

REDCENTRIC

INFRASTRUCTURE AS A SERVICE SERVICE DEFINITION

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1) OVERVIEW

Redcentric's Infrastructure as a Service (IaaS) enables the Customer to consume server, storage and network infrastructure through a simple unified platform. IaaS is already used by many Redcentric Customers to deliver tier 1 applications, all benefitting from expert infrastructure support provided by Redcentric's server, storage and network teams.

IaaS allows the Customer to:

- React faster and support business agility through faster delivery of new solutions.
- Increase business value by focusing on the applications providing services to the business
- Manage costs, whilst replacing capital with operational expenditure
- Gracefully migrate from traditional physical infrastructure into the cloud
- Supplement on premise infrastructure capacity or meet short term project requirements

IaaS provides the assurance of UK hosted and managed infrastructure delivered from Redcentric's ISO27001 accredited data centres. The underlying platforms are managed by Redcentric covering: performance, capacity, patching, installation and upgrades, all to a published Availability Service Level.

Customers can quickly deploy and manage infrastructure through a self-service portal, with the flexibility to meet scale-up and scale-out requirements. Customers can provision infrastructure from pre-built Windows and Linux templates, utilise their own templates or import virtual machines. The Customer controls the CPU, RAM, storage, network and operating system that makes up the infrastructure. Full remote administrative access is provided to servers to add and update applications running on them.

IaaS is delivered from the heart of Redcentric's network, allowing the Customer to provision servers within their WAN or to public networks, such as the Internet, N3 or Janet.

2) SERVICE DESCRIPTION

IaaS uses enterprise-class platforms deployed in Redcentric's data centres and managed end to end by Redcentric. The platforms provide a controlled environment for Customers to provision server infrastructure through a self-service portal. The service provides a number of strategic advantages over traditional physical deployments:

- Simple unified approach to provisioning and managing server, storage and network resource
- Rapid provisioning of infrastructure allowing IT to react quickly to new requirements
- Consistent, standardised and repeatable deployment of infrastructure allowing IT to focus on the application layer upwards, that delivers real business value

2.1) FUNCTIONALITY

2.1.1) IaaS Operation

IaaS provides a self-service portal that the Customer can use to deploy, manage or retire infrastructure. The features available from the self-service portal allow the Customer to self-service:

- Add, modify or remove servers
- Add, modify or remove internal networks
- Migrate disk resource between storage tiers
- Add or remove CPU, RAM, storage or network resource for individual servers

Configuration changes not supported within the self-service portal can be submitted via Redcentric's change request process. This would include tasks such as extending the operating system disk on specific servers, creating a build template from a deployed server, etc.

2.1.2) IaaS Access Methods

IaaS can be accessed as detailed in the table below.

Access method	Description
Console access	The virtual server console can be accessed by: <ul style="list-style-type: none">• VMware vSphere client to access the virtual server console• RDP session to a Windows server• SSH session to a Linux server
LAN	The virtual servers can be accessed on the LAN by: <ul style="list-style-type: none">• Other virtual servers deployed by the Customer on the same network• Redcentric physical hosted servers deployed for the Customer within the same data centre• Redcentric co-located hosting racks deployed for the Customer within the same data centre
WAN	The virtual servers can be accessed from the WAN where the:

Access method	Description
	<ul style="list-style-type: none"> • Customer takes WAN services from Redcentric • Customer deploys a WAN network connection into Redcentric's data centre
Internet	The virtual servers can be accessed from the Internet where the Customer takes managed firewall and internet services from Redcentric.
N3	The virtual servers can be accessed from the N3 network where the Customer takes managed firewall and N3 services from Redcentric.

2.1.3) IaaS – Virtual Server Specification

IaaS enables the Customer to provision and allocate resource with the following specification:

- CPU – Allocated 1, 2, 4, 6 or 8 CPU cores to each virtual server
- RAM – Allocate memory in 1GB increments up to 128GB to each virtual server
- Storage – Allocate disk storage in 1GB increments from a storage tier relevant to the application workload
- Network – Attach the server to the network, with up to 2 network interfaces per server

2.1.3.1) CPU Resources

Each virtual server is allocated a single CPU by default. Additional CPUs can be allocated, whilst the server is powered off, in quantities of 1, 2, 4, 6, or 8. Redcentric recommend allocating a single CPU per server, unless the server application is known to benefit from multiple CPUs. In some cases, allocating multiple CPUs can lead to a performance decrease for applications that are not able to utilise the additional CPUs.

2.1.3.2) RAM Resources

Each virtual server is allocated 1GB memory by default. Additional memory can be allocated in 1GB increments to a maximum of 128GB per server.

