



Schedule document

N4Cloud

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This schedule contains additional terms and conditions, service description & Service Levels applicable to the Cloud element of the Services and should be viewed with associated Order Form, Node4's General Terms and Conditions and the Acceptable Use Policy.

This schedule apply for Customer solutions deployed and or upgraded after October 2015.

1. Overview

The N4Cloud Service provides access to a self-service virtualisation platform hosted on infrastructure owned by Node4. The infrastructure is securely shared across multiple Customers and hosted in three Node4 UK data centres which provide security and resilient power and cooling.

Node4 manage the infrastructure up to the hypervisor and ensure a portal is available for provisioning.

By default, the Customer manages their virtual machines. Node4 can also provide management of virtual machine operating systems for an additional charge as part this service.

The components of the N4Cloud service are:

Self-Service Portal – web-based portal(s) and tools for self-service provisioning and management of the components of the service.

Compute Resource (Shared) - a pool of memory (RAM) and processor (vCPU) on shared virtualisation hardware on which the Customer runs virtual machines.

Compute Resource (Standby) - a pool of memory (RAM) and processor (vCPU) on shared virtualisation hardware reserved for the Customer to run virtual machines if a Disaster Recovery Event occurs.

Compute Resource (Dedicated) - a pool of memory (RAM) and processor (vCPU) on virtualisation

hardware dedicated to the Customer, on which the Customer runs virtual machines.

Virtual Machines – operating system instances running on compute resource.

Virtual Machine Software Licenses – pay-per-month licenses for software running in virtual machines on N4Cloud. Includes Microsoft SQL Server and Microsoft Remote Desktop Services.

Storage without Backup - a pool of disk storage on one or more performance tiers. This storage does not include backup.

Storage with Virtual Machine Backup - a pool of disk storage on one or more performance tiers that also includes backup of the virtual machine and a self-service web portal to recover files and folders.

Storage for Replicated Virtual Machines – storage used to hold the replicated image of virtual machines so they can be restarted in the event that a Disaster Recovery Event occurs. This is held on a storage device made by a manufacturer different to that used to provide other storage components.

Veeam Cloud Connect – storage repository in a Node4 datacentre which can be accessed via the Internet and used to store Veeam backups taken by the Customer.

Backup for Other Clouds – backup of remote servers and endpoint devices via the Internet.

Managed Services - Build – setup of the N4Cloud service with optional provisioning of virtual machines and installation of certain applications.

Managed Services - Operate - management of the N4Cloud platform and virtual machines.

2. Definitions

“Additional Terms” means this Schedule 2 forming part of the Master Agreement, which describes the Products and/ or Services to be provided and the relevant service levels;

“Customer Responsible Faults” means in the event that a Service Affecting or Non-Service Affecting Fault is identified as being attributable to Customer Provided Equipment, Premises, Customer

power supplies, or the action of the Customer, employees or agents of the Customer, the fault shall be deemed the responsibility of the Customer. Any downtime shall not be included in service availability measurements and does not qualify for compensation.

“Contracted Support Hours” Bronze, Silver, Silver Plus and Gold support levels as identified in the Incident Management Schedule.

“Equipment” means, without limitation, any equipment, machinery, and apparatus provided by Node4 as part of the Services, and/or used in order to make available the N4Cloud Service to the Customer;

“Fault Ticket Number” means the unique number issued when logging a fault with Node4.

“Hypervisor” means hardware and software used to create and run virtual machines allowing multiple operating systems to run concurrently on a single host computer.

“Monthly Review Period” means the calendar monthly periods commencing on the 1st of each month during the Term, over which Service performance measurements are calculated, provided that the first Monthly Review Period will commence following the Ready For Service Notification;

“Network Management System” means Node4’s network integrated fault management system;

“Node4 Network” means the network wholly owned and managed by Node4;

“Non-Service Affecting Fault” means a fault or condition which is not a Service Affecting Fault.

“Planned Outage” means in maintaining the service provided, Node4 may with reasonable notice require a temporary outage in service. Wherever possible Node4 will agree the outage with the Customer in advance of the required work. Any planned downtime shall not be included in fault or service reliability measurements.

“Service Affecting Fault (SAF)” means any failure of Node4 Network, equipment or service, which, in our reasonable opinion causes a loss of a customer’s

service. In all such cases the service shall be deemed unavailable and the length of downtime recorded by Node4 from when the fault is registered by Node4 and a fault ticket number allocated.

“Service Availability” means the time for which a Node4 service is usable, expressed as a percentage of the total time in a given Service Measurement Period. The Node4 service shall be deemed available for the purposes of calculating Service Availability if it is not usable due to an event outside our reasonable control, a Customer Responsible Fault, a Third Party Attributable Fault or is due to a Planned Outage.

“Service Measurement Period” means a calendar month for which the Service is available.

“Setup Charge” means Fees payable by the Customer for the setup of the Services as provided in the Order Form;

“Software Update” a minor release of software that typically fixes bugs and increases stability but adds very little new functionality.

“Software Upgrade” a major release of software that typically introduces new features.

“Standard MAC” means a change to one device which can be completed within 30 minutes by a technical support engineer between 7am and 7pm Monday to Friday.

“Technical Support Centre” means Node4’s fault management centre, which operates the Node4 Network Management System;

“Third Party Attributable Faults” means in the event that a Service Affecting or Non-Service Affecting Fault is identified as being attributable to a third party this measurement period shall not be included in service availability measurements. Such faults do not qualify for rebates or compensation. Node4 will endeavour to resolve and rectify such Third Party Attributable Faults as soon as possible.

