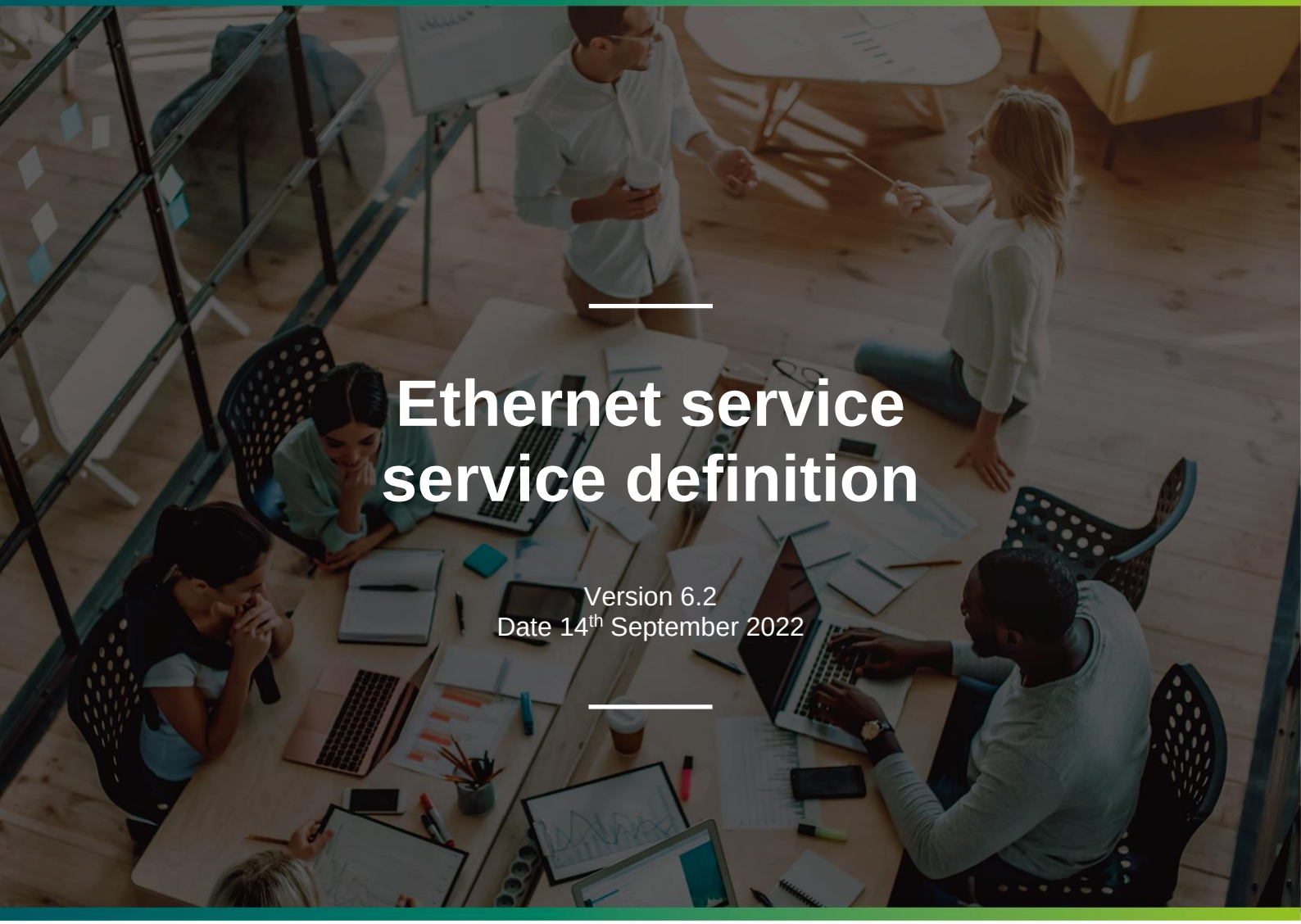

Ethernet service service definition

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redcentric

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1. Service overview

Redcentric's Ethernet Service is one of the Managed IP-VPN connectivity options. It is a high-quality connectivity solution aimed at businesses wishing to connect small, medium and large offices, data centres, and disaster recovery sites, etc. to the rest of the corporate network. The Ethernet Service includes a high specification terminating device that acts as the service demarcation point for the various bandwidth services that are available.

2. Service description

2.1 Service characteristics

Several connectivity options exist depending on the Customer site location and the total bandwidth required at the site.

Ethernet circuits using fibre-optic cable for transmission operate between 10Mbps and 10Gbps.

Ethernet circuits are also available using between 1 and 8 copper pair cables for transmission. The maximum available bandwidth available at a particular Customer site is determined by the distance between the site and the exchange and the number of pairs used. The maximum speed available where 8 pairs are used and the Customer site is close to the exchange is 35Mbps.

Finally, Ethernet circuits are available which use the shared fibre Generic Ethernet Access (GEA) loop commonly associated with fibre to the cabinet / premise broadband. Redcentric offers a 20Mbps symmetric service based on GEA over Ethernet (GEAoE) technology. A BT analogue phone line is required for GEAoE.

