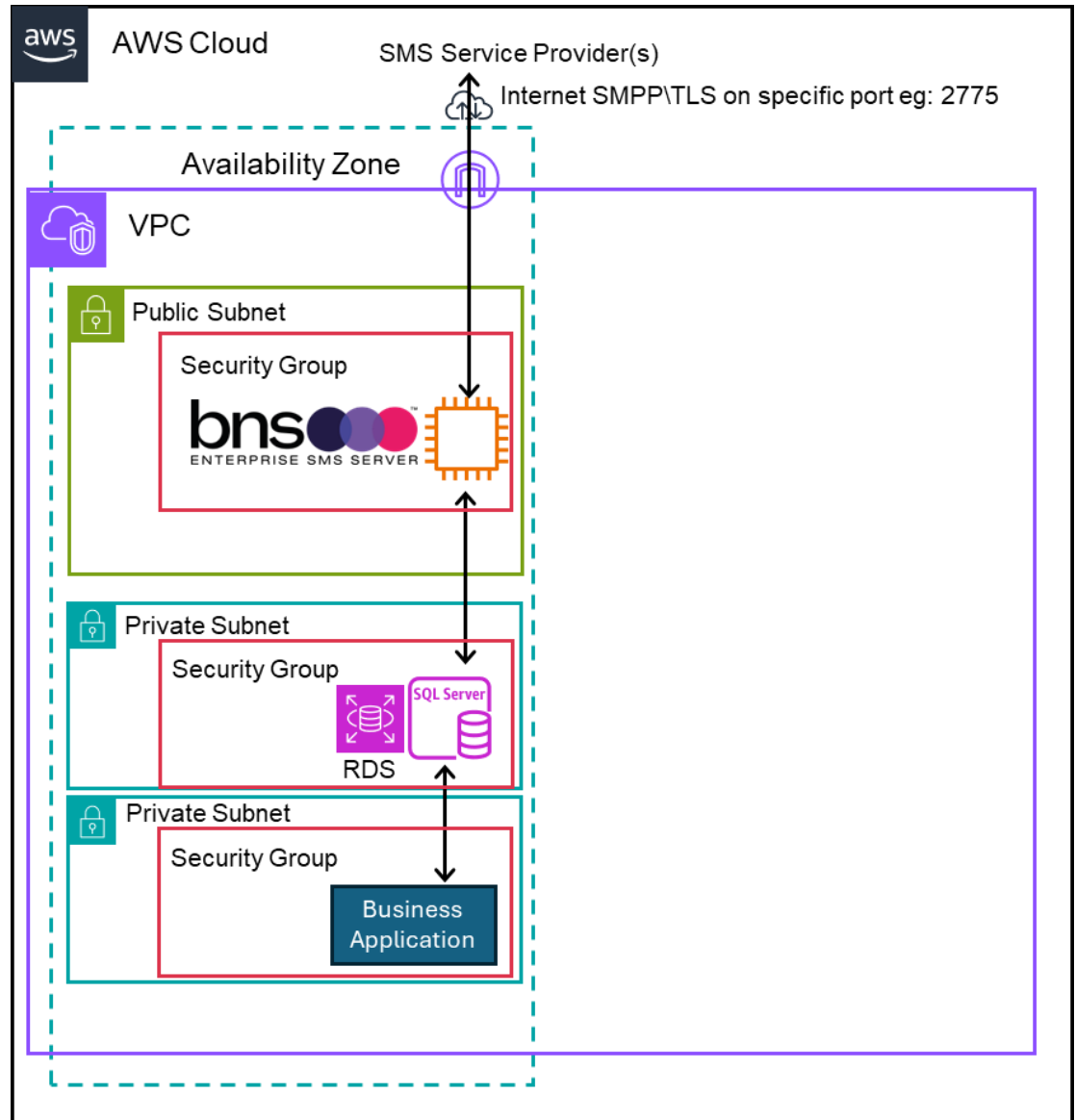
Amazon RDS can encrypt your Amazon RDS DB instances. Data that is encrypted at rest includes the underlying storage for DB instances, its automated backups, read replicas, and snapshots.

Amazon RDS encrypted DB instances use the industry standard AES-256 encryption algorithm to encrypt your data on the server that hosts your Amazon RDS DB instances. After your data is encrypted, Amazon RDS handles authentication of access and decryption of your data transparently with a minimal impact on performance.

For more information refer to AWS documentation at the link below:

<https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Overview.Encryption.html>

4.10.9 AWS architecture – Security Groups and Network ACLs



4.10.9.1 Network ACLs

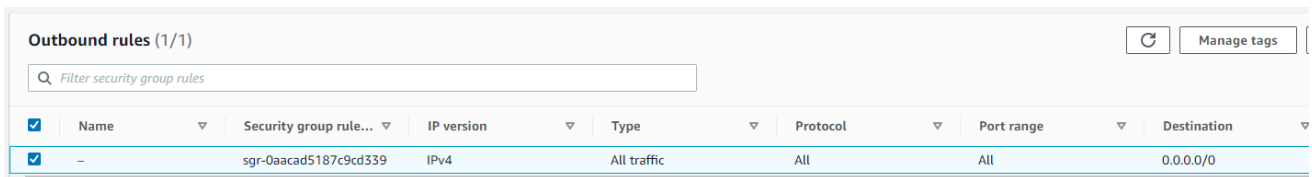
Network ACLs in the public subnet must allow for traffic to flow between the Internet and the public subnet. A VPC public subnet with an Internet gateway is generally configured to allow all traffic to flow in and out of the public subnet. Customers use Security Groups to control access to the EC2 Windows Server hosting the SMS software and the Internet

## 4.10.9.2 Security Groups

### Public Subnet Security Group

A security group is required for the public subnet to control access to\from the Internet.

Below shows an example of an outbound security group for the EC2 Windows SMS server allowing all traffic outbound to the Internet.



The screenshot shows the 'Outbound rules (1/1)' section of an AWS security group. A search bar contains 'Filter security group rules'. Below is a table with one rule:

<input checked="" type="checkbox"/>	Name	Security group rule...	IP version	Type	Protocol	Port range	Destination
<input checked="" type="checkbox"/>	-	sgr-0aacad5187c9cd339	IPv4	All traffic	All	All	0.0.0.0/0

### SMPP\TLS security

The SMS Server establishes an outbound connection to a SMS Service provider using a port they support for SMPP with TLS encryption.

- 
- ⓘ SMS Service providers do not make any inbound connections to the SMS Server. BNS Enterprise SMS Server uses separate SMPP Transmitter and SMPP Receiver binds. All connections are established from the SMS software to the SMS service provider for both SMPP Transmitter and SMPP Receiver binds. SMPP\TLS certificates are maintained by the SMS Service provider. The SMS Software negotiates SMPP\TLS encryption with the SMS Service provider together with IP addresses of the SMS Service Provider.
- 

### Inbound security group rules (public subnet)

As mentioned above, no inbound custom rules are required between the SMS Service provider on the Internet and the SMS Server on the VPC public subnet.

### RDS DB instance security group rules

The DB instance running on RDS MS SQL Server only needs to be available to the SMS Server, and not to the public Internet, a customer will require a VPC with both public and private subnets. The SMS server is hosted in the public subnet, so that it can reach the public Internet.

The DB instance is hosted in a private subnet. The SMS Server is able to connect to the DB instance because it is hosted within the same VPC, but the DB instance is not available to the public Internet, providing greater security.

Security group rules need to be set to allow inbound custom rules from the public

subnet to the private subnet.

Create the rules between security groups is well documented at [https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_Tutorials.WebServerDB.CreateVPC.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Tutorials.WebServerDB.CreateVPC.html)

Inbound security group rules to RDS MS SQL Server

An inbound rule must be created to allow access from your EC2 Windows SMS Server.

The screenshot shows the AWS IAM console interface for a security group. The 'Details' section includes:

- Security group name: RDS Network Security Group Example
- Security group ID: sg-05de54c...
- Description: RDS Network Security Group Example MS SQL and SMS Server permission
- VPC ID: vpc-0...
- Owner: iam-user-1234567890
- Inbound rules count: 1 Permission entry
- Outbound rules count: 1 Permission entry

The 'Inbound rules' tab is active, showing a table with one rule:

Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
-	sg-0ea7fc7e	-	MSSQL	TCP	1433	sg-0ff854ee4eb78662...	Inbound SQL access to RDS MS SQL

4.10.10 AWS RDS Database Credentials

The SMS Software generally uses Windows Authentication to access RDS SQL Server database resources.

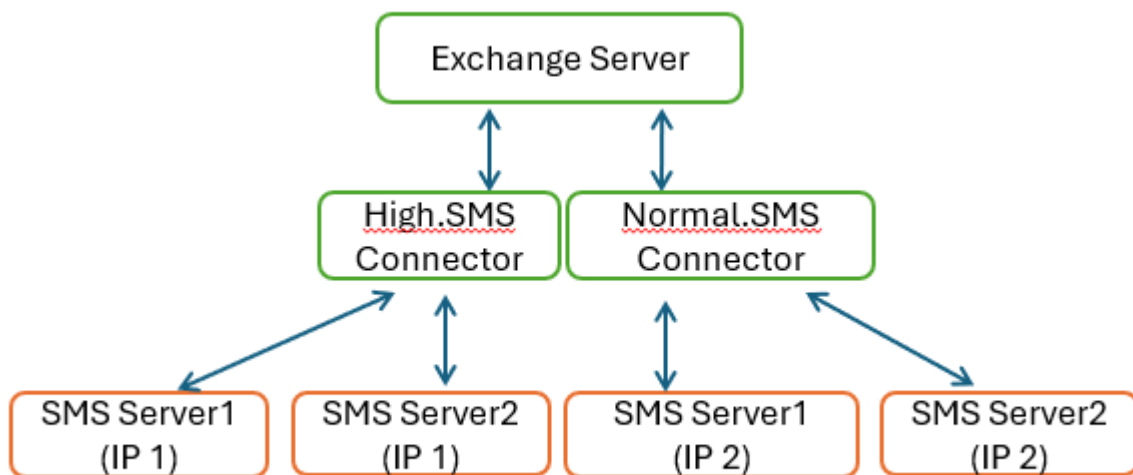
If a customer does not have Windows Authentication available, the SMS software encrypts the password of a local SQL user in its internal configuration file located on EC2 EBS volume.

The customer records any local SQL user details in their preferred password management software.

## SECTION 5 Exchange Server Configuration

### 5.1 Exchange Server SMTP Send Connector configuration

Exchange Server is the most efficient option for supporting applications which must use Email. SMTP Connector design load balances traffic to both SMS servers.



- Each SMS Server has 2 x IP addresses assigned to a single VNIC.

Examples shown below provide load balancing to both SMS Servers for both high and normal priority SMTP traffic.

- Note that SMTP priority does not dictate the actual priority of the SMS message, it purely provides a dedicated SMTP route for high versus normal SMTP traffic.

Examples below show 2 x SMS Servers from BNS's test lab. Using the 1<sup>st</sup> IP address on each SMS Server for High.SMS in your design would simplify the design.

SMS High Priority (high.sms) 172.31.10.187 (TST6) & 172.31.25.73

- general
- delivery
- scoping

\*Name:  
SMS High Priority (high.sms) 172.31.10.187 (TST6) & 172.31.25.73

Connector status:  
 Enable  
 Proxy through client access server

Comment:

Protocol logging level:  
 None  
 Verbose

\*Maximum send message size (MB):  
35

Save Cancel

SMS High Priority (high.sms) 172.31.10.187 (TST6) & 172.31.25.73

general  
▶ **delivery**  
scoping

\*Network settings:  
Specify how to send mail with this connector.

MX record associated with recipient domain  
 Route mail through smart hosts

+ ✎ -

SMART HOST
172.31.10.187
172.31.25.73

Smart host authentication:  
 None  
 Basic authentication  
 Offer basic authentication only after starting TLS

\*User name:

\*Password:

Note: all smart hosts must accept the same username and

Save Cancel

SMS High Priority (high.sms) 172.31.10.187 (TST6) & 172.31.25.73

general  
 delivery  
 ▸ **scoping**

\*Address space:  
 Specify the address space or spaces to which this connector will route mail.

+ ✎ -

TYPE	DOMAIN	COST
SMTP	high.sms	1

Scoped send connector

\*Source server:  
 Associate this connector with the following servers containing transport roles. You can also add Edge Subscriptions to this list.

+ -

SERVER	SITE	ROLE	VERSION
AWSEXCHANGE	AWS.DEV/C...	Mail...	Version ...

Save Cancel

➤ High.SMS is used for internal routing purposes.

- ⓘ No Internet based SMTP can flow to this domain. There is no requirement for any DNS changes, Exchange Server does everything internally in its own gateway address routing tables.

A second SMTP Connector is required for Normal.SMS SMTP traffic which will be sent to a second IP on each SMS Server. Each SMS Server has 1 x VNIC with 2 IP addresses.



### SMS Normal Priority (normal.sms)172.31.21.63&172.31.5.112(TST6)

**general**

delivery  
scoping

\*Name:

SMS Normal Priority (normal.sms)172.31.21.63&172.31.5.112(TST6)

Connector status:

- Enable
- Proxy through client access server

Comment:

Protocol logging level:

- None
- Verbose

\*Maximum send message size (MB):

35

Save

Cancel

SMS Normal Priority (normal.sms)172.31.21.63&172.31.5.112(TST6)

general  
▶ **delivery**  
scoping

\*Network settings:  
Specify how to send mail with this connector.

MX record associated with recipient domain  
 Route mail through smart hosts

+ ✎ -

SMART HOST
<b>172.31.21.63</b>
172.31.5.112

Smart host authentication:  
 None  
 Basic authentication  
 Offer basic authentication only after starting TLS

\*User name:

\*Password:

Note: all smart hosts must accept the same username and

Save Cancel

SMS Normal Priority (normal.sms)172.31.21.63&172.31.5.112(TST6)

general  
 delivery  
 ▶ scoping

\*Address space:  
 Specify the address space or spaces to which this connector will route mail.

+ ✎ -

TYPE	DOMAIN	COST
SMTP	normal.sms	1

Scoped send connector

\*Source server:  
 Associate this connector with the following servers containing transport roles. You can also add Edge Subscriptions to this list.

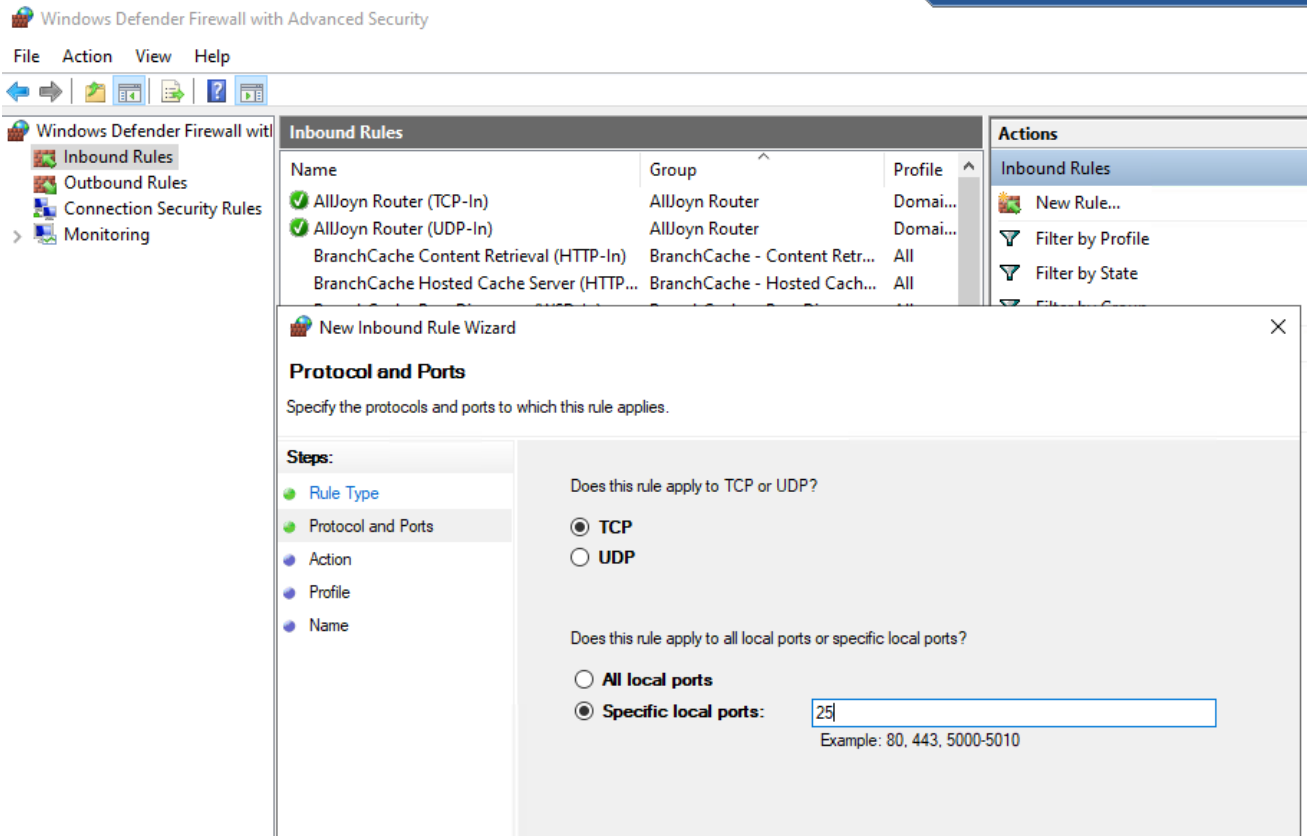
+ -

SERVER	SITE	ROLE	VERSION
AWSEXCHANGE	AWS.DEV/C...	Mail...	Version ...

Save Cancel

5.1.1 SMS Server port 25 for Exchange Server to send to SMS Server

- If your design has Exchange server then allow port 25 inbound on the SMS Servers. There is a whitelist option to allow only connections from specific IP addresses in the configuration ini file.

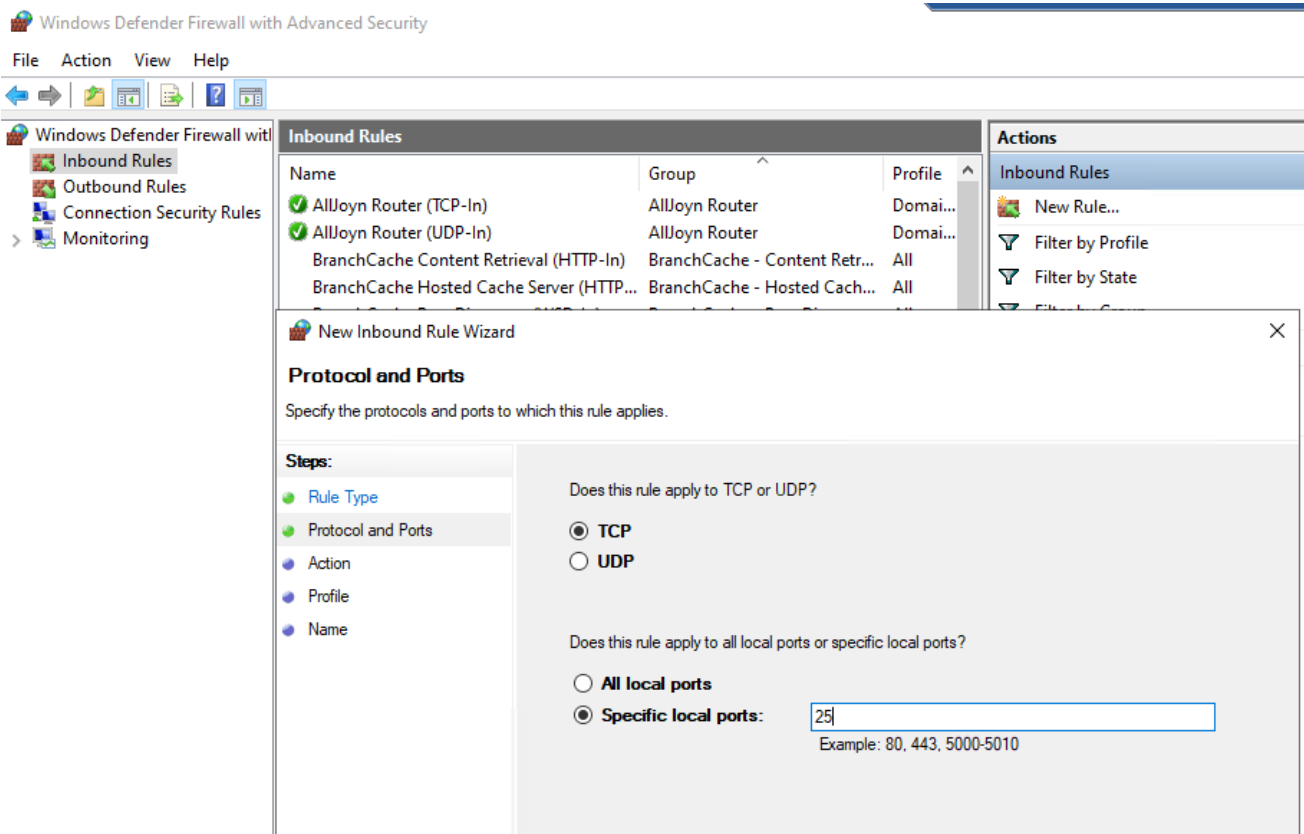


- Example above is Windows Defender firewall allow inbound rule port 25

## SECTION 6 Preparing your SMS server

### 6.1 Windows Server Operating System

- Perform a typical installation of Windows Server in a domain if you have an Active Directory domain. The software can work without a domain such as in a DMZ.
- If your design has on-premises\in-tenancy Exchange server then allow port 25 inbound on the SMS Server. There is a whitelist option to allow only connections from specific IP addresses in the smsboot.ini file.



- Example above is Windows Defender firewall allow inbound rule port 25

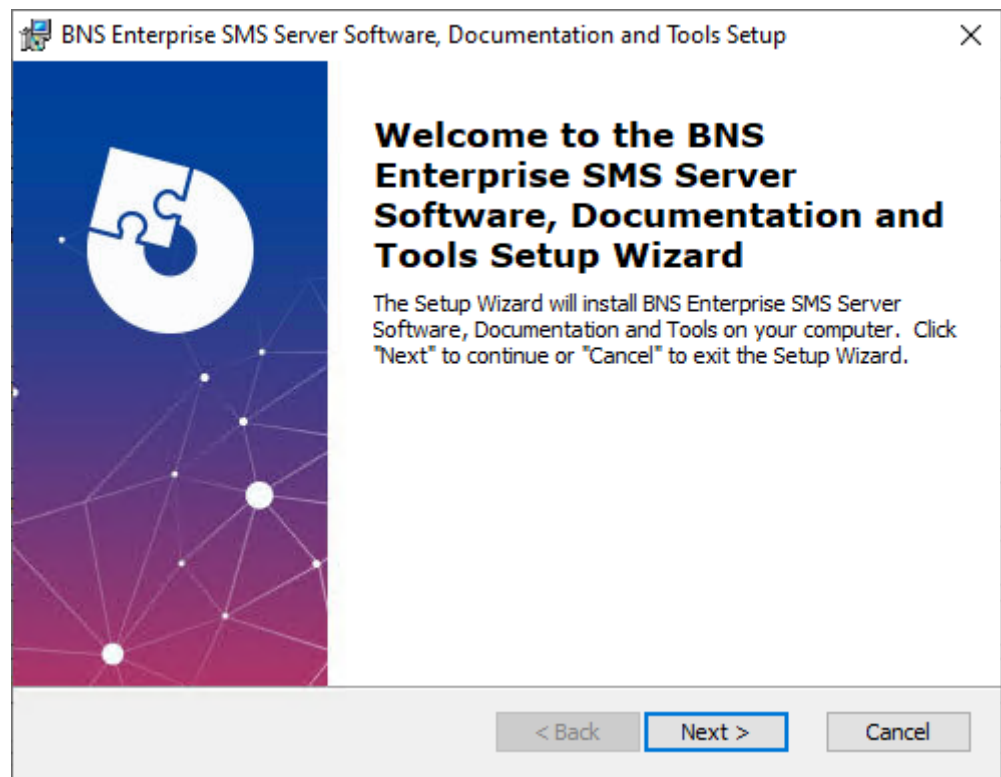
## SECTION 7 Installation folders

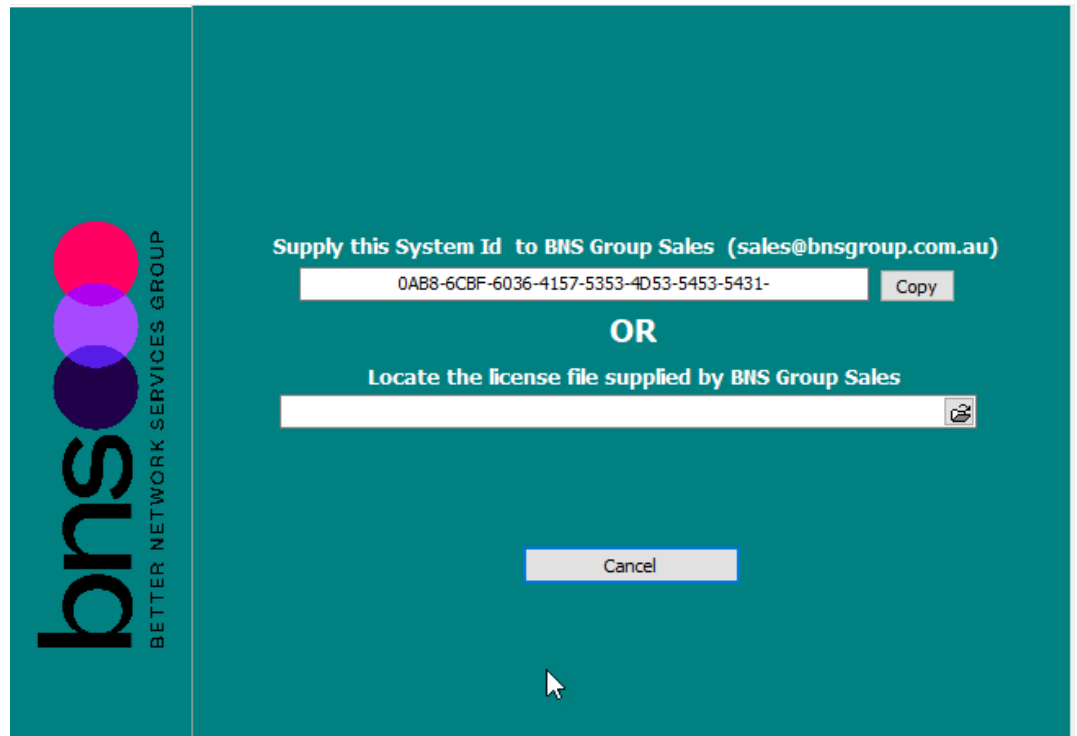
### 7.1 Installing the installation files

**Note:**

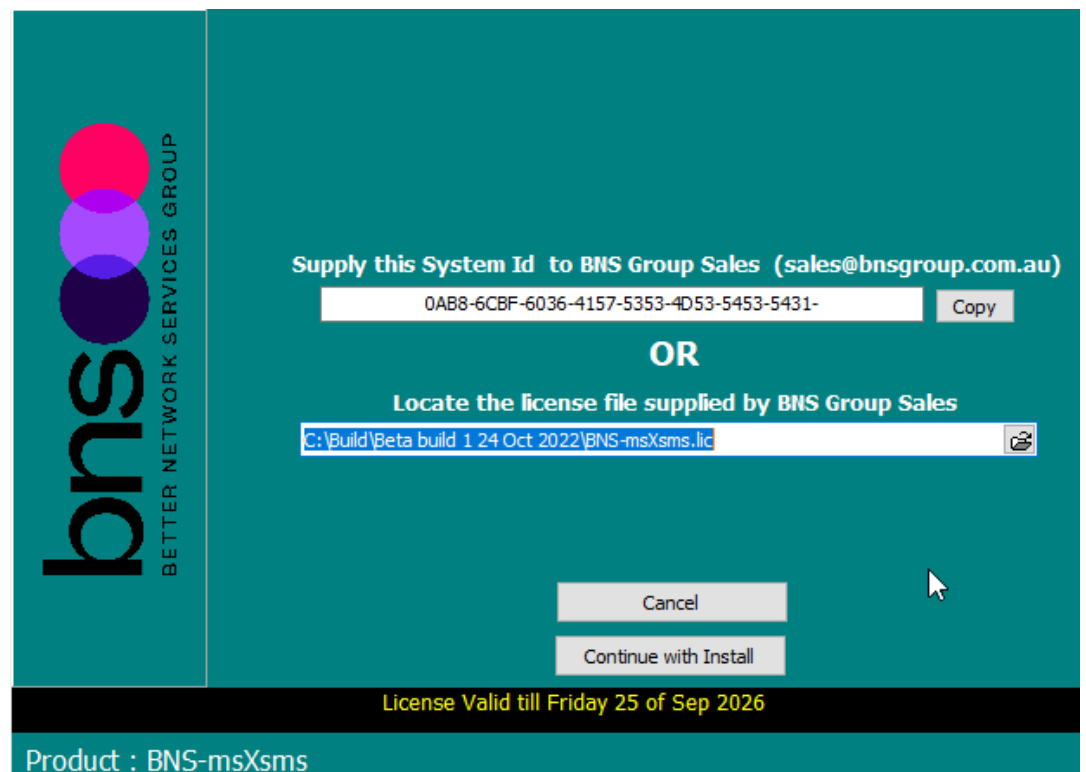
**This step is required first because it extracts the SQL scripts available along with other files.**

- Download the SMS Software from <https://smskb.bnsgroup.com.au/software-downloads>
- Extract the files to a location on the Windows Server where you will install the software.
- Run the command prompt elevated (Right click the Start icon and select Command Prompt (Admin))
- From within the command prompt run the MSI Installer install\_sms.msi
- Follow the wizard.