“Time To Resolve Fault (TTRF)” means the length of time from the issue of the fault ticket number to repair and resolution of the service and/or associated equipment.

3. Fees

Fees will commence when Ready For Service Notification is provided by Node4, this will follow either handover of a Service or notification from Node4 that the Service is available for Customer use, Fees may comprise any or all of the following aspects.

3.1 Installation and setup fees

Any applicable installation or set-up Fees as detailed on the Order Form.

3.2 Rental fees

Rental Fees are paid either monthly or annually in advance based on the options taken and any other related service and are identified on the Order Form.

3.3 Licensing fees

Licensing Fees in addition to those defined on the Order Form, which are activated directly by the Customer or due to increased usage will be invoiced the month following identification.

3.4 Customer resource increases

Increases in the level of resources (CPU, Memory, Storage) in addition to those defined on the Order Form, which are activated directly by the Customer via the N4 Cloud Portal will be invoiced from the date of increase and reflected on the next invoice.

3.5 Professional service fees

Additional tasks undertaken by Node4 at the request of the Customer or activities undertaken by the Customer which require the remote support of Node4 personnel will be charged at the hourly rates shown below.

Time support required:	Per hour	Per day
Mon – Fri business hours	£60.00 per hour	£480.00
Mon – Fri other times	£100.00 per hour	POA

Saturday	£100.00 per hour	POA
Sunday	£100.00 per hour	POA

Time is charged by the hour. These rates are for a trained technician and are subject to an annual review by Node4. For advanced engineers with MCSE or CCIE status please contact Node4 for pricing.

4. General provision of service

4.1 Data centre security

Node4 will ensure the following security measures are in place at the Node4 data centres from which the N4Cloud service is provided:

- Perimeter fencing with electric gates.
- Access via photo swipe card system.
- CCTV with 24 hour recording both external and internal to the data centre.
- Access Control Procedure.
- Staff on-site 24 hours a day.

Access to the data centre and/or Node4 infrastructure is not necessary for use of the N4Cloud service and is not permitted.

4.2 Data centre power

Node4 will provide power to the N4Cloud infrastructure using dual power feeds. UPS and Generator back-up shall be used with a minimum N+1 configuration.

4.3 Support

Node4 provides the service direct to the Customer. The Customer commits to fully manage all their customers and suppliers directly. Node4 will not interface directly with any third parties working with the Customer.

If the Customer requires Node4 to provide their customers with a customer care or NOC service this is available on request and subject to Professional Service Fees.

4.4 Third parties

Node4 shall not be liable in respect of any contract, agreement or relationship that Customer may have with any third party. If a dispute arises between Customer and a third party involving Node4's N4Cloud Service, Node4 shall provide the Customer with reasonable information and assistance (to the extent that such is not adverse to Node4's interests to Customer (at Customer's expense) in the resolution of such dispute.

4.5 Maintenance windows

Where Node4 plans to perform essential works and the changes are service affecting, Node4 will use reasonable endeavours to perform such works between the hours of 00:00 and 04:00 and will use reasonable endeavours to give the Customer at least five (5) days prior notice for network related work and at least ten (10) days prior notice for Infrastructure related work. In the event of an emergency or Service Affecting Fault such notice may be less than 24 hours. This is without prejudice to or limitation of the definition of Planned Outage.

5. Service Components - Platform

5.1 Self-Service portals

Node4 will provide one or more self-service portals ("portals") which the Customer can use to perform a set of provisioning and management tasks for their virtual machines, storage and backups.

Customers are allocated one or more usernames and passwords which are used to access the portals. Each username is assigned to a single user within the Customer's organisation.

The portals are secured using firewalls and Secure Sockets Layer (SSL) encryption.

Node4 may use multi-factor authentication to secure one or more self-service portals. This requires the Customer to provide a PIN number and enter this number into a mobile device, or answer an automated phone call, in order to be granted permission each time they login to the portal.

Node4 reserve the right to change the technology and look and feel of the portals from time to time. It is not permitted for users to remove copyright notices or change the look and feel of the portals.

This component is mandatory for all orders.

If specified on the Order Form, the N4 Cloud Portal will provide the ability for the Customer to increase the CPU, Memory and Storage virtual datacentre resources. By increasing the virtual datacentre resources via the N4 Cloud Portal the Customer agrees to an increase in the virtual data centre resources Fees. The Fees will increase from point of change with the N4 Cloud Portal until the end of the Term at the rates defined for the associated virtual datacentre resources on the Order Form.

A maximum increase of 20% of the existing virtual data centre resource can be completed each month within the N4 Cloud Portal.

5.2 Compute resource (Shared)

If specified on the Order Form, Node4 will reserve a pool of compute resource on physical hosts that form part of the N4Cloud hypervisor platform. These hosts are securely shared between multiple Customers.

Customer virtual machines run within this pool of resource. The amount of resource required by the Customer must be specified on the Order Form, in the form of both:

- the amount of virtual processor cores (vCPU) required in each N4Cloud datacentre;
- the amount of gigabytes of virtual RAM (vRAM) required in each N4Cloud datacentre.

Ownership of the hardware remains with Node4 at all times.

Each pool is limited to a single site and virtual machines cannot be transferred between sites without the use of disaster recovery technology.

If the amount of resource allocated to all virtual machines using the pool will exceed the pool size, requests via the self-service portal to provision new virtual machines or amend the resource allocated to a virtual machine will fail.

It may be possible that the resource allocated to virtual machines may exceed the pool size if some virtual machines are powered off. Virtual machines may not start, or performance may be degraded, if there is the pool size is too small to provide the resource assigned to virtual machines.

The Customer may request to change the amount of vCPU and vRAM in the pool. A request to lower the amount of vCPU and/or vRAM must not violate any prior commitments made on any Order Form.