The Ethernet Service provides a cost-effective and scalable solution where higher speed symmetric bandwidth is required. It is not necessary to use all of the capacity on the circuit initially. It is possible to order, for example, a 1Gbps circuit and initially only use, and pay for, 100Mbps of Virtual Private Network (VPN) traffic. There is spare capacity in future to increase the amount of VPN connectivity delivered to the site, or to add one or more other bandwidth services such as an Internet feed.

The Ethernet Service delivers as many bandwidth services as capacity will allow on the circuit. For example, if a 1Gbps line is ordered, any combination of bandwidth services can be ordered as long as the combined bandwidth of the services does not exceed 1Gbps.

2.2 Service design

A ‘short-haul’ Ethernet circuit, as outlined in section 1.1 is used to connect the Customer site to the Redcentric core via one of our supplier’s next generation networks. Redcentric specify a certain amount of backhaul bandwidth across the supplier’s network which dictates the maximum available aggregate bandwidth for the various required bandwidth services. A router or switch (“Customer Premises Equipment” or “CPE”) is installed on the Customer premises and this terminates the circuit. The CPE is polled so that failures are identified promptly. Typically, the various bandwidth services to which the Customer has subscribed are delivered to different ports on the CPE for straightforward deployment. Software on the CPE allows the various bandwidth services to occupy overlapping Internet Protocol (IP) address space. The end of the circuit that connects to the Redcentric core is commonly delivered with several others as part of an aggregate. The various layer-two Virtual Local Area Networks (VLAN) carrying the different bandwidth services are delivered to the appropriate VPN as they enter the equipment at the edge of the core network. Multi Protocol Label Switching (MPLS) is used in the core to offer secure and efficient data transfer to all sites on the network.

2.3 Coverage

Short-haul optical fibre Ethernet circuits generally operate at distances of up to 45Km. Ethernet over copper circuits can only operate up to about 4.5Km from the serving exchange. Consequently UK coverage for these services is extensive but there are parts of the UK that cannot be covered.

2.4 Customer premise equipment

Redcentric deploys a high-quality device on the Customer’s premises for remote management, performance monitoring and to provide demarcation of the bandwidth services.

CPE is selected according to immediate and future requirements including but not limited to the following:

- The number of bandwidth services, the committed Data-rate (CDR) and the nature of each (e.g., small-packet vs large-packet traffic)
- Packet-sampling analysis to meet compliance obligations (e.g., Netflow or similar)
- Presentation of bandwidth services: individual interfaces or trunks ports

CPE models incorporating wireless LAN interfaces are intended to offer basic wire-free connectivity. Included in the Service is support for:

- A single WLAN/SSID with non-Enterprise security (i.e., open or local pre-shared keys only).
- Pre-shared keys are changed at the Customer's request and not more often than every six months.
- The internal WLAN access-point is configured in local-mode and does not integrate with other WLAN infrastructure.
- CPE is typically deployed adjacent to the broadband network termination point and is not necessarily optimised for WLAN coverage.

Redcentric will optionally design, build and support more sophisticated WLAN environments to meet Customer requirements – these services incur additional charges.

If the firmware or hardware version of your CPE is forecast to become End of Support (EoS) / End of Life (EoL) during an initial contract term or a renewal of that contract term, Redcentric will no longer be able to provide security or critical firmware updates for that EoS or EoL CPE.

In order to continue to receive security and critical updates, a hardware refresh of the CPE will be required. Any hardware refresh, including the provision of new CPE, is outside the scope of this Service and will be chargeable. New CPE would need to be provided by Redcentric for an additional charge.

Redcentric will optionally design, build and support more sophisticated WLAN environments to meet Customer requirements – these services incur additional charges.

2.5 Improving availability of connectivity

For sites that require extremely high levels of availability, a second Ethernet, Asymmetric Digital Subscriber Line (ADSL) or other circuit can be provided to back up some or all of the bandwidth services delivered over the primary circuit should a failure occur. Failover from the primary circuit to the secondary circuit takes between one and five minutes. Requirements to achieve a specific failover time must be agreed in writing prior to contract signature.

2.6 Quality of service

Redcentric can deliver multiple bandwidth services on a single Ethernet circuit. Engineers apply Quality of Service (QoS) configuration as necessary to support some of these bandwidth services. Most notably, QoS is required to deliver Redcentric voice products.

Redcentric offers 4 Classes of Service (CoS) using the Differentiated Service (Diff-Serve) QoS model. This satisfies the vast majority of Customer requirements and can be implemented on cost-effective CPE.

QOS is also used to ensure that certain Customer traffic is treated differently to other traffic. For example, Customers may wish to identify and prioritise business critical application traffic (e.g. CRM or Citrix) to ensure that it gets a better level of service than, say, email or Internet traffic. The most common requirement for QoS is to ensure that real-time traffic (like interactive voice and video) is given the highest possible usable CoS.