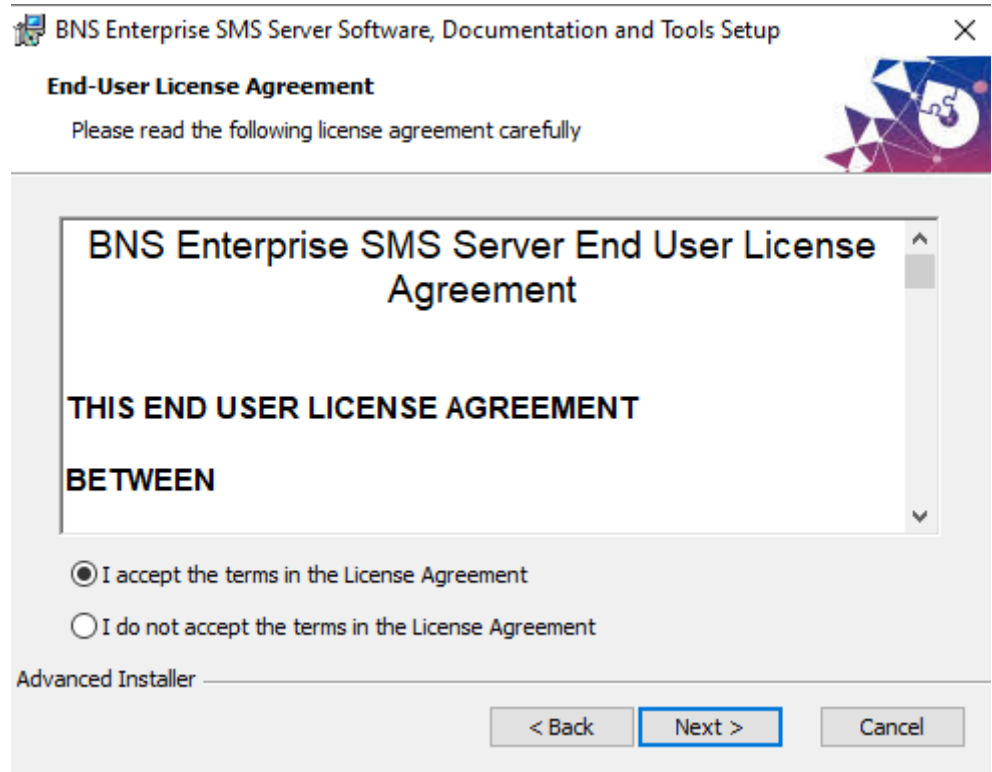




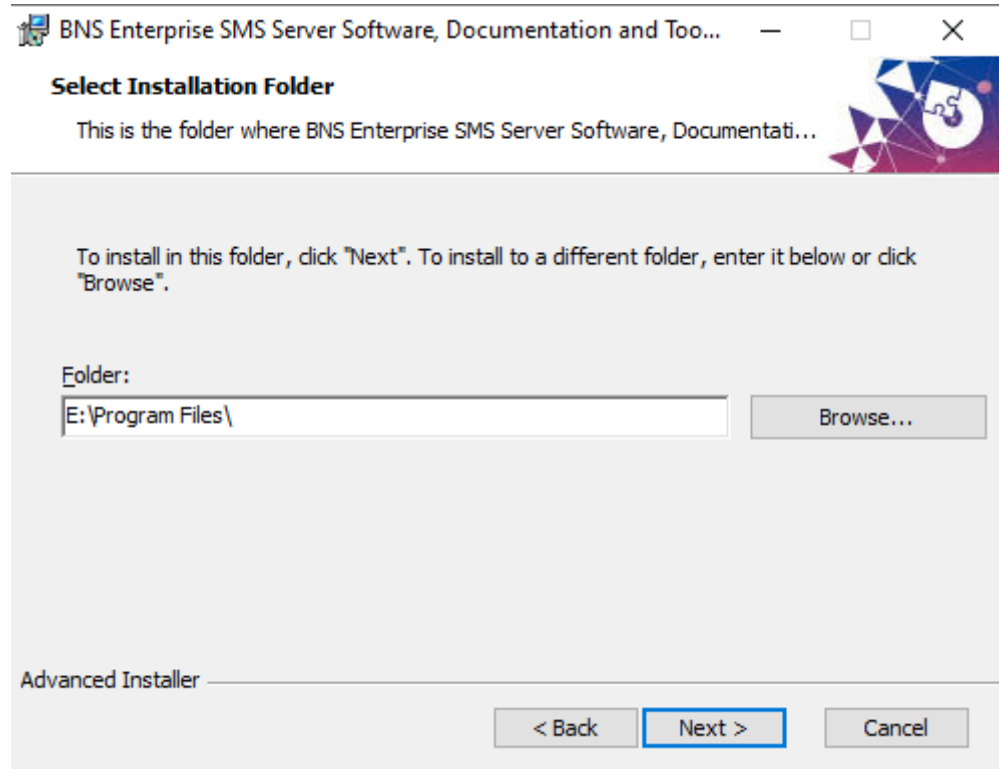
- A license file is required at installation time. Contact your integration partner for a limited trial license or a production license key. The System ID is displayed on the wizard and will be required for a license key to be generated.
- Example shown below.



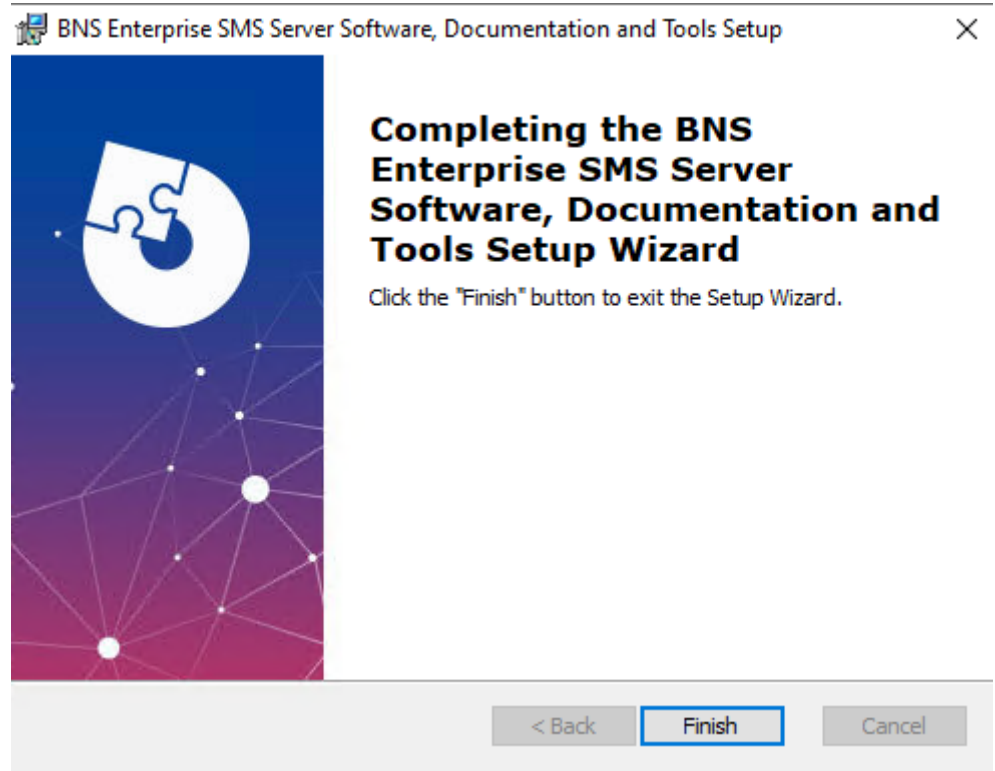
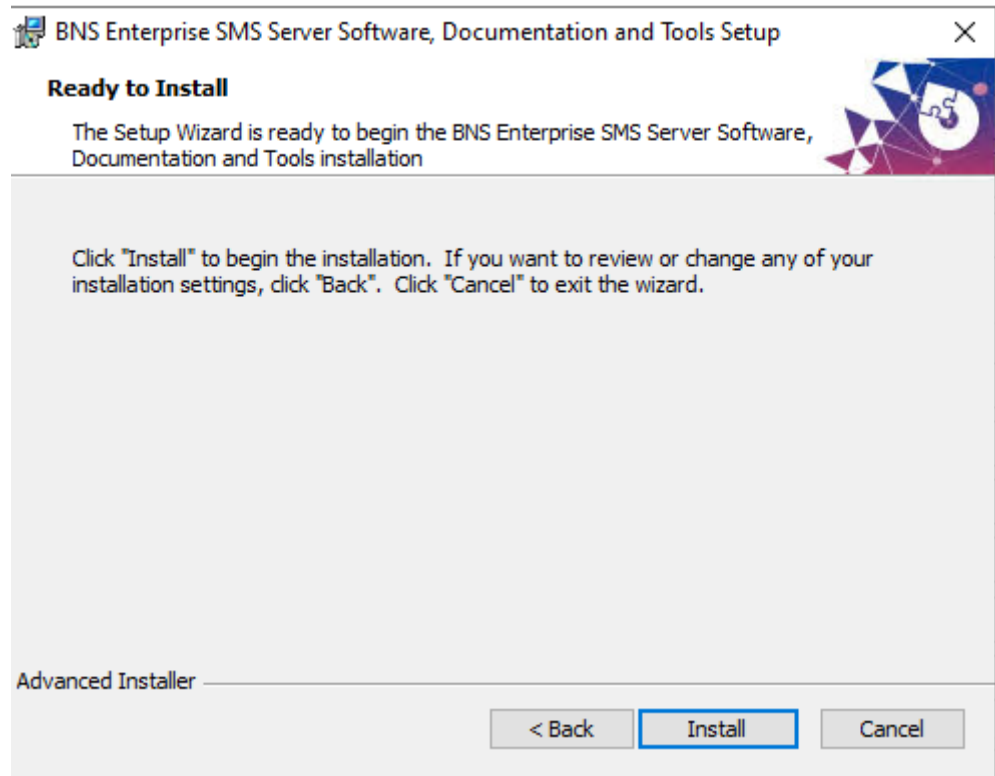
- Press continue











- Change the driver letter only if you have an application volume.







Data (E:) > Program Files > BNS Group > BNS Enterprise Sms Installation Software Documentation and Tools >

Name	Date modified	Type	Size
 BNS SMS Analytics	4/10/2024 11:19 AM	File folder	
 BNS SMS Console IIS Components	4/10/2024 11:19 AM	File folder	
 BNS SMS NT Events	4/10/2024 11:19 AM	File folder	
 BNS SMS Software	4/10/2024 11:19 AM	File folder	
 BNS SMS SQL DDL Scripts	4/10/2024 11:19 AM	File folder	
 BNS SMS SQL Test Utility	4/10/2024 11:19 AM	File folder	
 BNS SMS TestFrame	4/10/2024 11:19 AM	File folder	
 EULA	4/10/2024 11:19 AM	File folder	

---

## SECTION 8 Setup databases in AWS RDS Microsoft SQL Server

- 
- ❗ Most enterprise customers already have a central SQL Server platform which should be used. Microsoft SQL Server and SQL Express are supported in AWS. SQL Express is only to be used for proof of concepts
- 

AWS RDS MS SQL Server endpoint and port information is available in the AWS Console under RDS, Databases.

- 
- ❗ AWS RDS endpoint connection string must be used. **Do not use the Listener endpoint.**
- 

If you wish to deploy a new Amazon RDS for SQL Server instance then please follow the AWS guide at -

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_GettingStarted.CreatingConnecting.SQLServer.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.CreatingConnecting.SQLServer.html)

For high availability, deploy Multi-AZ RDS

([https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER\\_SQLServerMultiAZ.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/USER_SQLServerMultiAZ.html))


- 
- ❗ Security best practice is to not allow public access to your AWS RDS SQL Server.
- 

The high availability configuration is discussed in section 4.4 in detail.

## 8.1 SQL Server Database creation and sizing

Table 4: SQL Server database capacity planning

Database	Est transaction storage	Size of database	Comments
sms-archive	10 million records in Main Store table	15GB Initial sizing depends on expected total number of transactions.	This includes index space. If you plan to have 100million archive records then make your database size 150GB with room to grow. SQL transaction log files can be set to 30% of the estimated database size requirement.
sms-current	Cleared daily	1GB for large installations	This database contains transient data only. Information is moved to the archive early hours the following day. SQL transaction log files can be set to 30% of the estimated database size requirement.
SMS-SQL-API	Transient, cleared as transactions are processed	1GB initial size	This database contains transient data only. It is cleared by applications and the SMS software. SQL transaction log files can be set to 30% of the estimated database size requirement. <b>Row level security (RLS) is required when there is more than 1 application accessing this database.</b>

 SQL Admins are responsible for creating 3 databases.

Refer to this article for SQL transaction log file sizes.

[Manage transaction log file size - SQL Server | Microsoft Learn](#)

“The default auto growth size increment for new databases is 64 MB. Transaction log file autogrowth events larger than 64 MB cannot benefit from instant file initialization”.

The Database names can be named in accordance with your standards.

The default database names are:

- sms-current
- sms-archive
- sms-sql-api

- Create all 3 databases manually in accordance with your standards.  
3 DDL scripts are provided to create tables and indexes.

The scripts are located in the BNS Sms SQL DDL Scripts folder where the software was initially installed on the SMS Windows Server.

Data (E:) > Program Files > BNS Group > BNS Enterprise Sms Installation Software Documentation and Tools >

Name	Date modified	Type	Size
BNS SMS Analytics	4/10/2024 11:19 AM	File folder	
BNS SMS Console IIS Components	4/10/2024 11:19 AM	File folder	
BNS SMS NT Events	4/10/2024 11:19 AM	File folder	
BNS SMS Software	4/10/2024 11:19 AM	File folder	
BNS SMS SQL DDL Scripts	4/10/2024 11:19 AM	File folder	
BNS SMS SQL Test Utility	4/10/2024 11:19 AM	File folder	
BNS SMS TestFrame	4/10/2024 11:19 AM	File folder	
EULA	4/10/2024 11:19 AM	File folder	

SQL DBA’s can modify and execute the scripts according to their standards and tools they use.

Execute the scripts to create tables in the databases in this order:

- sms-current-virgin-build.sql against the SMS-CURRENT DB.  
(note this also creates the SMS-SQL-API DB tables)
- sms-archive virgin-build.sql against the SMS-ARCHIVE DB.
- sms-archive-create-indexes.sql against the SMS-ARCHIVE DB.

SQL DDL command file	Description
sms-current-virgin-build.sql	Creates the tables in the SQL Database called sms-current. Used for intial creation of tables in the first deployment at your site. You may change the name of

	the Database to your standards. <b>Note this script also creates the SMS-SQL-API DB.</b>
sms-archive-virgin-build.sql	Creates the tables in the SQL Database called sms-archive. Used for initial creation of tables in the first deployment at your site. You may change the name of the Database to your standards.
sms-archive-create-indexes	Provides a series of recommended indexes to create for reporting and inquiry purposes. Modify this to suit your specific needs.

- SQL DBA will execute the SQL statements using SQL Management Studio or other tools against the respective Databases to create the tables.

## 8.2 Login Permissions SMS server service account & smsconsole

- SQL DBA must create SQL Local users and provide full permissions to all databases to the sms service account (SMSServiceAccount) and a SQL user called smsconsole.

Databases	Permissions required	Comments
sms-current sms-archive SMS-SQL-API	DataReader and DataWriter	must be a SQL Local user account added to the SQL database.

## 8.3 Row level security (RLS) for SMS-SQL-API database tables

Row-Level Security (RLS) as the name suggests is a security mechanism that restricts the records from a SQL Server table based on the authorization context of the current user that is logged in.

➤ Implementing RLS is mandatory

Articles on RLS can be found at:

<https://www.sqlshack.com/introduction-to-row-level-security-in-sql-server/> and

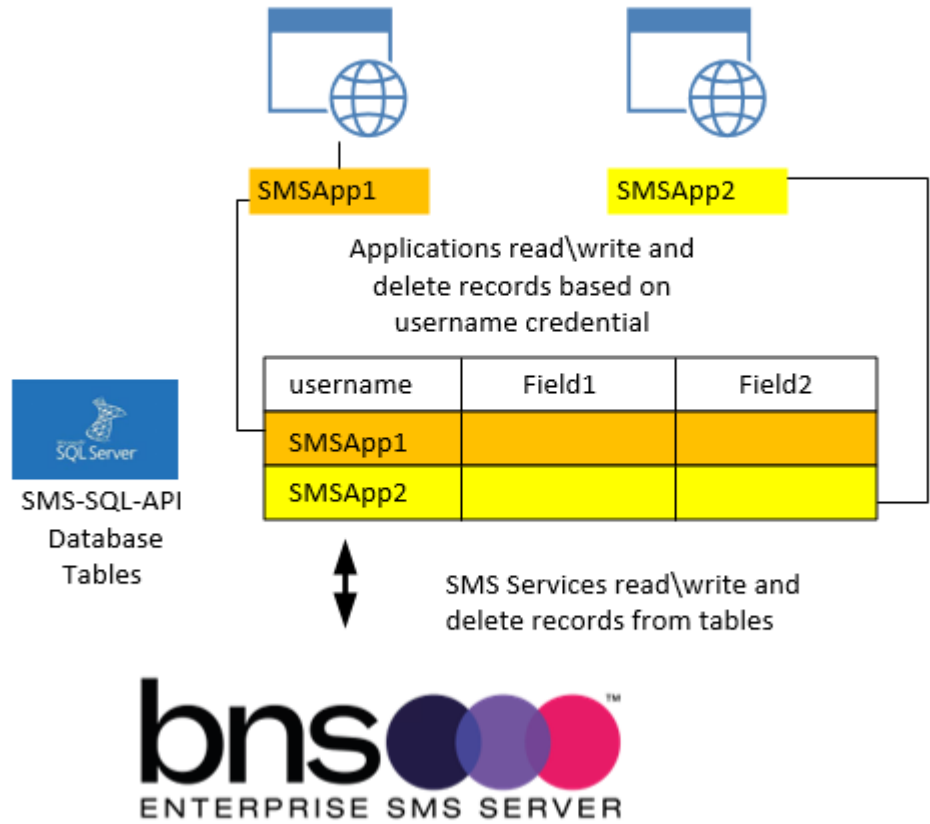
<https://docs.microsoft.com/en-us/sql/relational-databases/security/row-level-security?view=sql-server-ver16>

The Microsoft article states that:

- If a **dbo user, a member of the db\_owner role, or the table owner** queries a table that has a security policy defined and enabled, **the rows are filtered or blocked as defined by the security policy.**

This is why the SMS Server service account SQL user login also needs to be included in the RLS Scripts.

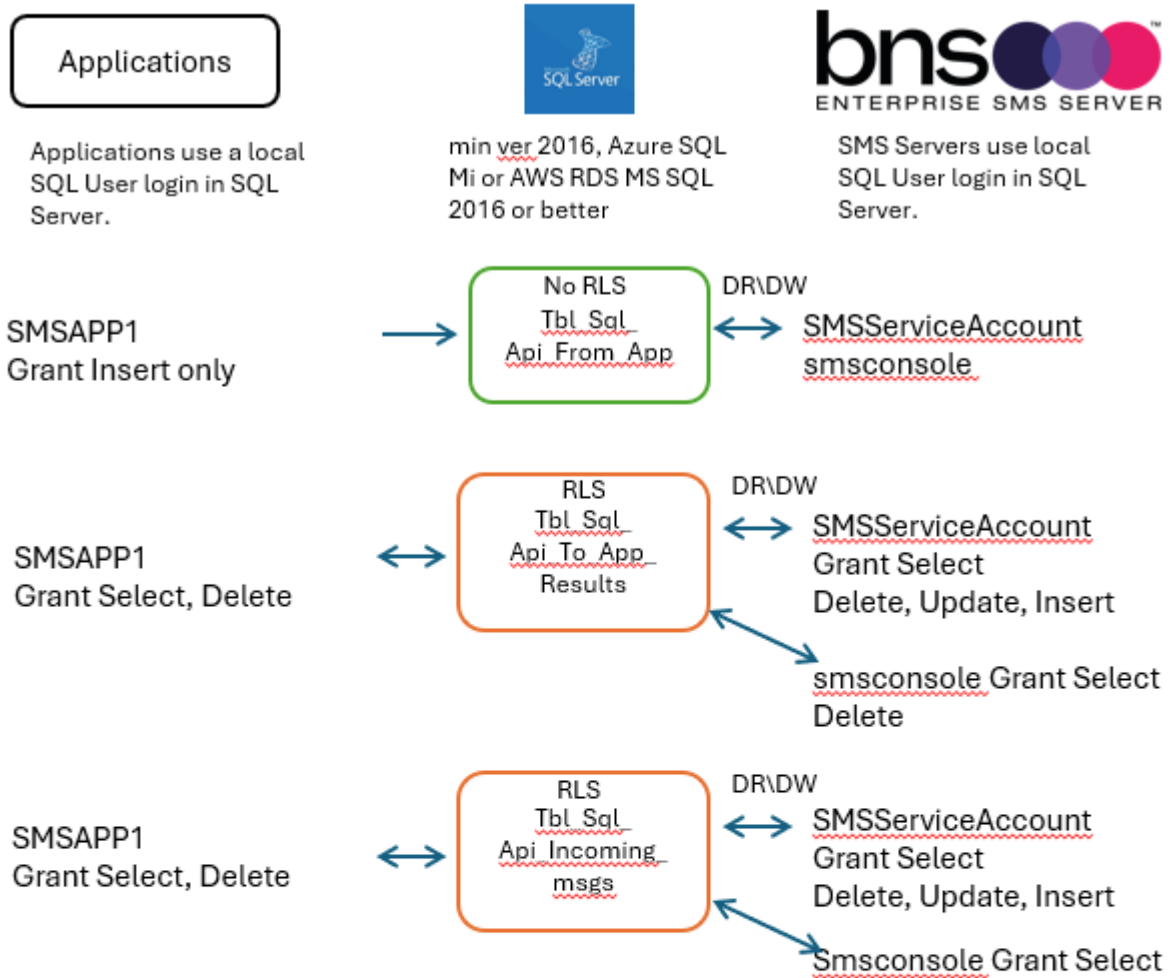
SQL Server row level security allows Applications to access only their records



The DDLs provided in the software provides SQL admins the ability to assign RLS based on the application’s SQL user login.



## 8.4 Implementing user login row level security using the scripts provided



SQL table securable permission with Row level security (RLS)

DR = Datareader

DW = Datawriter

Application accounts above are SQL user logins

SECURITY POLICY is a UserFilter (FILTER PREDICATE)

Which uses table column Main App UserName

The column Main App UserName exists in all 3 tables above but RLS is only needed on the orange coloured tables above.

Applications will simply write their request into the FROM App table with no requirement for RLS because the core SMS Services will read and delete the requests in the FROM App table

The above diagram shows the permissions required for RLS for applications and the SQL server service account. RLS is applied only to the SQL\_API\_To\_App\_Results table and SQL\_API\_Incoming\_msgs table. The SQL\_API\_FROM\_APP table has

normal specific permissions for the SMS Service Account SQL User and Applications.

smsconsole

- smsconsole SQL user has SELECT on all 3 SQL API DB tables in order to perform COUNTS for QUEUE display.
- smsconsole SQL user has Grant select and delete on the To\_App\_Results for QUEUE display and also to process its own results for the send SMS function in the console.
- smsconsole SQL user has Grant select on the incoming\_msgs table for QUEUE display.

Assumptions:

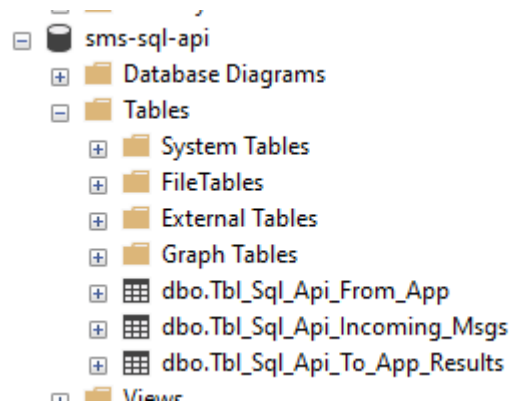
1. You have created a database called SMS-SQL-API database which is populated with 3 tables. The DDL which created the SMS-Current database tables also creates the SMS-SQL-API database tables.
2. SMSServiceAccount & smsconsole SQL user logins have datareader and datawriter permissions to SMS\_SQL\_API database.

---

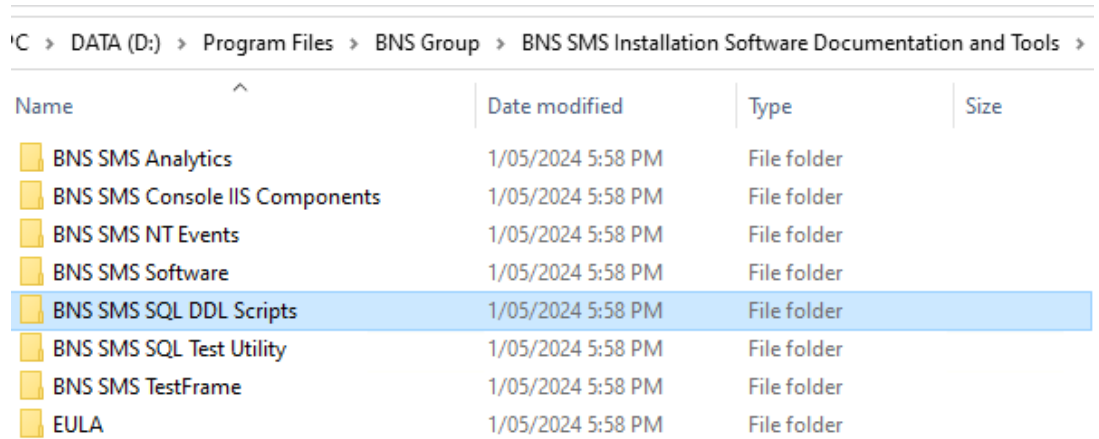
ⓘ RLS is not used with the SQL\_API\_FROM\_APP Table only the SQL\_API\_To\_Results and SQL\_API\_Incoming\_Msgs tables.

---

The tables in the SMS-SQL-API should be as follows:



Locate the SQL Query files in the SQL DDL scripts folder.



## 8.5 RLS Scripts

Locate the RLS Scripts in the BNS SMS SQL DDL Scripts folder.

Follow these steps to implement RLS on the SMS-SQL-API database tables.

### 8.5.1 Step 1 - GRANT Select for the SMS Service account SQL login

The SQL query file is called "RLS - STEP1 Grant\_sselect\_on\_SQL\_API for ALL SQL\_API tables".

- If your SMSServiceAccount is different (ie: to comply with your naming standards) simply change SMSServiceAccount in this script to comply with your standards.
- Run the SQL Query on the database tables

The SQL query will look similar to this example

---

**Note:** Grant Select is required for RLS even though the role permissions are datareader and datawriter for the SMS Service account SQL User

---

```
USE [SMS-SQL-API]
GO

/* assign select permission for the SMS Service account to the 2 tables which have RLS policies in the SQL-API
database.

SMSServiceAccount will have Datareader and Datawriter permissions to the Database. SMSServiceAccount does require
explicit permission to the tables noted below which have RLS.

24-9-2024 SMSConsole requires permissions for the Console to perform SQL Send testing and Counting

Note: Windows Domain authentication is not supported.

From App table does not have RLS. Applications will have write access only to the FROM APP table. Applications will
not have read access to the FROM APP table.

*/

GRANT SELECT, DELETE, UPDATE, INSERT ON dbo.Tbl_Sql_Api_To_App_Results TO SMSServiceAccount
GRANT SELECT, DELETE, UPDATE, INSERT ON dbo.Tbl_Sql_Api_incoming_msgs TO SMSServiceAccount

GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_To_App_Results TO SMSConsole
GRANT SELECT ON dbo.Tbl_Sql_Api_incoming_msgs TO SMSConsole
```

### 8.5.2 Step 2 – Create Inline Table-valued Function for selected SQL\_API tables

The SQL query file is called “RLS – STEP2 Create\_inline\_tablevalued\_Functions for select SQL\_API tables”.

Microsoft recommend using a Security schema specifically for RLS objects hence we have a schema called SMS\_RLS\_Security

Refer to <https://docs.microsoft.com/en-us/sql/relational-databases/security/row-level-security?view=sql-server-ver16>

This script creates the RLS Security schema and 2 Functions.

If your SMSServiceAccount SQL user name is different (ie: to comply with your naming standards) simply change SMSServiceAccount to comply with your standards.

You will note that the script has WHERE @UserName = USER\_NAME()

This is included in the Filter predicate for all applications which will be added to the system.

Note: Windows Domain Authentication is not supported therefore the SMSServiceAccount is a local SQL User. The reason for this is that some customers do not have Windows Auth setup for Azure SQL Mi. eg: CASA. There are complexities with Kerberos authentication in Entra so our design has to be simple and therefore SQL User login for the SMS Service Accounts that need to access SQL is the design.

24-9-2024 SMSConsole requires permissions for the Console to perform SQL Send testing and Counting

#### Notes

hyphens in sql user names in Azure are not allowed.

see article <https://stackoverflow.com/questions/6476828/new-user-cannot-login-to-sql-azure>

Microsoft recommend using a Security schema specifically for RLS objects hence we have one called SMS\_RLS\_Security

refer to <https://docs.microsoft.com/en-us/sql/relational-databases/security/row-level-security?view=sql-server-ver16>

\*/

```
USE [SMS-SQL-API]
GO
```

```
CREATE SCHEMA SMS_RLS_Security;
GO
```

```
CREATE FUNCTION SMS_RLS_Security.fn_SQL_API_TO_APP_RESULTS_Security(@UserName AS sysname)
    RETURNS TABLE
    WITH SCHEMABINDING
    AS
    RETURN SELECT 1 AS fn_SQL_API_TO_APP_RESULTS_Security_Result
    -- Logic for filter predicate
    WHERE @UserName = USER_NAME()
    OR USER_NAME() = 'SMSServiceAccount'
    OR USER_NAME() = 'SMSConsole'
    OR USER_NAME() = 'admin';
```

```
GO
```

```
CREATE FUNCTION SMS_RLS_Security.fn_SQL_API_Incoming_Msgs_Security(@UserName AS sysname)
    RETURNS TABLE
    WITH SCHEMABINDING
    AS
    RETURN SELECT 1 AS fn_SQL_API_Incoming_Msgs_Security_Result
    -- Logic for filter predicate
    WHERE @UserName = USER_NAME()
    OR USER_NAME() = 'SMSServiceAccount'
    OR USER_NAME() = 'SMSConsole'
    OR USER_NAME() = 'admin';
```

```
GO
```

---

**!** Remove user name 'admin' (if present) before you run this DDL.

---

### 8.5.3 Step 3 – Apply RLS Security policy for all tables

The SQL query file is called “RLS – STEP3 Apply\_Security\_Policy\_SQL\_API for ALL SQL\_API tables”.

No changes are required to this script.

The script creates the RLS Policy.

Run the script

```
USE [SMS-SQL-API]
GO

/* assign security policies for 2 tables in the SQL-API database */

CREATE SECURITY POLICY UserFilter_SQL_API_To_App_Results
ADD FILTER PREDICATE SMS_RLS_Security.fn_SQL_API_To_APP_Results_Security(Main_App_UserName)
ON dbo.Tbl_SQL_API_TO_APP_RESULTS

WITH (STATE = ON);
GO

CREATE SECURITY POLICY UserFilter_SQL_API_Incoming_Msgs
ADD FILTER PREDICATE SMS_RLS_Security.fn_SQL_API_Incoming_Msgs_Security(Main_App_UserName)
ON dbo.Tbl_SQL_API_Incoming_Msgs

WITH (STATE = ON);
GO
|
```

## 8.6 Creating SMSTestframe SQL users

A utility program shipped with the software is called SMSTestframe. It is used by testers and developers to generate SMS messages and processed results.

The first 2 applications to use the SMS API Interface will be 2 x SMSTestframe users:

- SMSTestframe
  - SMSTestframe2
- This will allow installers to run the testframe software on each SMS server using different SQL user logins to confirm operation is successful.