Virtual CPU is contended, meaning that a virtual CPU is not equivalent to a physical processor core. Memory is not contended.

If a pool is created with 4 vCPU and 8GB of RAM, and a single virtual machine is created with 2 vCPU and 4GB of RAM, then the pool is 50% full.

Node4 will reserve at least one physical hypervisor host at each site as a failover node. The failover node will take the place of any of the other physical nodes if they fail, but some downtime may occur to machines running on the failed node as they are restarted on the failover node.

5.3 Compute resource (Standby)

This component is the same as the *Compute Resource (Shared)* component except that the pool is not used for running virtual machines under normal circumstances. The pool can only be used by virtual machines in the event that a disaster recovery event is invoked following relevant Node4 procedures.

Node4 will charge for the standby resource at a rate that is lower than the *Compute Resource (Shared)* component because virtual machines are not powered on in this pool unless a disaster recovery event is invoked.

The lower rate is achieved because the same physical resource is reserved to protect virtual machines in different datacentres on the assumption that these sites are not likely to experience a disaster recovery event at the same time.

It is also possible to use spare capacity in the *Compute Resource (Dedicated)* component instead of this component for disaster recovery.

The amount of resource required by the Customer must be specified on the Order Form, in the form of both:

- the amount of virtual processor cores (vCPU) required in each N4Cloud datacentre;
- the amount of gigabytes of virtual RAM (vRAM) required in each N4Cloud datacentre.

The amount of resource required may not necessarily be the same as that allocated to the *Compute Resource (Shared)* component if the Customer does not wish to perform disaster recovery replication for all of their virtual machines.

If virtual machines are booted within this pool in a disaster recovery event, they shall be charged at the same rate as the *Compute Resource (Shared)* component for any calendar month in which they are powered on, except during any period of testing that has been agreed in writing by Node4 and limited to a maximum of two calendar weeks per year.

5.4 Compute resource (Dedicated)

If specified on the Order Form, Node4 will reserve a set of physical hosts on the N4Cloud hypervisor platform that are dedicated for exclusive use by the Customer during the contract term.

Customer virtual machines will run within this pool of resource. Selecting the number of hosts that are required is the responsibility of the Customer and the number of hosts is recorded on the Order form.

Node4 will install the VMWare vSphere hypervisor onto these nodes and create one or more clusters, based on Customer requirements.

A dedicated instance of the VMware Virtual Center (vCenter) software will be deployed for managing hosts provided using this component. Node4 will upgrade the hosts and vCenter from time to time to the latest version of the VMware software that is supported by Node4. Node4 will not permit versions of the hypervisor to be used that are no longer supported by the vendor.

Ownership of the hardware remains with Node4 at all times. The Customer may request to add additional hosts for an additional charge. The Customer may request to lower the amount of nodes but this must not violate any prior commitments made on any Order Form.

Each host is provided with a fixed amount of physical processors (CPU cores) and memory (GB RAM). Hosts are installed into a single site and virtual machines cannot be transferred between sites without the use of disaster recovery technology.

For each set of hosts in a single datacentre, the Customer must reserve at least one physical host to be used for failover in the event that one of the hosts fails. This component can only be provided with a minimum of 2 or more nodes per site, with one of those nodes designated as a 'failover' node. It is not permitted to use the *Compute Resource (Shared)* component for failover of hosts provided in this component.

5.5 Virtual machine

Node4 will provide specific software for every virtual machine identified on the Order Form. This component is required for every virtual machine that is present on the compute resource.

The Self-Service Portals shall not allow for the quantity of provisioned virtual machines to exceed the quantity of this component that has been purchased, regardless of whether those virtual machines are powered on or powered off.

The software may not be used and will not be provided for virtual machines that are not recorded on the Order Form. The software provided consists of:

- Anti-Virus Software License
- Backup and Recovery License
- Monitoring platform software license

These licenses shall remain the property of Node4 and are assigned to the Customer for each virtual machine charged under this component.

If specified on the Order Form, Anti-virus software is installed into any virtual machines provisioned by Node4. The Customer must install the anti-virus software into virtual machines that are provisioned by the Customer. The Customer may not remove this software. The anti-virus software does not protect virtual machines running Linux operating systems.

The Customer is responsible for applying anti-virus updates and for removing viruses from the operating system. The Customer must ensure that anti-virus updates are applied in a timely manner.

The Anti-Virus software may not be able to detect and/or remove all threats. If the Customer requires that data can be recovered if permanently deleted or damaged by a virus or other threat, then the

Customer is responsible for taking appropriate measures to protect their data (such as using a backup service).

The Backup and Recovery license is required to perform backups using the *Storage with Virtual Machine Backup* component.

5.6 Virtual machine software licenses

If specified on the Order Form, Node4 will provide monthly rental licenses for software to be installed and used in Customer virtual machines on N4Cloud. The software available is as follows:

- Microsoft SQL Server (Standard Edition)
- Microsoft SQL Server (Enterprise Edition)
- Microsoft Remote Desktop Services (SAL)

Node4 will charge for either edition of Microsoft SQL Server on a per virtual machine basis, subject to the number of vCPUs available to the virtual machine in units of 4, 6 or 8 vCPU. A minimum of 4 vCPUs must be purchased per virtual machine running either edition of SQL Server, even if the machine is allocated less than 4 vCPUs.

Node4 will charge for Microsoft Remote Desktop Services on a per user basis. Each named user may access more than one virtual machine in N4Cloud using the same license.

The Customer is responsible for ensuring that their virtual machines are appropriately licensed, and informing Node4 of any changes that require additional licenses.

