

This guide shows you how to deploy and connect to a VM that is configured to run SAP NetWeaver on Linux-based systems on Google Cloud. To deploy a VM that is running Windows, see the [Windows Deployment Guide \(/solutions/sap/docs/netweaver-deployment-guide-windows\)](/solutions/sap/docs/netweaver-deployment-guide-windows).

Deploy your VM and associated resources manually only if you require more control over your system configuration than Deployment Manager provides. Using Deployment Manager to deploy your Google Cloud resources is recommended because you can deploy SAP-certified VM configurations for SAP NetWeaver quickly, consistently, and with fewer errors. To learn more about Deployment Manager, see [Automated VM deployment for SAP NetWeaver on Linux Server \(/solutions/sap/docs/netweaver-deployment-linux-dm\)](/solutions/sap/docs/netweaver-deployment-linux-dm).

The VM that is deployed by these instructions is for use in a 3-tier configuration, where SAP NetWeaver runs on one VM and the database server runs on another. During deployment, you also install Google's monitoring agent and can validate that it is sending metrics to SAP.

To set up a 2-tier configuration, where SAP NetWeaver runs on the same VM as the database server, you deploy the database server first and create the VM and the required disk drives for both the database server and for SAP NetWeaver at that time. You then install SAP NetWeaver on the same VM as the database server. In a 2-tier configuration, SAP NetWeaver and SAP HANA must use different SAP system IDs (SIDs).

For instructions about deploying the VM for a database server, see the [database deployment guide \(/solutions/sap/docs/\)](/solutions/sap/docs/) for your database server.

For more details on planning your implementation, see the [Planning Guide \(/solutions/sap/docs/netweaver-planning-guide\)](/solutions/sap/docs/netweaver-planning-guide). For an overview of IT ops for your system, see the [Operations Guide \(/solutions/sap/docs/netweaver-operations-guide\)](/solutions/sap/docs/netweaver-operations-guide).

To create a project:

1. [Sign in](https://accounts.google.com/Login) (https://accounts.google.com/Login) to your Google Account.

If you don't already have one, [sign up for a new account](https://accounts.google.com/SignUp) (https://accounts.google.com/SignUp).

2. In the Cloud Console, on the project selector page, select or create a Cloud project.

★ **Note:** If you don't plan to keep the resources that you create in this procedure, create a project instead of selecting an existing project. After you finish these steps, you can delete the project, removing all resources associated with the project.

[Go to the project selector page](https://console.cloud.google.com/projectselector2/home/dashboard) (https://console.cloud.google.com/projectselector2/home/dashboard)

3. Make sure that billing is enabled for your Google Cloud project. [Learn how to confirm billing is enabled for your project](#) (/billing/docs/how-to/modify-project).

These instructions use [Cloud Shell](/shell/docs/) (/shell/docs/) to enter `gcloud` commands that deploy or configure your Google Cloud resources. Cloud Shell is accessed through the Cloud Console in your browser.

Cloud Shell runs on a VM that Google Cloud provisions each time you start Cloud Shell. The first time you use Cloud Shell, Google Cloud also creates a persistent `$HOME` directory for you, which is restored each time you open Cloud Shell.

The provisioned VM includes the latest [Cloud SDK](/sdk/docs/) (/sdk/docs/), which provides the `gcloud` command-line interface. Therefore, the `gcloud` commands that you use in Cloud Shell are the same as those you would use in a locally installed instance of the Cloud SDK.

If you have the Cloud SDK installed, you can issue the `gcloud` commands that are used in these instructions from your local machine. However, with a locally installed Cloud SDK you must always make sure that you are using the latest version of the Cloud SDK.

Whether you use Cloud Shell or Cloud SDK, you can set and change the properties of your `gcloud` command environment and save them as a *configuration*. Configurations are collections of key-value pairs that influence the behavior of the `gcloud` commands.

