



Pure commitment.

DESIGNING SOLUTIONS FOR HSCN



version 2.0

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OVERVIEW

The HSCN (Health and Social Care Network) is the replacement for the legacy N3 network, which served the health community for 12 years until March 2017 when the contract with BT ended. The N3 was essential for allowing hospitals and GP surgeries to connect and share data, as well as support programmes such as the NHS Care Records service. After a two-year transition period the NHS has moved to HSCN from March 2019.

UKCloud now offers only HSCN and no longer offers N3.

One of the benefits of HSCN is that there is a lower Information Governance (IG) entry point for connecting to the network. Organisations only need to sign up to the terms detailed in the HSCN Connection Agreement and then they can get access to the HSCN.

TIMELINE

Below is a typical example of the standard sequence of events which will be followed by customers and UKCloud in order for them to design and apply for HSCN connectivity:

1. You will usually have a meeting with a UKCloud Cloud Architect in order to start the engagement. The Cloud Architect will be able to understand your requirements and then advise you on best practices around designing for HSCN on UKCloud's Infrastructure as a Service (IaaS) or Platform as a Service (PaaS).
2. You will need to either:
 - a. Complete the HSCN Connection Agreement, submit it for approval by NHS Digital and then send to UKCloud.
 - b. Sign the UKCloud Master Services Agreement (MSA), which includes the flow down of terms from the HSCN Connection Agreement within.
3. A member of the UKCloud Customer Support team will then provision the HSCN-connected environment and hand it over to you once provisioning is complete. You will then be able to build the networks and virtual machines (VMs) within the environment, ensuring you continue to follow the best practices for designing for HSCN and do not invalidate the terms of the Connection Agreement.

It should be noted that not all engagements will follow this timeline specifically.

SCENARIOS

There are multiple scenarios that may occur in which you may require HSCN connectivity to provide services in the UK Public Sector. While the following scenarios are not exhaustive, most implementations will follow the same architectural patterns.

Scenario 1: Services connected to HSCN only – UKCloud for VMware

All virtual data centres (VDCs) in Assured UKCloud for VMware environments have an edge connected to the internet, with HSCN presented as a new edge. If you're providing services only onto HSCN, you may choose to use only the HSCN edge and not configure the internet edge at all. This is rare as most customers will want to be able to automatically pull updates from the internet for virtual machines (VMs). If you choose to only have HSCN configured in your environment, then all external source traffic to the VMs within the VDC will originate from the HSCN.

IP addressing

IP addresses for HSCN are visible on the edge device and you perform firewall configuration on the edge device to control traffic. You'll receive one usable HSCN IP as standard, however you can request more via a service request. If you require a large pool of IPs, we advise that you request an allocation from NHS Digital directly. UKCloud can then advertise these on your behalf.

Portal access and VM management

You can manage the HSCN-connected VDC through the UKCloud Portal and API directly via the internet or HSCN. You can initiate remote desktop sessions to manage VMs only over the HSCN.

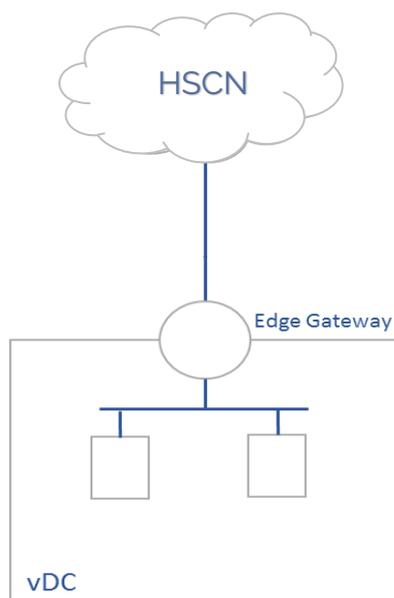


Figure 1. Connection to HSCN only

Scenario 2a: Services connected to HSCN and the internet – UKCloud for VMware

In most scenarios, you'll need to provide services out to both the HSCN and internet. When this is configured in UKCloud for VMware, the following architecture explains how the environment should be designed to achieve network separation.

