Pexip Infinity and Amazon Web Services Deployment Guide

Contents

Introduction

The Amazon Elastic Compute Cloud (Amazon EC2) service provides scalable computing capacity in the Amazon Web Services (AWS) cloud. Using AWS eliminates your need to invest in hardware up front, so you can deploy Pexip Infinity even faster.

You can use AWS to launch as many or as few virtual servers as you need, and use those virtual servers to host a Pexip Infinity Management Node and as many Conferencing Nodes as required for your Pexip Infinity platform.

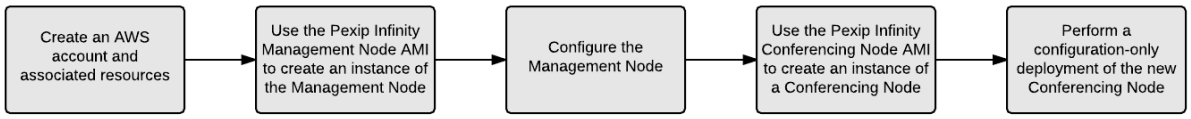
AWS enables you to scale up or down to handle changes in requirements or spikes in conferencing requirements. You can also use the AWS APIs and the Pexip Infinity management API to monitor usage and bring up / tear down Conferencing Nodes as required to meet conferencing demand, or allow Pexip Infinity to handle this automatically for you via its dynamic bursting capabilities.

Pexip publishes Amazon Machine Images (AMIs) for the Pexip Infinity Management Node and Conferencing Nodes. These AMIs may be used to launch instances of each node type as required.

Deployment guidelines

This section summarizes the AWS deployment options and limitations, and provides guidance on our recommended AWS instance types, security groups and IP addressing options.

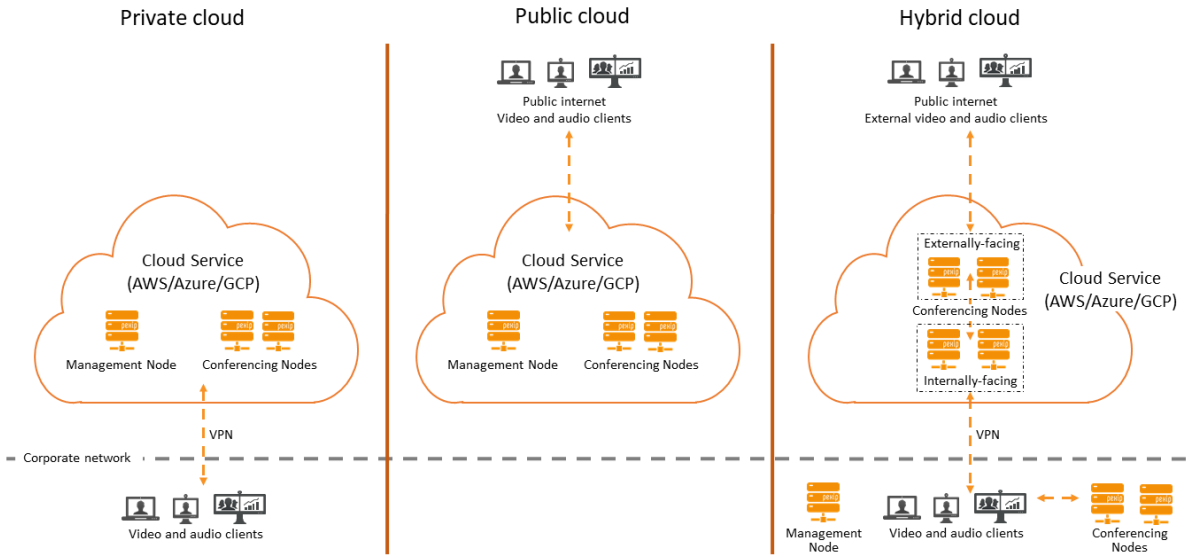
This flowchart provides an overview of the basic steps involved in deploying the Pexip Infinity platform on AWS:



Deployment options

There are three main deployment options for your Pexip Infinity platform when using the AWS cloud:

- **Private cloud**: all nodes are deployed within an AWS Virtual Private Cloud (VPC). Private addressing is used for all nodes and connectivity is achieved by configuring a VPN tunnel between the corporate network and the AWS VPC. As all nodes are private, this is equivalent to an on-premises deployment which is only available to users internal to the organization.
- **Public cloud**: all nodes are deployed within the AWS VPC. All nodes have a private address but, in addition, public IP addresses are allocated to each node. The node's private addresses are only used for inter-node communications. Each node's public address is then configured on the relevant node as a static NAT address. Access to the nodes is permitted from the public internet, or a restricted subset of networks, as required. Any systems or endpoints that will send signaling and media traffic to those Pexip Infinity nodes must send that traffic to the public address of those nodes. If you have internal systems or endpoints communicating with those nodes, you must ensure that your local network allows such routing.
- **Hybrid cloud**: the Management Node, and optionally some Conferencing Nodes, are deployed in the corporate network. A VPN tunnel is created between the corporate network and the AWS VPC. Additional Conferencing Nodes are deployed in the AWS VPC and are managed from the on-premises Management Node. The AWS-hosted Conferencing Nodes can be either internally-facing, privately-addressed (private cloud) nodes; or externally-facing, publicly-addressed (public cloud) nodes; or a combination of private and public nodes (where the private nodes are in a different Pexip Infinity system location to the public nodes). You may also want to consider dynamic bursting, where the AWS-hosted Conferencing Nodes are only started up and used when you have reached capacity on your on-premises nodes.



Limitations

The following limitations currently apply:

- Pexip Infinity node instances that are hosted on AWS can be deployed in one or many regions within AWS. However, if you deploy nodes across multiple AWS regions, it is your responsibility to ensure that there is a routable network between the AWS data centers, so that inter-node communication between the Management Node and all of its associated Conferencing Nodes can succeed. Pexip is unable to provide support in setting this AWS network up.

  Each AWS region contains multiple Availability Zones. A Pexip Infinity system location is equivalent to an AWS Availability Zone.