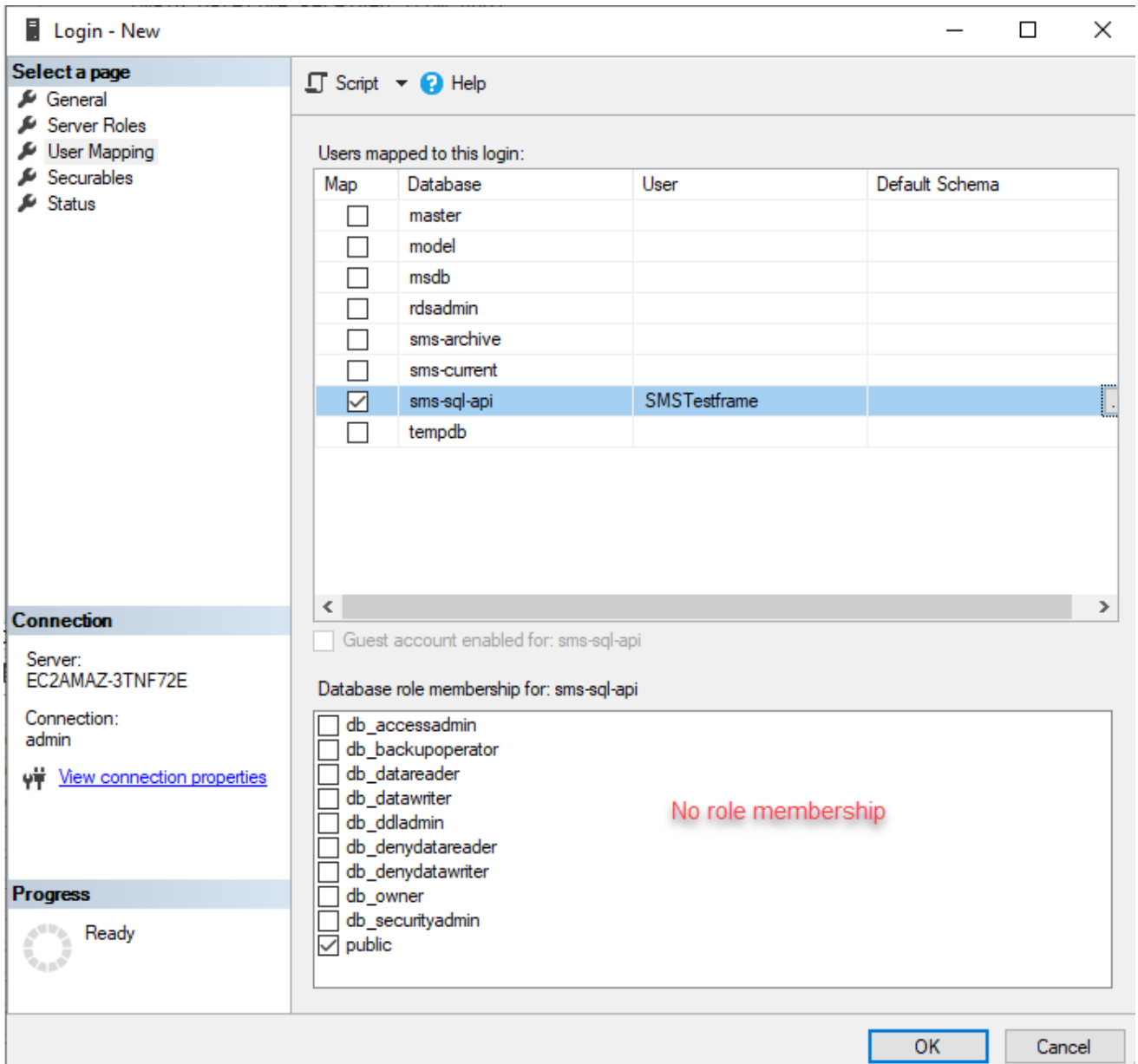
### 8.6.1 SQL Administrator actions to create application SQL users SMSTestframe and SMSTestframe2

- From SQL Server management studio navigate to SECURITY\LOGINS
- Create 2 new user login for the SMSTestframe and SMSTestframe2 users

The screenshot shows the 'Login - New' dialog box in SQL Server Enterprise Manager. The 'General' tab is selected. The 'Login name' is 'SMSTestframe'. 'SQL Server authentication' is selected. Password fields are filled with dots. 'Enforce password policy' is checked. 'Mapped to certificate' and 'Mapped to asymmetric key' are selected. 'Map to Credential' is checked. The 'Mapped Credentials' list is empty. 'Default database' is 'sms-sql-api' and 'Default language' is '<default>'. The 'Progress' bar shows 'Ready'.

- Select User Mapping
- Select the database SMS-SQL-API





■ OK

- Open a new query window
- The SQL script 'RLS - **Application users** Grant on STEP1 Grant\_on SQL API tables' is shown below.
- Run the script and apply the permissions to both SQL Users

```
USE [SMS-SQL-API]
GO

/* assign select permission for applications to all tables in the SQL-API database.

Note: Windows Domain authentication is not supported.

From App table does not have RLS but grant permissions are still required.

The first application SQL User to create is user = SMSTestframe

SMSTestframe SQL user is the application supplied by BNS used for testing purposes.

Please create the SMSTestframe SQL User then run this script to assign permissions

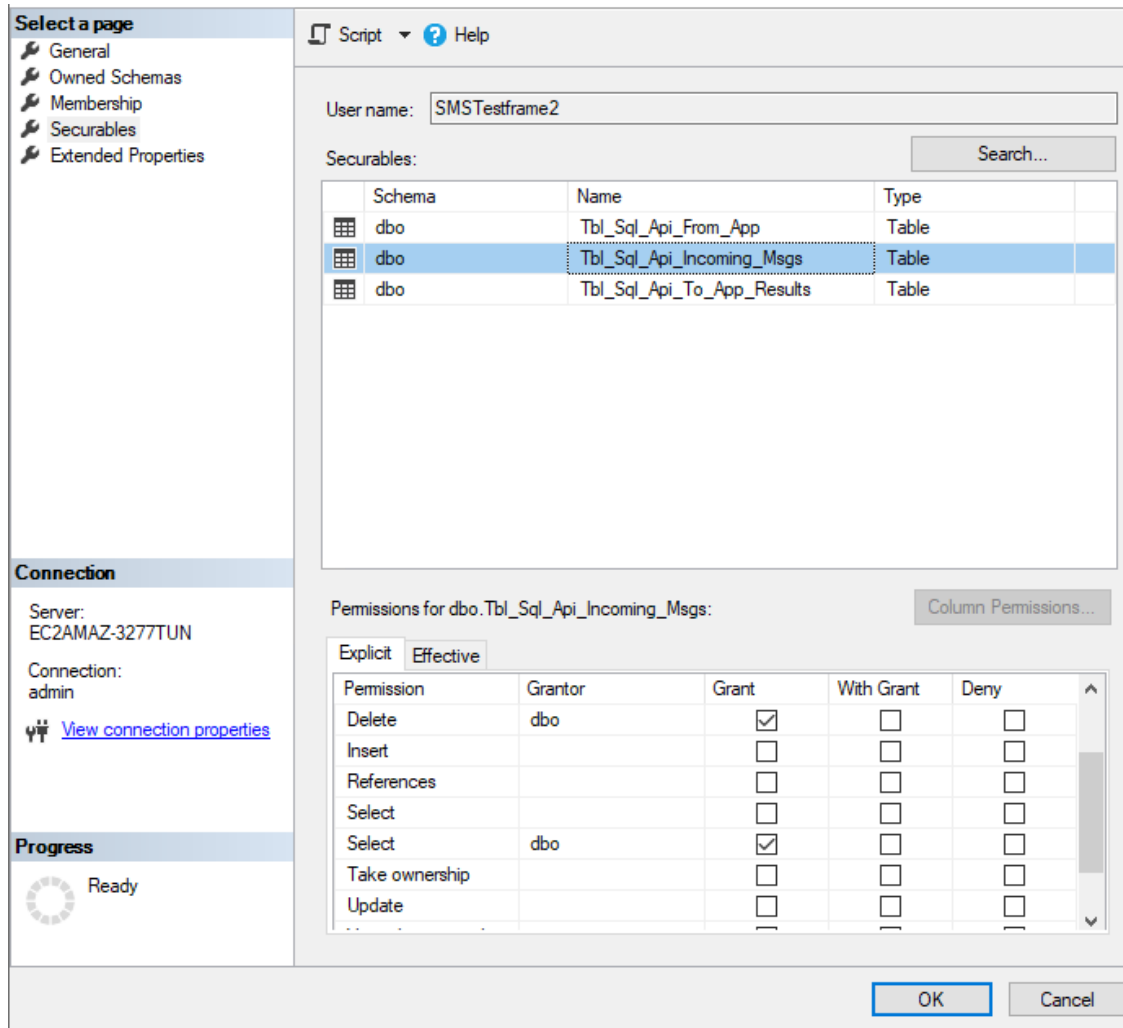
Follow the same procedure to create all other application users

*/

GRANT SELECT, INSERT ON dbo.Tbl_Sql_Api_From_App          TO SMSTestframe
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_To_App_Results  TO SMSTestframe
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_incoming_msgs   TO SMSTestframe

GRANT SELECT, INSERT ON dbo.Tbl_Sql_Api_From_App          TO SMSTestframe2
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_To_App_Results  TO SMSTestframe2
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_incoming_msgs   TO SMSTestframe2
```

- Execute the query
- **Navigate to Security under the Database itself.**
- Double click the user login
- Select Securables



- Check explicit permissions are correct for both users.

## 8.7 Onboarding applications to use the SQL-API database

### 8.7.1 Software developers

Advise your software developers to read the BNS knowledge base <https://smskb.bnsgroup.com.au/sqlinterface>

➤ Windows Authentication for applications is **not supported** because it would be too restrictive for applications not associated with a Windows based system.

- ❗ Some customers do not have the required trust relationships between their Windows AD and Microsoft Entra.

Credentials for applications using the SQL API Interface must be a local SQL user.

The screenshot shows the 'Login - New' configuration window. On the left, there is a navigation pane with 'Select a page' (General, Server Roles, User Mapping, Securables, Status), 'Connection' (Server: EC2AMAZ-3TNF72E, Connection: admin, View connection properties), and 'Progress' (Ready). The main area is titled 'Script Help' and contains the following fields and options:

- Login name: SMSQLEasyDoc (with a Search... button)
- Authentication options:
  - Windows authentication
  - SQL Server authentication
- Password: [masked]
- Confirm password: [masked]
- Specify old password
- Old password: [empty]
- Enforce password policy
- Enforce password expiration
- User must change password at next login
- Mapped to certificate: [dropdown]
- Mapped to asymmetric key: [dropdown]
- Map to Credential: [dropdown] (with an Add button)
- Mapped Credentials table:
 

Credential

 (with Remove button)
- Default database: sms-sql-api (dropdown)
- Default language: <default> (dropdown)

Application developers must add their SQL user login name to records they into the SMS\_SQL\_API\_From\_App table in a field called Main\_App\_UserName.

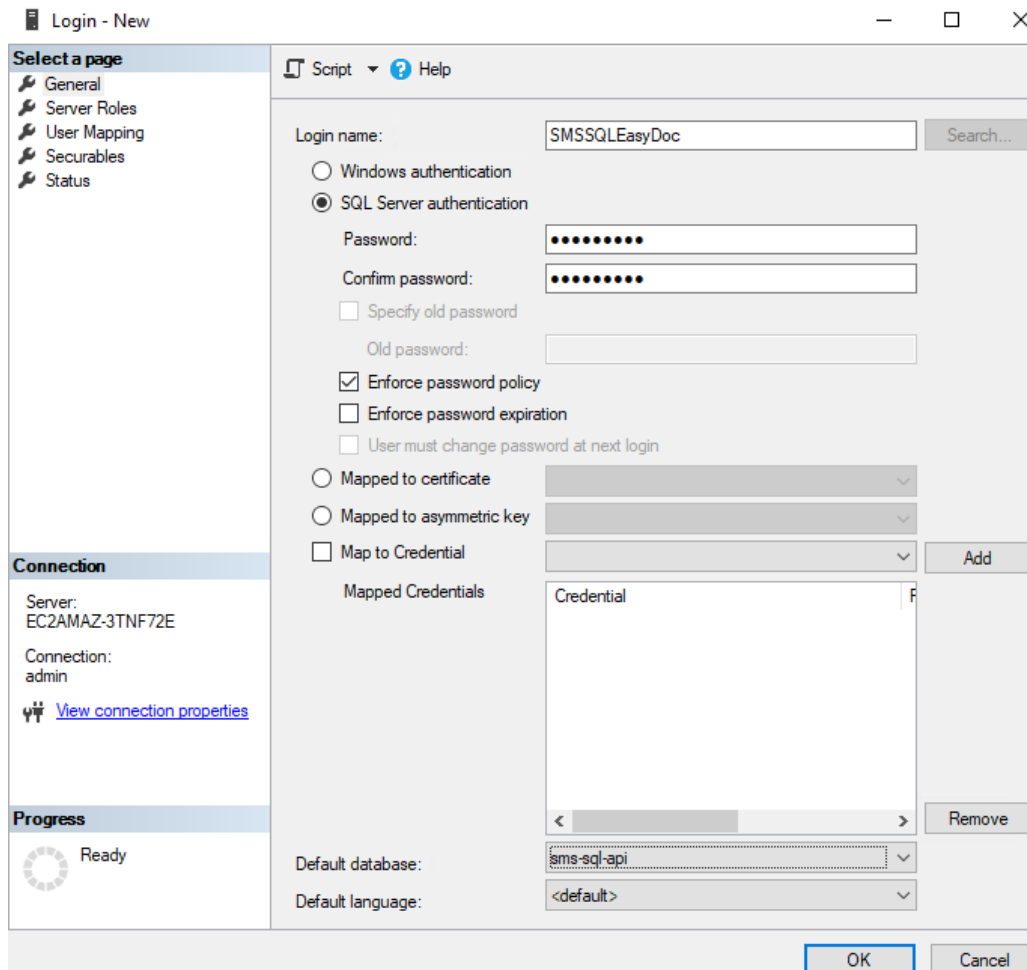
The SMS Server software provides the application’s SQL login username for transactions it writes back to the application in the Main\_App\_UserName field in the Tbl\_SQL\_API\_TO\_APP\_RESULTS and the Tbl\_SQL\_API\_INCOMING\_MSGS tables. The application’s Main\_APP\_UserName in the records which RLS then filters to each application.

Application developers do a `SELECT * FROM dbo.Tbl_Sql_Api_To_App_Results` and `dbo.Tbl_Sql_Api_incoming_msgs`.

RLS will only give them access to their records. Applications are responsible to process their results and any incoming SMS messages, deleting those records after they have processed them.

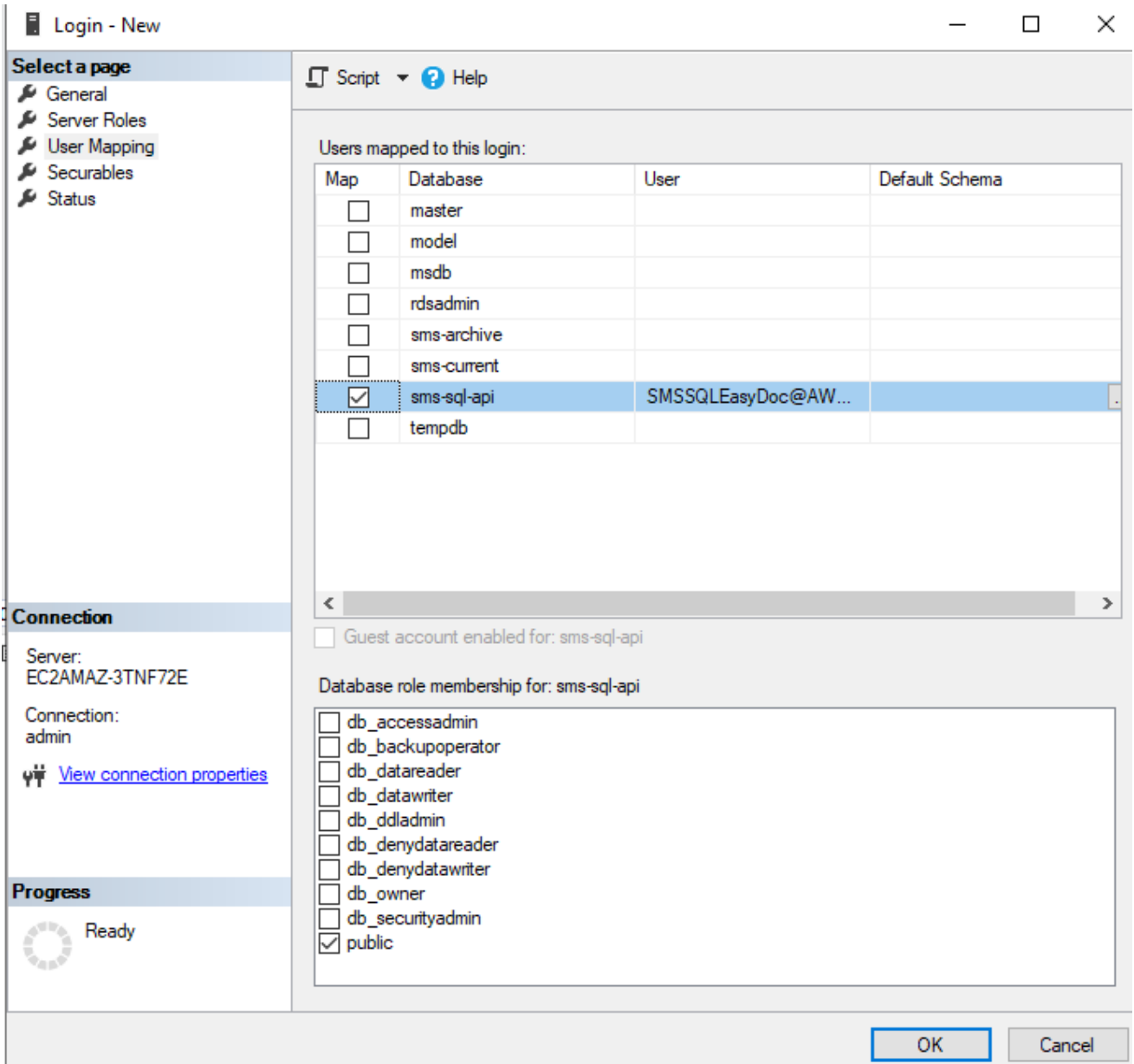
### 8.7.2 SQL Administrator actions to onboard new applications

- From SQL Server management studio navigate to SECURITY\LOGINS
- Create a new user login for the application you are on-boarding assign a SQL Local user



- Supply the SQL User login, password values and set their default database to sms-sql-api.

- Select User Mapping
- Select the database SMS-SQL-API



- OK

- Open a new query window
- The SQL script 'RLS - Application users Grant on STEP1 Grant\_on SQL API tables' is shown below.
- Run the script and apply the permissions to example user below

```

SQLQuery10.sql - sq...l-api (admin (150))*  SQLQuery16.sql - sq...l-api (admin (100))*  SQLQuery14.sql - sq...
USE [SMS-SQL-API]
GO

/* assign select permission for applications to all tables in the SQL-API database.
Note: Windows Domain authentication is not supported.
From App table does not have RLS.
The first application SQL User to create is user = SMSTestframe
SMSTestframe SQL user is the application supplied by BNS used for testing purposes.
Please create the SMSTestframe SQL User then run this script to assign permissions
Follow the same procedure to create all other application users
*/

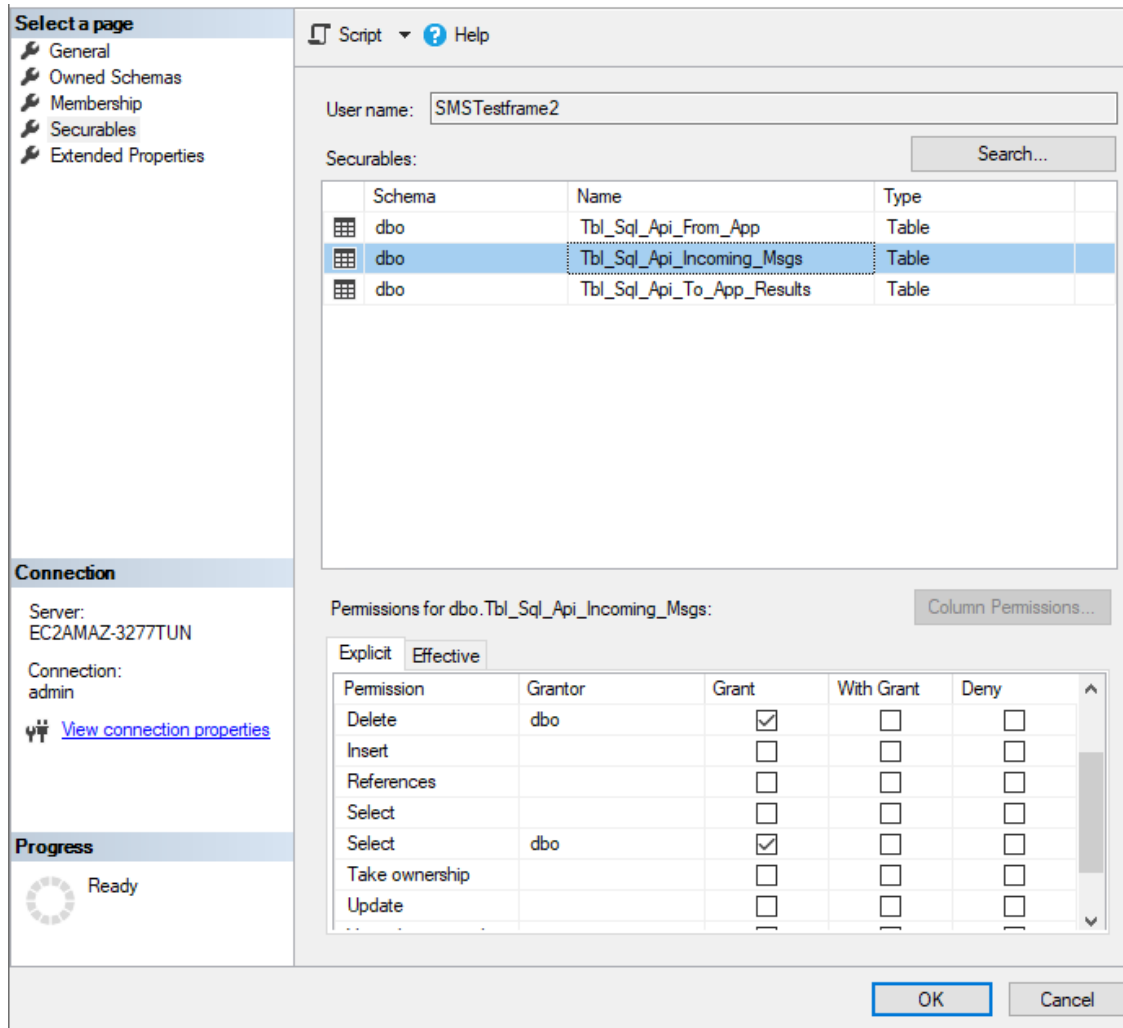
GRANT SELECT, INSERT ON dbo.Tbl_Sql_Api_From_App TO SMSSQLEasyDoc
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_To_App_Results TO SMSSQLEasyDoc
GRANT SELECT, DELETE ON dbo.Tbl_Sql_Api_incoming_msgs TO SMSSQLEasyDoc

100 %
Messages
Commands completed successfully.

Completion time: 2024-05-12T09:51:36.6589698+10:00

```

- Execute the query
- **Navigate to Security under the Database itself.**
- Double Click on the user login
- Select Securables



- Check explicit permissions are correct.



# SECTION 9 Install SMS Console

## 9.1 General

SMS Console is an IIS browser based console which can be installed on the Windows Server where the SMS software is installed. The SMS console should be installed on all servers.

It is compatible with most browsers including: Microsoft Edge.

### Console Software Requirements

Software	Version/service packs	Mandatory or optional	Vendor/Manufacturer
.net Framework	Version which comes with the OS	Mandatory	Microsoft Corporation
Internet Information Server	IIS which comes with the OS	Mandatory	Microsoft Corporation

#### 9.1.1 SQL Database Administrator (DBA)

- **Confirm** that your SQL DBA setup the smsconsole user from the previous section.

#### 9.1.2 Active Directory Security Groups

- ⓘ Customers who deploy this product in a workgroup can follow the same principles using local server groups and users.

In this section you will create an AD Security Group for your Configuration/ Admin Team to use. We have used the AD Security Group name 'SMS-Admin-Group'.

The SMS console will be expanded to perform other functions such as Operational functions as distinct from Configuration.

Setup another security group such as 'SMS-Operations-Group'. For now it will have no members it is for future use.

- Create an Active Directory Security Group for the infrastructure administrators eg: 'sms-admin-group'.

**NOTE:** Add your AD domain user account to that group and also the domain account you are currently using to perform the installation of this software.

- Create an Active Directory Security Group for the operations team eg: 'sms-operations-group'. No users required for this group as this is reserved for future use.

## 9.2 Installation of IIS for the Console

---

### 9.2.1 Install Internet Information Server

Microsoft's Internet Information Server is required to support SMS console.

This documentation describes the steps required to install IIS.

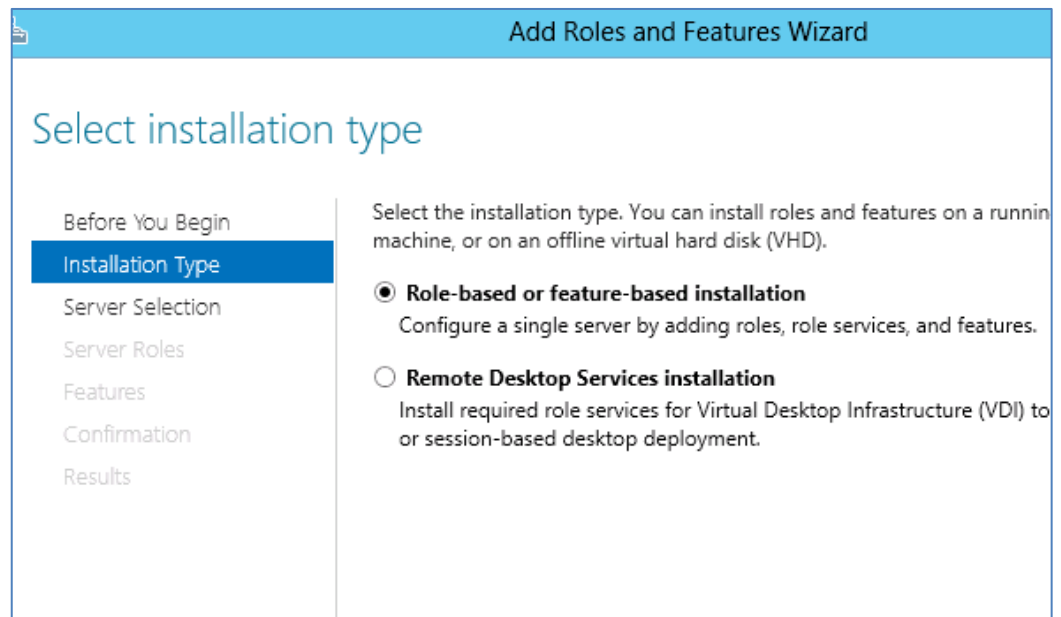
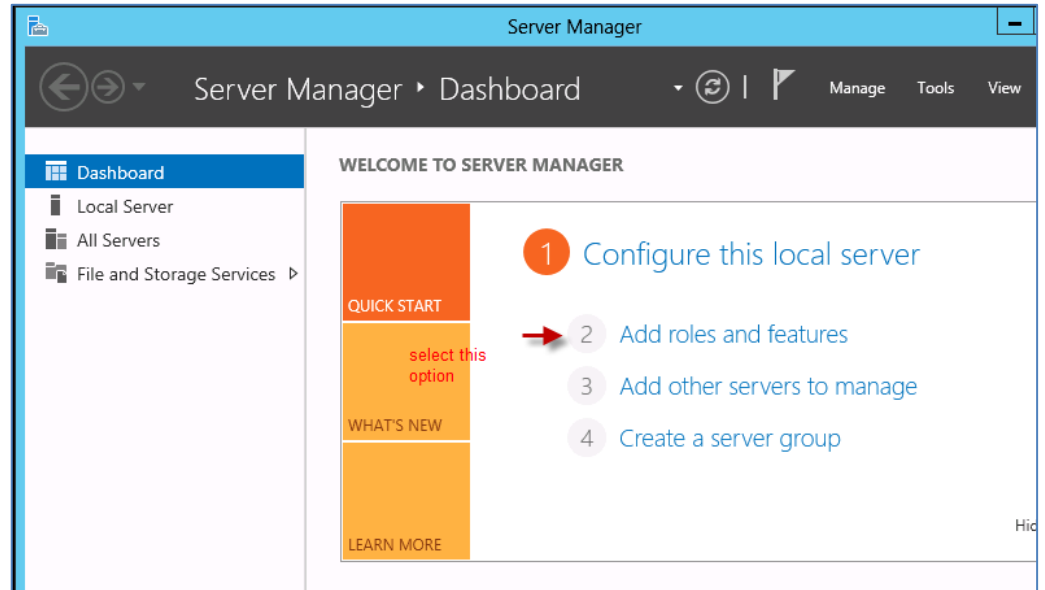
---

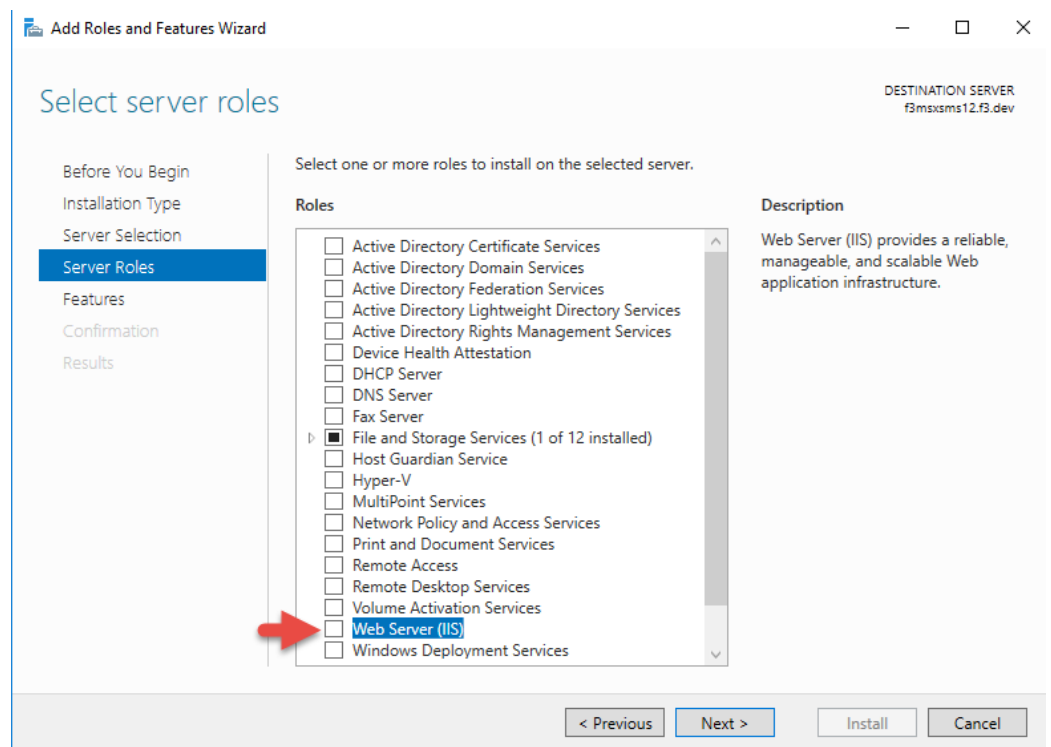
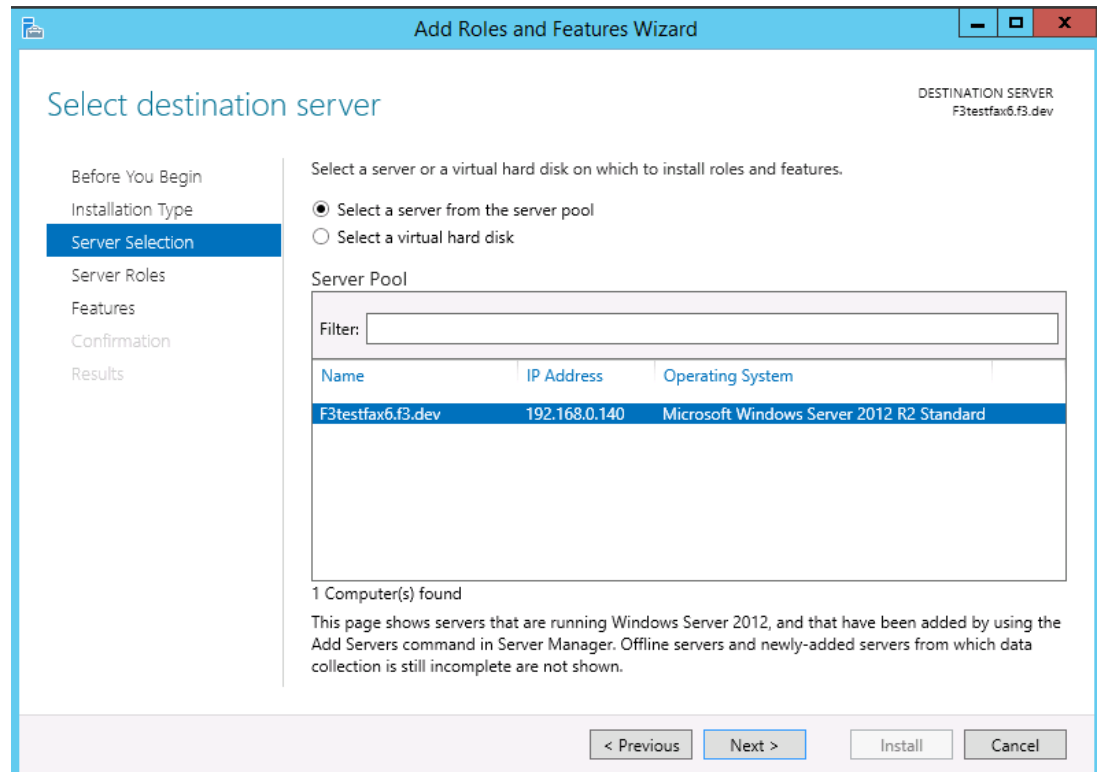
📌 Windows Server 2022 installs ASP.NET version 4.8 which is supported.