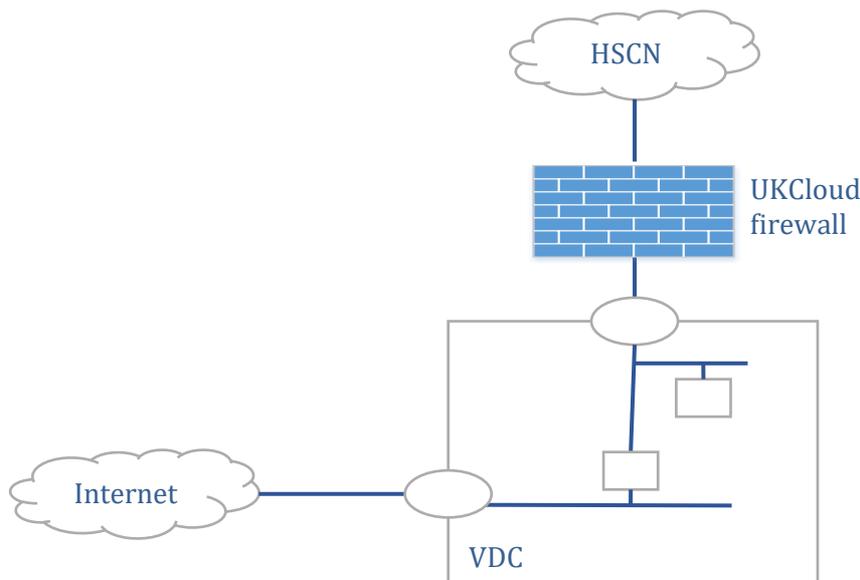


Figure 2. Internet and HSCN using UKCloud for VMware

Networks are separated using different edge gateways; firewalling, NAT, external and internal network creation are all controlled using both gateways. You can use vApps to contain VMs that are providing services to the different networks. For more information about edge functionality and vApp creation, please see the UKCloud [Knowledge Centre](#).

You must use different networks to ensure network separation between HSCN and the internet. In the example in Figure 2, the separation of HSCN and the internet is achieved by using an externally routed network to the internet and a separate externally routed network to HSCN, which are both connected to a VM. Network separation is achieved through firewalls. You must not join an externally routed network to both HSCN and the internet at the same time.

IP addressing

IP addresses for HSCN are visible on the edge device and you perform firewall configuration on the edge device to control traffic. You'll receive one usable HSCN IP as standard, however you can request more via a service request. If you require a large pool of IPs, we advise that you request an allocation from NHS Digital directly. UKCloud can then advertise these on your environment.

You'll also receive two internet IPs per VDC.

Portal access and VM management

You can manage the VDCs through the UKCloud Portal and API via the internet or HSCN. You can initiate remote desktop sessions to manage HSCN-connected VMs over the HSCN or over the internet by using a jump-off server within the internet-facing part of the environment.

Scenario 2b: Services connected to HSCN and the internet – UKCloud for OpenStack

When designing an HSCN-connected cloud native solution, it's important to ensure network separation to prevent bridging between HSCN and the internet. You can achieve this by using a series of networks and instances to build your solution, **ensuring that there isn't a single network spanning between both HSCN and internet routers.**

Figure 3 shows what a typical UKCloud for OpenStack implementation should look like to achieve network separation.