2.1.3.3) Storage Resources

Each virtual server will consume disk storage to accommodate the operating system, application and data files. Storage can be allocated from different storage tiers to meet the specific application workload requirement. Each storage tier provides:

- High performance storage will deliver up to 2 IOPS per allocated usable GB and an average response time of 10 – 15 ms, based on 70/30 read/write split and 8KB transaction size.
- Performance storage will deliver up to 1 IOPS per allocated usable GB and an average response time of 20 – 30ms, based on 70/30 read/write split and 8KB transaction size.
- Standard storage will deliver up to 0.25 IOPS per allocated usable GB and an average response time of 30-50 ms, based on 70/30 read/write split and 8KB transaction.
- Archive storage will provide capacity only

Virtual servers deployed from Redcentric templates will typically have a single disk of at least 24GB disk for the operating system drive. This size may vary with each template used, and the Customer should check the disk size before deploying.

2.1.3.4) Network Resources

Each server will be attached to one network resource by default, with a maximum of two connections per server. The network connections are classified into internal and external interfaces. Internal interfaces connect only the Customer's servers together and can be provisioned by the Customer through the self-service portal.

External interfaces connect the Customer's servers to other network resources, such as a Customer WAN, Internet via a Managed Firewall or Customer LAN within a co-located hosted rack in Redcentric's data centre. These network resources will be configured by Redcentric as part of the service activation. Connection to the Customer's networks allows the servers to co-exist within the Customer's IP address scheme and be fully routable & integrated into the Customer's network environment.

2.1.4) Service Management

Redcentric will monitor and manage IaaS up to and including the virtual hardware layer. The Customer will be responsible for managing the virtual server operating systems and applications hosted within IaaS.

2.1.5) Software Updates

Redcentric will monitor the product lifecycles of supporting platforms that deliver the service such as; VMware vSphere, NetApp, EMC, Cisco, HP technologies. Critical patches, and patches required in response to published security alerts, will be applied as appropriate.

Redcentric will occasionally perform platform upgrades as new versions of software become available. These will be planned and managed through Redcentric's change process with appropriate notification issued to Customers where necessary.

2.1.6) Capacity and Performance Management

Redcentric will monitor and manage the capacity of the platforms supporting the service to provide headroom:

- for new infrastructure provision to meet existing or new Customer requirements
- to meet demands of resource allocated to Customer infrastructure

Redcentric will set a provisioning limit for the Customer within the IaaS self-service portal. This ensures that Customers cannot instantly over provision platform resource. Customers can request an increase in platform provisioning limits via a support request or by contacting their account manager.

Redcentric will allow a Customer to increase their IaaS usage within 1 month by the lesser of:

- 50% of the starting point within the month
- 256 resource units
- 1TB high performance or performance storage
- 2TB standard storage
- 5TB archive storage

2.1.7) Microsoft Software Licensing

Microsoft's end user licence agreement prohibits the use of Customer owned licences on shared service platforms, such as Redcentric's IaaS, except where licence mobility applies. Microsoft licence mobility allows Customers to transfer specific application family licences, where a valid software assurance (SA) agreement is in place. Microsoft licence mobility currently applies to the following six application families:

- SQL
- Exchange
- Lync
- Dynamics
- SharePoint
- System Center

For all cases where a Customer cannot use their licences, via licence mobility, Redcentric will provide Microsoft licences via its Microsoft service provider licence agreement (SPLA) as a separate monthly rental charge. Licences are provided with the following responsibilities:

- Redcentric will provide a Windows Server licence for all Customer servers deployed via the service. The charge for this is included within the IaaS resource unit
- Redcentric will provide Microsoft licences for all Customer application servers deployed via the service. The Customer must notify Redcentric of any quantity or licence type changes from the service agreement, for which Redcentric will assign licences and charges monthly in arrears

2.1.8) Complementary Services

The service is typically deployed with the following additional Redcentric services:

- Connectivity – Redcentric's network services and/or the Internet are required to access the Virtual Server Hosting service.
- Data Management – Redcentric provides managed storage, backup and archiving services.
- Security – Redcentric's Managed Firewall Service provides protection for traffic traversing network boundaries with different trust levels.

2.1.9) Reporting

A real-time view of machines provisioned, regardless of whether they are switched on or off, along with allocated storage, is available via the IaaS self-service portal.

2.1.10) Infrastructure Location

All server / storage infrastructure is provided from Redcentric managed data centres in the UK and all associated data is stored in the UK only.

2.2) CUSTOMER DEPENDENCIES

The following are Customer Dependencies for IaaS.