  Note that service providers may deploy multiple independent Pexip Infinity platforms in any AWS location (subject to your licensing agreement).
- SSH access to AWS-hosted Pexip Infinity nodes requires key-based authentication. (Password-based authentication is considered insufficiently secure for use in the AWS environment and is not permitted.) An SSH key pair must be set up within the AWS account used to launch the Pexip Infinity instances and must be assigned to each instance at launch time. You can create key pairs within AWS via the EC2 Dashboard Key Pairs option, or use third-party tools such as PuTTYgen to generate a key pair and then import the public key into AWS.

  Note that:
  - Pexip Infinity node instances only support a single SSH key pair.
  - If you are using a Linux or Mac SSH client to access your instance you must use the **chmod** command to make sure that your private key file on your local client (SSH private keys are never uploaded) is not publicly viewable. For example, if the name of your private key file is my-key-pair.pem, use the following command: `chmod 400 /path/my-key-pair.pem`

  See http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-key-pairs.html for more information about creating a key pair.
- We do not support AWS deployments in China.

Recommended instance types and call capacity guidelines

AWS instances come in many different sizes. In general, Pexip Infinity Conferencing Nodes should be considered compute intensive and Management Nodes reflect a more general-purpose workload.

For deployments of up to 30 Conferencing Nodes, we recommend using:

- **Management Node**: an **m4.large** instance.
- **Transcoding Conferencing Nodes**: a **c4.2xlarge** instance.
- **Proxying Edge Nodes**: either **m4.xlarge** or **c4.xlarge**.

This should provide capacity for approximately 15 HD / 34 SD / 175 audio-only calls per Transcoding Conferencing Node.

Note that m3.large and c3.2xlarge can be used instead if m4.large and c4.2xlarge are not available in your region. Larger instance types (such as c4.4xlarge and c4.8xlarge) may also be used for a Transcoding Conferencing Node, but the call capacity does not increase linearly so these may not represent the best value.

IP addressing

Within a VPC, an instance's private IP addresses can initially be allocated dynamically (using DHCP) or statically. However, after the private IP address has been assigned to the instance it remains fixed and associated with that instance until the instance is terminated. The allocated IP address is displayed in the AWS management console.

Public IP addresses may be associated with an instance dynamically (at launch/start time) or statically through use of an Elastic IP. Dynamic public IP addresses do not remain associated with an instance if it is stopped — and thus it will receive a new public IP address when it is next started.

Pexip Infinity nodes must always be configured with the private IP address associated with its instance, as it is used for all internal communication between nodes. To associate an instance's public IP address with the node, configure that public IP address as the node's **Static NAT address** (via **Platform Configuration > Conferencing Nodes**).

Assumptions and prerequisites

The deployment instructions assume that within AWS you have already:

- signed up for AWS and created a user account, administrator groups etc
- created a Virtual Private Cloud network and subnet
- configured a VPN tunnel from the corporate/management network to the VPC
- created or imported an SSH key pair to associate with your VPC instances
- created a security group (see Configuring AWS security groups for port requirements)
- decided in which AWS region to deploy your Pexip Infinity platform (these guidelines assume that all Pexip Infinity node instances that are hosted on AWS are deployed in the same AWS region).

For more information on setting up your AWS environment, see http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/get-set-up-for-amazon-ec2.html.

To look at the steps taken in setting up an example lab deployment of a Management Node in AWS, see http://www.graham-walsh.com/2016/01/deploying-pexip-management-node-in-amazon-web-services/, and to see an example of deploying a Conferencing Node in AWS, see http://www.graham-walsh.com/2016/01/deploying-pexip-conference-node-in-amazon-web-services/.

Configuring AWS security groups

Access to AWS instances is restricted by the AWS firewall. This may be configured by associating an instance with an AWS security group that specifies the permitted inbound and outbound traffic from the group.

A minimal AWS security group that permits access to a public cloud style Pexip Infinity deployment would look similar to this:

Inbound rules

Type	Protocol	Port range	Source
SSH	TCP	22	<management station IP address/subnet>
HTTPS	TCP	443	0.0.0.0/0
Custom TCP Rule	TCP	1720	0.0.0.0/0
Custom TCP Rule	TCP	5060	0.0.0.0/0
Custom TCP Rule	TCP	5061	0.0.0.0/0
Custom TCP Rule	TCP	8443	<management station IP address/subnet>
Custom TCP Rule	TCP	33000-49999	0.0.0.0/0
Custom UDP Rule *	UDP	5060	0.0.0.0/0
Custom UDP Rule	UDP	40000-49999	0.0.0.0/0
Custom UDP Rule	UDP	500	<sg-12345678>
Custom UDP Rule	UDP	1719	0.0.0.0/0
Custom Protocol	ESP (50)	All	<sg-12345678>
All ICMP	ICMP	All	<management station IP address/subnet>

* only required if you intend to enable SIP over UDP

Outbound rules

Type	Protocol	Port range	Source
All traffic	All	All	0.0.0.0/0

Where **0.0.0.0/0** implies any source / destination, **<management station IP address/subnet>** should be restricted to a single IP address or subnet for SSH access only, and **<sg-12345678>** is the identity of this security group (and thus permits traffic from other AWS instances — the Management Node and Conferencing Nodes — associated with the same security group).

A single security group can be applied to the Management Node and all Conferencing Nodes. However, if you want to apply further restrictions to your Management Node (for example, to exclude the TCP/UDP signaling and media ports), then you can configure additional security groups and use them as appropriate for each AWS instance.

Remember that the Management Node and all Conferencing Nodes must be able to communicate with each other. If your instances only have private addresses, ensure that the necessary external systems such as NTP and DNS servers are routable from those nodes.

For further information on the ports and protocols specified here, see Pexip Infinity port usage guide.

Deploying a Management Node in AWS

As with all Pexip Infinity deployments, you must first deploy the Management Node before deploying any Conferencing Nodes. In a hybrid cloud deployment the Management Node may be deployed in the corporate network or in the AWS VPC. This section describes how to deploy the Management Node in AWS.