Some vendors may require that software used on the Node4 platform must be licensed by Node4. The Customer agrees that additional license fees may be payable for software deployed on virtual machines on N4Cloud.

Node4 reserve the right to change the licenses that are available from time to time and/or the units used to charge for licenses.

5.7 Storage without backup

If specified on the Order Form, Node4 will reserve a pool of storage resource on one or more tiers of storage on the N4Cloud storage devices, on which Customer virtual machine disks are stored and run.

This component is used to provide storage for virtual machines for which virtual machine backup is not required.

There are four tiers, each offering different performance. Each tier is presented to the Node4 VMware cluster as a single datastore with multiple redundant paths and is used by multiple Customers.

The Self-Service Portal software is used to isolate a quota of capacity in each tier and ensure that it is only visible to the correct Customer. A Customer is not able to access storage used by other Customers. Each pool of storage is limited to a single datacentre.

It is not permitted to connect storage directly to the operating system of a virtual machine and raw device mappings are not supported, except at the discretion of Node4 and when agreed in advance in writing.

The Order Form must specify the amount of required storage in useable GB for one or more of the following performance tiers:

- **Tier 0 Storage without Backup** – consists of flash (SSD) disk only for extreme performance. Typically used for workloads such as databases.
- **Tier 1 Storage without Backup** – consists of SAS disk together with a smaller flash (SSD) cache that is used to hold frequently accessed blocks to increase performance.
- **Tier 2 Storage without Backup** – consists of SAS disk only. Used for most workloads.
- **Tier 3 Storage without Backup** – consists of SATA disk only. Typically used for archiving of data.

Node4 reserve the right to select the vendor used to provide storage to the platform, which may change from time to time.

The Customer is charged for the space allocated to the pool and not for the actual space allocated to virtual machine disks. Storage must only be consumed by virtual machines and may not be presented out for consumption over the network from other devices, including those in colocation.

Node4 may apply a volume discount based on the amount of storage consumed. This volume discount may be removed if the level of usage falls below the level for which a discount is offered. Discounts are

effective only from the date a level is reached that is eligible for a discount and is not retrospectively for past usage. Node4 may vary the volume discount levels and rates from time to time.

5.8 Storage with virtual machine backup

This component is identical to the *Storage without Backup* component except that it includes virtual machine backup.

If specified on the Order Form, Node4 will reserve a pool of storage resource on one or more tiers of storage on the N4Cloud storage devices, on which Customer virtual machine disks are stored and run.

There are four performance tiers, each consisting of a different type of disk. Each tier is presented to the Node4 VMware cluster as a single datastore with multiple redundant paths.

The Order Form must specify the amount of required storage in useable GB for one or more of the following performance tiers:

- Tier 0 Storage with Virtual Machine Backup
- Tier 1 Storage with Virtual Machine Backup
- Tier 2 Storage with Virtual Machine Backup
- Tier 3 Storage with Virtual Machine Backup

Node4 will reserve a secondary pool of storage resource which is used to hold backups of the data. The size of the pool will be determined by Node4 based on the amount of storage selected from the four tiers. All backup data is held on SATA disk.

For data to be backed up in this component, a backup software license is required. Node4 will provide a backup software license for each virtual machine covered by the *Virtual Machine* component. All licenses shall remain the property of Node4.

Virtual machines that are being backed up must be running on the *Compute Resource (Shared)* or *Compute Resource (Dedicated)* components.

The backup software runs on a server that is securely shared by multiple Customers and can only be used to perform backups of virtual machines running on N4Cloud.

Node4 will provide a self-service portal that the Customer can use to perform the following self-service tasks:

- Restore the image of a virtual machine from a successful backup, in place of the original.
- Restore files and folders, from the image of a virtual machine stored in a successful backup, back onto the virtual machine.
- Download files and folders stored in a successful backup.

In order to index the file system in each virtual machine, the user must provide operating system credentials with appropriate permissions. This may be a specific domain account or credentials for individual virtual machines.

The software also allows for the recovery of individual items of data from Microsoft Exchange, Microsoft SQL Server, Microsoft SharePoint and Microsoft Active Directory without the need to restore the whole dataset. For example, it is possible to recover an individual e-mail from Microsoft Exchange without restoring the whole Exchange mailbox database. Restoration is performed by Node4 and is only available for virtual machines covered by the *Managed Services – Level 2*, *Managed Services – Level 3* or *Managed Services – Level 4* components.

It is the Customer's responsibility to ensure their data is backed-up. By default, all virtual machines that run on datastores created by this component will be included in the backup job. Any virtual machines that are added after the initial provisioning of the service will automatically be added to the backup job as long as they are stored on the datastores created by this component.

An "offsite" copy of backup data is also stored at a different Node4 datacentre.

This service allows only for 30-day incremental backup. One backup is taken each day and incremental block changes are stored. Changes are stored for a rolling 30 day period (retention period). This means that on day 31, the changes made on day 1 are made permanent and can no longer be recovered.

Node4 have made an estimation of the amount of data required on disk after deduplication and compression that will be achieved when pricing this service. Node4 reserve the right to increase pricing if the Customer workload is found to have a rate of change that varies significantly from that estimation, either at a point in time or as part of a trend.

This component cannot be used if the Customer performs encryption of data on virtual machine disks as this will affect the deduplication and compression ratios which Node4 can achieve.

By prior written agreement and at the discretion of Node4, Node4 may permit alternative retention periods and/or a grandfather-father-son retention policy. Such adjustments will require additional retention storage, which is charged separately. The amount required must be estimated by Node4 Pre-Sales based on information provided by the Customer and will appear on the invoice as 'Additional Retention Storage'. This is charged per useable gigabyte per month of space on the Node4 storage array used to store the data, after deduplication and compression have been applied. Node4 reserve the right to change the amount required should the estimate prove insufficient based on actual Customer usage, for which additional Fees may apply.