Some basic actions you can take with a configuration in Cloud Shell include:

- Initialize a configuration with `gcloud init`.
- Check the settings of your current `gcloud` configuration with `gcloud config list`.

- Change the Google Cloud project you are working in with `gcloud config set project [PROJECT_ID]` where `[PROJECT_ID]` represents your Google Cloud project.
- Set a default region with `gcloud config set compute/region [REGION]` where `[REGION]` represents a Google Cloud region.
- Set a default zone with `gcloud config set compute/zone [ZONE]` where `[ZONE]` represents a Google Cloud zone.
- Create a new configuration with `gcloud config configurations create [NAME]` where `[NAME]` represents the name for the configuration.

For more information about working with configurations, see [Managing Cloud SDK configurations](#) (`/sdk/docs/configurations`).

For security purposes, create a new network. You control who has access by adding firewall rules or by using another access control method.

If your project has a default VPC network, don't use it. Instead, create your own VPC network so that the only firewall rules in effect are those that you create explicitly.

to avoid unintentionally exposing your VM instance to the internet, follow these recommendations:

Use a NAT gateway.

[Create firewall rules](#) (`/vpc/docs/using-firewalls#creating_firewall_rules`) that block all external access that you don't require.

When you create your VMs:

- Specify a network tag for each VM for use in routing and firewall rules. If you use the Deployment Manager templates that Google Cloud provides, specify a tag with `networkTag: [TAG]`.
- Create the VMs without an external IP. If you use the Deployment Manager templates that Google Cloud provides, specify `publicIP: No`.

1. Go to Cloud Shell.

[OPEN Cloud Shell](https://console.cloud.google.com/?cloudshell=true) (`https://console.cloud.google.com/?cloudshell=true`)

2. Create a new network in the custom subnetworks mode:

where:

- `[YOUR_NETWORK_NAME]` is the name of the new network. The network name can contain only lowercase characters, digits, and the dash character (-).

Specify `--subnet-mode custom` to avoid using the default auto mode, which automatically creates a subnet in each Compute Engine region. For more information, see [Subnet creation mode](#) (/vpc/docs/vpc#subnet-ranges).

3. Create a subnetwork, and specify the region and IP address range:

where:

- `[YOUR_SUBNETWORK_NAME]` is the new subnetwork.
- `[YOUR_NETWORK_NAME]` is the name of the network you created in the previous step.
- `[REGION]` is the region where you want the subnetwork. Use a region that is [supported for SAP NetWeaver](#) (/solutions/sap/docs/netweaver-planning-guide#planning_regions_zones).
- `[YOUR_RANGE]` is the IP address range, [specified in CIDR format](#) (https://wikipedia.org/wiki/Classless_Inter-Domain_Routing), such as `10.1.0.0/24`. If you plan to add more than one subnetwork, assign non-overlapping CIDR IP address ranges for each subnetwork in the network. Note that each subnetwork and its internal IP address ranges are mapped to a single region.

4. Optionally, repeat the previous step and add additional subnetworks.

If you intend to create a VM without a public IP address, you must create a NAT gateway so that your VM can access the internet to download Google's monitoring agent. If you intend to assign an external public IP address to your VM, you can skip this procedure.

1. Create a VM to act as the NAT gateway in the subnet you just created:

where:

- [YOUR_VM_NAME] is the name of the VM you are creating that you want to use for the NAT gateway.
- [YOUR_ZONE] is the zone where you want the VM.
- [YOUR_IMAGE_FAMILY] and [YOUR_IMAGE_PROJECT] specify the image you want to use (/compute/docs/images#os-compute-support) for the NAT gateway VM. If you are using SUSE Linux Enterprise Server (SLES) for your SAP NetWeaver components, you must specify a SLES VM for your gateway as well. However, if you are using Red Hat Enterprise Linux (RHEL), then you don't have to select a premium image for your gateway. For example, to select the latest version of Debian, specify `--image-family debian` and `--image-project debian-cloud`.
- [YOUR_MACHINE_TYPE] is any supported machine type. If you expect high network traffic, choose a machine type with that has at least 8 virtual CPUs.
- [YOUR_SUBNETWORK_NAME] is the name of the subnetwork where you want the VM.
- [YOUR_VM_TAG] is the tag that is applied to the VM you are creating. If you will also use this VM as a bastion host (/solutions/sap/docs/netweaver-planning-guide#bastion_hosts_nat), this tag is used to apply the firewall rule only to this VM.