Task summary

Deploying a Management Node in AWS consists of the following steps:

1. In the AWS management console, pick the desired AWS region and use the launch wizard to create an instance of the Management Node.
2. Search the Community AMIs section for the relevant Pexip Infinity Management Node AMI.
3. Ensure that the instance is associated with a suitable security group, and that an SSH key pair has been associated with the instance.
4. After the instance has booted, SSH into it and set the administrator password. This will then terminate the SSH session.
5. SSH in to the Management Node again and complete the Pexip Infinity installation wizard as for an on-premises deployment.

These steps are described below in more detail.

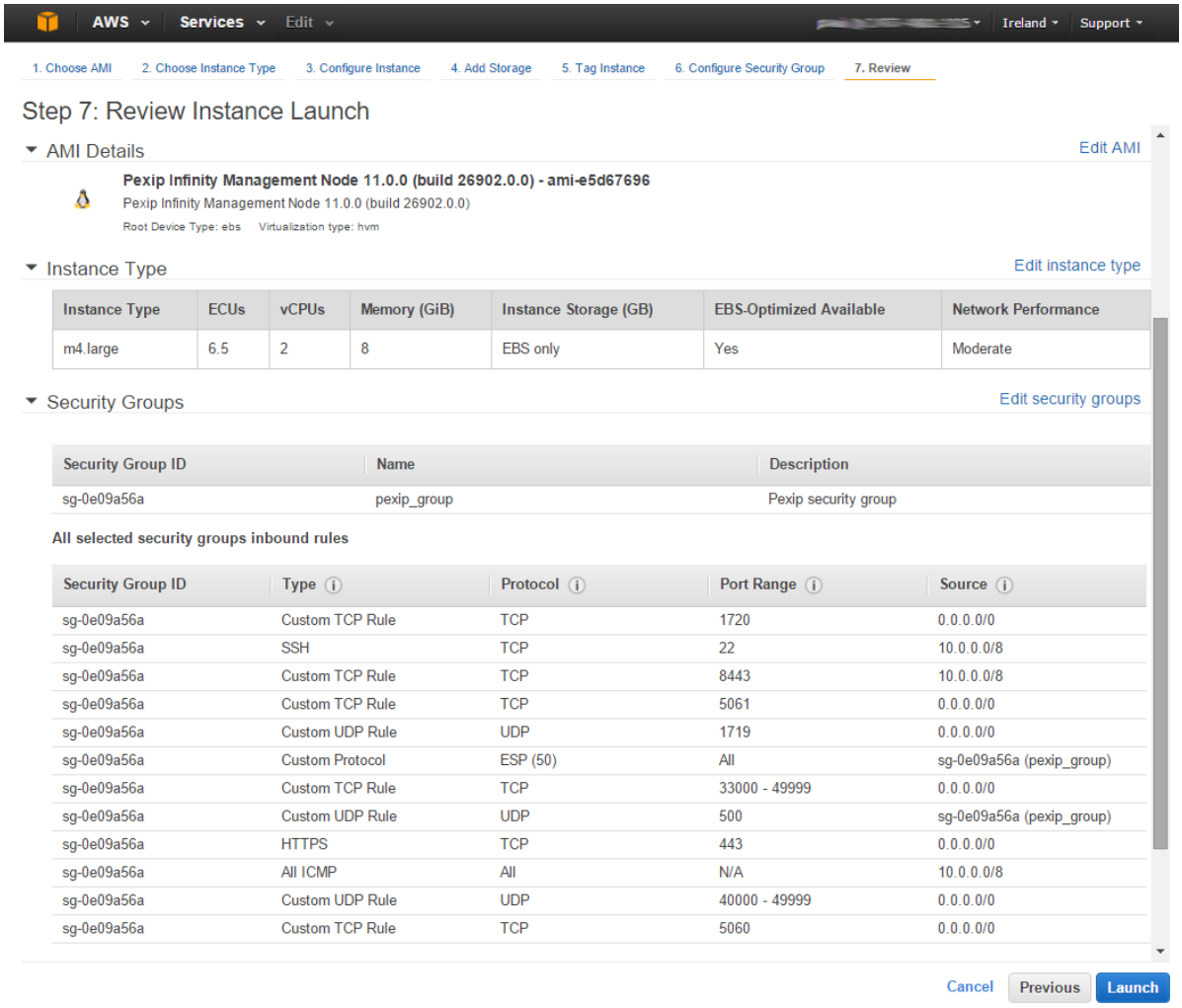
Task breakdown

1. In the AWS management console, ensure that you have selected the AWS region in which you intend to deploy the Management Node and all of its associated Conferencing Nodes.
2. From the EC2 dashboard, select **Launch Instance**.
   This launches the wizard in which you will select and configure your image.
3. Complete Step 1: Choose an Amazon Machine Image (AMI):
   a. Select **Community AMIs**.
   b. Search the Community AMIs section for "Pexip".
   c. Select **Pexip Infinity Management Node <version> build <build_number>** where **<version>** is the software version you want to install.
4. Complete Step 2: Choose an Instance Type:
   a. For deployments of up to 30 Conferencing Nodes, we recommend using an **m4.large** instance type for the Management Node.
   b. Select **Next: Configure Instance Details**.
5. Complete Step 3: Configure Instance Details:
   a. Complete the following fields (leave all other settings as default):

Number of instances	1
Subnet	Use default subnet.
Auto-assign Public IP	Enable or disable this option according to whether you want the node to be reachable from a public IP address. Your subnet may be configured so that instances in that subnet are assigned a public IP address by default. Note that the Management Node only needs to be publicly accessible if you want to perform system administration tasks from clients located in the public internet.
Primary IP	Either leave as ***Auto-assign*** or, if required, specify your desired IP address. (AWS reserves the first four IP addresses and the last one IP address of every subnet for IP networking purposes.)

   b. Select **Next: Add Storage**.