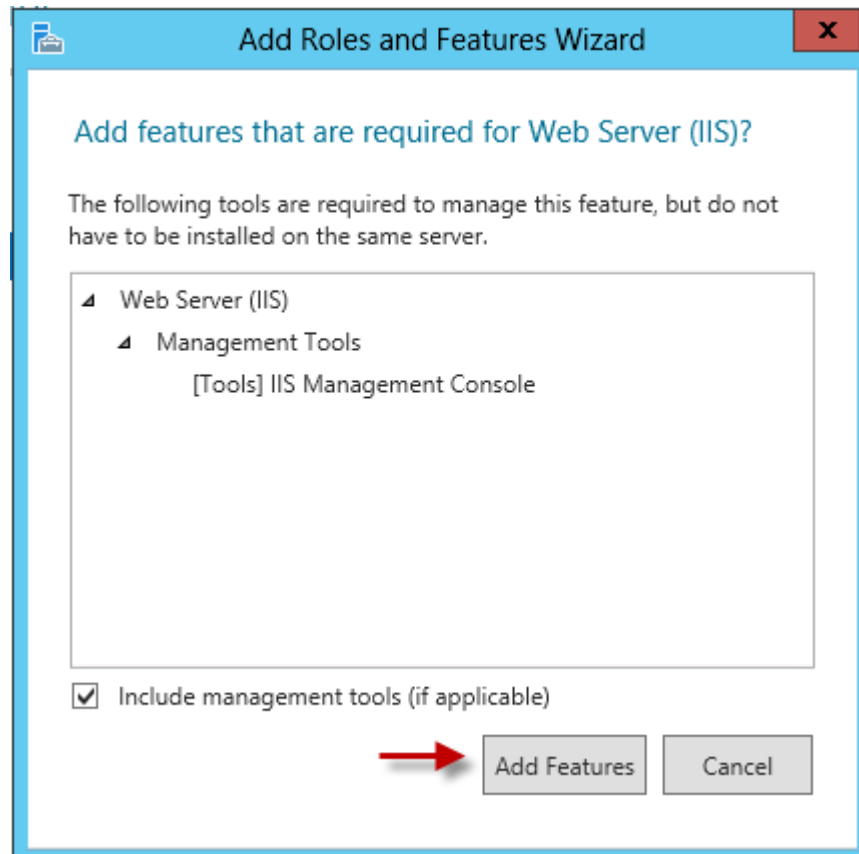
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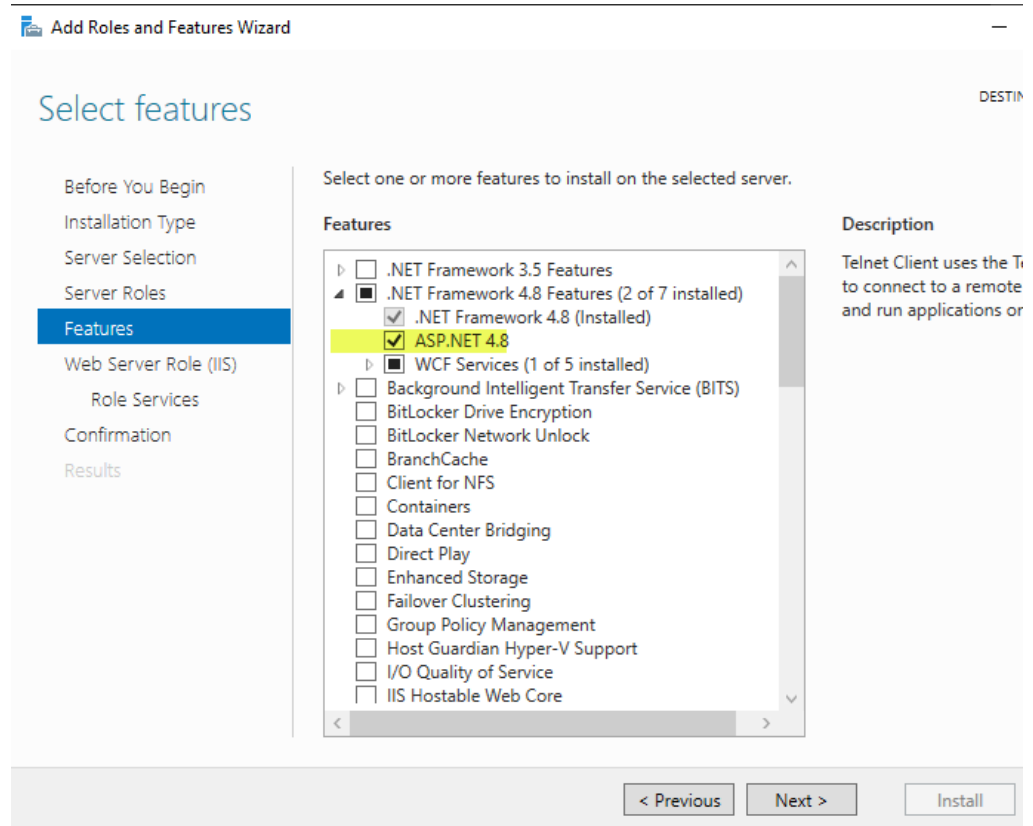
## 9.2.2 Installing IIS on the SMS Server

### ■ Installing IIS

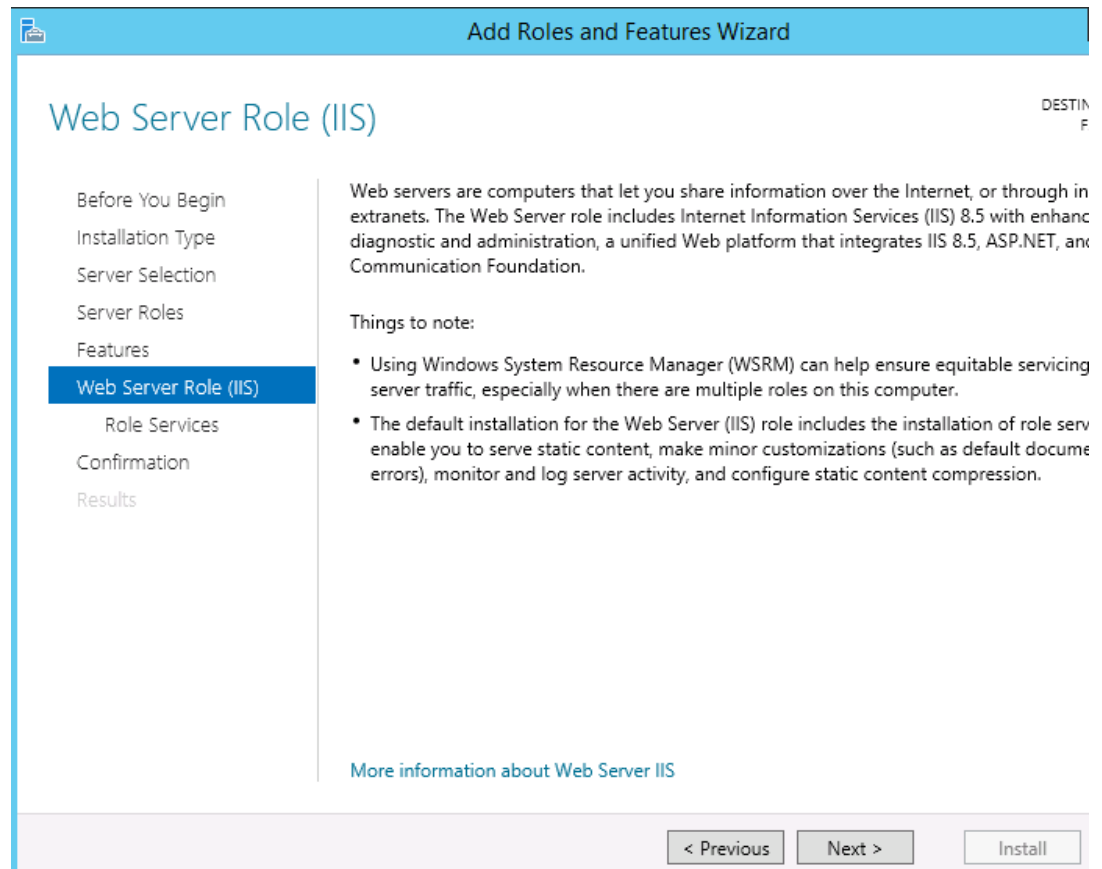


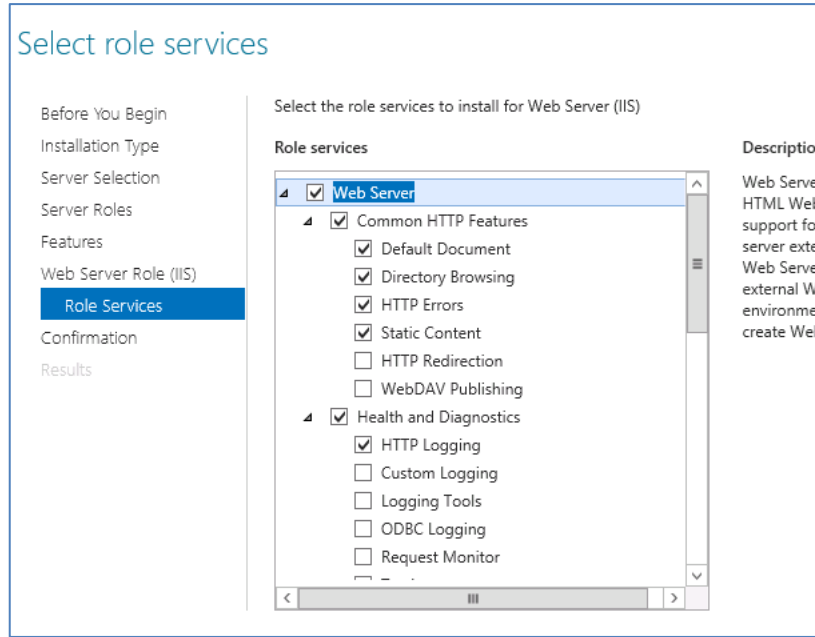




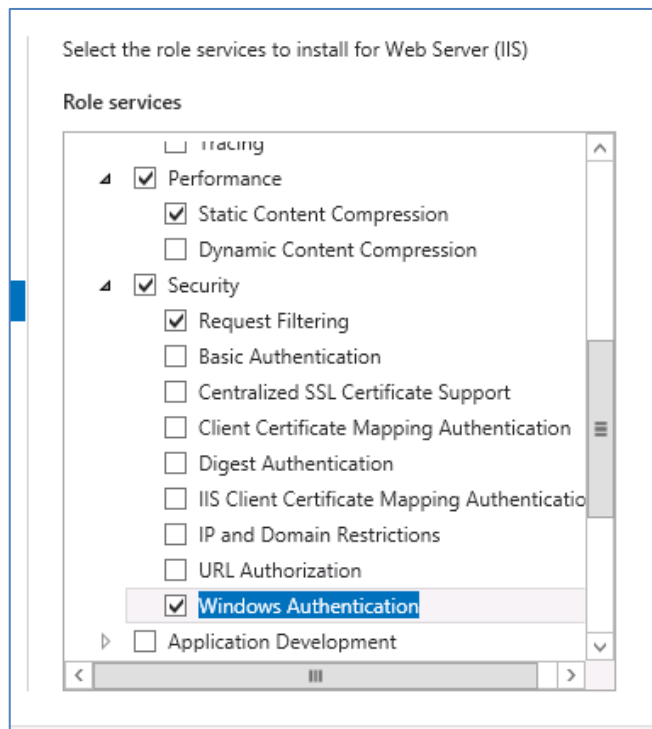


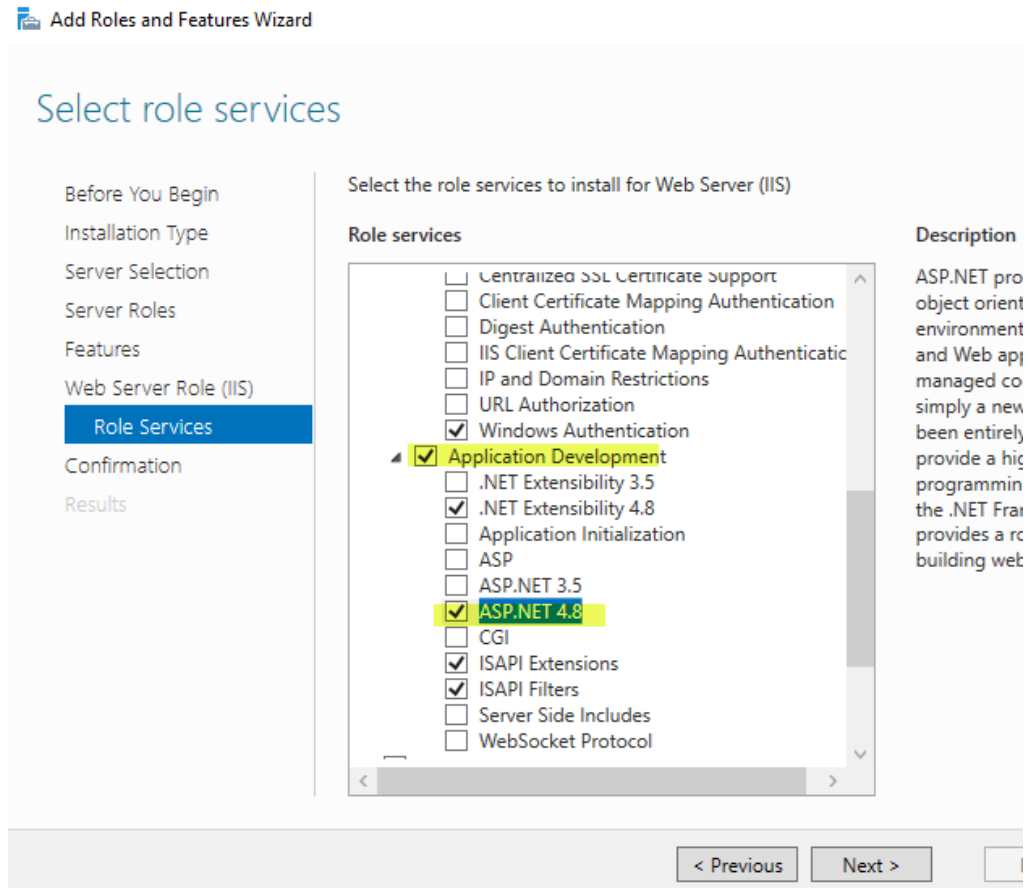
- Select ASP.NET 4.8 (Windows Server 2022) then press next. This option could be lower depending on the version of Windows server being used.





■ Scroll down the list of options





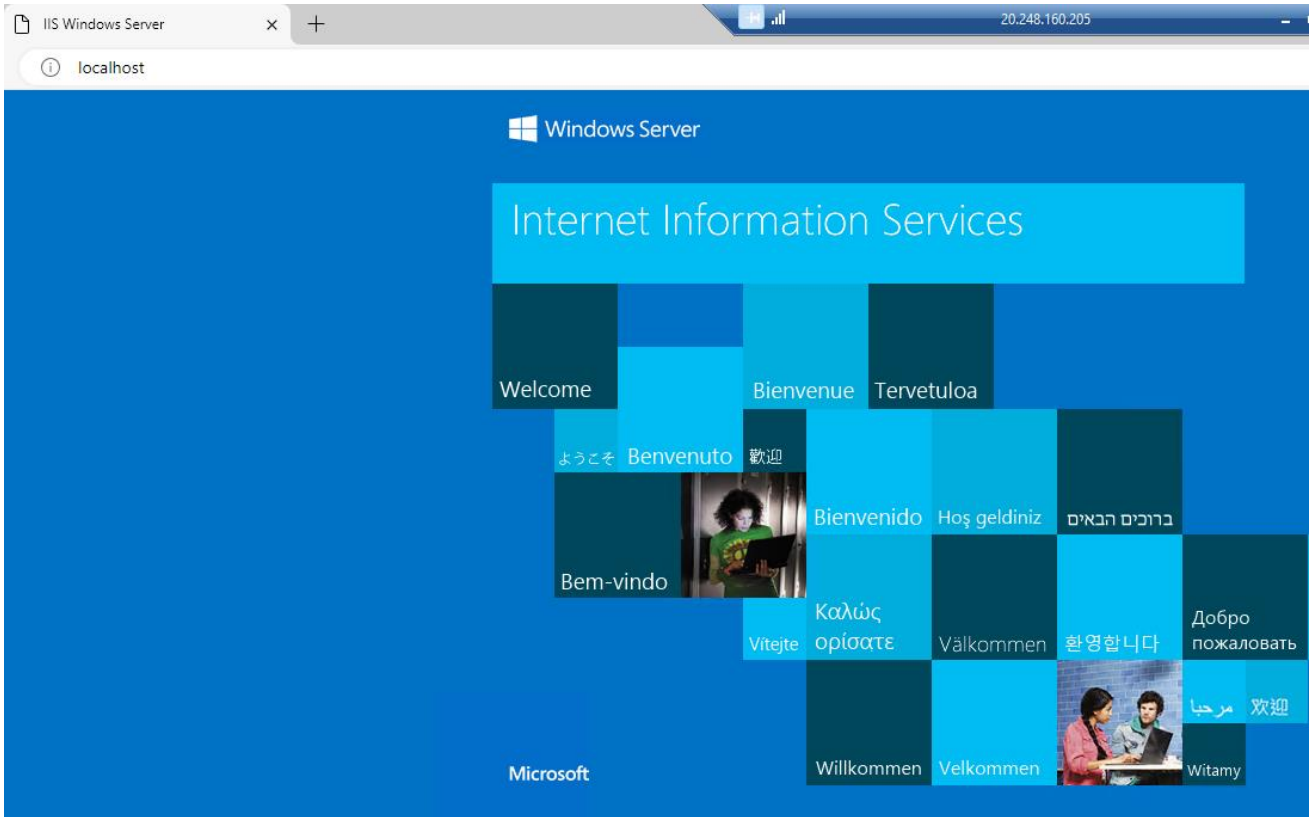
- Select ASP.NET 4.8 and it will present a list of other services required to be added.
- Select NEXT when you have checked all of the above options
  
- Select Install

To check that IIS installed correctly open a web browser from your SMS server and proceed to the following address:

- <http://localhost>

You should see the default IIS webpage for example:





## 9.3 Install the Console

### 9.3.1 Internet Explorer Enhanced Security

ⓘ Microsoft Edge is supported but we recommend you turn off IE enhanced settings.

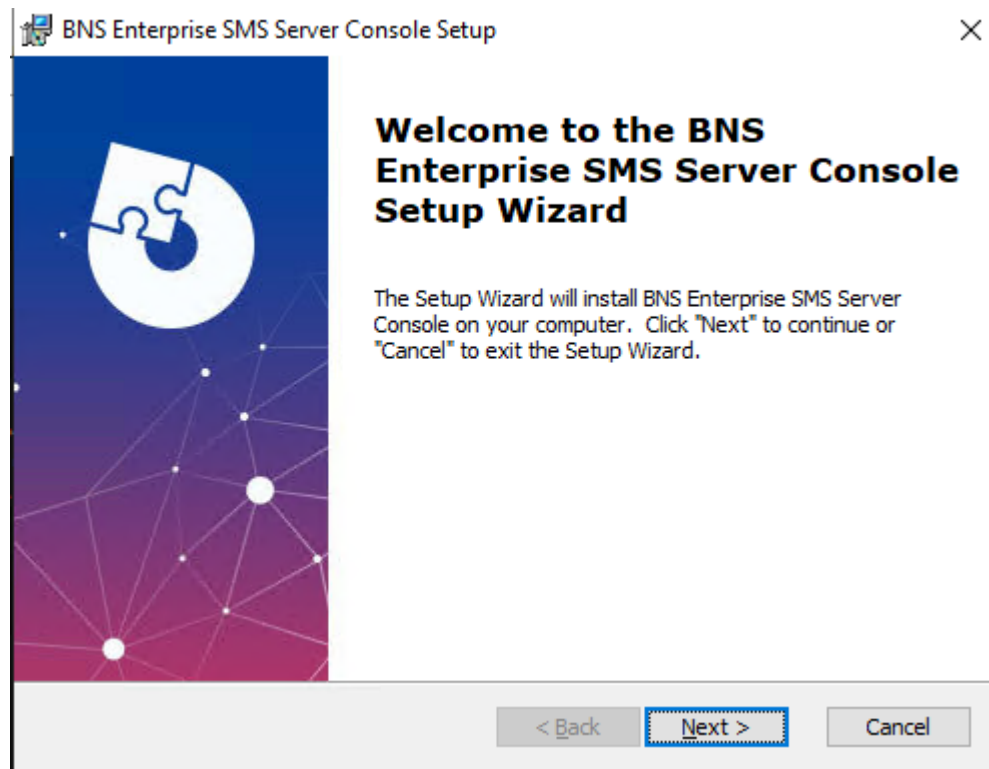
- Run Server Manager
- Turn OFF IE Enhanced Security because this can affect the operation of ASP.NET based applications.

### 9.3.2 Console installation

The console can be installed on one or more SMS servers.

Navigate to Program Files\BNS Group\BNS Enterprise Sms Installation Software Documentation and Tools.

- Open a CMD (Run as Administrator)
- CD to Program Files\BNS Group\BNS Enterprise Sms Installation Software Documentation and Tools\BNS SMS Console IIS Components
- Run Setup\_BNSSMS\_CloudConsole.MSI



- Next and follow wizard
- Install to the volume where all of the software is being installed eg: D: drive.

■ Install/Finish

C > Data (E:) > Program Files > BNS Group >

Name	Date modified	Type
BNS Enterprise Sms Console IIS Components	4/10/2024 2:18 PM	File folder
BNS Enterprise Sms Installation Software Documentation and Tools	4/10/2024 11:19 AM	File folder

The folder BNS Enterprise SMS Console IIS Components contains the files for the web site.

Name	Date modified	Type	Size
bin	11/9/2022 1:17 PM	File folder	
images	11/9/2022 1:17 PM	File folder	
styles	11/9/2022 1:17 PM	File folder	
alertgroups.aspx	12/6/2021 2:38 PM	ASPX File	54 KB
businessapplications.aspx	12/6/2021 2:38 PM	ASPX File	35 KB
cloudresources.aspx	12/6/2021 2:38 PM	ASPX File	2 KB
Default.aspx	3/12/2022 3:55 PM	ASPX File	15 KB
DestinationRouting.aspx	12/6/2021 2:38 PM	ASPX File	9 KB
Footer.ascx	12/6/2021 2:38 PM	ASCX File	1 KB
interfaces.aspx	12/6/2021 2:38 PM	ASPX File	6 KB
menu	4/13/2022 12:14 PM	XML Document	2 KB
menu_API	4/13/2022 12:14 PM	XML Document	3 KB
menu_BOTH	4/13/2022 12:13 PM	XML Document	3 KB
menu_DR	4/13/2022 12:14 PM	XML Document	3 KB
sender_domains.aspx	12/6/2021 2:38 PM	ASPX File	16 KB
senderID.aspx	12/9/2021 12:45 PM	ASPX File	27 KB
Site1.Master	12/6/2021 2:38 PM	MASTER File	3 KB
smsc.aspx	12/6/2021 2:38 PM	ASPX File	8 KB
SMSServers.aspx	12/6/2021 2:38 PM	ASPX File	18 KB
SQLAPIQueries.aspx	4/13/2022 10:47 AM	ASPX File	7 KB
SQLAPIQueriesDetail.aspx	3/19/2022 12:58 PM	ASPX File	9 KB
SQLAPISend.aspx	4/13/2022 12:10 PM	ASPX File	16 KB
SQLAPIStatus.aspx	3/19/2022 5:01 PM	ASPX File	9 KB

## 9.4 Configure IIS

### 9.4.1 Create folder for SMS console web site

Name	Date modified	Type	Size
Build	3/10/2024 4:38 PM	File folder	
Program Files	4/10/2024 11:19 AM	File folder	
smsconsole	4/10/2024 2:22 PM	File folder	

- Create a folder called smsconsole on the same drive letter where the software is installed.
- Copy all of the web site files and sub folders from Program Files\BNS Group\BNS Enterprise Sms Console IIS Components folder into the smsconsole folder.

The SMSConsole folder should now contain the files and folders just copied.

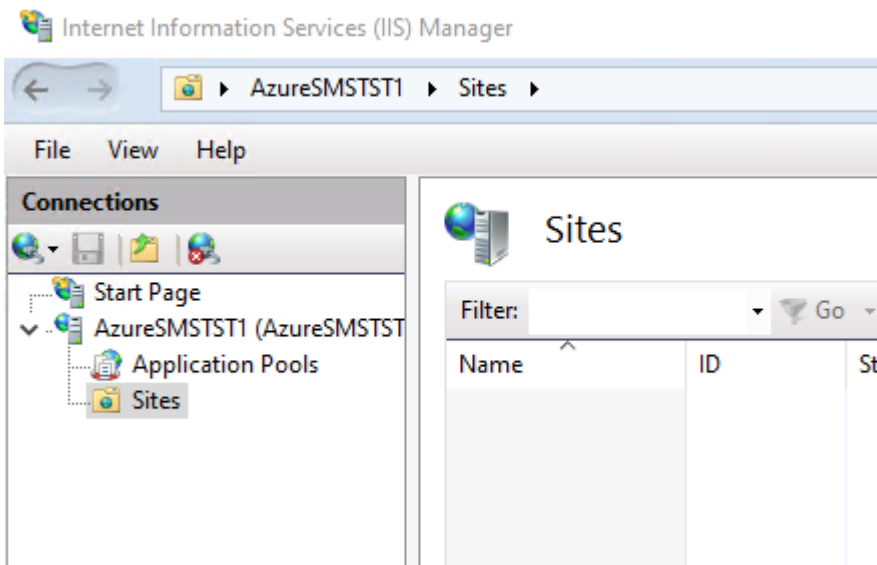
> This PC > Data (E:) > smsconsole >

Name	Date modified	Type	Size
bin	4/10/2024 2:25 PM	File folder	
images	4/10/2024 2:25 PM	File folder	
styles	4/10/2024 2:25 PM	File folder	
alertgroups.aspx	6/12/2021 2:38 PM	ASPX File	54 KB
businessapplications.aspx	19/09/2024 1:21 PM	ASPX File	43 KB
changelog	26/09/2024 3:00 PM	Text Document	3 KB
cloudresources.aspx	6/12/2021 2:38 PM	ASPX File	2 KB
countryrules.aspx	15/08/2023 3:40 PM	ASPX File	21 KB
Default.aspx	15/08/2023 2:40 PM	ASPX File	20 KB
Footer.ascx	6/12/2021 2:38 PM	ASCX File	1 KB
interfaces.aspx	15/02/2023 1:42 PM	ASPX File	6 KB
menu	12/09/2024 2:07 PM	XML Document	3 KB
menu_API	12/09/2024 2:08 PM	XML Document	3 KB
menu_BOTH	12/09/2024 2:08 PM	XML Document	3 KB
menu_DR	12/09/2024 2:08 PM	XML Document	3 KB

### 9.4.2 Configure IIS

- From the Start screen select Windows Administrative tools
- Run Internet Information Services (IIS) Manager.
- Navigate to Sites to locate the default web site

- From IIS remove the default web site



- From IIS create a web site (right click Sites)

Add Website ? X

Site name:  Application pool:

Content Directory

Physical path:

Pass-through authentication

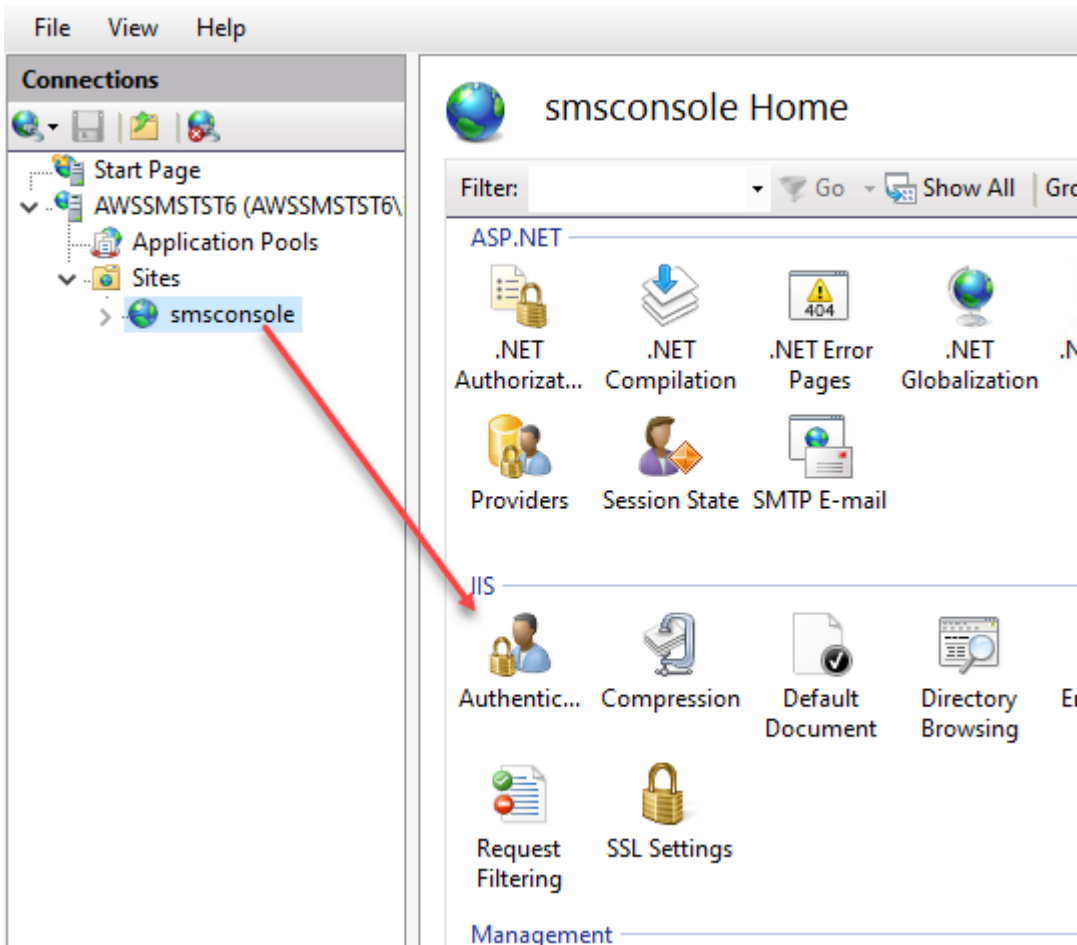
Binding

Type:	IP address:	Port:
<input type="text" value="http"/> ▼	<input type="text" value="All Unassigned"/> ▼	<input type="text" value="80"/>