2. Create a route that is tagged so that traffic passes through the NAT VM instead of the default internet gateway:

where:

- [YOUR_ROUTE_NAME] is the name of the route you are creating.

- [YOUR_NETWORK_NAME] is the network you created.
- [YOUR_VM_NAME] is the VM you are using for your NAT gateway.
- [YOUR_ZONE] is the zone where the VM is located.
- [YOUR_TAG_NAME] is the tag on the route that directs traffic through the NAT VM.

3. If you also want to use the NAT Gateway VM as a bastion host, run the following command to allow inbound SSH access to this instance from the internet:

where:

- [YOUR_NETWORK_NAME] is the network you created.
- [YOUR_VM_TAG] is the tag you specified when you created the NAT gateway VM. This tag is used so this firewall rule applies only to the VM that hosts the NAT gateway, and not to all VMs in the network.

By default, incoming connections from outside your Google Cloud network are blocked. To allow incoming connections, set up a firewall rule for your VM. Firewall rules regulate only new incoming connections to a VM. After a connection is established with a VM, traffic is permitted in both directions over that connection.

You can create a firewall rule to allow access to specified ports, or to allow access between VMs on the same subnetwork.

Create firewall rules to allow access for such things as:

- The default ports used by SAP NetWeaver, as documented in [TCP/IP Ports of All SAP Products](https://help.sap.com/viewer/575a9f0e56f34c6e8138439eefc32b16/2.0/en-US/616a3c0b1cc748238de9c0341b15c63c.html) (https://help.sap.com/viewer/575a9f0e56f34c6e8138439eefc32b16/2.0/en-US/616a3c0b1cc748238de9c0341b15c63c.html)
- Connections from your computer or your corporate network environment to your Compute Engine VM instance. If you are unsure of what IP address to use, talk to your company's network admin.

- Communication between VMs in a 3-tier or scaleout configuration. For example, if you are deploying a 3-tier system, you will have at least 2 VMs in your subnetwork: the VM for SAP NetWeaver, and another VM for the database server. To enable communication between the two VMs, you must create a firewall rule to allow traffic that originates from the subnetwork.
- SSH connections to your VM instance, including [SSH from the browser](https://cloud.google.com/compute/docs/ssh-in-browser) (https://cloud.google.com/compute/docs/ssh-in-browser), through port 22.
- Connections to your VM instance from third-party tools, such as a local terminal or PuTTY. Create a rule to allow access for the tool through your firewall. For more information, see [Connecting using third-party tools](/compute/docs/instances/connecting-advanced#thirdpartytools) (/compute/docs/instances/connecting-advanced#thirdpartytools).

The following procedure is a simplified version of the instructions for creating firewall rules. For more detailed instructions, see [Virtual Private Cloud documentation](/vpc/docs/using-firewalls#creating_firewall_rules) (/vpc/docs/using-firewalls#creating_firewall_rules).

To create a firewall rule:

1. In the Cloud Console, go to the **Firewall Rules** page.

[Open Firewall Rules page](https://console.cloud.google.com/networking/firewalls/list) (https://console.cloud.google.com/networking/firewalls/list)

2. At the top of the page, click **Create firewall rule**.

- In the **Network** field, select the network where your VM is located.
- In the **Targets** field, select **All instances in the network**.
- In the **Source filter** field, select one of the following:
 - **IP ranges** to allow incoming traffic from specific IP addresses. Specify the range of IP addresses in the **Source IP ranges** field.
 - **Subnets** to allow incoming traffic from a particular subnetwork. Specify the subnetwork name in the following **subnets** field. You can use this option to allow access between the VMs in a 3-tier or scaleout configuration.
- In the **Protocols and ports** section, select **Specified protocols and ports** and specify **tcp: [PORT_NUMBER] ;**.