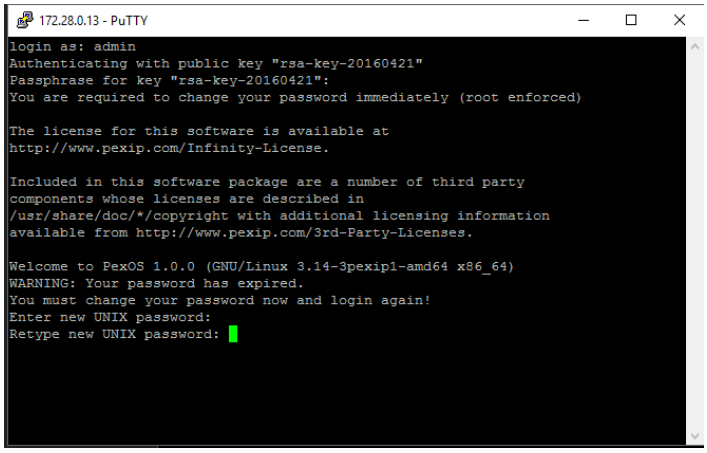
6. Complete Step 4: Add Storage:
   a. Accept the default settings (the Pexip AMI will have set these defaults appropriately for a Management Node).
   b. Select **Next: Tag Instance**.
7. Complete Step 5: Tag Instance:
   a. You can optionally add tags to your instance, if you want to categorize your AWS resources.
   b. Select **Next: Configure Security Group**.
8. Complete Step 6: Configure Security Group:
   a. Select and assign your security group to your Management Node instance.
   b. Select **Review and Launch**.
9. Complete Step 7: Review Instance Launch:
   a. This step summarizes the configuration details for your instance.
   You may receive a warning that your security group is open to the world. This is to be expected if you are deploying a public or hybrid VPC that is intended to be accessible to publicly-located clients.



   b. Select **Launch**.
10. You are now asked to select an existing key pair or create a new key pair:
    a. Select the key pair that you want to associate with this instance, and acknowledge that you have the private key file.
    You will need to supply the private key when you subsequently SSH into this instance.
    b. Select **Launch instances**.
    The **Launch Status** screen is displayed.

11. Select **View Instances** to see all of your configured instances and ensure that your Instance State is ***running***.
    The status screen also indicates the private IP address, and public IP address if appropriate, of the instance.
12. Connect over SSH into the Management Node instance to complete the installation of Pexip Infinity.
    Use an SSH client to access the Management Node by its private IP address, supplying your private key file as appropriate.
13. Follow the login process in the SSH session:
    a. At the login prompt, enter the username ***admin***.
    b. Supply the key passphrase, if requested.
    c. At the "Enter new UNIX password:" prompt, enter your desired password, and then when prompted, enter the password again.

    This will then log you out and terminate your SSH session.



14. Reconnect over SSH into the Management Node instance and continue the installation process:
    a. Log in again as ***admin***.
       You are presented with another login prompt:
       ```
       Running Pexip installation wizard...
       [sudo] password for admin:
       ```
    b. Enter the UNIX password you just created.
       The Pexip installation wizard will begin after a short delay.
    c. Complete the installation wizard to apply basic configuration to the Management Node:
       i. Accept the defaults for the **IP address**, **Network mask** and **Gateway** settings.
       ii. Enter your required **Hostname** and **Domain suffix** for the Management Node.
       iii. Configure one or more **DNS servers** and **NTP servers**. You must override the default values if it is a private deployment.
       iv. Set the **Web administration username** and **password**.
       v. Select whether to **Enable incident reporting** and whether to **Send deployment and usage statistics to Pexip**.

       The DNS and NTP servers at the default addresses are only accessible if your instance has a public IP address. The installation wizard will fail if the NTP server address cannot be resolved and reached.

    After successfully completing the wizard, the SSH connection will be lost as the Management Node reboots.
15. After a few minutes you will be able to use the Pexip Infinity Administrator interface to access and configure the Management Node (remember to use https to connect to the node if you have only configured https access rules in your security group).
    You can now configure your Pexip Infinity platform licenses, VMRs, aliases, locations etc, and add Conferencing Nodes.

Deploying a Conferencing Node in AWS

After deploying the Management Node you can deploy one or more Conferencing Nodes in AWS to provide conferencing capacity.

Task summary

Deploying a Conferencing Node in AWS consists of the following steps:

1. In the AWS management console, select the same AWS region in which the Management Node is deployed and use the launch wizard to create an instance of a Conferencing Node.
2. Search the Community AMIs section for the relevant Pexip Infinity Conferencing Node AMI.
3. Ensure that the instance is run as a dedicated instance (tenancy), is associated with a suitable security group, and that an SSH key pair has been associated with the instance.
4. After the instance has booted, perform a configuration-only deployment on the Management Node to inform it of the new Conferencing Node.
5. Upload the resulting XML document to the new Conferencing Node.
6. Configure the Conferencing Node's static NAT address, if you have a assigned a public IP address to the instance.

These steps are described below in more detail.