Host name:

Example: www.contoso.com or marketing.contoso.com

Start Website immediately



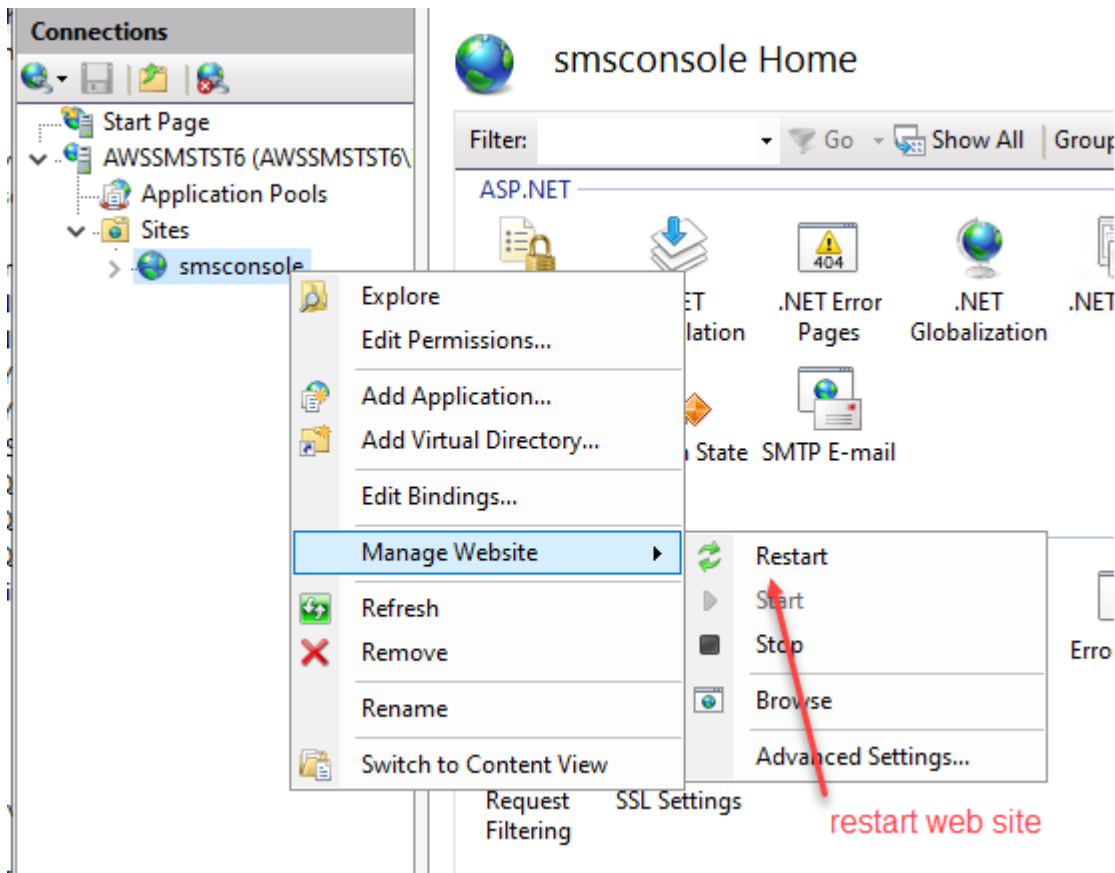
### Authentication

Group by: No Grouping

Name	Status	Response Type
Anonymous Authentication	Disabled	
ASP.NET Impersonation	Enabled	
Forms Authentication	Disabled	HTTP 302 Login/Redirect
Windows Authentication	Enabled	HTTP 401 Challenge

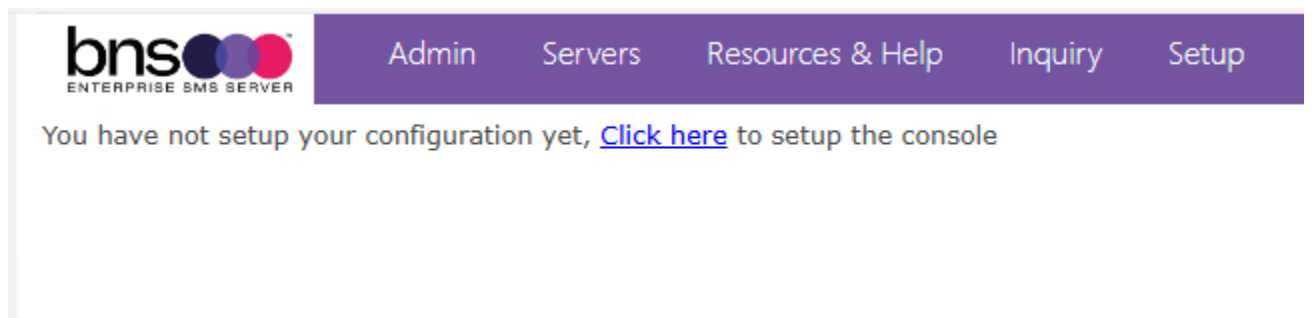
- Set the above options

- From IIS, restart the web site



## 9.5 Configure settings and test console connection

- Run Edge browser from the SMS Server and enter `http://localhost`  
A screen will be displayed requesting that you click here to configure the SMS Console.





The following web page should be displayed after you click here.

- ⓘ Azure SQL Mi Host Name can be located in the Azure portal under SQL Managed instance
- ⓘ There is no requirement to add ,1433 at the end of the host name
- ⓘ There is no requirement to specify the port number.

▶ Start  Stop + New database ✎ Reset password 🗑 Delete 🗨 Feedback

^ Essentials

Resource group : <a href="#">sqlmibns</a>	Managed instance admin : sqladmin
Status : Stopped	<b>Host</b> : bnssqlmi.b96d6227cac2
Location : Australia East	Pricing tier : General Purpose Stand
Subscription : <a href="#">Pay-As-You-Go</a>	Instance pool : <a href="#">Not in an instance pool</a>
Subscription ID : 8779336b-ba31-4312-bb27-50e0a3b46c3e	Virtual network / subnet : <a href="#">ynet-bnssqlmi/Manager</a>
Creation date : 2024-08-15 05:20 (UTC)	Virtual cluster : <a href="#">VirtualClusteref6ce28c-c</a>
Tags <a href="#">(edit)</a> : <a href="#">Add tags</a>	

- Supply the name of your SQL Server and the names of the current and archive databases.
- Supply the smsconsole user name eg: smsconsole. Note this is the same for both Admin and Operations.
- Save the configuration.



Admin Servers Resources & Help Inquiry Setup

Setup SMS Console

Configuration Saved.

Confirm that this message appears

Setup Console

SQL Connection Mode ?: <input type="text" value="SQL Auth"/>	Persist Security Info ?: <input type="text" value="Off"/>
SQL Server Host Name ?: <input type="text" value="bnssqlmi.b96d6227cac2.database.w"/>	Integrated Security ?: <input type="text" value="Off"/>
	SQL Server Port ?: <input type="text"/>

### 9.5.1 Test the connection to the current database

■ Select test connection

```

Admin Member To Compare against Logged on User Account: AzureSMSTST1/installer
Admin Member Check: AzureSMSTST1/installer is a member of sms-admin-group (Operator)/
Local Admin Member Check Group: System.__ComObject
Admin Member To Compare against Logged on User Account: AzureSMSTST1/ceo
Admin Member Check: AzureSMSTST1/ceo is NOT current user AzureSMSTST1/installer
AD Admin Member Check Problem:
System.DirectoryServices.AccountManagement.PrincipalServerDownException: The server could not be
contacted. ---> System.DirectoryServices.Protocols.LdapException: The LDAP server is unavailable. at
System.DirectoryServices.Protocols.LdapConnection.Connect() at
System.DirectoryServices.Protocols.LdapConnection.SendRequestHelper(DirectoryRequest request,
Int32& messageID) at
System.DirectoryServices.Protocols.LdapConnection.SendRequest(DirectoryRequest request, TimeSpan
requestTimeout) at
System.DirectoryServices.AccountManagement.PrincipalContext.ReadServerConfig(String serverName,
ServerProperties& properties) --- End of inner exception stack trace --- at
System.DirectoryServices.AccountManagement.PrincipalContext.ReadServerConfig(String serverName,
ServerProperties& properties) at
System.DirectoryServices.AccountManagement.PrincipalContext.DoServerVerifyAndPropRetrieval() at
System.DirectoryServices.AccountManagement.PrincipalContext..ctor(ContextType contextType, String
name, String container, ContextOptions options, String userName, String password) at
System.DirectoryServices.AccountManagement.PrincipalContext..ctor(ContextType contextType) at
msXsms_Cloud_Console._test.Page_Load(Object sender, EventArgs e) in C:\webs\msXsms Cloud
Console\msXsms Cloud Console\msXsms Cloud Console\test.aspx.cs:line 231

Session userisadmin: True
Session cstr: Data Source=bnssqlmi.b96d6227cac2.database.windows.net;database=SMS-
CURRENT;user
id=smsconsole;password=EAAAAGEbePy6N+52RU6wH0EHQgBfkm91+RZqT/D0tPZ0djhT;Trusted_Connection=False;Persi
Security Info=False;
DB Version: 2.0.0
  
```

← If the test connection worked, the DB version should be displayed

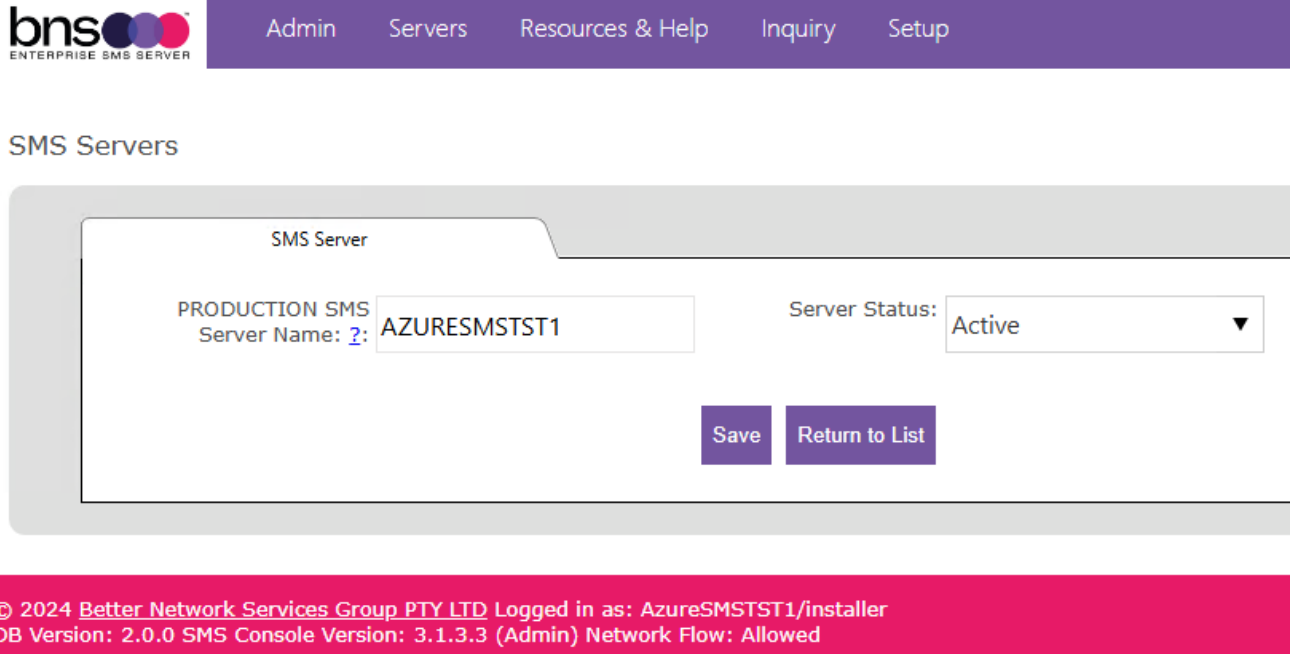
© 2024 Better Network Services Group PTY LTD Logged in as: AzureSMSTST1/installer  
 DB Version: 2.0.0 SMS Console Version: 3.1.3.3 (Admin) Network Flow: Allowed

- A successful connection to the database is confirmed if the DB Version: is shown at the bottom of the screen above.

From the Servers menu, Add a new sms server

- Then click on Servers once you have a successful connection.

- Add your new SMS server name and set to ACTIVE Status



The screenshot shows the BNS Enterprise SMS Server console interface. At the top left is the BNS logo. A navigation bar contains links for Admin, Servers, Resources & Help, Inquiry, and Setup. Below this, the page title is "SMS Servers". The main content area shows a form for editing an SMS server. The form has a tab labeled "SMS Server". Inside the form, there is a label "PRODUCTION SMS Server Name: ?:" followed by a text input field containing "AZURESMTST1". To the right, there is a "Server Status:" label followed by a dropdown menu currently set to "Active". Below the input fields are two buttons: "Save" and "Return to List". At the bottom of the console, a pink footer bar contains the text: "© 2024 Better Network Services Group PTY LTD Logged in as: AzureSMSTST1/installer DB Version: 2.0.0 SMS Console Version: 3.1.3.3 (Admin) Network Flow: Allowed".

### 9.5.2 Display of full message in the inquiry menu option

By default the full message of a SMS will not be displayed in the console. To allow the full message to be displayed to administrators, rename the file NOSHOW.MSG to another value eg: NOSHOWxxxx.MSG

### 9.5.3 Console administration

Refer to <https://smskb.bnsgroup.com.au/console>

---

# SECTION 10 Exchange Online Mailbox and Graph API settings

## 10.1 Exchange online

---

**i** This section is only required if your intend to use Exchange Online for sending SMS via Exchange Online from end users or business applications.

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**Note:** Exchange online has many limits. Large customers with Exchange Server in their network should consider using SMTP Connectors from\ to their Exchange server for SMS traffic which has to be SMTP based.

Customers with Exchange online and knowing the limitations, can use Office 365 mailboxes and transport rules.

Exchange online limits can be found at this URL <https://learn.microsoft.com/en-us/office365/servicedescriptions/exchange-online-service-description/exchange-online-limits#sending-limits-1>

Create an Office 365 mailbox together with Exchange Online transport rules to allow email based users and applications the ability to send to [number@domain.SMS](mailto:number@domain.SMS)

- Create a mailbox and follow all of the steps to register an application in the Azure portal. This is fully documented with examples at [Exchange Online Mailbox SMS \(bnsgroup.com.au\)](#)
- Record all of the details created in Exchange online and the Azure portal in a password database. The details will be required in the next section as part of the main windows services installation.

# SECTION 11 Installing SMS Windows Services

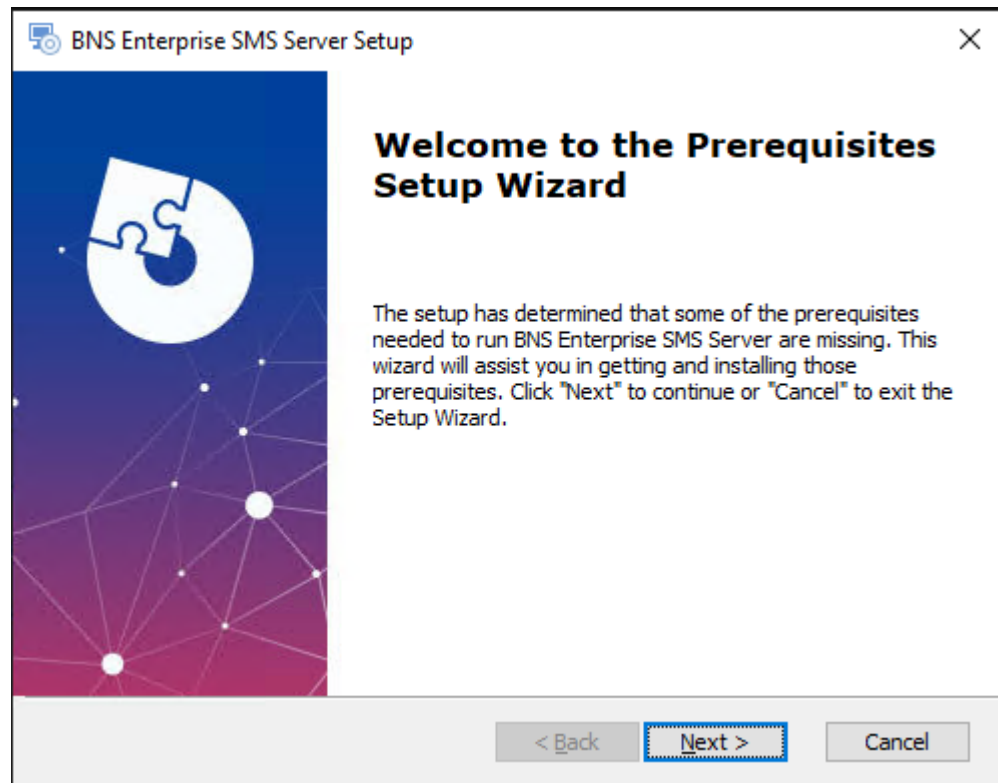
## 11.1 Before you install the software

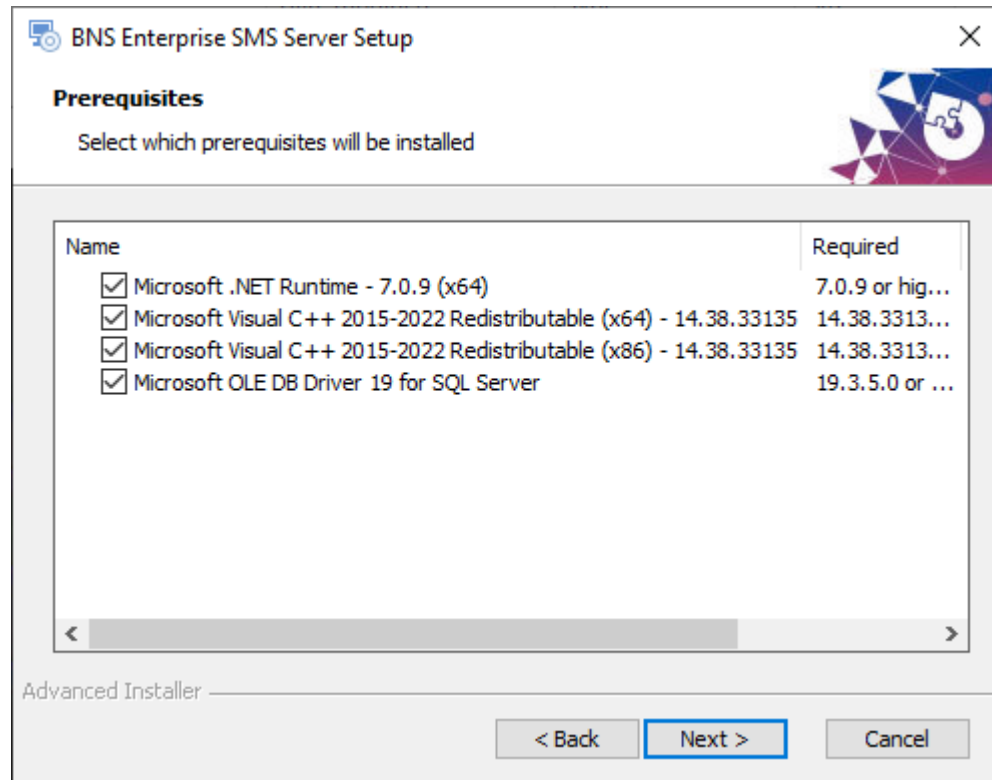
- Ensure that you are logged in with full permissions to the server.
- Add the sms service account you set up to the local administrators group.

## 11.2 Run the Setup program

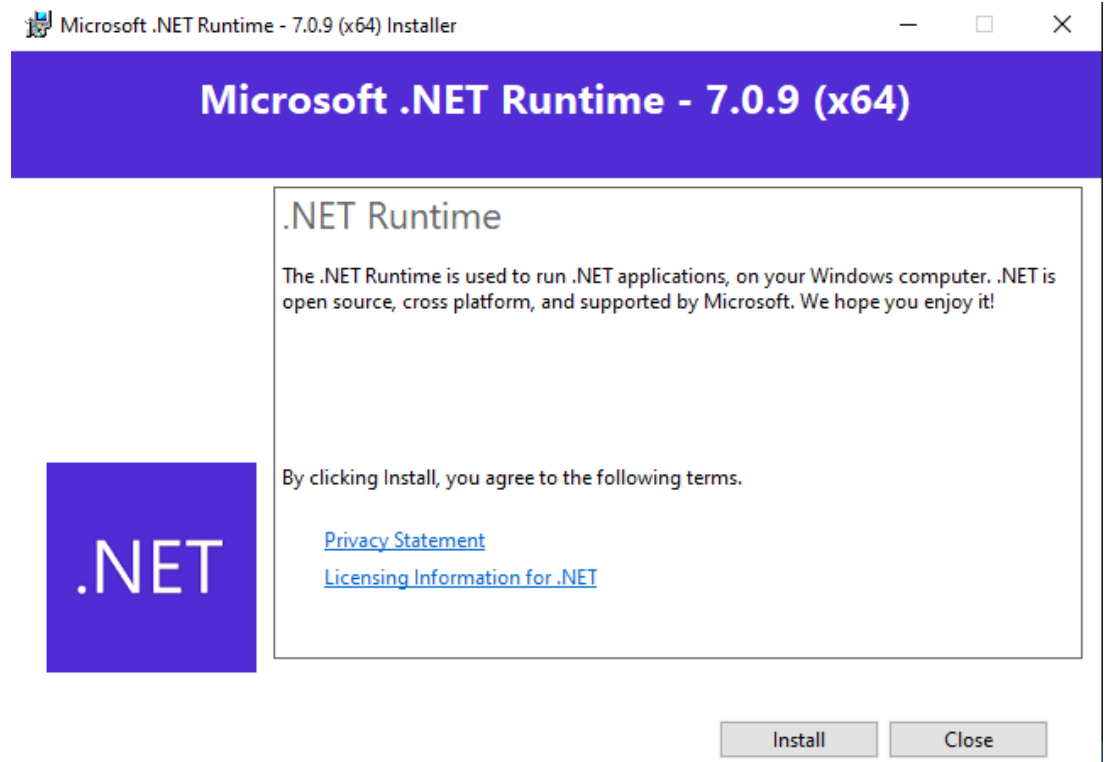
The set up program is located in the directory SMS Software as shown below.

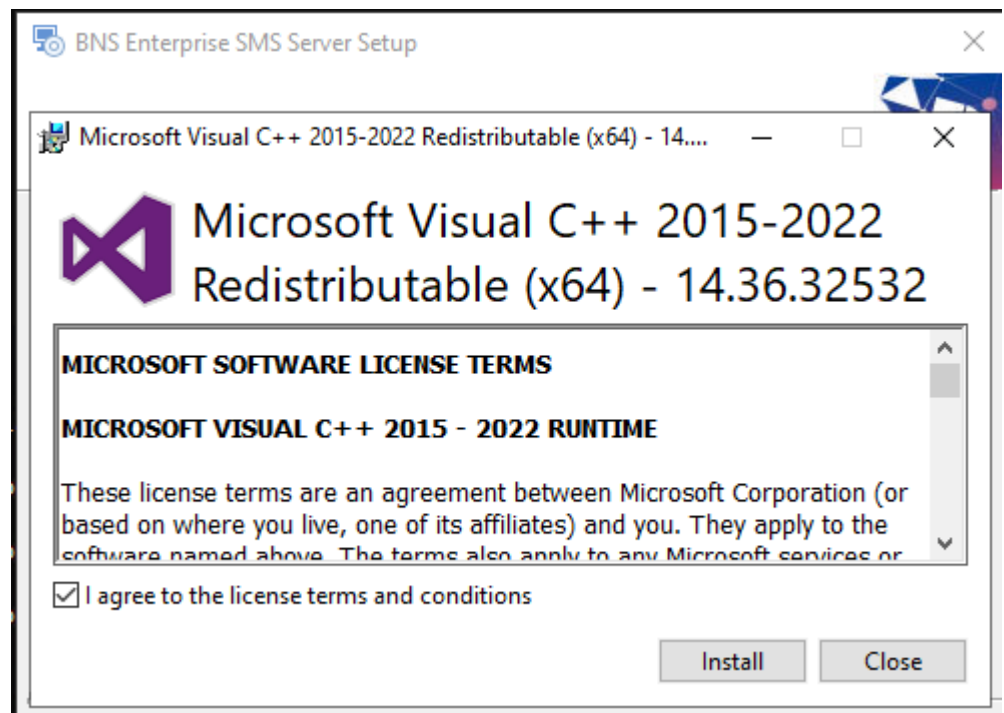
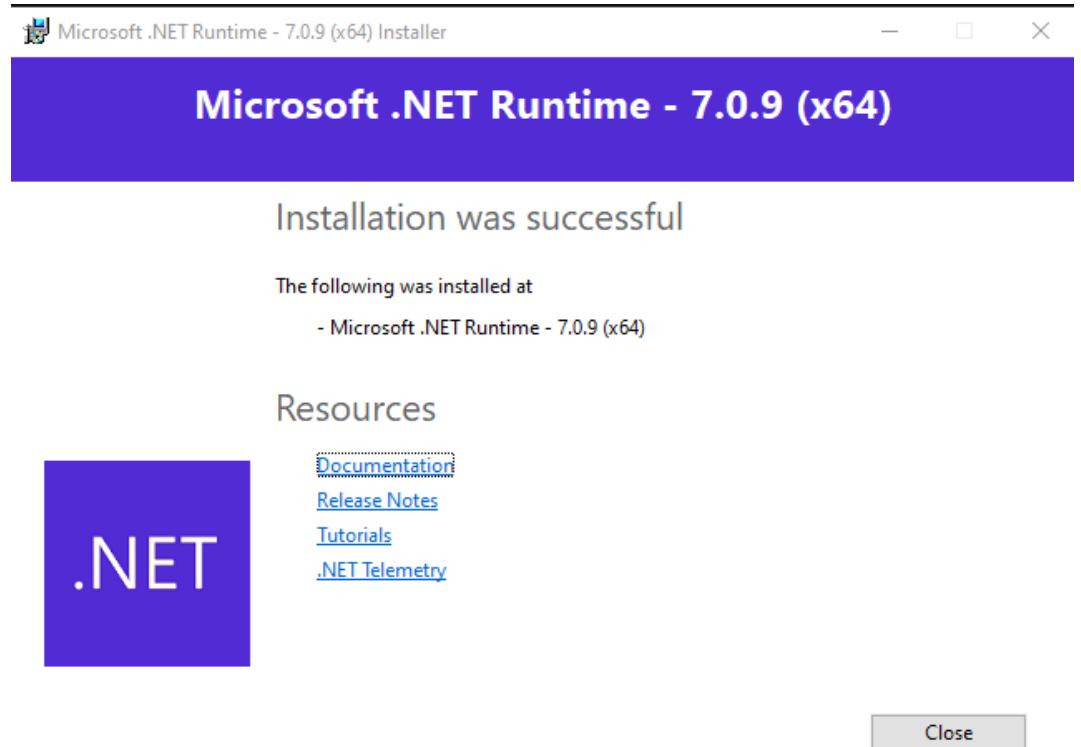
- Run the command prompt elevated.
- Navigate to Program Files\BNS Group\BNS Enterprise Sms Installation Software Documentation and Tools\BNS SMS Software
- Run the SETUP\_BNSSMS.EXE
- Wait for the software to check all pre-requisites before it presents the screen below.
- Follow the setup wizard.