- The Customer must allocate the correct quantities of CPU, RAM, Disk and Network resources appropriate for the operating system and applications within the virtual server
- The Customer must install, support, patch and upgrade the virtual server operating system
- The Customer must install, support, patch and upgrade the applications(s) running within the virtual server
- The Customer must update Redcentric on Microsoft licence usage for applications running within the virtual server
- The Customer must ensure that all Customer OS and application licences are compliant with the Customer's vendor specific licensing agreements
- The Customer must ensure that a suitable data management policy is employed to protect against virtual server data loss
- The Customer must ensure that the required application vendor(s) support deployment within a VMware environment

2.3) EXCLUSIONS

The following are excluded from the scope of IaaS.

- Support of the Customer's virtual server operating system and applications
- Backup of the Customer's data within the virtual server, unless taken as part of a separate Redcentric service
- Recovery of the Customer's virtual servers to a second Redcentric data centre, unless taken as part of a separate Redcentric service

2.4) ROLES AND RESPONSIBILITIES

The following table categorises roles and responsibilities that apply to IaaS.

Use Case	Responsibility	Additional Notes
Provision a new virtual server from an Redcentric or Customer template	Customer	Customer perform via IaaS self-service portal
Change a virtual server configuration (CPU, RAM, network, storage tier)	Customer	Customer perform via IaaS self-service portal
Remove a virtual server	Customer	Customer perform via IaaS self-service portal
Power on/off a virtual server	Customer	Customer perform via IaaS self-service portal
Add disks to an existing virtual server	Customer	Customer perform via IaaS self-service portal
Add network connections to an existing virtual server	Customer	Customer perform via IaaS self-service portal
Increase provisioning limits on the IaaS self-service portal	Customer	Customer to request via Redcentric change request process
Increase the size of an existing virtual server disk	Customer	Customer to request via Redcentric change request process
Request a clone or create template of an existing virtual server	Customer	Customer to request via Redcentric change request process. Redcentric will perform this work during working hours or charge time and materials for out of hours work.
Apply virtual server level configuration, such as affinity/anti-affinity rules	Customer	Customer to request via Redcentric change request process. Redcentric will review and validate the request before responding. Redcentric will perform this work during working hours or charge time and materials for out of hours work.
Import a virtual server into IaaS	Customer	Customer to request via Redcentric change request process. Redcentric will review and validate the request before responding. Redcentric will perform this work during working hours or charge time and materials for out of hours work.

The response and implementation time for a Customer submitted change request is governed by Redcentric's published Customer service plan.

3) IMPLEMENTATION AND ACCEPTANCE

3.1) IAAS IMPLEMENTATION

Redcentric will enable logon to the IaaS self-service portal for specified Customer contact as part of the service delivery. By default this will include the identified Customer contact on the service agreement, but can include additional Customer contacts identified during service activation.

Redcentric will setup network resources as part of the service activation. This will include identification of IP addresses, default gateways, firewall configuration, etc.

Upon service activation, the Customer will be able build their infrastructure within the self-service portal. The Customer will be able to build a new server using an Redcentric provided template. Additionally the Customer can engage with Redcentric Professional Services to:

Migrate physical server infrastructure

Import or create a new server build template specific to the Customer's needs

Import a server image from the Customer's hypervisor platform

The target lead time to complete service delivery is detailed in the table below, for each service element. This is subject to the timescales of delivery of the specific connection mechanism used to connect the Customer to IaaS, such as delivery of Ethernet access circuits, NHS network (N3) connection, Internet address allocation via RIPE, firewall configuration, options selected, etc.

Service Element	Service Activation Timescales
IaaS Implementation	Target completion within 20 working days

3.2) IAAS ACCEPTANCE

The following are the Acceptance Criteria applicable to IaaS:

- Verify that the primary Customer contact can access the IaaS self-service portal

The Customer will need to nominate (pre-installation) and make available an appropriately qualified representative to work with the Redcentric representative during the service delivery. The nominated Customer representative will accept delivery of IaaS as a fully commissioned service and sign the service sign-off document and return this to Redcentric. The installation will be carried out between 09:00 - 17:30, Monday – Friday, except where agreed with the Customer.

4) SERVICE LEVELS AND SERVICE CREDITS

4.1) SERVICE LEVELS

The Service Level applicable to IaaS is as follows:

Service Level: Availability

Measurement Period: Month

Service Level	Not less than 99.99%
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4.2) FLOOR SERVICE LEVEL

The Floor Service Level applicable to IaaS in respect of Availability shall be 85% in any given Month.

4.3) SERVICE CREDITS

The Service Credits applicable to IaaS shall be calculated as follows:

$$\text{Service Credit} = \frac{C \times S}{MS}$$

Where:

- S = the number of seconds by which Redcentric fails to meet the Service Level for Availability in the relevant Month
- C = total Charges payable in respect of IaaS for the same Month
- MS = the total number of seconds in the same month

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