3. Click **Create** to create your firewall rule.

The following instructions show you how to deploy an example 3-tier SAP system running Linux and either SAP HANA, SAP ASE, or IBM Db2 for Linux, UNIX and Windows (IBM Db2) as the database. The database components run on one VM, and the other SAP components, including the SAP central services, run on a second VM.

For general considerations for a scale-out system, see [Deploying a 3-tier scale-out system](#) (#deploying_a_3-tier_scale-out_system).

When you create a VM, you can specify several options, including the operating system, region, machine type, and persistent disks. You must also specify a start-up script to install Google's monitoring agent on the VM.

To create a VM:

1. Go to the **Images** page in Compute Engine:

[Go to the Images page](https://console.cloud.google.com/compute/images) (<https://console.cloud.google.com/compute/images>)

2. To use a public image, choose an image from one of the following image families:

- For RHEL, select an image that begins with `rhel-`, such as `rhel-7-sap-apps`.
- For SLES, select an image that begins with `sles-`, such as `sles-12-sp3-sap`.

3. Click the **Create instance** button.

4. Enter a name for the VM.

Limit your name to 13 characters, because this is the maximum supported by SAP. For more information, see SAP Note [611361: Hostnames of SAP servers](#) (<https://launchpad.support.sap.com/#/notes/611361>).

5. Select the region and zone for your VM based on the location of your internal resources and users, and based on the CPU platform you want to use.

For more details on the zones supported for SAP NetWeaver, see the following guides and SAP Notes:

- [SAP Netweaver on Google Cloud Planning Guide](#) (/solutions/sap/docs/netweaver-planning-guide#planning_regions_zones)
- [SAP Note 2446441 - Linux on Google Cloud Platform \(IaaS\): Adaptation of your SAP License](#) (<https://launchpad.support.sap.com/#/notes/2446441>)

6. Under **Machine type**, select a pre-defined `n1-standard` or `n1-highmem` machine type, or customize a VM to more precisely match your expected workload.

★ **Note:** Before you customize a VM for SAP NetWeaver, review the information about custom machine types in the [Planning Guide](/solutions/sap/docs/netweaver-planning-guide#machine_types) and in [SAP Note 2456432](https://launchpad.support.sap.com/#/notes/2456432).

To compare the supported machine types and their persistent-disk limitations, see the [Planning Guide](/solutions/sap/docs/netweaver-planning-guide#machine_types).

7. Optionally, in the **Boot disk** section, click **Change** to configure your boot disk. For Linux systems, ensure that the boot disk is at least 16 GB.

8. Under **Access Scope**, for the Compute Engine default service account, select **Set access for each API**.

To ensure that your VM instance can interact with Compute Engine and Stackdriver and that the Google monitoring agent functions correctly, the following API access for the service account are recommended:

API	Access
Cloud Source Repositories	Read Write
Compute Engine	Read Write
Service Control	Enabled
Service Management	Read Only
Stackdriver Logging API	Full
Stackdriver Monitoring API	Full
Stackdriver Trace	Write Only
Storage	Full

9. Expand the **Management, disks, networking, sole tenancy** section.

10. If you are using a NAT gateway, in the **Networking** tab, under **Network tags**, add the tag that you specified as `[YOUR_TAG_NAME]` when you set up the route that directs traffic through the gateway.

11. In the **Management** tab, under **Automation > Startup script**, specify the following script to install the Google monitoring agent:

The startup script creates two cron jobs that are required for the continuous operation of Google's monitoring agent, so do not delete them.