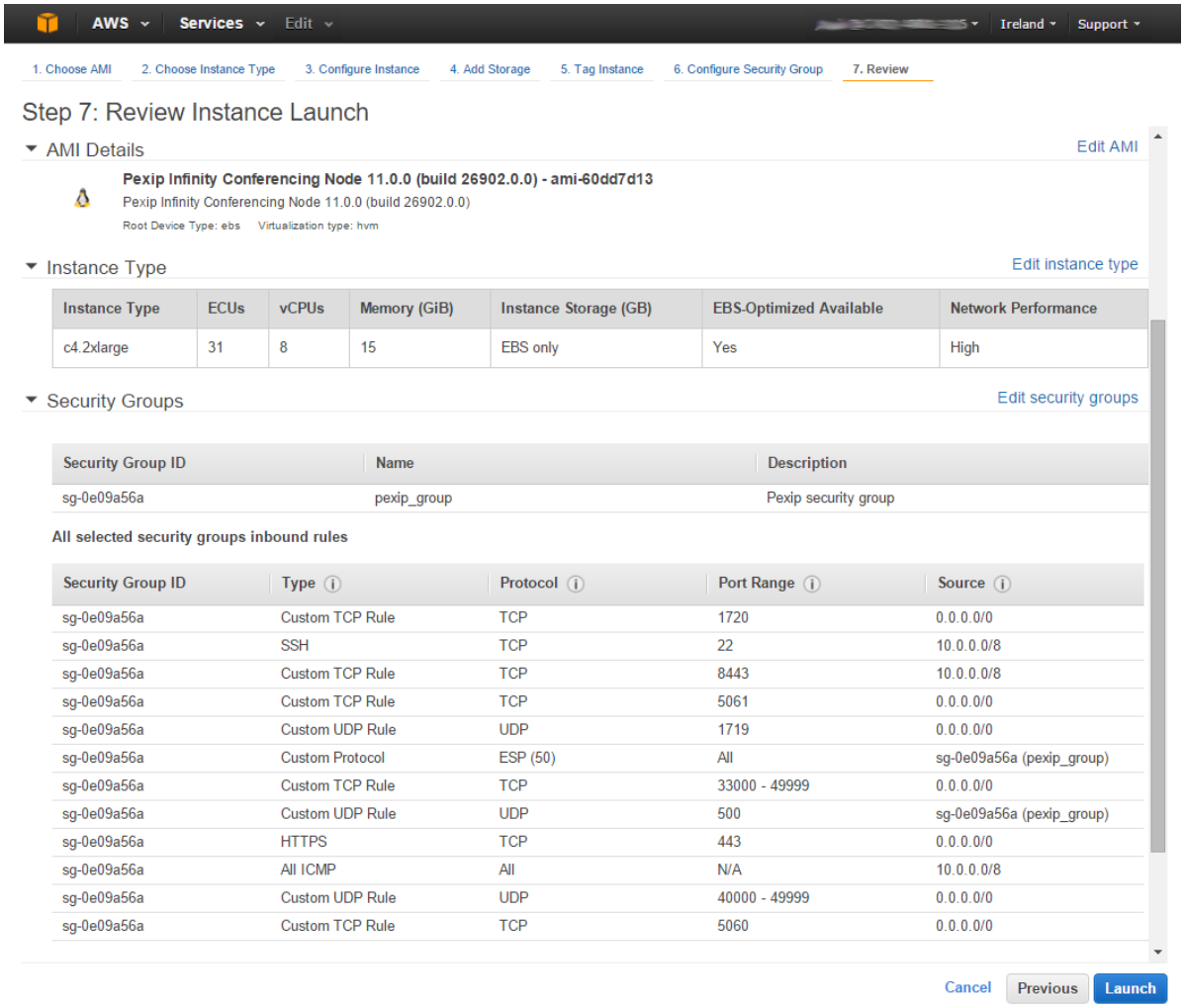
Task breakdown

1. In the AWS management console, ensure that you have selected the same AWS region in which the Management Node is deployed.
2. From the EC2 dashboard, select **Launch Instance**.
   This launches the wizard in which you will select and configure your image.
3. Complete Step 1: Choose an Amazon Machine Image (AMI):
   a. Select **Community AMIs**.
   b. Search the Community AMIs section for "Pexip".
   c. Select **Pexip Infinity Configuration Node <version> build <build_number>** where **<version>** is the software version you want to install.
4. Complete Step 2: Choose an Instance Type:
   a. We recommend using a **c4.2xlarge** instance type for the Conferencing Node.
   b. Select **Next: Configure Instance Details**.
5. Complete Step 3: Configure Instance Details:
   a. Complete the following fields (leave all other settings as default):

Number of instances	1
Subnet	Use default subnet.
Auto-assign Public IP	Enable or disable this option according to whether you want the node to be reachable from a public IP address. You must assign a static public/external IP address to the Conferencing Node if you want that node to be able to host conferences that are accessible from devices in the public internet. Your subnet may be configured so that instances in that subnet are assigned a public IP address by default. If you want to assign a persistent public IP address (an Elastic IP Address) you can do this after the instance has been launched.
Primary IP	Either leave as ***Auto-assign*** or, if required, specify your desired IP address. (AWS reserves the first four IP addresses and the last one IP address of every subnet for IP networking purposes.)
Tenancy	Select ***Dedicated - Run a Dedicated instance***.

   b. Select **Next: Add Storage**.

6. Complete Step 4: Add Storage:
   a. Accept the default settings (the Pexip AMI will have set these defaults appropriately for a Conferencing Node).
   b. Select **Next: Tag Instance**.
7. Complete Step 5: Tag Instance:
   a. You can optionally add tags to your instance, if you want to categorize your AWS resources.
   b. Select **Next: Configure Security Group**.
8. Complete Step 6: Configure Security Group:
   a. Select and assign your security group to your Conferencing Node instance.
   b. Select **Review and Launch**.
9. Complete Step 7: Review Instance Launch:
   a. This step summarizes the configuration details for your instance.
   You may receive a warning that your security group is open to the world. This is to be expected if you are deploying a public or hybrid Conferencing Node that is intended to be accessible to publicly-located clients.



   b. Select **Launch**.
10. You are now asked to select an existing key pair or create a new key pair:
   a. Select the key pair that you want to associate with this instance, and acknowledge that you have the private key file. (Note that you will not be required to SSH into Conferencing Node instances.)
   b. Select **Launch instances**.
   The **Launch Status** screen is displayed.

11. Select **View Instances** to see all of your configured instances and ensure that your Instance State is ***running***.
    The status screen also indicates the private IP address, and public IP address if appropriate, of the instance.
12. Make a note of the Private IP address that has been assigned to the new Conferencing Node.
13. Perform a configuration-only deployment of the new Conferencing Node:
    a. Log in to the Pexip Infinity Administrator interface on the Management Node.
    b. Go to **Platform Configuration > Conferencing Nodes**.
    c. Select **Add Conferencing Node**.
    d. For deployment type, choose ***Generic (configuration-only)***.
    e. Enter the details of the new Conferencing Node, including:

IPv4 address	Enter the Private IP address that AWS has assigned to the new Conferencing Node.
Network mask	The netmask depends upon the subnet selected for the instance. The default AWS subnet has a /20 prefix size which is a network mask of 255.255.240.0.
Gateway IP address	The gateway address is the first usable address in the subnet selected for the instance (e.g. 172.31.0.1 for a 172.31.0.0/20 subnet).