- ! Different versions of Microsoft components are shipped with new versions of this software. At the time of writing this documentation the versions above were as shipped.
- ! .Net Runtime is a component required only for the From Exchange Service which uses the Graph API

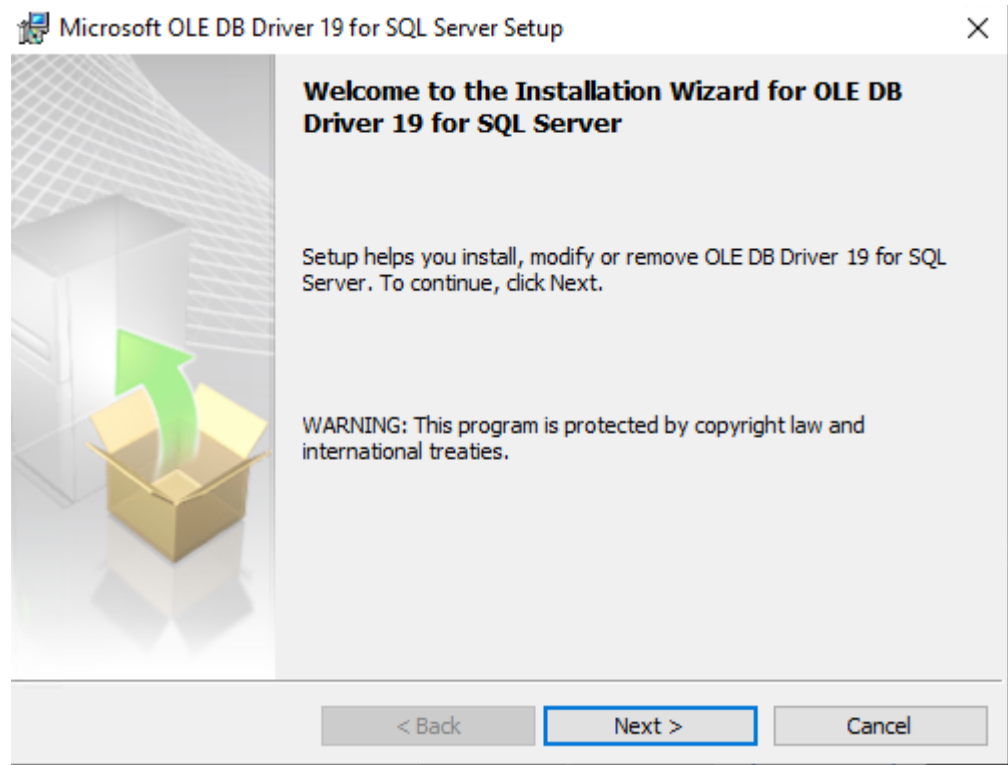
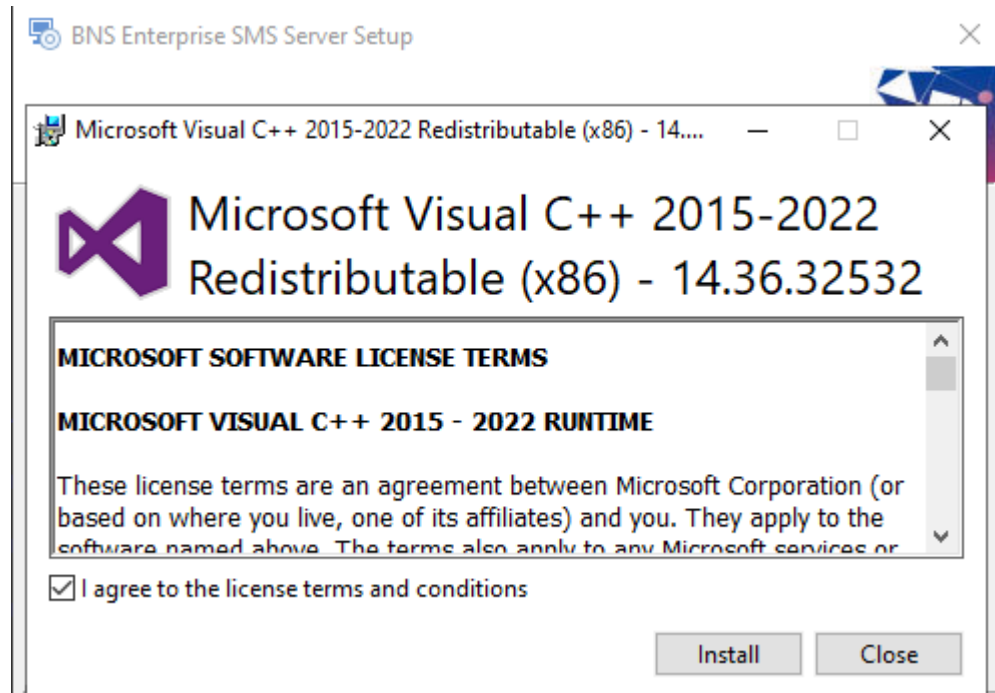


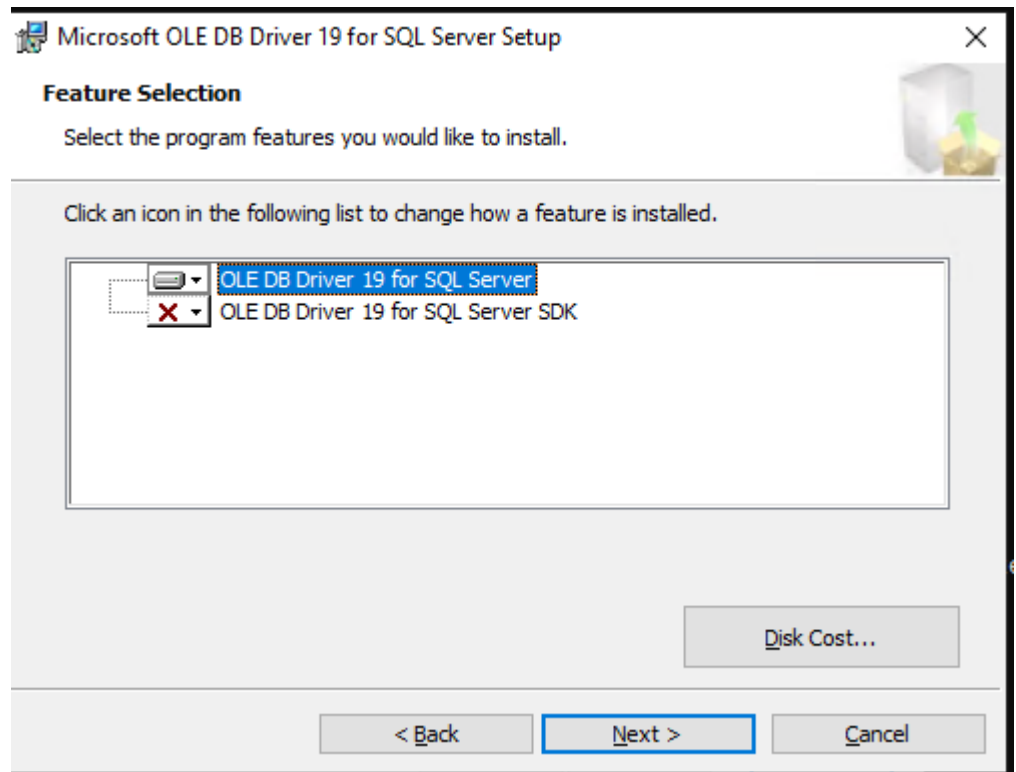
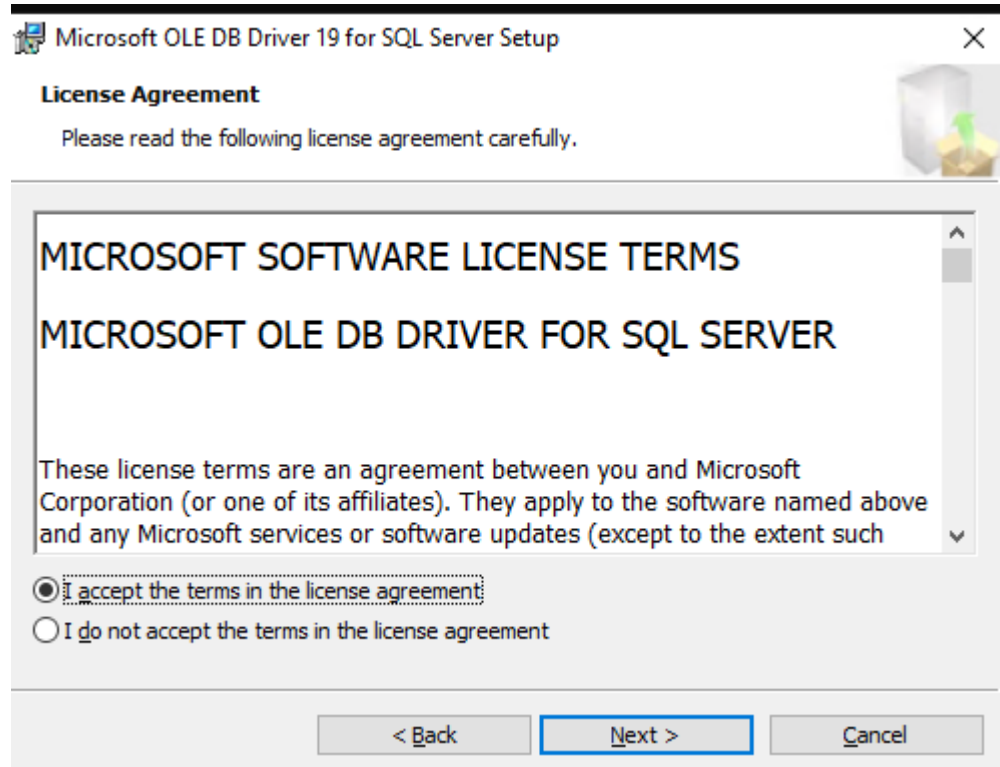


If the above screen does not display, check the bottom of your screen to bring it into focus.

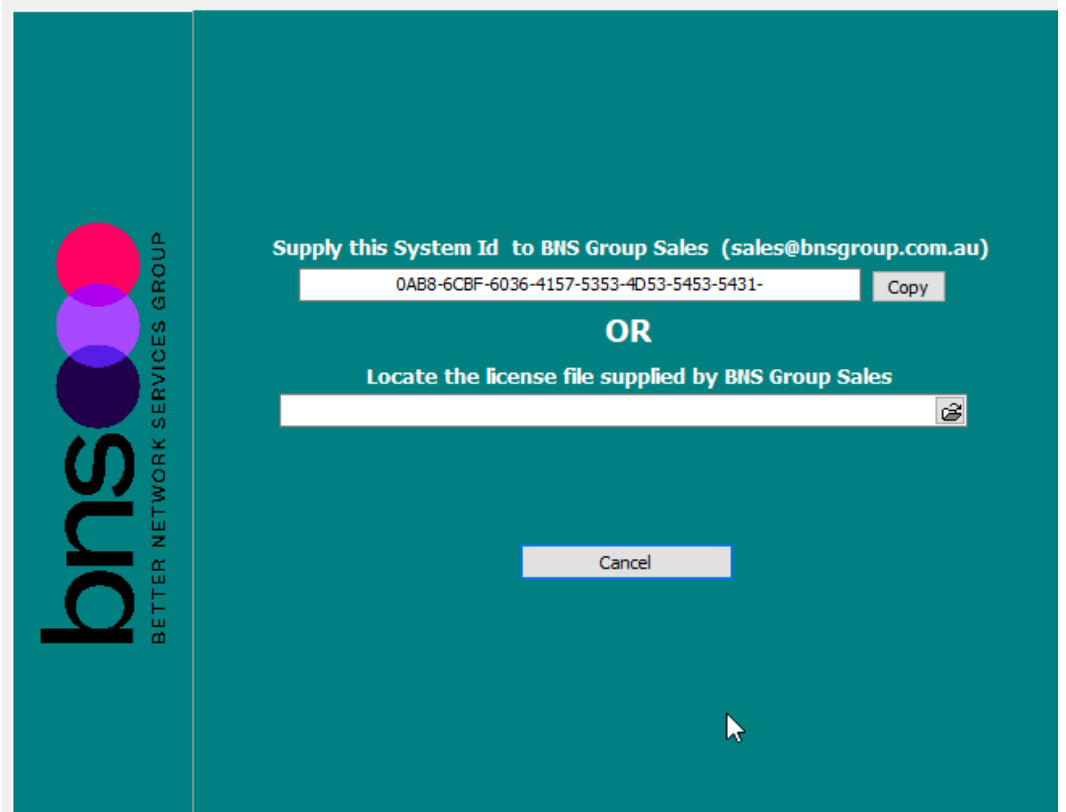
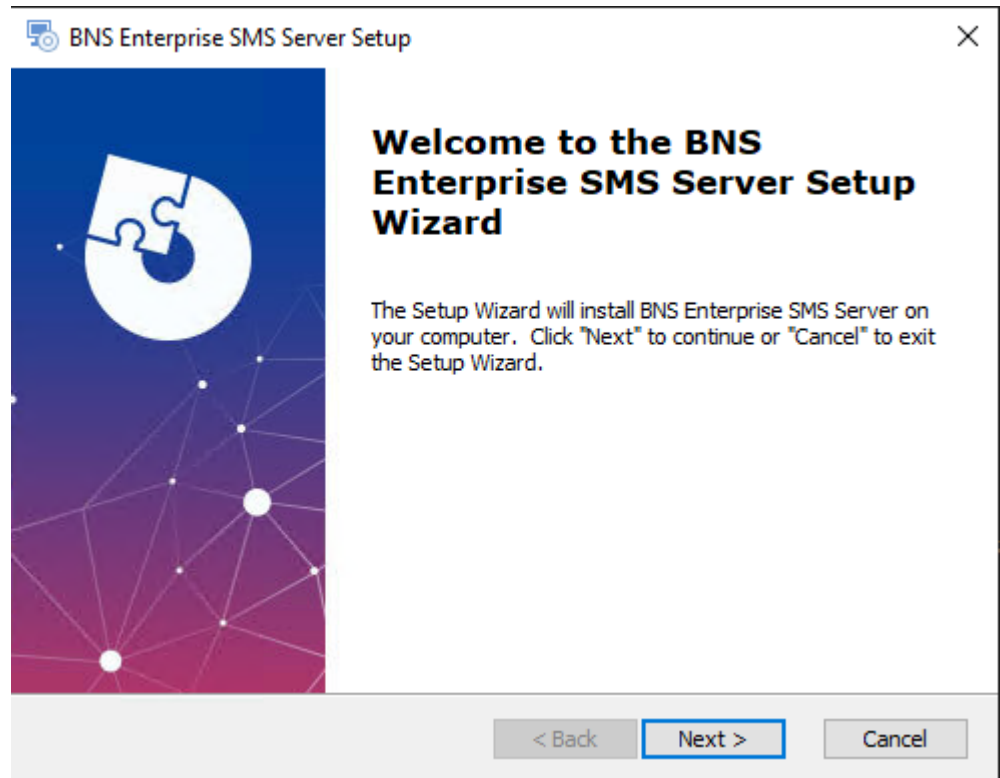
If you see a screen from the installation showing something similar to the following, it is because there is a later version already installed on this server.



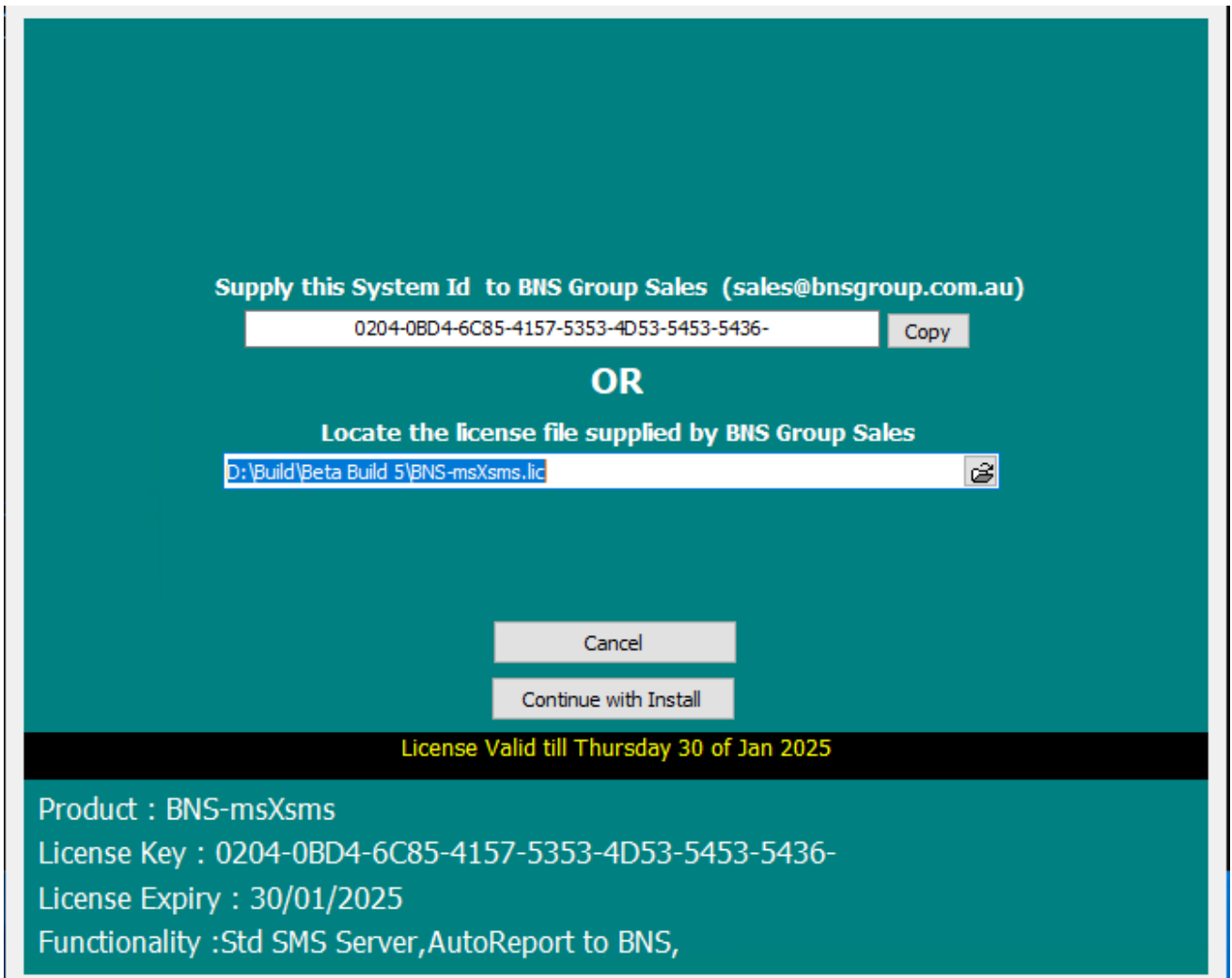




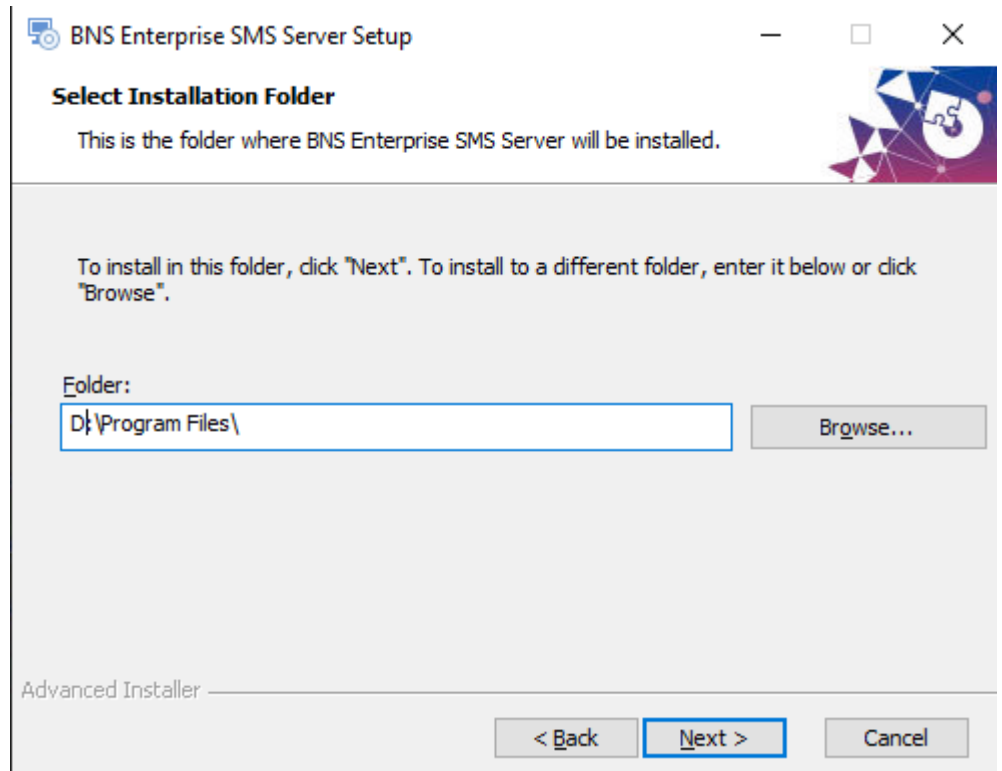
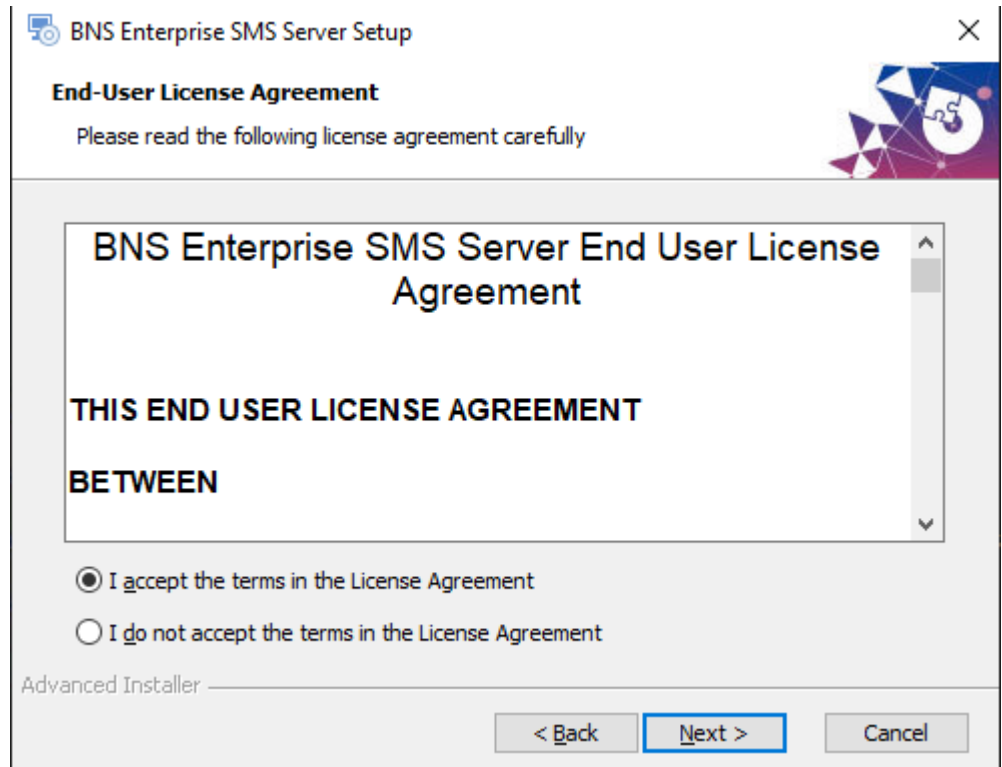
- Leave selection defaults and press next.
- Then press install



- Locate the license file used earlier.



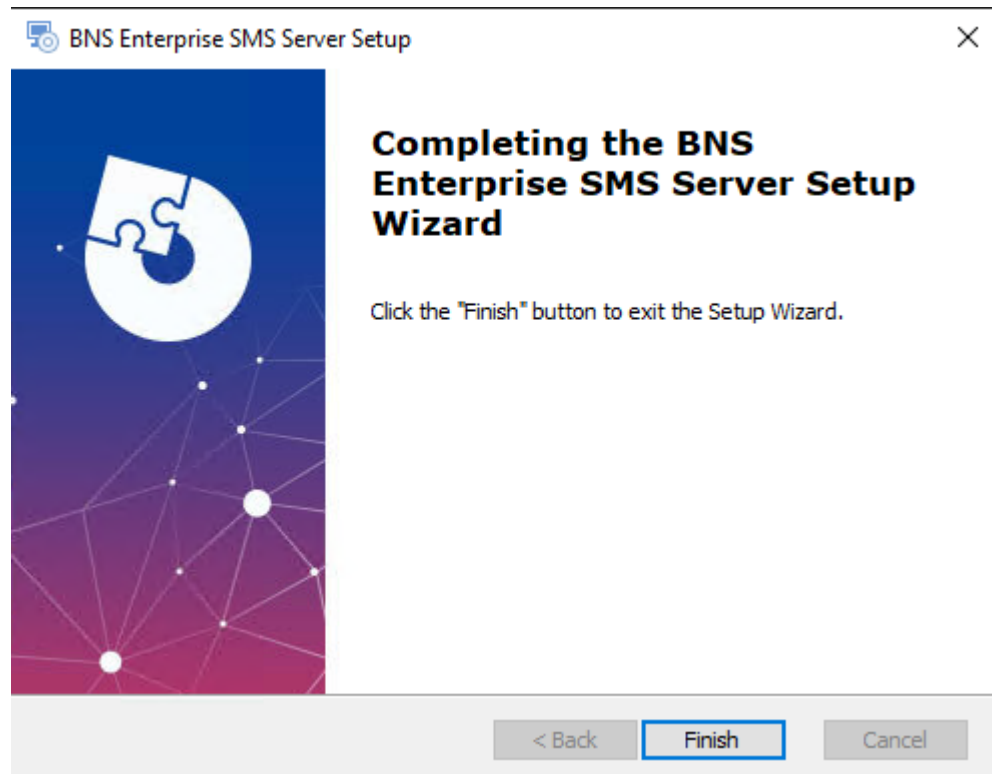
- Press continue with install once you supply a valid license file.



The screenshot shows a Windows-style dialog box titled "BNS Enterprise SMS Server Setup" with a close button in the top right corner. Below the title bar, the text "Logon Information" is displayed in bold, followed by the instruction "Specify service account information". The main area of the dialog contains three input fields: "Account Name:" with the text "smsserviceaccount", "Domain:" with a single period ".", and "Password:" with a series of dots. A red arrow points from the text "for a non AD installation domain is a full stop" to the period in the Domain field. At the bottom of the dialog, the text "Advanced Installer" is visible on the left, and three buttons are on the right: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

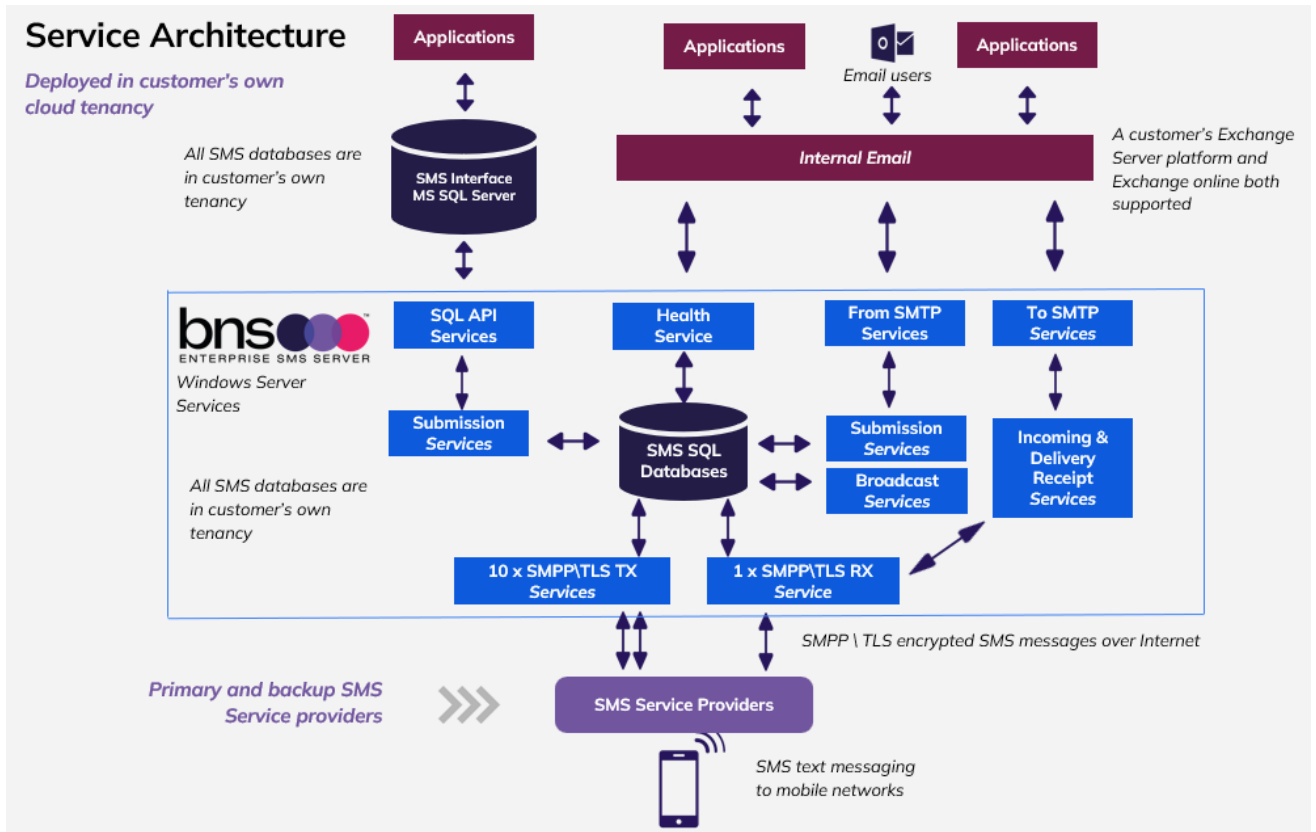
Each SMS Servers should have its own Windows service account for HA purposes.

- Press Install when prompted



### 11.3 Check the services are installed

BNS Enterprise SMS Attendant	Performs Ar...	Automatic	.\smsserviceaccount
BNS Enterprise SMS Bulk Submission via SQL	Processes hi...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector From High SQL	Accepts ap...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector From Normal SQL	Accepts ap...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector From SMTP High Priority	Handles Hi...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector From SMTP Normal Priority	Handles No...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector To SMTP Acknowledgements	Sends Ackn...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector To SMTP Incoming	Sends Inco...	Manual	.\smsserviceaccount
BNS Enterprise SMS Connector To SMTP Queued and Delivered	Sends Queu...	Manual	.\smsserviceaccount
BNS Enterprise SMS Delivery Status	Process all ...	Manual	.\smsserviceaccount
BNS Enterprise SMS From Exchange Online	Manages re...	Manual	.\smsserviceaccount
BNS Enterprise SMS HA Monitor	Will monito...	Automatic	.\smsserviceaccount
BNS Enterprise SMS Health Service	Monitors S...	Manual	.\smsserviceaccount
BNS Enterprise SMS Incoming	Handles Inc...	Manual	.\smsserviceaccount
BNS Enterprise SMS Logger	Will record ...	Manual	.\smsserviceaccount
BNS Enterprise SMS SMSC Connector RX	Handles all I...	Manual	.\smsserviceaccount
BNS Enterprise SMS SMSC Connector TX	Handles all ...	Manual	.\smsserviceaccount
BNS Enterprise SMS Submission Alert Priority	Submits Ale...	Manual	.\smsserviceaccount
BNS Enterprise SMS Submission High Priority	Submits Hi...	Manual	.\smsserviceaccount
BNS Enterprise SMS Submission Normal Priority	Submits No...	Manual	.\smsserviceaccount
BNS Enterprise SMS Submission Simple Broadcast	Submits Lo...	Manual	.\smsserviceaccount





## 11.4 Add the service account to local administrators group

- Check that this has been completed.