The Google monitoring agent, which sends data to the SAP monitoring system, must be installed and running to get support from SAP.

For more information about the Google monitoring agent, see the [Operations Guide \(/solutions/sap/docs/netweaver-operations-guide#understanding_the_monitoring_agent_lifecycle\)](/solutions/sap/docs/netweaver-operations-guide#understanding_the_monitoring_agent_lifecycle).

12. In the **Management** tab, under **Availability policy**, ensure that you leave the following default settings:

- To ensure availability of your SAP systems, keep the **Preemptibility** setting **Off (recommended)**.
- To ensure that your VM can restart if there's a maintenance or failure event, keep the **Automatic restart** setting **On (recommended)**.
- To ensure that your VM is migrated to other hardware during infrastructure maintenance, keep the **On host maintenance** setting on **Migrate VM instance (recommended)**.

13. Optionally, in the **Disks** tab, under **Boot disk > Deletion rule**, clear the **Delete boot disk when instance is deleted** checkbox.

14. In the **Disks** tab, under **Additional disks**, click **Add new disk** to add persistent disks for storage.

a. Optionally, specify a name in the **Name** field.

b. In the **Create a disk** window, under **Disk Type**, select the disk type based on the purpose of the disk.

- For SAP NetWeaver binaries, add a standard persistent disk (HDD). SSD disks are generally not required for SAP application installations.
- For the swap disk, add an HDD disk.

c. Under **Source type**, select **Blank disk**.

d. Specify the size of your disk.

For the swap disk, size the disk according to your needs. The minimum recommended size is 24 GB. For larger instances, you may need more. Refer to the SAP documentation. For example, see [SAP Note 1597355 - Swap-space recommendation for Linux](https://launchpad.support.sap.com/#/notes/1597355) (<https://launchpad.support.sap.com/#/notes/1597355>).

e. Click **Done**.

f. Repeat these steps to create each disk you need for your system.

15. In the **Networking** tab, under **Network interfaces**, click the pencil icon to edit the selected network interface.

a. Select [the network that you created](#) (#creating_a_network) previously.

b. Select the subnetwork.

c. Click **Done**.

16. Click **Create** to create and start the instance.

At the bottom of the page, you can click **REST** or **command line** to see the equivalent REST and `gcloud` commands for the instance you are creating. These can be useful for creating additional VMs.

If you have [defined a firewall rule](#) (#adding_firewall_rules) that allows access on port 22, you can connect to a Linux VM using common SSH tools.

GCP provides two easy connection methods. You can connect with a click of a button through the Cloud Console or you can connect from a terminal by using a `gcloud` command.

New VMs can take some time to boot up before an SSH connection can be established. If you fail to connect to a new VM, retry after a few minutes.

You can also generate a new key-pair for your Linux VM and apply it to your project, which allows you to connect using third-party tools such as [PuTTY on Windows workstations](#) (/compute/docs/instances/connecting-advanced#thirdpartytools). For more details, see [Creating a new SSH key pair](#) (/compute/docs/instances/adding-removing-ssh-keys#createsshkeys).

Other connection options, which are not discussed here, are also possible.

For more detailed information about connecting to a Linux VM on Google Cloud, see [Connecting to Linux instances](#) (/compute/docs/instances/connecting-to-instance#gctools).

After you connect to your VM, format and mount the disk drives, including the SAP disk drives and the swap disk drive.

The following steps format and mount the `/usr/sap` disk. For other disks, such as `/sapmnt` or `/backup`, replace the `usrsap` and `/usr/sap` volume and mount point identifiers in the example commands with identifiers for those disks.