    You must also specify other fields such as the **Name**, **Role**, **Hostname**, **Domain**, **System location** and assign a **TLS certificate**. For a full list of configuration fields, see https://docs.pexip.com/admin/deploy_vm_template.htm#deployment.
    f. Select **Finish**.
    g. Select **Download Conferencing Node Configuration** and save the XML configuration file.
    A zip file with the name **pexip-<hostname>.<domain>.xml** will be downloaded.
14. You must now upload the XML configuration file to the new Conferencing Node:
    a. Browse to **https://<conferencing-node-private-ip>:8443/** and use the form provided to upload the XML configuration file to the Conferencing Node VM.
    If you cannot access the Conferencing Node, check that you have allowed the appropriate source addresses in your security group inbound rules for management traffic.
        i. Select **Choose File** and select the XML configuration file.
        ii. Select **Upload**.
    b. The Conferencing Node will apply the configuration and then reboot. When it has rebooted, it will connect to the Management Node.
    You can close the browser window used to upload the file.
15. If you want the node to have a persistent public IP address you can assign an Elastic IP address to the Conferencing Node. To do this, use the **Elastic IPs** option in the Amazon VPC console.
    Note that the public IP address assigned when the instance was launched (if **Auto-assign Public IP** was selected), will always be available and will not change while the instance remains running. A new (different) public IP address is only assigned if the instance is stopped and restarted.
16. Configure the Conferencing Node's static NAT address, if you have a assigned a public IP address to the instance:
    a. Log in to the Pexip Infinity Administrator interface on the Management Node.
    b. Go to **Platform Configuration > Conferencing Nodes** and select the Conferencing Node.
    c. Configure the **Static NAT address** as the instance's public IP address (either the auto-assigned public address or the Elastic IP address as appropriate).

After deploying a new Conferencing Node, it takes approximately 5 minutes before the node is available for conference hosting and for its status to be updated on the Management Node. (Until it is available, the Management Node will report the status of the Conferencing Node as having a last contacted and last updated date of "Never".)

Configuring dynamic bursting to the AWS cloud

Pexip Infinity deployments can burst into the Amazon Web Services (AWS) cloud when primary conferencing capabilities are reaching their capacity limits, thus providing additional temporary Conferencing Node resources.

This provides the ability to dynamically expand conferencing capacity whenever scheduled or unplanned usage requires it. The AWS cloud Conferencing Nodes instances are only started up when required and are automatically stopped again when capacity demand normalizes, ensuring that AWS costs are minimized.

For complete information about dynamic bursting, see Dynamic bursting to a cloud service.

Configuring your system for dynamic bursting to AWS

These instructions assume that you already have a working Pexip Infinity platform, including one or more primary (always on) Conferencing Nodes in one or more system locations. These existing Conferencing Nodes can be deployed using whichever platform or hypervisor you prefer.

Firewall addresses/ports required for access to the AWS APIs for cloud bursting

Access to the AWS APIs for cloud bursting is only required from the Management Node.

The Management Node always connects to destination port 443 over HTTPS.

DNS is used to resolve the AWS API addresses. Currently, Pexip Infinity uses the "Amazon Elastic Compute Cloud (Amazon EC2)" DNS FQDNs listed at http://docs.aws.amazon.com/general/latest/gr/rande.html#ec2_region but this may change in the future. An exception is if you are using GovCloud, where **ec2.us-gov-west-1.amazonaws.com** is used instead.

Setting up your bursting nodes in AWS and enabling bursting in Pexip Infinity

You must deploy in AWS the Conferencing Nodes that you want to use for dynamic bursting, and then configure those nodes in Pexip Infinity as the overflow destination for your primary (always on) Conferencing Nodes:

1. In Pexip Infinity, configure a new "overflow" system location e.g. "AWS burst", that will contain your bursting Conferencing Nodes.
   (Note that system locations are not explicitly configured as "primary" or "overflow" locations. Pexip Infinity automatically detects the purpose of the location according to whether it contains Conferencing Nodes that may be used for dynamic bursting.)
2. In AWS, set up a user and associated access policy that the Pexip Infinity Management Node will use to log in to AWS and start and stop the node instances.
   See Configuring an AWS user and policy for controlling overflow nodes for more information.
3. Deploy in AWS the Conferencing Nodes that you want to use for dynamic bursting. Deploy these nodes in the same manner as you would for "always on" usage (see Deploying a Conferencing Node in AWS), except:
   a. Apply to each cloud VM node instance to be used for conference bursting a tag with a **Key** of **pexip-cloud** and an associated **Value** set to the **Tag value** that is shown in the **Cloud Bursting** section on the **Platform Configuration > Global Settings** page.
      This tag indicates which VM nodes will be started and shut down dynamically by your Pexip system, and relates to the access policy document configured in the previous step.
   b. When adding the Conferencing Node within Pexip Infinity:
      i. Assign the Conferencing Node to the overflow system location (e.g. "AWS burst").
      ii. Disable (uncheck) the **Enable distributed database** setting (this setting should be disabled for any nodes that are not expected to always be available).
   c. After the Conferencing Node has successfully deployed, manually stop the node instance on AWS.
4. In Pexip Infinity, go to **Platform Configuration > Global Settings**, enable cloud bursting and then configure your bursting threshold, minimum lifetime and other appropriate settings for AWS:

Option	Description
Enable bursting to the cloud	Select this option to instruct Pexip Infinity to monitor the system locations and start up / shut down overflow Conferencing Nodes hosted in your cloud service when in need of extra capacity.

Bursting threshold	The bursting threshold controls when your dynamic overflow nodes in your cloud service are automatically started up so that they can provide additional conferencing capacity. When the number of additional HD calls that can still be hosted in a location reaches or drops below the threshold, it triggers Pexip Infinity into starting up an overflow node in the overflow location. See Configuring the bursting threshold for more information.
Tag name and Tag value	These read-only fields indicate the tag name (always **pexip-cloud**) and associated tag value (the hostname of your Management Node) that you must assign to each of your cloud VM node instances that are to be used for dynamic bursting.
Minimum lifetime	An overflow cloud bursting node is automatically stopped when it becomes idle (no longer hosting any conferences). However, you can configure the **Minimum lifetime** for which the bursting node is kept powered on. By default this is set to 50 minutes, which means that a node is never stopped until it has been running for at least 50 minutes. If your service provider charges by the hour, it is more efficient to leave a node running for 50 minutes — even if it is never used — as that capacity can remain on immediate standby for no extra cost. If your service provider charges by the minute you may want to reduce the **Minimum lifetime**.
Cloud provider	Select ***AWS***.
AWS access key ID and AWS secret access key	Set these to the **Access Key ID** and the **Secret Access Key** respectively of the **User Security Credentials** for the user you set up in the AWS dashboard within **Identity And Access Management** in step 2 above.