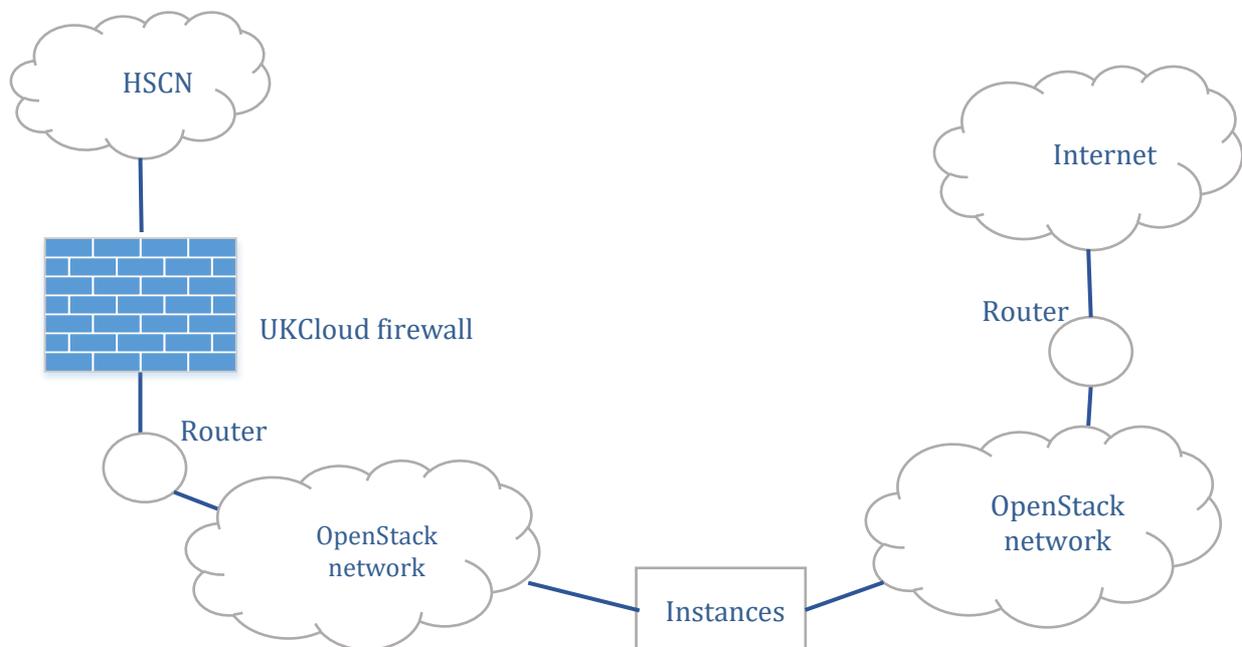


Figure 3. Internet and HSCN using UKCloud for OpenStack

IP addressing

Your assigned floating HSCN IP address will be visible within your OpenStack project; you can then create routers to present that IP to the rest of your environment. The UKCloud controlled firewall permits HSCN traffic on standard ports – you'll need to provision your own firewalls to control traffic. You'll receive one usable HSCN IP as standard, however you can request more via a service request. If you require a large pool of IPs, we advise that you request an allocation from NHS Digital directly. UKCloud can then advertise these on your environment.

You'll receive two internet IPs per project and will need to provision another firewall for the internet.

Portal access and VM management

Currently, you can manage projects through the UKCloud Portal and API only directly via the internet. You can manage remote desktop sessions to manage HSCN-connected instances over the HSCN or over the internet by using a jump-off server within the internet-facing part of the environment. **To manage the environment over HSCN, you must create an RDP session to an instance within the project and then hit the Portal from within the project itself.**

Scenario 3: Services built on internet VDC and HSCN connectivity added post build

You may start creating services and then add HSCN later. In this instance, the environment would have connectivity to only the internet. When you've signed up to the terms of the Connection Agreement and are ready for HSCN, you need to raise a service request for HSCN connectivity to be added to the environment; this will be added as a second edge gateway.

Scenario 4: HSCN-connected VDC with services in the Elevated security domain

HSCN connectivity is currently available only into UKCloud's Assured security domain. There may be scenarios where you're providing services over HSCN, but the data itself is deemed too sensitive to be stored in Assured. Therefore, you may want to have a VDC in the Elevated security domain to host the data into, to ensure there is separation between the internet/HSCN facing services and the database.

To move data from the Assured (HSCN-facing) VDC into the Elevated security domain, you must use the Cross Domain Security Zone (CDSZ) to ensure the integrity of the data in Elevated. For more information on the CDSZ, see the [Getting Started Guide](#), [Blueprint](#) and [application process](#) available in the Knowledge Centre.