1. In a terminal connected to your VM, switch to super user:
2. Create a physical volume for the disk:
3. Create a volume group for the disk:
4. Create a logical volume for the disk:
5. Format the disk. The following command formats the disk with a single `xfs` file system and no partition table:

★ **Note:** Earlier versions of IBM Db2 do not support the `xfs` file system. For the Db2-supported file systems, see [SAP Note 405827 - Linux: Recommended file systems](https://launchpad.support.sap.com/#/notes/405827) (<https://launchpad.support.sap.com/#/notes/405827>).

6. Update the file system table `fstab`:

The `nofail` option is specified so that the instance can continue to boot even if the disk is not present. For example, if you take a snapshot of the boot disk and create a new instance without

any persistent disks attached, the instance can continue through the startup process and not pause indefinitely.

7. Create a mount point:

8. Mount the disk to the VM:

9. Confirm that the disk is mounted properly:

You should see output similar to the following:

10. Repeat these steps for each additional disk.

1. In a terminal connected to your VM, create a physical volume for the swap disk:

2. Create a volume group for the swap disk:

3. Create a logical volume for the swap disk:

4. Format the swap disk:

5. Update `fstab`:

6. Mount the disk to the VM:

After you have created your VM, consult the relevant SAP notes on installation and ensure that your system includes the software components specified:

- [1310037 - SUSE LINUX Enterprise Server 11: Installation notes](https://launchpad.support.sap.com/#/notes/1310037)
(<https://launchpad.support.sap.com/#/notes/1310037>)
- [1984787 - SUSE LINUX Enterprise Server 12: Installation notes](https://launchpad.support.sap.com/#/notes/1984787)
(<https://launchpad.support.sap.com/#/notes/1984787>)
- [1496410 - Red Hat Enterprise Linux 6.x: Installation and Upgrade](https://launchpad.support.sap.com/#/notes/1496410)
(<https://launchpad.support.sap.com/#/notes/1496410>)
- [2002167 - Red Hat Enterprise Linux 7.x: Installation and Upgrade](https://launchpad.support.sap.com/#/notes/2002167)
(<https://launchpad.support.sap.com/#/notes/2002167>)

If you haven't yet deployed your database on Google Cloud, follow the instructions for setting up your database in both the Google Cloud deployment guide for your database, and in the database documentation that is provided by your database vendor.

Google Cloud provides deployment guides for the following SAP-certified databases:

- [SAP HANA guides](/solutions/sap/docs/sap-hana-guides) (/solutions/sap/docs/sap-hana-guides)
- [SAP ASE guides](/solutions/sap/docs/sap-ase-guides) (/solutions/sap/docs/sap-ase-guides)
- [SAP MaxDB guides](/solutions/sap/docs/sap-maxdb-guides) (/solutions/sap/docs/sap-maxdb-guides)
- [IBM Db2 guides](/solutions/sap/docs/sap-ibm-db2-guides) (/solutions/sap/docs/sap-ibm-db2-guides)
- [Windows SQL Server guide](/compute/docs/instances/sql-server/creating-sql-server-instances) (/compute/docs/instances/sql-server/creating-sql-server-instances): when SAP NetWeaver is running on Linux, Windows SQL Server is supported only in 3-tier architectures.

When SAP NetWeaver and the database server are running on different VMs in a 3-tier architecture, make sure that your firewall rules are defined to allow communication between the VMs.

The Stackdriver Logging agent provides you with a solution for Google Cloud system-activity logging, including operating system events and, if you are using SAP HANA, SAP HANA events. The Stackdriver Logging agent is an optional but recommended component. See the [SAP NetWeaver on Google Cloud operations guide](/solutions/sap/docs/netweaver-operations-guide#use_stackdriver_logging) (/solutions/sap/docs/netweaver-operations-guide#use_stackdriver_logging) for more information about Google Cloud logging.

To install the Stackdriver Logging agent in your new VM, see the instructions for Linux and Windows in [Installing the agent](/logging/docs/agent/installation#joint-install) (/logging/docs/agent/installation#joint-install).