In the event that a virtual machine is deleted, Node4 shall retain the associated data for 5 calendar days, after which it is permanently deleted.

In the event that the Customer contract is cancelled for any reason, Node4 shall retain data until the last day of the notice period during which normal Fees shall apply. On the first day following this period, the data shall be permanently deleted and the retention period shall immediately cease to apply.

Node4 may apply a volume discount based on the amount of storage consumed. This volume discount may be removed if the level of usage falls below the level for which a discount is offered. Discounts are effective only from the date a level is reached that is eligible for a discount and is not retrospectively for past usage. Node4 may vary the volume discount levels and rates from time to time.

If a Disaster Recovery event occurs, Node4 shall on a reasonable commercial endeavours basis, start

backups of the replica virtual machines that have been booted into production use. In such an event, the Customer will not be able to perform self-service recovery of data.

5.9 Storage for replicated virtual machines

If specified on the Order Form, Node4 will reserve a pool of storage on a Node4 storage array to store replicated virtual machines on one of three performance tiers.

The pool will be presented to the Node4 hypervisors as a datastore for use by Disaster Recovery Replication software. The software is configured to replicate active virtual machines to this datastore. In the event of a Disaster Recovery Event, Customer virtual machines will run from this storage.

This component shall use a different manufacturer to that used for other storage components. As a result performance of virtual machines running on this storage during a Disaster Recovery Event may differ from that during normal operation. Specifically, performance may be lower when running from this storage.

The storage is sold in units of 1GB, and the amount of storage ordered via this component should be equal to the sum of all virtual disks on all replicated virtual machines. The amount of storage ordered should not be calculated based on the amount of space used within file systems inside the virtual machines.

Node4 will include in sufficient storage within the price to hold changes for a 5 day journaling window and average rate of data change. If the data used varies significantly from this estimation, Node4 reserve the right to review the requirement, which may require additional Fees or a reduction in the journaling window.

The same charge for this storage will apply regardless of whether a Disaster Recovery event is currently occurring.

Backup is not available for this storage. Virtual machines that are stored using the 'Storage with Virtual Machine Backup' component will be backed up from the 'Storage For Replicated Virtual

Machines' storage in the event of a Disaster Recovery Event.

5.10 Veeam cloud connect

If specified on the Order Form, and where the Customer has an existing installation of the Veeam backup and recovery software on their premises or in colocation, Node4 can provide a remote repository for storage of backups in a single Node4 datacentre. The backup data is transferred over the Internet using the Cloud Connect technology from Veeam.

Where requested, Node4 will setup a quota of storage on the Node4 Cloud Connect platform. Node4 will provide credentials and a URL.

The Customer should enter this URL and credentials into their Veeam software. The Veeam software will then create a CloudConnect repository. The Customer is responsible for creating one or more backup copy jobs which then use that backup repository. The Customer must still perform a local backup within their existing Veeam environment, but when configured, the Cloud Connect functionality will allow for backup data to be copied to a Node4 repository in order to provide an "offsite" backup.

The Customer can recover data back from this repository into their environment. As this connection is made via the Internet, the CloudConnect copy will take some time to be restored. Therefore it should not be relied upon as a primary copy.

The Customer must ensure the quota is of sufficient size in order to hold the backup data. Typically this can be identified by the Customer by reviewing the space required for the backup job in their Veeam installation.

The Customer is responsible to ensure they have sufficient space to perform backups. The software will not issue automated e-mail alerts if the allocated quota of storage is starting to near full. Backups will fail in the event that insufficient space is available.

5.11 Backup for other clouds

If specified on the Order Form, Node4 will provide a software application and credentials that allows the Customer to perform backup of:

- Files, folders and application data (Microsoft Exchange, Microsoft SQL Server, Microsoft

SharePoint Server, MySQL) held on physical servers in Node4 colocation or on the Customer premises;;

- Files, folders and application data (Microsoft Exchange, Microsoft SQL Server, Microsoft SharePoint Server, MySQL) held on virtual servers in Node4 colocation or on the Customer premises where the virtualisation platform is VMware vSphere or Microsoft Hyper-V;
- Data stored on endpoint devices such as laptops and desktop computers.

A different version of the software may be required for the backup of different types of data.

The Customer must install the software onto the operating system of each physical server, desktop or laptop that should be protected by backup and enter the credentials provided by Node4. For virtual machine backup, the software should be installed onto a physical or virtual machine that can communicate with the hypervisor and virtualisation management software (such as VMware vCenter).

The software connects to Node4 infrastructure and backup data is transferred from that operating system to Node4 storage in a Node4 datacentre. By default, data is stored on Node4 storage in a single off-site location only. Optionally, the Customer may request that this data is copied to a second location for an extra charge.

The Customer may specify a retention period for each system being backed up using the software application.

The Customer must purchase sufficient backup storage space in order to write backup data. This storage is sold at a price per gigabyte of data held in the backup repository (GB).

Data in the repository is calculated after compression processes have been applied. The backup software and backup storage do not perform deduplication.

Node4 recommends that the repository storage purchased is at least 100% of the size of the source data (typically the size of data 'used' on the file system) and that retention periods are limited to 30 days.

The Customer may decrease the amount of storage purchased if the space required is lower because a higher compression ratio has been achieved. The Customer cannot reduce this until at least one calendar month has elapsed since the first backup was taken.