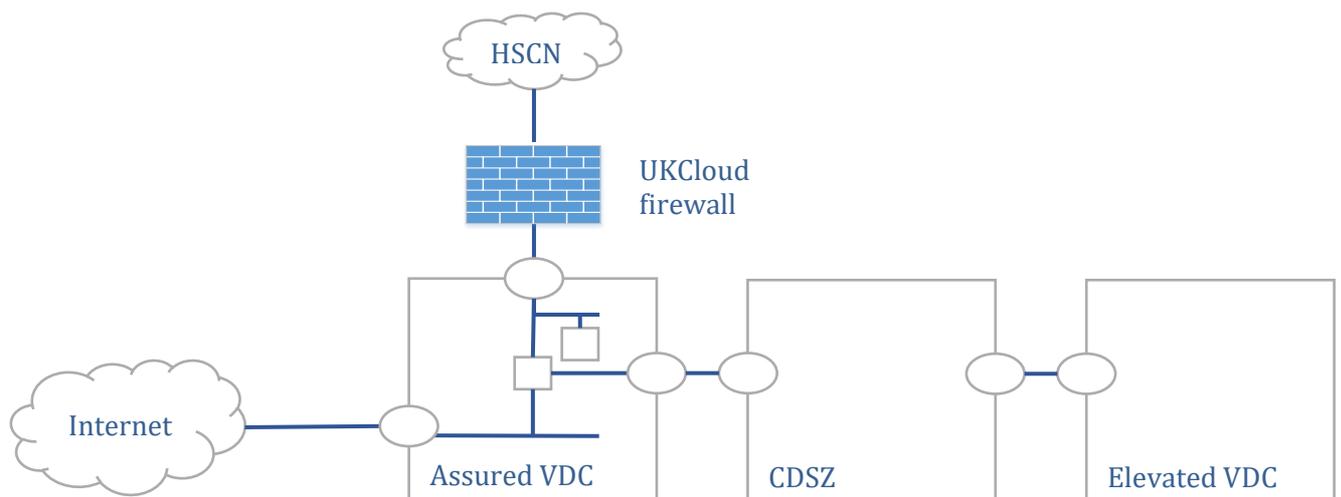


Figure 4. Cross Domain Security Zone

You can have a VM that is connected to three externally routed networks: one each to HSCN, the internet and the CDSZ network.

In some cases, you may need to provide a service both to the HSCN in Assured and to the PSN in Elevated at the same time. To facilitate this, you need to use the CDSZ to traverse between the HSCN-connected Assured security domain and the PSN-connected Elevated security domain. The architecture allows onward PSN connectivity for services in the Elevated VDC. For PSN connectivity to be allowed, you must have a PSN Code of Connection or Code of Practice, which you must present to UKCloud.