## 11.5 SMS Configuration smsboot.ini (msXsmsboot.ini)

Edit the settings in the smsboot.ini file as required to connect to:

- SQL server Databases
- SMPP Service provider(s)
- SMTP servers or Office 365 SMTP
- Active Directory if applicable
- The relevant ini file values need to be edited. See below.

```
[From-SMTP-Connector]
From-SMTP-Connector-High-IP-str= nnn.nnn.nnn.nnn
From-SMTP-Connector-High-Port-str=25
From-SMTP-Connector-MaxRecipientsInMsg-int=1000
From-SMTP-Connector-EnableWhiteList-bool=0
From-SMTP-Connector-WhiteList-str=xxx.xxx.xxx.xxx;yyy.yyy.yyy.yyy
From-SMTP-Connector-SystemAlertDomain-str=alert.sms
From-SMTP-Connector-SupportedSmsDomains-str=all.domains
From-SMTP-Connector-SimpleBroadcastDomains-
str=@broadcast(.*)\.sms;@(.)broadcast\.sms

SMSC-Connector-SMPP-Carriers-
str=SINCH;MessageMedia;Soprano;TIM;OptusProd;OptusDR;Simulator1;Simulator2;Generi
c3.4
SMSC-Connector-SMPP-Production-str=Simulator1 (Enter the SMPP Carrier you are
using from the above certified list)
SMSC-Connector-SMPP-FailOver-str=XXXXXX (enter your backup SMPP carrier if you
have a separate contract with another carrier)

SMSC-Connector-XXXXXXX-SMSC-SystemId-str=enter your SMPP account here

SMSC-Connector-XXXXXXX-SMSC-Password-str=enter your password here

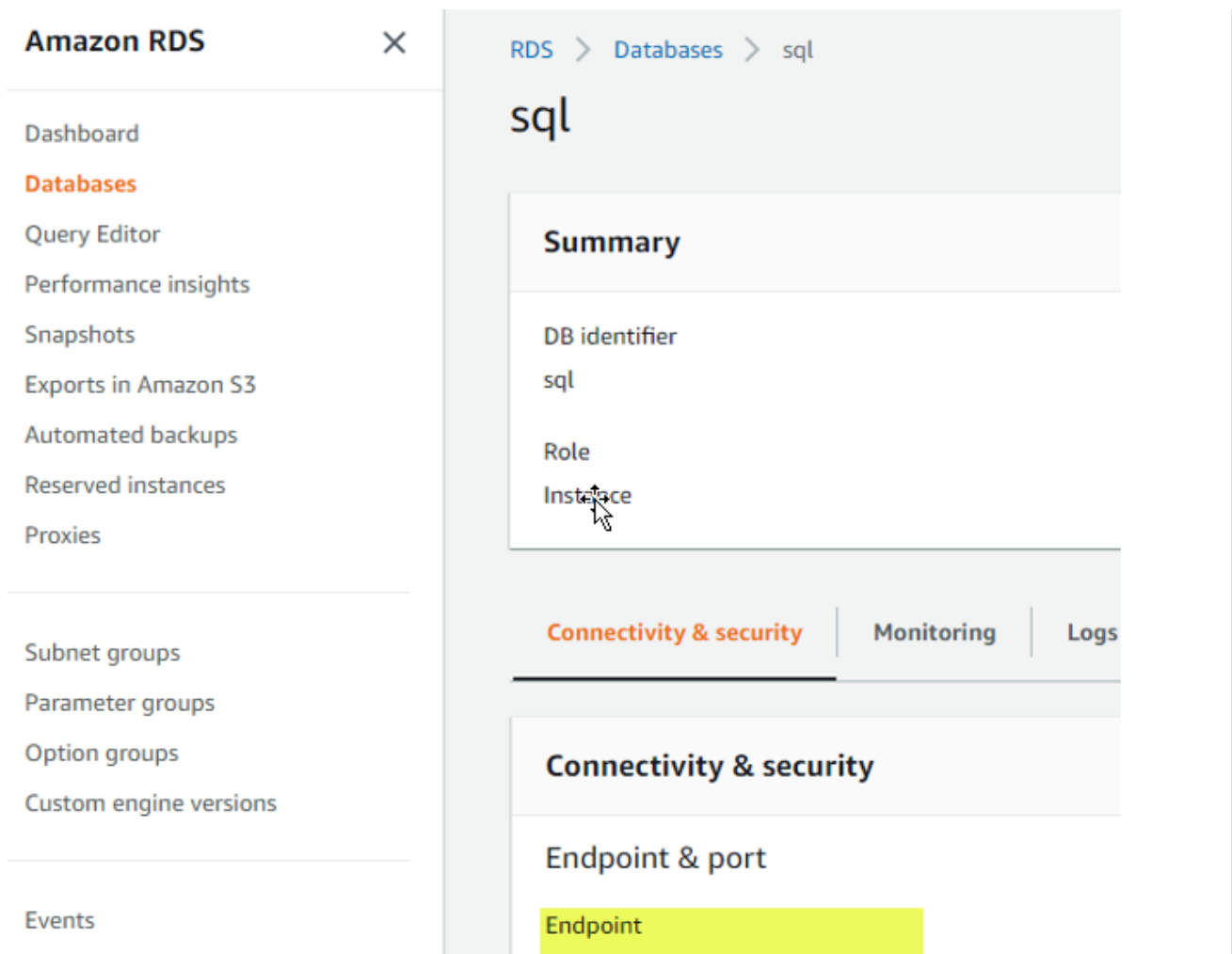
SMSC-Connector-XXXXXXX-SMSC-PasswordEncrypted-int=1 (Set this to 1 after you have
supplied the password. After the services start, the password you entered in
this ini file will be encrypted. Make sure you close the INI file before
starting services.

To-SMTP-Connector-SenderName-str=SMS Gateway
To-SMTP-Connector-SenderEmail-str= Office 365 SMS Service login email address
To-SMTP-Connector-AdministratorEmail-str=Administrator@domain.com
To-SMTP-Connector-SmtpServerDNSorIP-str=smtp.office365.com
To-SMTP-Connector-SmtpServerPort-int=587
To-SMTP-Connector-SmtpUserName-str=Office 365 SMS Service login email address
To-SMTP-Connector-SmtpPassword-PasswordEncrypted-int=1 (change to 1)
```

```

To-SMTP-Connector-SmtpPassword-str=your_password
To-SMTP-Connector-SmtpUseTLSEncryption-int=1
To-SMTP-Connector-MaxAcksToProcess-int=1000
To-SMTP-Connector-MaxConfToProcess-int=1000
To-SMTP-Connector-MaxInboundToProcess-int=1000
To-SMTP-Connector-SubjectPrefix-Ack-str=SMS Conf for:
To-SMTP-Connector-SubjectPrefix-Failed-str=SMS Failed message to:
To-SMTP-Connector-SubjectPrefix-Sent-str=SMS Queued to:
To-SMTP-Connector-SubjectPrefix-Delivered-str=SMS Delivered to:
To-SMTP-Connector-SubjectPrefix-BCast-str=SMS Broadcast request Ref# :
To-SMTP-Connector-SenderName-Inbound-str=[Main_AppCustom1] SMS
To-SMTP-Connector-SenderEmail-Inbound-str=[Main_SMSC_Sender_SMSNo]@outlook.sms
To-SMTP-Connector-SubjectPrefix-Inbound-str=SMS from:
    
```

```
Incoming-Service-DefaultInboundRouteEmail-str=administrator@domain.com
```



```

[Database]
Database-Prod-SqlServer-str=AWS RDS end point string
Database-Prod-ArchiveSqlServer-str=xxxxxxxxxxx
Database-Prod-SqlDB-str=sms-current
Database-Prod-ArchiveDB-str=sms-archive
Database-Prod-AuthType-str=auServer
    
```

Database-Prod-SqlLogin-str=SQL local user for this SMS Server  
 Database-Prod-PasswordEncrypted-int=1

**!** When you supply the password below, make sure the PasswordEncrypted-Int = 1

Database-Prod-SqlPass-str=password for this SQL local user password will be encrypted when the services start.  
 Database-Prod-Port-str=1433

Email protective marking (refer to BNS technical support).

[SQL-API-Database]  
 SQL-API-Database-SqlServer-str= end point connection string

SQL-API-Database-SqlDB-str=SMS-SQL-API  
 SQL-API-Database-AuthType-str=auServer  
 SQL-API-Database-SqlLogin-str=your service login  
 SQL-API-Database-PasswordEncrypted-int=1  
 SQL-API-Database-SqlPass-str=password of the service password will be encrypted when the services start.  
 SQL-API-Database-Port-str=1433

[From-SQL-LoadBalancer]  
 SQLI-AnyServer-List-str=SMSServer1:1, SMSServer2:1, SMSServer3:2 (See notes)  
 SQLI-MyServer-List-str=SMSServer4:1, SMSServer5:1, SMSServer6:1

```

From-SQL-Connector-ApiRole-Is-Master-Or-Slave-str=MASTER
From-SQL-Connector-Move-Stalled-Traffic-To-CurrentActiveServer-Auto-int=1
From-SQL-Connector-FlushArraysHigh-int=0
From-SQL-Connector-FlushArraysNormal-int=0
From-SQL-Connector-Normal-Priority-RecsToProcess-int=200
[From-SQL-LoadBalancer]
SQLI-AnyServer-List-str=AzureSMSTST1:1
SQLI-MyServer-List-str=
[To-SQL-Connector]
    
```

1st server is master others are Slave  
 remove other servers from this parameter  
 remove all servers from this one

Notes for SQL Load Balancer

1. Keyword ANY Server in the cloud console configuration uses the SQLI-AnyServer-List-str list.
2. Enter your initial server to replace SMSServer1:1 and remove the others in the ANYServer list.
3. Add additional as your deploy them.
4. The :1 in the example above means a weighting for the load balancer. Ie: 1 will be sent to that server, 2 meaning 2 messages will be sent to a server etc in a round robin.
5. This must be set correctly otherwise the server on startup will check the existence of the server

**SQLI-MyServer-List-str**

1. Administrators can create their own custom server lists to load balance messages to.
2. This applies to SMTP and SQL API.
3. Example: MYServer is like a custom server tag. The tag must be in the format SQLI-TAG-List-str
4. In this example the tag is MYServer.

[System-Health]

System-Health-External-AlertTheseEmailAdrsEachCycle-str=address1@domain.com,address2@domain.com

- The above email addresses are notified if there is a detected health issue.

System-Health-External-SendEmailsOnExceptionOnly-int=1

System-Health-External-AlertTheseMobilesEachCycle-str=611234567890,611234567098

- The above mobile numbers will receive an SMS at a scheduled time.

System-Health-MessageMask-str=Health Check from Local Server [Server] at Local Time of [DateTime]

System-Health-ShowLastNCharsInServerName-int=4

System-Health-SendTimes24hr-str=0900,1500,2000

- The above times are the defaults for sending a health check SMS

System-Health-MaxCycleTimeInMins-int=30

System-Health-Business-Application-SenderEmailAdr-

str=HealthCheckerServer1@system.internal

System-Health-SmtpServerDNSorIP-str=smtp.office365.com

System-Health-SmtpServerPort-int=587

System-Health-SmtpUseTLSEncryption-int=1

System-Health-SmtpFromDisplayName-str=SMS Health Check Service

System-Health-SmtpUserName-str=Office 365 SMS Service login email address

System-Health-SmtpPassword-EncryptPassword-int=1 (Set this to 1)

System-Health-SmtpPassword-str=Office 365 SMS Service password

to SQL connector support address server config file 4

[System-Health]

System-Health-External-AlertTheseEmailAdrsEachCycle-str=pereirac@bnsgroup.com.au

System-Health-External-SendEmailsOnExceptionOnly-int=0

System-Health-External-AlertTheseMobilesEachCycle-str=61412869513,61412869531

System-Health-MessageMask-str=Health Check from Local Server [Server] at Local Time of [DateTime]

System-Health-ShowLastNCharsInServerName-int=4

System-Health-SendOnTheHour-int=1

System-Health-SendTimes24hr-str=0900,1500,2000

System-Health-MaxCycleTimeInMins-int=60

System-Health-Business-Application-SenderEmailAdr-str=HealthCheckerAzureSMSTST1@system.internal

System-Health-SmtpServerDNSorIP-str=smtp.office365.com

System-Health-SmtpServerPort-int=587

System-Health-SmtpUseTLSEncryption-int=1

System-Health-SmtpFromDisplayName-str=Sms Health Check Service

System-Health-SmtpUserName-str=Office365User@domain.com

System-Health-SmtpPassword-EncryptPassword-int=0

System-Health-SmtpPassword-str=specifypasswordhere

System-Health-SyslogPort-int=514

Your Server name

enter same sender email address as To SMTP Connector

## 11.6 Graph API Settings

The screenshot shows a Windows File Explorer window with the path `Program Files > BNS Group > msXsms Enterprise > Programs` selected. The file list includes various folders and files, with `msXsmsgraph` highlighted. To the right, a Notepad window titled `msXsmsgraph - Notepad` displays the configuration parameters for the Graph API. A red arrow points from the `msXsmsgraph` file in the File Explorer to the Notepad window. Another red arrow points from the Notepad window to a red text box on the right.

```
msXsmsgraph - Notepad
File Edit Format View Help
[DiagLog]
DiagLog-Graph-Trace-int = 0

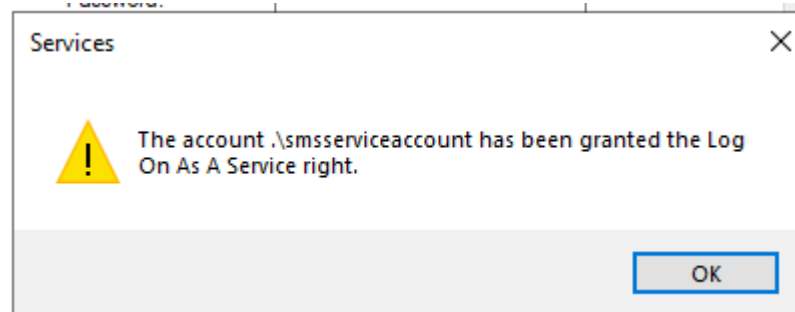
[Internal]
Internal-Outbound-GRAPH-Encrypted-ApplicationId-str =
Internal-Outbound-GRAPH-Encrypted-AppSecret-str =
Internal-Outbound-GRAPH-EncryptValues-int = 0
Internal-Outbound-GRAPH-TenantId-str =
Internal-Outbound-GRAPH-MailBoxToRead-str =
Internal-Outbound-GRAPH-ScanFrequencyInSeconds-int = 30
Internal-Outbound-GRAPH-CaptureMessages-int = 0
Internal-Outbound-GRAPH-EmailsToRead-int = 100
Internal-Outbound-GRAPH-Connected-int = 2
Internal-Outbound-GRAPH-SentPurgeTime-int = 1
```

edit the  
msXsmsgraph.ini  
file and supply the  
graph API  
parameters

- These parameters were created in the previous chapter Exchange Online mailbox.

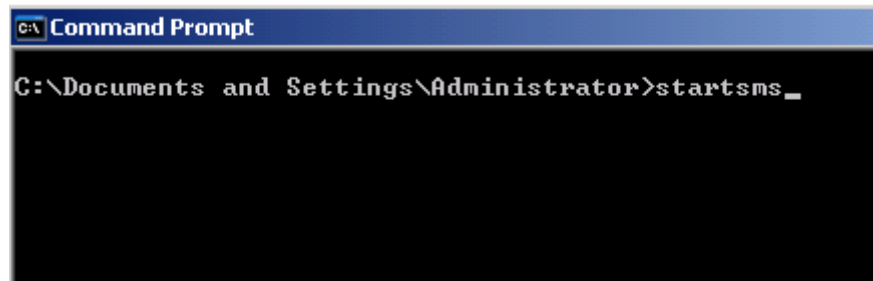
## 11.7 Check services

- In service control manager, set the password again to assign logon as service permission for the windows service account



ALL services are set to run 'manual' except for the SMS System Attendant Service and HA monitor.

- Some services must be disabled by design, for example:
  - SQL API Services will be disabled on servers which are not eligible in the design to take control over the API databases. Refer to API Control table implementation.
- Run STARTSMS to start all services.
- STARTSMS can be run from the Windows search option next to the Windows Start button or by launching a CMD window elevated as administrator.



Note: Stopsms stops all services but for now please make sure all services are running.

## 11.8 Check log files for all services

Check the central operations log in the SMS Console.

Check other logs as required.

SMS services produce detailed log files which can be found in the following folders.

C > Data (E:) > Program Files > BNS Group > BNS Enterprise Sms > Programs > Logs >

Name	Date modified	Type	Size
BnsSmsAttendant	4/10/2024 4:21 PM	File folder	
BnsSmsBulkSubmissionSQL	4/10/2024 4:21 PM	File folder	
BnsSmsCritical	4/10/2024 4:20 PM	File folder	
BnsSmscSecondaryTx-1	4/10/2024 4:27 PM	File folder	
BnsSmscSecondaryTx-2	4/10/2024 4:27 PM	File folder	
BnsSmscSecondaryTx-3	4/10/2024 4:27 PM	File folder	
BnsSmsDeliveryStatusMaster	4/10/2024 4:21 PM	File folder	
BnsSmsDeliveryStatusSecondary-1	4/10/2024 4:27 PM	File folder	
BnsSmsDeliveryStatusSecondary-2	4/10/2024 4:27 PM	File folder	
BnsSmsDeliveryStatusSecondary-3	4/10/2024 4:27 PM	File folder	
BnsSmsFromHighSQL	4/10/2024 4:21 PM	File folder	
BnsSmsFromNormalSQL	4/10/2024 4:21 PM	File folder	
BNSsmsHAMonitor	4/10/2024 3:08 PM	File folder	
BNSsmsLogger	4/10/2024 3:08 PM	File folder	
BNSsmsMasterTx	4/10/2024 4:20 PM	File folder	
INT-TXmsXsmsCloudFromGraphINT	4/10/2024 3:08 PM	File folder	
msXsmsAttendant	4/10/2024 3:08 PM	File folder	
msXsmsFromSmtphigh	4/10/2024 4:20 PM	File folder	
msXsmsFromSMTPNormal	4/10/2024 4:20 PM	File folder	
msXsmsHealth	4/10/2024 4:20 PM	File folder	
msXsmsIncoming	4/10/2024 4:20 PM	File folder	
msXsmsSmscRX	4/10/2024 4:21 PM	File folder	
msXsmsSubmissionAlert	4/10/2024 4:21 PM	File folder	
msXsmsSubmissionHigh	4/10/2024 4:21 PM	File folder	
msXsmsSubmissionNormal	4/10/2024 4:21 PM	File folder	
msXsmsSubmissionSimpleBroadcast	4/10/2024 4:21 PM	File folder	
msXsmsToSmtphigh	4/10/2024 4:20 PM	File folder	
msXsmsToSmtphighIncoming	4/10/2024 4:20 PM	File folder	
msXsmsToSmtphighQD	4/10/2024 4:20 PM	File folder	
msXsmsUpgrade	4/10/2024 3:10 PM	File folder	

Open each log file to see if the services started without any errors and were able to connect to SQL.

```

18Mar2009 11:24:49:580 : < msXsmsSmsc > : Service Started
18Mar2009 11:24:49:751 : < msXsmsSmsc > : Error - Boot Configuration file missing, please configure system.
18Mar2009 11:24:49:876 : < msXsmsSmsc > : Service Stopped
18Mar2009 11:51:27:479 : < msXsmsSmsc > : Service started
18Mar2009 11:51:27:604 : < msXsmsSmsc > : Connecting to SQL Database using windows Credentials.
18Mar2009 11:51:27:870 : < msXsmsSmsc > : Conncted to Production SQL Database - msXsms-Current
18Mar2009 11:51:27:995 : < msXsmsSmsc > : Software Version : 1.7.30 Database version : 1.7.29
18Mar2009 11:51:28:120 : < msXsmsSmsc > : Error - The Database and Software versions are incompatible, if a so
18Mar2009 12:18:43:287 : < msXsmsSmsc > : Service started
18Mar2009 12:18:43:459 : < msXsmsSmsc > : Connecting to SQL Database using windows Credentials.
18Mar2009 12:18:43:959 : < msXsmsSmsc > : Conncted to Production SQL Database - msXsms-Current
18Mar2009 12:18:44:100 : < msXsmsSmsc > : Software Version : 1.7.30 Database version : 1.7.30
18Mar2009 12:18:44:209 : < msXsmsSmsc > : Server f2psms1 is set to status of Active
18Mar2009 12:18:44:365 : < msXsmsSmsc > : Loading Tbl_UserCache into memory
18Mar2009 12:18:44:475 : < msXsmsSmsc > : Loaded 0 record(s) into memory.
18Mar2009 12:18:44:584 : < msXsmsSmsc > : Loading Tbl_SMPP_Providers into memory
18Mar2009 12:18:44:693 : < msXsmsSmsc > : Loaded 5 record(s) into memory.
18Mar2009 12:18:44:803 : < msXsmsSmsc > : Loading Tbl_SMSC_SMSNumbers into memory
18Mar2009 12:18:44:912 : < msXsmsSmsc > : Loaded 2 record(s) into memory.
18Mar2009 12:18:45:021 : < msXsmsSmsc > : Loading Tbl_Business_Apps into memory
18Mar2009 12:18:45:131 : < msXsmsSmsc > : Loaded 1 record(s) into memory.
18Mar2009 12:18:45:240 : < msXsmsSmsc > : Loading Tbl_Sender_Domain_Defaults into memory
18Mar2009 12:18:45:350 : < msXsmsSmsc > : Loaded 1 record(s) into memory.
18Mar2009 12:18:45:459 : < msXsmsSmsc > : Loading Tbl_Network_Alert into memory
18Mar2009 12:18:45:584 : < msXsmsSmsc > : Loaded 0 record(s) into memory.
18Mar2009 12:18:45:693 : < msXsmsSmsc > : Server F2PSMS1 is running in Active mode and will process outbound a
18Mar2009 12:18:46:115 : < msXsmsSmsc > : Connected and Authenticated with smsglobal.com.au on port 1775

```

Log file smsSmsc shows the initial startup of the service which created the ini file then stopped.

When the ini file was edited with correct configuration values and the services were subsequently started, connection to SQL failed because version checking of the software versus the database version did not match.

Connection and binding to the SMS Service provider is the final stage of a successful startup in this example log file.

### 11.8.1 Licensing

To fully license your product, you are required to supply a value called “System ID” to your reseller who in turn obtains a license key for the subscription period eg: 12 months.

The System ID is nothing more than a value generated which is tied to the configuration of your hardware. It does not identify anything about your organization or credentials or any other elements which would breach security. It is only a means of generating a key pair based on your server configuration.



## 11.9 Anti-virus software

---

After the software has been installed the following directories must be excluded from being scanned:

**Exclude these directories from Real time scanning and scheduled scans**

**Program files\BNS Group and all sub directories**

**Program files(x86)\BNS Group and all sub directories**

### 11.9.1 Windows Server Windows Defender

For performance reasons it is recommended to exclude the BNS Group folder from being scanned for threat protection.

- Settings
- Update and Security
- Windows Security
- Virus & threat protection

- ←
- ☰
- 🏠 Home
- 🛡️ Virus & threat protection
- 🔒 Firewall & network protection
- 📁 App & browser control
- 📱 Device security

Last scan: 30/04/2020 2:37 AM (quick scan)  
 0 threats found.  
 Scan lasted 1 minutes 59 seconds  
 16523 files scanned.

[Quick scan](#)

[Scan options](#)

[Threat history](#)

Who's protecting me  
[Manage providers](#)

Change your privacy  
 View and change pri  
 for your Windows 10  
[Privacy settings](#)  
[Privacy dashboard](#)  
[Privacy Statement](#)

### ⚙️ Virus & threat protection settings

No action needed.

[Manage settings](#)

**select this**

### 🔄 Virus & threat protection updates

Protection definitions are up to date.

[Privacy Statement](#)

[Submit a sample manually](#)

### Controlled folder access

Protect files, folders, and memory areas on your device from unauthorized changes by unfriendly applications.

[Manage Controlled folder access](#)

### Exclusions

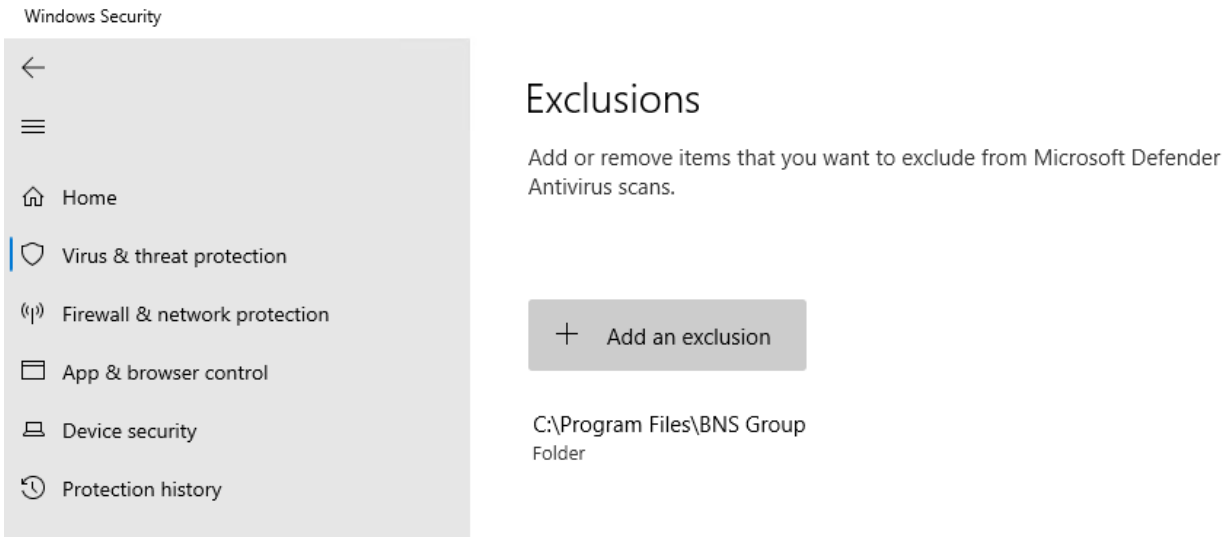
Windows Defender Antivirus won't scan items that you've excluded. Excluded items could contain threats that make your device vulnerable.

**→** [Add or remove exclusions](#)

### Notifications

Windows Defender Antivirus will send notifications with critical information about the health and security of your device. You can specify which non-critical notifications you would like.

- ☰
- 🏠 Home
- 🛡️ Virus & threat protection
- 🔒 Firewall & network protection
- 📁 App & browser control
- 📱 Device security



Adding the BNS Group root folder will exclude sub folders will prevent Defender consuming excessive CPU on a busy system.

---

## SECTION 12 Data Analytics

### 12.1 To be documented when released

---

To be documented.

---


## SECTION 13 SMS Testframe software

### 13.1 Test Frame utility software

---

This software available from the Start menu allows engineers to test to SQL API and SMTP interfaces.

---

 Only use under advice from BNS Group

---

### 13.2 Configuring the test tool

---

Contact BNS Group This is for system engineers only and they must be trained in its use.

## SECTION 14 Health Service

### 14.1 What is the Health Service?

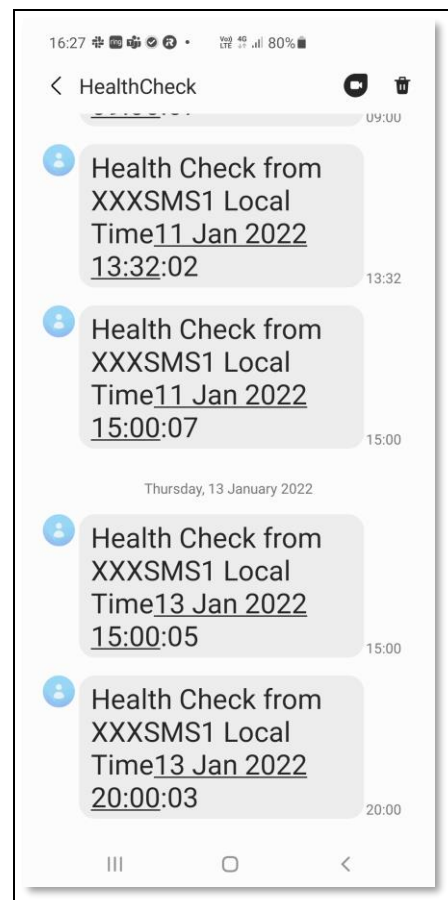
The health service is a Windows Service running on each SMS Server. The service sends test SMS messages to a configured set of mobile numbers at times defined by the system administrator.

For example, a system engineer and/or platform owner can receive multiple SMS messages from that server during the day to prove that end to end connectivity is fully operational.

A platform owner would expect an SMS from the servers at say 9am in the morning and 3pm in the afternoon. If the SMS messages do not arrive that will be an indication that something is not operational either within the customer's network or the service provider or the mobile telecommunications network.

Example phone SMS messages. Some customers do not allow full server names to be exposed on public networks. **Eg: Federal Government. That is configurable.**

[Here!!](#)




## 14.2 System alerts

In addition to the health service, the system will send email alerts to a nominated email address if it detects warnings or errors.

The health service can detect a SMS message flow problem and report it via email to the nominated system administrator email address.

Example email message from the Health service to the system administrator showing that SMS message flow issues were detected.

FAILED :msXsms Health Check Report for F3MSXSMS16 - Fri 14 Jan 2022 09:30:02



BNS Service Account  
To ● Clive Pereira; ● Laurence Buchanan

↩ Reply
↩ Reply All
→ For

**msXsms Enterprise**

**Periodic Health check report performed on SMS message flow**

Health Service -----> SQL Server F3SQL2019/Tbl\_Sql\_Api\_From\_App

Fri 14 Jan 2022 09:00:02 - SMS to 61412869513 placed in SQL Tbl\_Sql\_Api\_From\_App Table  
 Fri 14 Jan 2022 09:00:02 - SMS to 61412869531 placed in SQL Tbl\_Sql\_Api\_From\_App Table

Health Service <----- msXsms Connector From SQL Service

Fri 14 Jan 2022 09:00:07 - SMS to 61412869513 assigned to SMS Server F3MSXSMS16 for processing  
 Fri 14 Jan 2022 09:00:07 - SMS to 61412869531 assigned to SMS Server F3MSXSMS16 for processing

I

Health Service <----- msXsms Connector To SQL Service

Fri 14 Jan 2022 09:00:12 - SMS to 61412869513 with messageid 503 has been accepted by provider  
 Fri 14 Jan 2022 09:00:28 - SMS to 61412869513 has failed with error (2) Message is undeliverable by SMSC [**\*\* ERROR \*\***]  
 Fri 14 Jan 2022 09:00:12 - SMS to 61412869531 with messageid 504 has been accepted by provider  
 Fri 14 Jan 2022 09:00:28 - SMS to 61412869531 with messageid 504 has been delivered by provider

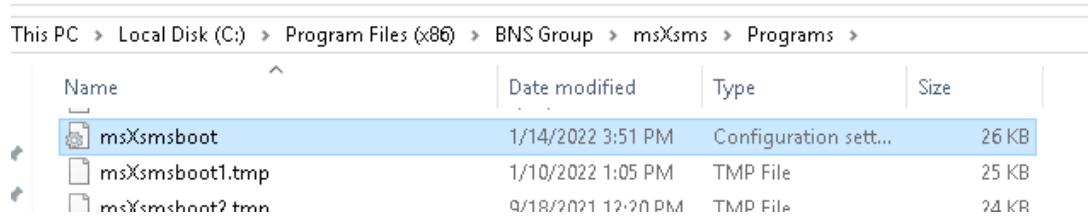
Health Service <----- msXsms Server F3MSXSMS16

Fri 14 Jan 2022 09:30:02 one or more messages were not delivered in 30 minute(s) [**\*\* ERROR \*\***]  
 Fri 14 Jan 2022 09:30:02 \*\*\*\*\* Health check has FAILED \*\*\*\*\*

-----END OF REPORT-----

## 14.3 Configuring the Health Service

Configuration of the Health service is in the smsboot.ini file in the programs folder.



Name	Date modified	Type	Size
msXsmsboot	1/14/2022 3:51 PM	Configuration sett...	26 KB
msXsmsboot1.tmp	1/10/2022 1:05 PM	TMP File	25 KB
msXsmsboot2.tmp	9/18/2021 12:20 PM	TMP File	24 KB

The ini file contains the parameters for the Health service to function

[System-Health]

System-Health-External-AlertTheseEmailAdrsEachCycle-str=**emailaddress1,emailaddress2**

System-Health-External-SendEmailsOnExceptionOnly-int=1

System-Health-External-AlertTheseMobilesEachCycle-str=**61412nnnnnn,61412nnnnnn**

System-Health-MessageMask-str=Health Check from [Server] Local Time[DateTime]

System-Health-ShowLastNCharsInServerName-int=4

System-Health-SendTimes24hr-str=0900,1500,2000

System-Health-MaxCycleTimeInMins-int=30

System-Health-Business-Application-SenderEmailAdr-str=**HealthCheckerServer<ServerName>@system.internal**

System-Health-SmtpServerDNSorIP-str=smtp.office365.com

System-Health-SmtpServerPort-int=587

System-Health-SmtpUseTLSEncryption-int=1

System-Health-SmtpFromDisplayName-str=**SMS Health Check Service**

System-Health-SmtpUserName-str=**<customer's smtp user email address used for the service to send emails. Eg: SMSServiceAccount@xxxxxxxxxxxxxx >**

System-Health-SmtpPassword-EncryptPassword-int=0

System-Health-SmtpPassword-str=C2A96FC2B06AC2ADC288C2ABC2906F7BC2A6C29CC28A7B7BC28C7D717E7E

System-Health-SyslogPort-int=514



### Configure the ini file

- nominate the email addresses to receive error reports in relation to health.
- Nominate the mobile numbers to receive health check SMS messages each day.
- Create a business application entry for the health service for each SMS Server. **HealthCheckerServer<ServerName>@system.internal**. Set the name in the ini file to match the entry you made in the business applications section of the SMS cloud console. All administration functions through the SMS console are documented in <https://smskb.bnsgroup.com.au/console>
- when setting the initial password for the SMTP email user account used to send emails, set System-Health-SmtpPassword-EncryptPassword-int=1
- Set the value of the password in System-Health-SmtpPassword-str then save and close the ini file. Stop SMS services using an elevated CMD window command STOPSMS
- Then run STARTSMS from the same CMD window. After all services are started, the password in the smsboot.ini file should then be encrypted.
-

# SECTION 15 Configuring other services

## 15.1 Simple broadcast

Simple broadcast is currently restricted to SMTP based submissions using internal email servers sending on port 25.

- Simple broadcast requires the following services to be enabled on the SMS Server:
  - sms from SMTP service
  - sms submission services

Refer to the simple broadcast admin guide - > [Simple Broadcast Admin Guide \(bnsgroup.com.au\)](http://bnsgroup.com.au)

Refer to the simple broadcast end user guide - > [Send Simple SMS Broadcast from Outlook \(bnsgroup.com.au\)](http://bnsgroup.com.au)

## 15.2 SMS Submissions using SMTP

SMTP to SMS is currently restricted to internal email servers sending on port 25.