For instructions on installing SAP NetWeaver on your new VM, see the [SAP help portal](https://help.sap.com/viewer/p/SAP_NETWEAVER_750) (https://help.sap.com/viewer/p/SAP_NETWEAVER_750) and the [SAP NetWeaver Master Guide](https://help.sap.com/doc/18cb1a50b9924bc3b94c2988cc8c51d9/7.5/en-US/mg_nw_75.pdf) (https://help.sap.com/doc/18cb1a50b9924bc3b94c2988cc8c51d9/7.5/en-US/mg_nw_75.pdf).

Important: The Software Provisioning Manager (SWPM) chooses the disk drive with the most free space as an installation location for each component. On Google Cloud, it's important that you don't accept the defaults. Be sure to assign the proper roles in the SWPM dialog boxes.

After you install SAP NetWeaver:

1. Update the SAP kernel to the minimum supported patch level.

For details on the supported SAP kernel patch levels, see [SAP Note 2446441 - Linux on Google Cloud \(IaaS\): Adaptation of your SAP License](#)

(<https://launchpad.support.sap.com/#/notes/2446441>).

2. Install your permanent SAP NetWeaver license.

For more information from SAP about managing your SAP NetWeaver licenses, see [SAP Licensing Procedure](#)

(<https://help.sap.com/viewer/0643d547dfad4ce497bd7da1264fce777.5.6/en-US/fbde4502a496988fe13d459d66b8b.html>)

The SAP Host Agent has been enhanced for running on Google Cloud. Ensure that you run at least the minimum SAP Host Agent version required for the Google Cloud environment.

For details, refer to the following SAP Notes:

- SAP Note [2460297 - SAP on Linux on Google Cloud Platform: Enhanced Monitoring](#) (<https://launchpad.support.sap.com/#/notes/2460297>).
- To update your SAP Host Agent by default on a regular basis, see SAP Note [1473974 - Using the SAP Host Agent Auto Upgrade Feature](#) (<https://launchpad.support.sap.com/#/notes/1473974>).

After you have deployed a VM and installed SAP NetWeaver, validate that Google's monitoring agent is functioning properly with SAP's enhanced monitoring.

You can check whether the monitoring agent is running by polling for a *health check* from the server. Follow these steps:

1. In the Cloud Console, open Cloud Shell.

OPEN Cloud Shell (<https://console.cloud.google.com/?cloudshell=true>)

2. Connect to the VM instance you want to monitor. For details on how to connect, see [Connecting to your VM](#) (#connecting_to_your_vm).
3. At the command prompt, enter the following command:

If the monitoring agent is functioning properly, the value for `status` is `UP`. For example:

If the monitoring agent isn't running, see the Operations Guide section about [restarting Google's monitoring agent](#) (/solutions/sap/docs/netweaver-operations-guide#restarting_monitoring).

To check whether the connection between Google's monitoring agent and SAP NetWeaver works as intended, enter transaction `ST06` in your SAP NetWeaver ABAP system. In the overview pane, check the availability and content of the following fields for the correct end-to-end setup of the SAP and Google monitoring infrastructure:

- **Cloud Provider:** Google Cloud Platform
- **Enhanced Monitoring Access:** TRUE
- **Enhanced Monitoring Details:** ACTIVE

This section contains information about how to correct common issues.

If you are setting up a 3-tier SAP system and having connection issues between your VMs, ensure that you have [created a firewall rule](#) ([#adding_firewall_rules](#)) to allow traffic between VMs on your subnetwork.

If you are having issues connecting to your VM through [ssh](#), ensure that you have created a firewall rule to open port 22 on the Google Cloud network you are using.

For other possible issues, see [Known issues](#) ([/compute/docs/ssh-in-browser#known_issues](#)) for SSH from the browser.

To troubleshoot the monitoring agent, see the [Operations guide](#) ([/solutions/sap/docs/netweaver-operations-guide#troubleshooting_monitoring](#)).