The Customer is responsible to ensure they have sufficient space to perform backups. The software can be configured to issue automated e-mail alerts if the allocated quota of storage is starting to near full. If the Customer will not have sufficient space, they may reduce the retention period (in which case some old data is deleted) or purchase additional storage space. Backups will fail in the event that insufficient space is available.

The Customer creates a backup set for data that should be included in the backup and selects the data (such as e-mail mailboxes or file system folders) to backup. The Customer is responsible for operating and configuring the agent software that Node4 provides, including monitoring any alerts generated within it.

Node4 is responsible for ensuring that the backup repository service is operational to receive and send backup data to the software running in the Customer estate.

The server running the backup software must be able to communicate over the network and/or Internet with the Node4 repository. The Customer is responsible for ensuring network connectivity from the backup software to the Internet.

This component cannot be used for backing up virtual machines running in N4Cloud, including those operating on the *Compute Resource (Dedicated)* component.

6. Service components – Managed service (Build)

6.1 Build: N4Cloud standard

This component is mandatory for all orders.

Node4 will perform the following before informing the Customer that the service is ready for use:

- Create a Customer account on the Self-Service Portals;

- Create an allocation (pool) of CPU, memory, storage as specified on the Order Form and agreed by Node4;
- Configure backup jobs for virtual machines using the *Storage with Virtual Machine Backup* component.
- Configure the portal to allow access by the Customer to provision their solution;

6.2 Build: N4Cloud advanced

This component is mandatory for all orders where the Customer is using the Compute Resource (Dedicated) or a Disaster Recovery solution.

Node4 will perform one or more of the following additional activities before informing the Customer that the service is ready for use:

- Configure disaster recovery software to perform replication of virtual machines as required.
- Create an instance of the VMware vCenter software.
- Physically install compute nodes.
- Install the VMware hypervisor on the compute nodes.
- Join the compute nodes to the vCenter software and Self-Service Portals.

6.3 Build: Virtual machine provisioning

If specified on the Order Form, Node4 will provision virtual machines and install the operating system. A charge shall be levied for each virtual machine that is provisioned.

Node4 will not configure the operating system as part of this component other than the parameters needed in order to provision the virtual machine, such as an IP address and hostname.

Node4 will define a password at the time of provisioning which must be changed by the Customer after handover of the virtual machine to the Customer.

6.4 Build: Application installation (Windows)

If specified on the Order Form, Node4 will perform the installation of certain applications or software roles into the Microsoft Windows operating system of a virtual machine immediately after the *'Build: Virtual*

Machine Provisioning' component and using the default credentials defined by Node4.

Installation is charged for every application in every virtual machine. The applications and software roles that are currently supported include:

- Microsoft Active Directory Domain Services (AD DS) – commonly known as installing a 'domain controller'
- Microsoft Exchange
- Microsoft SQL Server

This component does not include the cost of any software licenses. Where a license is required, the Customer is responsible for ensuring sufficient licenses are available prior to installation. Node4 may install other applications at the discretion of Node4 and by prior written agreement.

6.5 Build: Application installation (Linux)

If specified on the Order Form, Node4 will perform the installation of certain applications or software roles into the Linux operating system of a virtual machine immediately after the *'Build: Virtual Machine Provisioning'* component and using the default credentials defined by Node4.

Installation is charged for every application in every virtual machine. The applications and software roles that are currently supported include:

- Apache web server
- NGINX web server
- MySQL database server
- Magento
- Drupal
- Wordpress
- Cpanel
- Plesk
- Webmin
- Zabbix

The list of supported applications and software roles may change from time to time. An updated list is available from Node4 upon request. Node4 may be able to provide support for applications or software roles that are not present on the list if requested by the Customer. This will be at the sole discretion of Node4 and subject to bespoke pricing.

This component does not include the cost of any software licenses. Where a license is required, the Customer is responsible for ensuring sufficient licenses are available prior to installation. Node4 may install other applications at the discretion of Node4 and by prior written agreement.

This component does not include any configuration of the software or patching of the application after installation.

7. Service components – Managed service (operate)

Different operate models are available in order to provide increasing levels of service. Each incremental level includes the aspects defined, in addition to aspects included in preceding levels.

7.1 Operate: Level 1

Node4 will perform a set of activities for the Node4 N4Cloud infrastructure.

The Customer may request that Node4 does not perform one or more of the activities though this will not result in a price reduction.

The activities performed in this component are:

7.1.1 Monitoring

Node4 will monitor the Node4 infrastructure via the Node4 monitoring system to provide pro-active fault management up to the hypervisor level by Node4 during the contracted support hours.

As standard the following are monitored:

- device response time/device availability,
- interface statistics (utilisation & errors),
- CPU and Memory usage.

In the event the device stops responding, or a monitored threshold is exceeded, Node4 Technical Support will pro-actively investigate the issue during the contracted support hours.

Node4 will not monitor Customer virtual machines.

7.1.2 Fault management

Node4 will investigate and take reasonable commercial measures to resolve any service failure

caused by the Node4 infrastructure. Faults will be dealt with as described in section of this document called “Fault Reporting and Management”.

Equipment used by Node4 to provide the service shall be covered by either a) hardware maintenance agreement that provides for repairs and replacement parts and/or b) the holding of spare parts which can be utilised by Node4 to restore service.

7.1.3 Software patching

Node4 will apply software updates and patches to the Node4 infrastructure when they are required due to software defect (bug) or security vulnerability.

The Customer will be responsible for software updates and patches to virtual machines.

7.1.4 Capacity management

Node4 will manage the Node4 infrastructure to ensure there is sufficient capacity to meet SLA targets. Information regarding installed or active capacity of the infrastructure is not visible to the Customer.