5. Go to **Platform Configuration > Locations** and configure the system locations that contain your primary (always on) Conferencing Nodes so that they will overflow to your new "AWS burst" location.
   When configuring these locations, you must set the **Primary overflow location** to the bursting location containing your overflow nodes. (Automatic bursting, and the stopping and starting of overflow nodes only applies to the **Primary overflow location**; the **Secondary overflow location** can only be used for standard overflow i.e. to other "always on" nodes.)
   We recommend that you do not mix your primary (always on) Conferencing Nodes and your bursting nodes in the same system location.

Configuring an AWS user and policy for controlling overflow nodes

Within AWS you must set up a user and an access policy to be used by Pexip Infinity to start up and shut down the Conferencing Node overflow instances:

1. From the AWS dashboard, select **Identity and Access Management**.
2. Select **Users** and create a new user on behalf of the Pexip platform e.g. username "**pexip**". Ensure that "**Generate an access key for each user**" is selected.
3. Either download the user credentials or select **Show User Security Credentials** and make a note of the **Access Key ID** and the **Secret Access Key** — you will enter these values into the **Global Settings** page in the Pexip Infinity Administrator interface. (You must copy or download these key values when you create the user; you will not be able to access them again later.)
4. Select **Policies** and then **Create Your Own Policy** to set up the access policy for the overflow nodes:
   a. Enter a **Policy Name** and **Description**.
   b. For the **Policy Document**, copy/paste the following text:

```
{
   "Version": "2012-10-17",
   "Statement": [
       {
           "Action": [
               "ec2:Describe*"
           ],
           "Effect": "Allow",
           "Resource": "*"
       },
       {
           "Action": [
               "ec2:StartInstances",
               "ec2:StopInstances"
           ],
           "Effect": "Allow",
           "Resource": "*",
           "Condition": {
               "StringEquals": {
                   "ec2:ResourceTag/pexip-cloud": "<bursting-tag-value>"
               }
           }
       }
   ]
}
```

c. The only element of this policy document that you need to change is to replace **<bursting-tag-value>** with the **Tag value** that is shown in the **Cloud Bursting** section on the **Platform Configuration > Global Settings** page.

d. Select **Validate Policy** and then (if valid) **Create Policy**.

5. Attach your "**pexip**" user to your policy:

   a. From the **Policies** page, select the checkbox next to your policy (you can filter on Customer Managed Policies if necessary).

   b. From the **Policy Actions** dropdown select **Attach**, select the checkbox next to your **pexip** user and select **Attach Policy**.

   This policy only allows the **pexip** user i.e. the Pexip Infinity platform, to retrieve a list of instances and to start and stop existing instances that you have tagged as **pexip-cloud**. The Pexip Infinity platform cannot (and will not attempt to) create or delete AWS instances.

Configuring the bursting threshold

When enabling your platform for cloud bursting the most important decision you must make is the level at which to set the bursting threshold:

- The bursting threshold controls when your dynamic overflow nodes in your cloud service are automatically started up so that they can provide additional conferencing capacity. When the number of additional HD calls that can still be hosted in a location reaches or drops below the threshold, it triggers Pexip Infinity into starting up an overflow node in the overflow location.

  For example, setting the threshold to 5 means that when there are 5 or fewer HD connections still available in a location, an overflow node will be started up.
- When an overflow location reaches the bursting threshold i.e. the number of additional HD calls that can still be hosted on the Conferencing Nodes in the overflow location reaches the threshold, another overflow node in that location is started up, and so on.

  Note that the current number of free HD connections in the original location are not taken into account when seeing if the overflow location needs to overflow further — however, new calls will automatically use any available media resource within those original primary locations that has become available.
- The bursting threshold is a global setting — it applies to every system location in your deployment.
- Note that it takes approximately 5 minutes for a dynamic Conferencing Node instance to start up and become available for conference hosting. If your primary deployment reaches full capacity, and the overflow nodes have not completed initiating, any incoming calls during this period will be rejected with "capacity exceeded" messages. You have to balance the need for

having standby capacity started up in time to meet the expected demand, against starting up nodes too early and incurring extra unnecessary costs.

Manually starting an overflow node

If you know that your system will need additional capacity at a specific time due to a predictable or scheduled spike in demand, but do not want to wait for the bursting threshold to be triggered before starting up the overflow nodes, you can manually start up any of your overflow nodes.

Do not manually start an overflow node too early. If you manually start up a node more than the **Minimum lifetime** minutes before the node is needed, it will most probably get automatically stopped again before it is used.

You can start overflow nodes via the management API or via the Administrator interface:

- **via the management API**: the cloud_node status resource can be used to list all of the available overflow nodes, the cloud_monitored_location and cloud_overflow_location resources retrieve the current load on the primary locations and any currently active overflow locations respectively, and the start_cloudnode resource can be used to manually start up any overflow node. This means that a third-party scheduling system, for example, could be configured to start up the overflow nodes via the management API approximately 10 minutes before a large conference is due to start.
  For example, let's assume that you have:
  - a regular spike in conferencing capacity demand at 9:00am every morning
  - an even usage of about 20% of that spike level during the rest of the day
  - a 30:70 ratio between your "always on" capacity and your overflow cloud capacity

  we would recommend:
  - configuring a low bursting threshold, such as 10-20% of your "always on" capacity (i.e. if your "always on" capacity is 80 HD calls, then set the bursting threshold to 12)
  - getting your scheduling system to call the API to manually start up all of your overflow cloud nodes at 8:50am on weekdays.
- **via the Pexip Infinity Administrator interface**: go to **Status > Cloud Bursting** and select **Start** for the required nodes (the **Start** option is in the final column of the **Cloud overflow nodes** table).