By default, some of the services supporting SMTP are set to disabled.

To activate all of the required services to support SMTP ensure that all of the services are set to manual from disabled.

Here!

msXsms Connector From SMTP High Priority	Handles Hi...	Running	Manual	.\msxsms_sa
msXsms Connector From SQL	Accepts ap...	Running	Manual	.\msxsms_sa
msXsms Connector To SMTP Acknowledgements	Sends Ackn...	Running	Manual	.\msxsms_sa
msXsms Connector To SMTP Incoming	Sends Inco...	Running	Manual	.\msxsms_sa
msXsms Connector To SMTP Queued and Delivered	Sends Queu...	Running	Manual	.\msxsms_sa
msXsms Connector To SQL	Returns sms...	Running	Manual	.\msxsms_sa
msXsms Health Service	Monitors S...	Running	Manual	.\msxsms_sa
msXsms Incoming	Handles Inc...	Running	Manual	.\msxsms_sa
msXsms SMSC Connector RX	Handles all I...	Running	Manual	.\msxsms_sa
msXsms SMSC Connector TX	Handles all ...	Running	Manual	.\msxsms_sa
msXsms Submission Alert Priority	Submits Ale...	Running	Manual	.\msxsms_sa
msXsms Submission High Priority	Submits Hi...	Running	Manual	.\msxsms_sa
msXsms Submission Simple Broadcast	Submits Lo...	Running	Manual	.\msxsms_sa
msXsms System Attendant	Performs Ar...	Running	Automatic	.\msxsms_sa

Previous versions of BNS's SMS Enterprise SMS server software had 3 SMTP priorities: Low Normal and High.

BNS changed this in version 2.0 of the software because SQL interfaces will be used mainly for applications in the future.

In Version 2.0 there are 2 x FROM SMTP services and 2 x Submission Services.

One is designated as HIGH priority and the other as NORMAL priority. SMTP priority allows messages to traverse the Exchange server system as quick as possible for SMTP based applications based on the destination address space eg: [number@high.sms](#) and [number@normal.sms](#)

All SMS transmission priorities are now controlled in the Applications & Users section of the SMS console.

BNS may implement its GRAPH API support into the platform allowing Exchange online transport rules to route SMS traffic via a mailbox. This is only to be used for low volumes. All high volumes are to use SQL as the main interface.

### 15.2.1 Exchange on-premises transport role servers

Customers with Exchange on-premises transport role servers can continue to use private domain addressing with the .SMS extension.

Eg: POLICY\_RENEWALS.SMS

#### 15.2.1.1 smsboot.ini file listen on port 25

The IP address of this server needs to be defined in the smsboot.ini file and firewall rules on the Windows Server need to allow connections on port 25.

##### INI File parameters

[From-SMTP-Connector]

From-SMTP-Connector-High-IP-str=nnn.nnn.nnn.nnn

From-SMTP-Connector-High-Port-str=25

### 15.2.2 Exchange Online transport rules

Exchange Online transport rules can be used to re-direct outbound SMS requests to a mailbox for processing by the SMS Server.

#### How to create a new transport rule in Exchange Online

# Set rule conditions

Name and set conditions for your transport rule

Name \*

Apply this rule if \*

The recipient

A recipient's domain is [Enter words](#)

← specify domain →

this example shows the QA environment being used in BNS's O365 tenancy

  0 items

Edit Delete

enter your value then press add

An example could be BHP.SMS or BNS.SMS or ABC.SMS etc.

### specify domain

Add

 Edit  Delete

1 item

QA.SMS



Press Save



Save

Cancel

# Set rule conditions

Name and set conditions for your transport rule

Name \*

Apply this rule if \*

The recipient  +

A recipient's domain is 'QA.SMS' 

Do the following \*


Redirect the message to  +

Redirect the message to [Select one](#) 

Except if

Select one  + 

---

 Select the mailbox of the primary active SMS server

---

# Set rule conditions

Name and set conditions for your transport rule

Name \*

Apply this rule if \*

The recipient  +

A recipient's domain is 'QA.SMS' 

Do the following \*

Redirect the message to  +

Redirect the message to 'QAMailbox1@bnsgroup.com.au' 

**nominate the primary sms server mailbox**

Except if

Select one  + 

# Set rule settings

Set settings for your transport rule

## Rule mode

- Enforce
- Test with Policy Tips
- Test without Policy Tips

## Severity \*

Not specified ▼

Activate this rule on

10/11/2022 📅 - 3:30 PM ▼

Deactivate this rule on

10/11/2022 📅 - 3:30 PM ▼

- Stop processing more rules
- Defer the message if rule processing doesn't complete

## Match sender address in message \*

Header ▼

## Comments

This transport rule is used for sending SMS messages from users and applications which can only support the email interface.

[Back](#) [Next](#)



# Review and finish

After your finish creating this rule, it is turned off by default until you turn it on from the Rules page

**Rule name**

QA.SMS

**Rule comments**

This transport rule is used for sending SMS messages from users and applications which can only support the email interface.

---

**Rule conditions**

**Apply this rule if**

A recipient's domain is 'QA.SMS'

**Do the following**

Redirect the message to 'QAMailbox1@bnsgroup.com.au' Specific date range is not set

**Except if**

[Edit rule conditions](#)

**Rule settings**

**Mode**

Enforce

**Set date range**

**Priority**

16

**Severity**

Not Specified

**For rule processing errors**

Ignore

**Stop processing more rules**

false

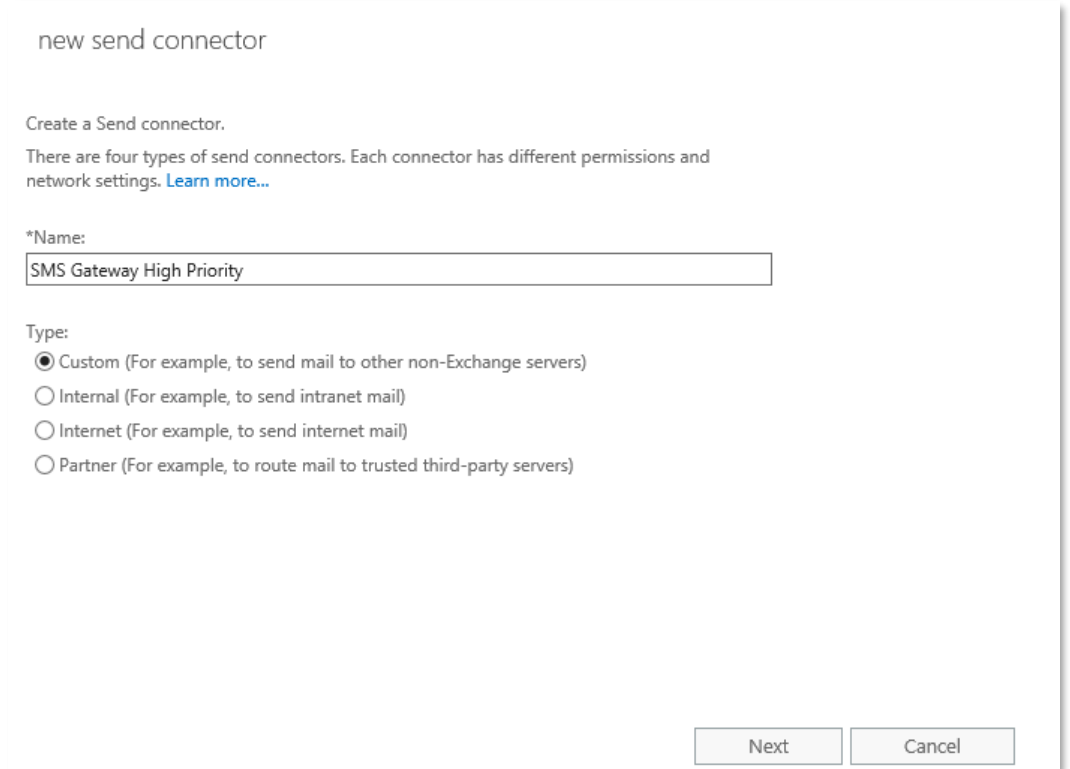
[Edit rule settings](#)

Back

Finish

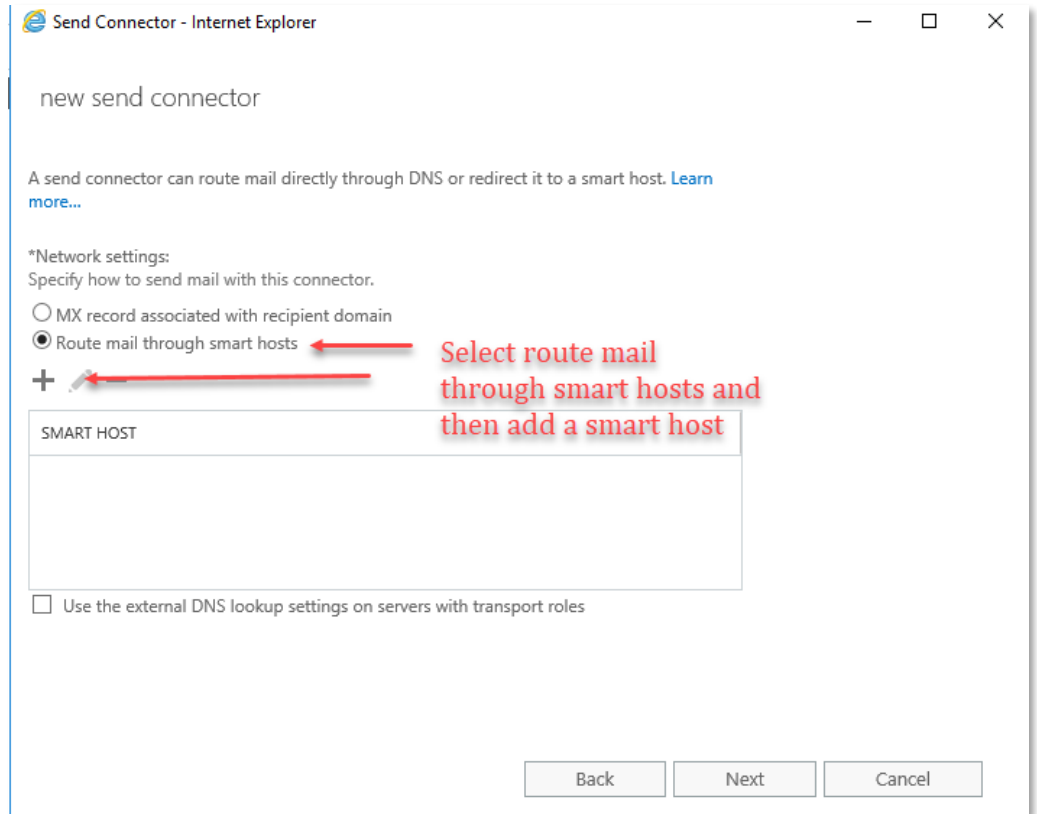
### 15.2.3 On-premises Exchange SMTP Connector example

- Open the Exchange Admin Center.
- Navigate to Mail Flow, Send Connectors
- Select New Send Connector



The screenshot shows the 'new send connector' wizard in the Exchange Admin Center. The title is 'new send connector'. Below the title, it says 'Create a Send connector. There are four types of send connectors. Each connector has different permissions and network settings. [Learn more...](#)'. The '\*Name:' field contains 'SMS Gateway High Priority'. The 'Type:' section has four radio button options: 'Custom (For example, to send mail to other non-Exchange servers)', 'Internal (For example, to send intranet mail)', 'Internet (For example, to send internet mail)', and 'Partner (For example, to route mail to trusted third-party servers)'. At the bottom right, there are 'Next' and 'Cancel' buttons.

- Press Next



new send connector

A send connector can route mail directly through DNS or redirect it to a smart host. [Learn more...](#)

\*Network settings:  
Specify how to send mail with this connector.

MX record associated with recipient domain  
 Route mail through smart hosts

+ ✎ -

SMART HOST
192.168.1.30

Use the external DNS lookup settings on servers with transport roles

Back Next Cancel

■ Multiple SMS Servers can be defined for redundancy

new send connector

Configure smart host authentication. [Learn more...](#)

Smart host authentication:

None  
 Basic authentication  
     Offer basic authentication only after starting TLS

\*User name:  
\_\_\_\_\_  
\*Password:  
\_\_\_\_\_

Note: all smart hosts must accept the same username and password.


Exchange Server authentication  
 Externally secured (for example, with IPsec)

Back Next Cancel

new send connector

A Send connector routes mail to a specified list of domains. These domains can be an SMTP address space or a custom type. [Learn more...](#)

\*Address space:  
Specify the address space or spaces to which this connector will route mail.

 **Add the address space for high priority SMS traffic**

TYPE	DOMAIN	COST

Scoped send connector

Back Next Cancel

- Click on the Add button

Address Space -- Webpage Dialog

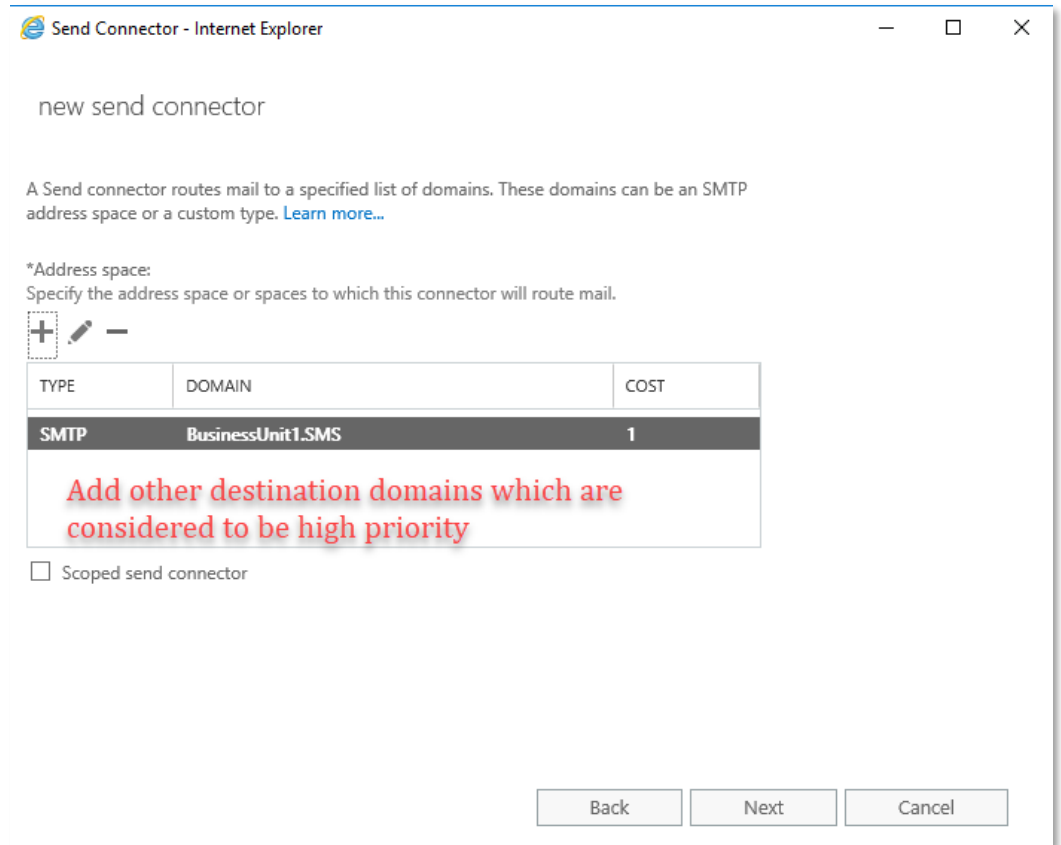
add domain

\*Type:  
SMTP

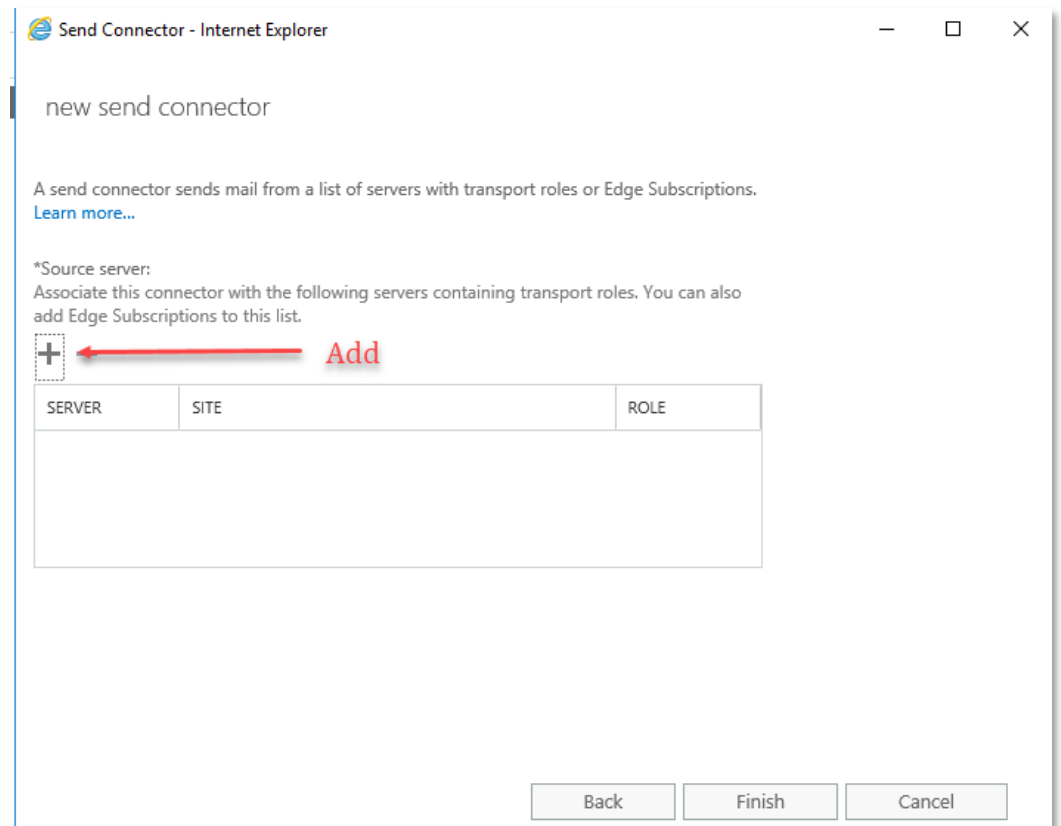
\*Full Qualified Domain Name (FQDN):  
BusinessUnit1.SMS **enter your brand name for high priority SMS**

\*Cost:  
1 **eg: BNS.SMS**

Save Cancel



- Select Next to add a server which has the transport role.



new send connector

A send connector sends mail from a list of servers with transport roles or Edge Subscriptions. [Learn more...](#)

\*Source server:  
Associate this connector with the following servers containing transport roles. You can also add Edge Subscriptions to this list.

+ -

SERVER	SITE	ROLE
F3EXCHANG...	f3.dev/Configuration/Sites/Default-First-Site-Na...	Mailbox

Back Finish Cancel

Multiple transport role servers can be used.

---

## SECTION 16 Testing the system

### 16.1 SMS Console

---

BNS engineers will help the customer configure the system using the SMS Console in addition to the smsboot.ini file configuration settings.

SMS Console documentation can be found at this link

<https://smskb.bnsgroup.com.au/console>

### 16.2 Testing from the test frame

---

This is the best option to use during deployment. It can test SQL and SMTP interfaces are configured correctly.

BNS engineers will help the customer perform initial tests using the test frame software.

### 16.3 Testing from Email environment

---

BNS engineers will help the customer perform initial tests using either Exchange online or Exchange Server and Microsoft Outlook.



---

## SECTION 17 Backup and recovery

### 17.1 Disaster recovery

---

The architecture allows a proxy Windows SMS server in a DR site to take over from a failed production Windows SMS Server.

This is detailed later in this deployment guide.

### 17.2 Data storage

---

All data is stored in SQL Server. Current day data is stored in the sms-current Database. Early hours of the following day, the previous days information is then moved to the sms-archive database.

The SMS-SQL-API database contains only transient information between business applications and the SMS Server core services.

Standard backup and recovery of SQL server should be managed by the customer.

### 17.3 Configuration files

---

Configuration files are stored on each Windows SMS Server. They are simple text files which can be edited using notepad.

### 17.4 AWS EC2 instance backup and recovery

---

BNS recommends that a weekly backup of the EC2 instance be performed. The design of the SMS software holds all data in SQL server. Therefore, the data on the SMS server is transient and contains mainly log files.

If the SMS Server EC2 instance blue screens for example, a simple restore of the EBS volumes including the root volume should be performed to bring the system back to a working state.

To backup EC2 instances follow the AWS backup documentation in the link below

<https://docs.aws.amazon.com/prescriptive-guidance/latest/backup-recovery/ec2-backup.html>

After a restore, if the Windows server is part of an AD domain, it is advisable to confirm that logins to the AD Domain are operation. Failure to login to the Windows server would be most likely a Kerberos machine account authentication error. For more information refer to [Kerberos Authentication Overview | Microsoft Docs](#)

## 17.5 AWS RDS SQL backup and restore

---

The SMS Server design has a Current DB and an Archive DB.

The software processes all SMS traffic into the Current DB in a 24 hour period.

A configurable value in the smsboot.ini file controls the time that the previous days transactions are moved from the Current DB to the Archive DB.

System-Attendant-Service-Archive24hrStartTime-str=0030

System-Attendant-Service-Archive24hrStopTime-str=0530

The default recommended time window is between 0030hours and 0530hours (Local Server time).

To backup AWS RDS follow the AWS documentation in the link below

[https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP\\_CommonTasks.BackupRestore.html](https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_CommonTasks.BackupRestore.html)

---

## SECTION 18 Routine maintenance

### 18.1 Software Windows service credentials

---

If the customer requires the SMS Services to change passwords from time to time, the service accounts will need to be changed in services control manager for each server which is using that service account.

### 18.2 SMPP \ TLS

---

The SMS Software negotiates TLS based on the SMS Service providers TLS cyphers. As such there is no key management required on the SMS Server for TLS encryption.

### 18.3 Software patches and upgrades

---

If Software patches to the SMS software are required, BNS will notify all customers.

Upgrades are managed through a software release notice which describes the upgrade process relevant to that release of software.

### 18.4 License management of the SMS Software

---

Annual licenses are provided to the customer which are renewed usually as part of an enterprise agreement. BNS will provide updated license files which are deployed by the customer in accordance with instructions provided by email.

## 18.5 AWS Service limits

---

AWS maintains service quotas (formerly called service limits) for each account to help guarantee the availability of AWS resources and prevent accidental provisioning of more resources than needed. Some service quotas are raised automatically over time as you use AWS. However, most AWS services require that you request quota increases manually.

If any resource used by the SMS Software is limited in any way, the customer will need to manually request a service increase.

BNS has reviewed both EC2 and RDS quotas listed in the AWS console. BNS is not aware of any limitation which could be exceeded by the software itself.

Refer to service limits at this link

[https://docs.aws.amazon.com/general/latest/gr/aws\\_service\\_limits.html](https://docs.aws.amazon.com/general/latest/gr/aws_service_limits.html)

# SECTION 19 Emergency Maintenance

## 19.1 Handling fault conditions

Depending on what the fault is will depend on what action is required by the customer's IT team.

Irrespective of the fault a ticket should be raised with BNS using email [support@bnsgroup.com.au](mailto:support@bnsgroup.com.au)

Minimum information required in your email to [Support@bnsgroup.com.au](mailto:Support@bnsgroup.com.au)

1. A brief description of the problem
2. Your contact details including telephone number
3. The name of your organization
4. Criticality / business impact

On receipt of your email, BNS's automated ticketing systems will provide a case number response back via email. BNS generally contact the customer by telephone.

The following are identifiable possible faults which could occur and the recommended action.

### 19.1.1 Business processes are unable to access the SMS-SQL-API DB

Recommended actions:

- Check with the SQL Admin for any exceptions in the access control logs in SQL Server.
- Run the test tool provided with the SMS Software (refer section 12).

### 19.1.2 SMS messages are not being received from the Health Service to nominated handsets

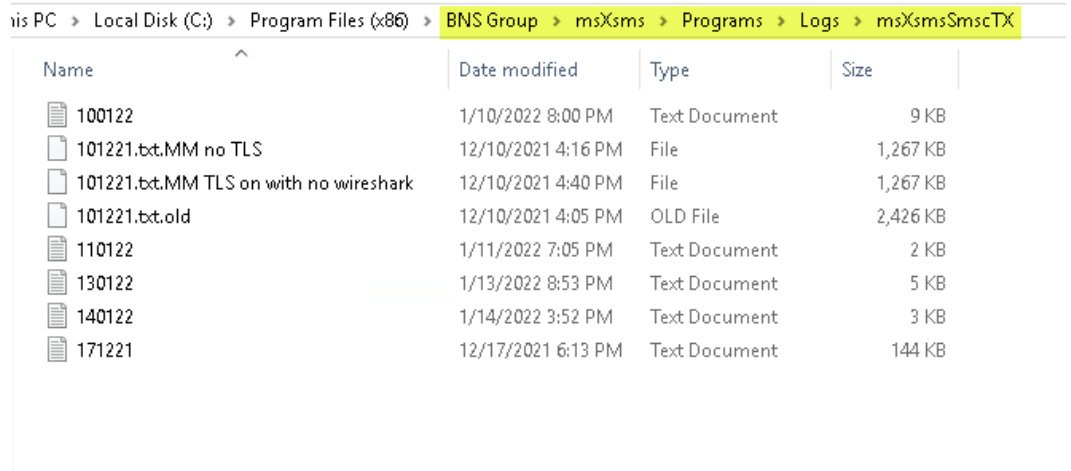
Recommended actions:

- Check the Health Service log files to ensure the service is not reporting any error messages.
- Run the test tool provided with the SMS Software (refer section 12). Confirm what happens with the test tool and report this to BNS on a support ticket.

### 19.1.3 SMS messages are not being sent to handsets

Recommended actions:

- Run the test tool provided with the SMS Software (refer section 12). Confirm what happens with the test tool and report this to BNS on a support ticket.
- Check the log file for the smscTX service for any reported errors and see if it is actually processing messages.
- Send a copy of this TX log to BNS on the support ticket.



Open the log file to see if messages are being processed. Local server times are used in the log file.

```

13Jan2022 12:38:52:857 : < msXsmsSmScTX > : Server AWS5MS1 is running in Active mode and will process outbound and inbound messages.
13Jan2022 12:38:52:857 : < msXsmsSmScTX > : Using Character Set : msXsms-SMSC-gsm0338.chr
13Jan2022 12:38:52:935 : < msXsmsSmScTX > : Connected and Authenticated with 13.237.67.114 on port 3600
13Jan2022 12:38:52:951 : < msXsmsSmScTX > : TLS/SSL NOT configured on this connection.
13Jan2022 12:39:03:141 : < msXsmsSmScTX > : Socket Connection terminated abruptly, an auto reconnect will be attempted in 30 seconds with Production
13Jan2022 12:39:33:265 : < msXsmsSmScTX > : Using Character Set : msXsms-SMSC-gsm0338.chr
13Jan2022 12:39:33:328 : < msXsmsSmScTX > : Connected and Authenticated with 13.237.67.114 on port 3600
13Jan2022 12:39:33:343 : < msXsmsSmScTX > : TLS/SSL NOT configured on this connection.
13Jan2022 12:43:50:042 : < msXsmsSmScTX > : Priority : N EventId: 51095 Part A of SMS Message from app1@bns.com to Cell No : 61412869513 was queued
13Jan2022 12:47:01:426 : < msXsmsSmScTX > : Priority : N EventId: 51097 Part A of SMS Message from app1@bns.com to Cell No : 61412869513 was queued
13Jan2022 15:00:09:652 : < msXsmsSmScTX > : Priority : L EventId: 51099 Part A of SMS Message from HealthCheckerServerAWS5MS1@system.internal to Cell
13Jan2022 15:00:09:683 : < msXsmsSmScTX > : Priority : L EventId: 51100 Part A of SMS Message from HealthCheckerServerAWS5MS1@system.internal to Cell
13Jan2022 20:00:08:240 : < msXsmsSmScTX > : Priority : L EventId: 51101 Part A of SMS Message from HealthCheckerServerAWS5MS1@system.internal to Cell
13Jan2022 20:00:08:272 : < msXsmsSmScTX > : Priority : L EventId: 51102 Part A of SMS Message from HealthCheckerServerAWS5MS1@system.internal to Cell
13Jan2022 20:53:15:785 : < msXsmsSmScTX > : Dis-connected from SQL Database - msXsms-Current
13Jan2022 20:53:15:785 : < msXsmsSmScTX > : Service Stopped
    
```

If you see MessageIds from the service provider in the log as the example below but you are not seeing them on destination handsets then the issue is with the service provider. A manual failover to a secondary service in this instance would be required. This is documented at <https://smskb.bnsgroup.com.au/manualfailover> don't forget to log the issue with your SMS Service provider and advise the business what has happened. Messages which have been sent to the SMS Service provider cannot be sent again. You will have to wait until their service is restored. However, if their outage is likely to be some time, you can perform a manual failover to a secondary provider to process new SMS requests.

```

61412869513 was queued to SMSC : SINCH with a MessageId of 17e511afbf10003f3be1e3c268e3bf98
61412869513 was queued to SMSC : SINCH with a MessageId of 17e511de78e0003f3be1e3c268e3f03c
@system.internal to Cell No : 61412869513 was queued to SMSC : SINCH with a MessageId of 17e5197cbb80003f3be1e3c268f3d6
@system.internal to Cell No : 61412869531 was queued to SMSC : SINCH with a MessageId of 17e5197cbe10003f3be1e3c268f3d6
@system.internal to Cell No : 61412869513 was queued to SMSC : SINCH with a MessageId of 17e52aa6ebf0003f3be1e3c26904ff
@system.internal to Cell No : 61412869531 was queued to SMSC : SINCH with a MessageId of 17e52aa6ee80003f3be1e3c26904ff
    
```

---

# SECTION 20 Support

## 20.1 How to receive support

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Primary support is via email by sending a request to [support@bnsgroup.com.au](mailto:support@bnsgroup.com.au)

If the customer has a system down condition:

- Log a support via email first [support@bnsgroup.com.au](mailto:support@bnsgroup.com.au) then
- Call +61 2 80016653 24 x 7 and leave your details for 'Technical Support'.

## 20.2 Support Tiers

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BNS has 1 main support tier for enterprise customers offering a 4 hour SLA response during business hours 9am to 6pm Monday through Friday Australian Eastern time zone Sydney\Canberra.

Support requests logged via email to [support@bnsgroup.com.au](mailto:support@bnsgroup.com.au) is mandatory to receive a 4 hour response.

All support is via: email, telephone and remote assist using Microsoft Teams or the preferred remote tools supported by the customer.

BNS operates a 24 x 7 service for taking support requests after an initial email has been sent to [support@bnsgroup.com.au](mailto:support@bnsgroup.com.au)

- For urgent service, call +61 2 80016653 24 x 7 and leave your details for 'Technical Support'. State that your request is urgent.

Customers requiring premium service for 24 x 7 service should contact BNS for more information.

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# SECTION 21 Disaster Recovery planning

## 21.1 DR Partner Server

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- This is no longer used in version 2. The design is ACTIVEACTIVE across Multi-AZ providing best practice high availability in Azure or AWS.



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## SECTION 22 Appendix

### 22.1 AWS RDS performance testing

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Performance tests at BNS to be re-published when final builds are ready for beta.