Node4 do not provide capacity management of Customer virtual machines.

7.1.5 Customer support

Node4 will provide Gold level support, as identified in the fault management and reporting handbook covering up to the hypervisor level only.

7.1.6 Backup job management

Node4 will set up automated monitoring of backup jobs for virtual machines running on the ‘*Storage with Virtual Machine Backup*’ component. In the event that a backup job fails, a ticket is generated automatically and Node4 will investigate the cause and re-run the job. Node4 cannot guarantee that every backup will be successful. Whilst data is validated as part of the backup process, Node4 will not perform test restores of data or virtual machines unless by prior agreement for which a charge may be levied.

7.2 Operate: Level 2

If specified on the Order Form, Node4 will perform the activities listed in this component for a group of

virtual machines on N4Cloud. The names of the virtual machines covered by this component should be captured on the Order Form and by default if this level is selected it should be selected for all virtual machines on the same platform.

This component is charged on a per virtual machine per month basis. All virtual machines that are dependent on each other must be included in the group. For example, both virtual machines for web servers and database servers used to deliver an application should be included in the same group.

The Customer may request that Node4 does not perform one or more of the activities though this will not result in a price reduction.

The activities performed in this component are:

7.2.1 Operating system management

Node4 will define and proactively monitor a set of Operating System metrics and critical services. Alerts will be generated in the event that pre-defined thresholds are breached. Thresholds will be set so that an alert is generated under normal circumstances before a 'critical' condition occurs.

Node4 will take action to diagnose the cause of the alarm and remediate the alarm condition where possible.

Node4 will require remote access to the operating system. Node4 may require that an agent is installed into the operating system in order to enable monitoring.

7.2.2 Incident management

In the event that an unplanned interruption to the normal operation of the:

- Operating System in a virtual machine is reported through monitoring alarms;
- Operating System in a virtual machine via notification from the Customer.

Node4 shall attempt to restore the service to normal operation on a reasonable commercial endeavours basis.

Incidents shall be handled by 1st line engineers in the first instance and appropriately escalated to 2nd or 3rd line engineers where appropriate.

Node4 will create a ticket on the Node4 ticketing system for each incident. The Customer is not permitted access to the system to review ticket information.

Tickets will be assigned a priority based on an assessment of impact, as determined at the discretion of Node4.

Node4 may offer advice on recommended actions to reduce the probability of service affecting faults or incidents from occurring. If the Customer does not implement this advice, and the incident occurs frequently, Node4 reserve the right to cease responding to further occurrences.

All remediation work performed by Node4 will normally be performed using remote access technologies only. The Customer shall not prevent remote access to the virtual machines as this will prevent Node4 from assisting in the resolution of incidents.

7.2.3 Operating system patching

At an agreed frequency and during the Maintenance Window, Node4 will install critical patches into the operating system. Patches may require a reboot of the operating system which may result in downtime of the Customer virtual machines. This shall not be considered as downtime for the calculation of service levels or service credits. Where multiple servers are used for redundancy (for example a pair of web servers), the virtual machines shall be rebooted separately.

7.2.4 Operating system troubleshooting

Upon request, Node4 will help the Customer to troubleshoot issues with the operating system. Node4 will perform periodic reviews of event logs for critical alerts and investigate potential resolution.

All remediation work performed by Node4 will normally be performed using remote access technologies only. The Customer shall not prevent remote access to the virtual machines.

7.2.5 Operating system change management

Upon request, Node4 will work with the Customer to implement up to 5 Standard MAC or 150 minutes in total of changes to the operating system per month.

Additional Fees for changes will be subject to the Professional Services Fees defined in 3.3 for the following.

Node4 reserves the right to apply additional Fees if:

- a) Any Standard MACs above 5 or 150 minutes in total per month.;
- b) if the change fails and the Customer asks for additional troubleshooting rather than rollback of the change and/or
- c) the Customer requires these changes to be performed outside of normal working hours. Implementing changes outside of normal working hours shall be at the sole discretion of Node4 and by prior written agreement only. For complex changes, or changes which require an implementation and/or rollback plan (specified at the discretion of Node4) that will allow service to be restored in the event the change is not successful

The implementation of changes by Node4 shall normally only be performed using remote access technologies. The Customer shall not prevent remote access to the virtual machines.

7.2.6 Object level recovery from backups

For virtual machines stored on the *Storage with Virtual Machine Backup* component, it is possible under normal conditions to recover individual items of data from Microsoft Exchange, Microsoft SQL Server, Microsoft SharePoint and Microsoft Active Directory without the need to restore the whole dataset. For example it is possible to recover an individual e-mail from Microsoft Exchange without restoring the whole Exchange mailbox database.

Upon request, Node4 will perform up to two recoveries on behalf of the Customer per virtual machine per calendar month. Node4 will monitor the number of requests and should these be considered excessive, Node4 reserves the right to increase the Fees for the service.

The Customer is responsible for ensuring that sufficient detail is provided to allow for the data to be recovered to be quickly located – for example, the name of an e-mail, sender and folder in which it is

located. The Customer may be required to join a screen sharing session with Node4 to assist in locating the data to be restored.

7.2.7 Disaster recovery invocation

Upon request, Node4 shall invoke virtual machine failover using the Disaster Recovery software.

7.2.8 Disaster recovery annual test

Upon request, Node4 shall invoke virtual machine failover using “test mode” in the Disaster Recovery software. This failover may be invoked for the platform up to a maximum of two times in any 12 calendar month period.

7.3 Operate: Level 3

For more complex solutions, Node4 may propose a bespoke service that shall be defined in a separate service schedule and will incur additional Fees.