Converting between overflow and "always on" AWS Conferencing Nodes

If you need to convert an existing "always on" AWS Conferencing Node into an overflow node:

1. In AWS:
   a. Apply a tag with a **Key** of **pexip-cloud** and an associated **Value** set to the **Tag value** that is shown at the bottom of the **Platform Configuration > Global Settings** page.
   b. Manually stop the node instance on AWS.
2. In Pexip Infinity:
   a. Change the system location of the Conferencing Node to the overflow system location (e.g. "AWS burst").
   b. Disable the node's **Enable distributed database** setting. After a node has been deployed, this setting can only be changed via the Management configuration API using the worker_vm resource.

If you need to convert an existing AWS overflow Conferencing Node into an "always on" node:

1. In AWS:
   a. Remove the tag with a **Key** of **pexip-cloud** from the AWS instance.
   b. Manually start the node instance on AWS.
2. In Pexip Infinity:
   a. Change the system location of the Conferencing Node to a location other than the overflow system location.
   b. Enable the node's **Enable distributed database** setting. After a node has been deployed, this setting can only be changed via the Management configuration API using the worker_vm resource.

Managing AWS instances

This section describes the common maintenance tasks for stopping, restarting and permanently removing Conferencing Node AWS instances.

Temporarily removing (stopping) a Conferencing Node instance

At any time you can temporarily remove a Conferencing Node instance from your Pexip Infinity platform if, for example, you do not need all of your current conferencing capacity.

To temporarily remove a Conferencing Node instance:

1. Put the Conferencing Node into maintenance mode via the Pexip Infinity Administrator interface on the Management Node:
   a. Go to **Platform Configuration > Conferencing Nodes**.
   b. Select the Conferencing Node(s).
   c. From the **Action** menu at the top left of the screen, select **Enable maintenance mode** and then select **Go**.
   While maintenance mode is enabled, this Conferencing Node will not accept any new conference instances.
   d. Wait until any existing conferences on that Conferencing Node have finished. To check, go to **Status > Live View**.
2. Stop the Conferencing Node instance on AWS:
   a. From the AWS management console, select **Instances** to see the status of all of your instances.
   b. Select the instance you want to shut down.
   c. From the **Actions** drop-down, select **Instance State > Stop** to shut down the instance.

Reinstating (restarting) a stopped Conferencing Node instance

You can reinstate a Conferencing Node instance that has already been installed but has been temporarily shut down.

To restart a Conferencing Node instance:

1. Restart the Conferencing Node instance on AWS:
   a. From the AWS management console, select **Instances** to see the status of all of your instances.
   b. Select the instance you want to restart.
   c. From the **Actions** drop-down, select **Instance State > Start** to start the instance.
2. Take the Conferencing Node out of maintenance mode via the Pexip Infinity Administrator interface on the Management Node:
   a. Go to **Platform Configuration > Conferencing Nodes**.
   b. Select the Conferencing Node.
   c. Clear the **Enable maintenance mode** check box and select **Save**.
3. Update the Conferencing Node's static NAT address, if appropriate.
   If your Conferencing Node instance was configured with an auto-assigned public IP address, it will be assigned a new public IP address when the instance is restarted.
   a. Go to **Platform Configuration > Conferencing Nodes** and select the Conferencing Node.
   b. Configure the **Static NAT address** as the instance's new public IP address.

After reinstating a Conferencing Node, it takes approximately 5 minutes for the node to reboot and be available for conference hosting, and for its last contacted status to be updated on the Management Node.

Permanently removing a Conferencing Node instance

If you no longer need a Conferencing Node instance, you can permanently delete it from your Pexip Infinity platform.

To remove a Conferencing Node instance:

1. If you have not already done so, put the Conferencing Node into maintenance mode via the Pexip Infinity Administrator interface on the Management Node:
   a. Go to **Platform Configuration > Conferencing Nodes**.
   b. Select the Conferencing Node(s).
   c. From the **Action** menu at the top left of the screen, select **Enable maintenance mode** and then select **Go**.
   While maintenance mode is enabled, this Conferencing Node will not accept any new conference instances.
   d. Wait until any existing conferences on that Conferencing Node have finished. To check, go to **Status > Live View**.
2. Delete the Conferencing Node from the Management Node:
   a. Go to **Platform Configuration > Conferencing Nodes** and select the Conferencing Node.
   b. Select the check box next to the node you want to delete, and then from the **Action** drop-down menu, select **Delete selected Conferencing Nodes** and then select **Go**.
3. Terminate the Conferencing Node instance on AWS:
   a. From the Amazon VPC console, select **Instances** to see the status of all of your instances.
   b. Select the instance you want to permanently remove.
   c. From the **Actions** drop-down, select **Instance State > Terminate** to remove the instance.

Viewing cloud bursting status

You can view the current status of your overflow nodes and locations, and view a history of all events that have been applied to overflow nodes.

Viewing current status

Go to **Status > Cloud Bursting** to see an overview of the media load of your primary locations (that contain your "always-on" Conferencing Nodes), and whether your overflow nodes and locations are in use.

- Any issues relating to your cloud bursting deployment will also be shown on this page.
- The list of primary locations only includes those system locations that are configured with a **Primary overflow location** that contains bursting nodes.
- An **approaching threshold** message is displayed in the **Available HD** connections column for the primary locations when the number of available HD connections is less than or equal to the bursting threshold plus two.
  This message changes to **bursting threshold reached** when the number of available HD connections is less than or equal to the bursting threshold (and therefore overflow nodes are started up).
- You can manually start any overflow nodes by selecting **Start** for the required node (the **Start** option is in the final column of the **Cloud overflow nodes** table).
- The status page dynamically updates every 15 seconds.

Viewing historic events

Go to **Status > Conferencing Node History** to see all of the events (stop, start or running) that have been applied to overflow Conferencing Nodes and, where appropriate, the reason why the event was applied (for example if a node was shut down as there was no longer a need for the extra capacity).