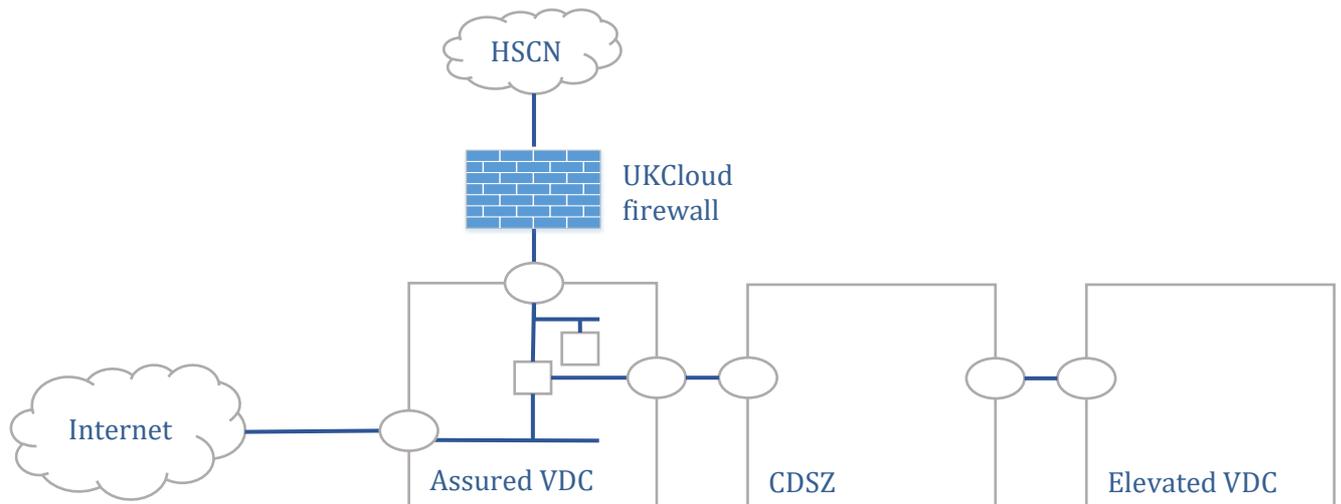


Figure 5. Cross Domain Security Zone and PSN in Elevated

IP addressing

IP addresses for HSCN are visible on the edge device and you can perform firewall configuration on the edge device to control traffic. You'll receive one usable HSCN IP as standard, however you can request more via a service request. If you require a large pool of IPs, we advise that you request an allocation from NHS Digital directly. UKCloud can then advertise these on your environment.

You'll receive two internet IPs per VDC. You can perform NAT functions on the edge to ensure internet connectivity for VMs within the environment.

PSN connectivity is provided to the Elevated VDC through a UKCloud controlled firewall. The PSN address is translated at this firewall to an internal address and is routed to the edge on the Elevated VDC. There are five IPs that are connected to the Elevated VDC edge. You can specify which one of these addresses you would like the PSN IP translated to.

Portal access and VM management

You can manage the Assured (internet/HSCN-connected) VDC through the UKCloud Portal and API via the internet and HSCN. You can initiate remote desktop sessions to manage HSCN-connected VMs over the HSCN or over the internet by using a jump-off server within the internet-facing part of the environment.

You can currently manage the Elevated (PSN-connected) and CDSZ VDCs through the UKCloud Portal and API only via the PSN or by using UKCloud's Secure Remote Access (SRA) service. For more information on SRA, see the SRA [Service Definition](#) in the Knowledge Centre.

Additional information

Getting OS updates to servers that are on HSCN

There is currently no direct connectivity between VMs that are connected to the HSCN and the OS repositories that are provided by UKCloud.

For HSCN-connected VMs to receive updates, you must provision a repository server within the HSCN-facing environment. This VM should be provisioned with connectivity to both external public IP networks and an internal network connected to VMs with onward connectivity to the HSCN. Relevant OS updates should be downloaded to this server and distributed to the other VMs within the VDC to ensure they remain up-to-date with patches.

Opening ports on HSCN

UKCloud has a list of whitelisted ports that are open as standard on our firewalls. If you require additional ports to be opened for HSCN, raise a service request.

Adding HSCN to an existing VDC

If you've deployed your VDC and later want to connect it to HSCN, you can do this by signing up to the HSCN Connection Agreement terms. A new edge with HSCN will then be provisioned into the environment.

MORE INFORMATION

For further information about UKCloud and how we can help you, please email us at info@ukcloud.com.

ABOUT UKCLOUD

UKCloud is dedicated to the UK Public Sector. We provide assured, agile and value-based true public cloud that enable our customers to deliver enhanced performance through technology.

- **We're focused on cloud.** Delivering a true cloud platform that is scalable, flexible, assured and cost-effective.
- **We're open. You are never locked in.** Using industry standards and open source software we enable flexibility and choice across multiple cloud solutions.
- **Dedicated to the UK Public Sector.** Our business is designed specifically to serve and understand the needs of public sector organisations.

- **We develop communities.** We bring together communities of users that are able to share datasets, reuse code, test ideas and solve problems.
- **Customer engagement.** We will only be successful if our customers are successful. We embody this in the promise: Easy to adopt. Easy to use. Easy to leave.

Additional information about UKCloud can be found at www.ukcloud.com or by following us on Twitter at @ukcloudltd.

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UKC-GEN-664 • 11/2019 • version 2.0