Typically this bespoke service may include the following types of activity for the Customer platform:

- Management of Database & Web Server software
- Quarterly Capacity Planning
- Security Assessments and Counter-Measures

7.4 Operate: Level 4

For more complex solutions that require a “Dev/Ops Application Management” approach, Node4 may propose a bespoke service that shall be defined in a separate service schedule and will incur additional Fees.

Typically this bespoke service may include the following types of activity for the Customer platform:

- Automated Configuration Management
- Managed Code Deployment
- Application Performance Guidance
- Application Monitoring

8. Additional services

The following items are not part of this service and are described in separate service schedule documents. They may incur an additional charge.

- Virtual Firewalls
- Load Balancing

- **Internet Bandwidth** - an allocation of bandwidth for connecting to and from the internet and/or Node4 MPLS network.
- **Public IP addresses** – an allocation of public IP addresses for connecting to virtual machines from the Internet.
- **Disaster Recovery Replication (DR)** – replication of virtual machines between two hypervisors to allow recovery of service in a disaster recovery event. This service provides compute and storage resource that can be used to hold replicated virtual machines. The replication of virtual machines is covered in a separate Service Schedule.

It should be assumed that any activity or element of a service that is not described in this schedule is not provided as part of the N4Cloud service. Project work, other than that described, is specifically excluded from this service.

9. Fault reporting

9.1 Fault handling

Faults are handled as outlined in Node4's Incident Management Service Schedule.

9.2 Time to repair

Node4 aims to resolve requests in relation to the Node4 infrastructure causing a loss of service within four (4) hours, with the following response times:

Business Hours

Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5
Faults & Technical Queries Acknowledgement*	30 Mins	30 Mins	1 Hr	2 Hrs	1 Day
Remedial Engineer Actions Commence	1 Hr	2 Hrs	4 Hrs	12 Hrs	N/A
Time to Resolve Fault**	4 Hrs	4 Hrs	24 Hrs	72 Hrs	5 Days***

Out of Business Hours

Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5
Faults & Technical Queries Acknowledgement*	60 Mins	60 Mins	Auto-mated Email Response	Auto-mated Email Response	Auto-mated Email Response
Remedial Engineer Actions Commence	2 Hours	2 Hours	N/A	N/A	N/A
Time to Resolve Fault**	5 Hours	5 Hours	N/A	N/A	N/A

Hours of response is dependent on Service Level (Bronze, Silver, Silver Plus, Gold).

All priority 1 & 2 faults should be raised via the tickets system then followed by a phone call.

* Acknowledgement refers to an automated service which generates a response and alerts engineers of a service failure; or where there is dialogue between the client and the engineer.

** Node4 will use reasonable endeavours to adhere to the TTRF guidelines. Where fault resolution involves third parties, or hardware replacement, then this is subject to the support contracts in place with those parties.

9.3 Fault duration

All faults recorded by the Node4 Monitoring System will be reconciled against the corresponding fault ticket raised by the Technical Support Centre. The exact fault duration will be calculated as the elapsed time between the fault being reported to the Technical Support Centre and the time when Service is restored.

10. Service credits

10.1 Compute resource (shared) availability

The component is considered available if all hypervisor hosts hosting the Customer virtual machines are operating in a normal state.

If a hypervisor node fails, and the virtual machines are migrated to another node, then downtime shall be considered as the time between a) the time the hypervisor node is detected as no longer functioning and b) the time the virtual machines start to power on another host.

Availability levels apply to the hypervisor platform and are not measured per virtual machine.

The following equation will be used to calculate the Compute Resource (shared) availability. References to hours are to the number of hours in the applicable Monthly Review Period:

$$\frac{((\text{Total hours} - \text{Total hours Unavailable}) / \text{Total hours}) \times 100}{}$$

Node4 will provide the Customer with service credits, as set out below, for the failure to meet the following targets:

Service Availability	Service Credits as % of Monthly Rental Charge - Compute Resource (Shared)
<99.99%-99.85%	5%
<99.85%-99.7%	10%
<99.7%-99.5%	20%
<99.5%-99.0%	25%
<99%	50%

10.2 Calculation of service credits

Where a Monthly Review Period incorporates part of a month, any service credit will apply to a pro-rated monthly Rental Charge.

Service credits will be calculated monthly, aggregated and credited to the Customer on a quarterly basis.

If a Service is cancelled during a Monthly Review Period, no service credit will be payable in respect of that circuit for that Monthly Review Period.

The Customer must claim any service credit due to a failure to meet the Service Levels, in writing, within twenty one (21) Business Days of the date at which the Customer could reasonably be expected to become aware of such failure, otherwise no service credits shall be payable. The Customer shall not be entitled to any service credits in respect of a claim unless and until Node4 has received notice of the claim in writing in accordance with the above. Should Node4 require additional information from the Customer, the Customer shall assist, and shall not be entitled to any service credits until Node4 has received all the information it has reasonably requested.

10.3 Exclusions to payment of service credits

Without prejudice to or limitation of the definition of Service Availability, service credits will not be payable by Node4 to the Customer in relation to the Service Availability for faults or disruptions to the Services caused by any of the following:

- The fault, action or negligence of the Customer, its employees, agents or contractors;
- The Customer failing to comply with the provisions of the Agreement;
- A fault in, or any other problem associated with, equipment connected on the Customer's side of the Node4 Network termination point, except where such fault or problem is directly caused by the fault, action or negligence of Node4, its employees, agents or contractors;
- Any event described in Clause 10 (Force Majeure) of Node4's Terms and Conditions;
- Any Planned Outage.

Service credits are not applicable for more than one breach of any targets outlined in this document arising from the same occurrence.