When required, Redcentric technical consultants will work with a Customer to gather QoS requirements, before designing and documenting a policy which will be implemented on Redcentric network components.

Redcentric hardware can be configured to identify traffic based on IP addresses, protocol number, Customer Differentiated Service Code Point (DSCP) packet markings, etc. The hardware will classify each packet by marking, re-marking or trusting any existing Customer markings as required. Core devices treat individual packets according to their classification at various places in the network.

For maximum efficiency, the volume of traffic is specified as follows:

Real-time class is specified in terms of the bandwidth required

Priority and Standard classes are specified in terms of the percentage of bandwidth

Best Effort class refers to any remaining traffic

Note: hardware constraints can dictate certain steps for the bandwidths above.

E.g. if a Customer wanted 10Mbps VPN bandwidth; of which 2Mbps would be used as an inter-site voice trunk and approximately 2Mbps was required for voice signalling and Citrix, bandwidths could be defined as follows:

Traffic Class	Traffic assigned	Bandwidth
Real-time	Inter office voice	2Mbps
Priority	Voice signal + Citrix	25% remaining (i.e. 2Mbps is 25% of 8Mbps)
Standard		
Best Effort	All other traffic	(This will be the remainder i.e. 6Mbps)

Good design practice dictates that limits should be placed on the percentage of traffic allocated to the various classes. Redcentric consultants will provide best practice advice, and document these percentages in the QoS policy.

The table below shows typical traffic allocation along with default QoS actions.

Traffic Class	Typical traffic assigned	Default action on traffic exceeding the allocation
Real-time	Real time voice/video payload	Drop
Priority	Business critical	Re-mark – place in Standard queue
Standard	Normal business	Re-mark – place in Best Effort queue
Best Effort	All other traffic	Drop

The various access circuit options (e.g. ADSL and Ethernet etc.) have different QoS capabilities as dictated by the underlying infrastructure. Traffic requires end-to-end QoS support. Therefore traffic travelling between two locations effectively has the QoS capability equal to the lower of the links. For example, traffic travelling from an ADSL connected site to an Ethernet connected site (and vice versa) will have the end-to-end QoS capability of the ADSL line.

Redcentric consultants will specify a suitable CPE device taking into account initial and potential future requirements. If, at some future point a higher specification device is required, most likely due to upgrading service bandwidths, a CPE upgrade charge will be applied.

2.7 Backhaul bandwidth specification

Redcentric deploys different grades of backhaul bandwidth to meet Customer requirements:

- Premium backhaul traffic is given priority and the full bandwidth will be available under normal operating conditions, even when the network is under heavy load.
- Standard backhaul is contended, and when the network is under heavy load, throughput will reduce. Redcentric does not commit to deliver the full bandwidth under such circumstances.
- MultiCoS backhaul is used on GEAoE access circuits and behaves similarly to standard backhaul under heavy load.

2.8 Lead times

The typical lead time to provide the fibre based Ethernet Service is 65 Business Days. If the majority of infrastructure is in-place, this can drop to as low as 35 Business Days. If additional construction work is required, lead times can be in excess of 65 days.

The standard lead time to provide copper and GEAoE based Ethernet Service is 30 Business Days. If the majority of infrastructure is in place, this can drop to as low as 20 Business Days. If additional construction work is required, lead times can be in excess of 30 Business Days.

2.9 Upgrades and site moves

The ability for Redcentric to offer access circuit upgrades and circuit shifts depends on a number of factors including the technology, the circuit supplier and the term commitment Redcentric makes with the circuit supplier at the point of order. Customers are encouraged to discuss any possible upgrade or move requirements they are

likely to have prior to contract signature. Circuit upgrades and moves will incur one-off and often increased recurring charges. If Redcentric understands these requirements prior to ordering circuits from suppliers, commercial impact can be minimised as much as possible.

2.10 Excess construction charges

Once an order is placed for the Ethernet Service, Redcentric places an order with the circuit supplier. The circuit supplier undertakes a site survey within a few weeks of receiving the order and any Excess Construction Charges (ECC) are identified. If ECC are applied, Redcentric will re-calculate and submit the revised installation and monthly charges to the Customer. If the revised charge is unacceptable, the Customer has the option to cancel the order.

2.11 CPE faults

The CPE located on the Customer site forms part of the Ethernet Service and is polled every 5 minutes for fault detection and reporting purposes. Please see the Managed IP-VPN Core Service Definition for more details.

If Redcentric determine that a fault on the Service lies with the CPE, Redcentric will aim to despatch an engineer and a replacement device next business day. Please see the Managed IP-VPN Core Service Definition for details of the expedited CPE repair option.

3. Implementation and acceptance

3.1 Acceptance criteria

The following Acceptance Criteria apply to the Ethernet Service:

- Check the LAN connection to the CPE for speed and duplex mismatches and errors (where possible).
- Test IP connectivity by pinging devices on remote sites (VPN) and/or a known web address (Internet Service)
- Failover testing where resilient solution is offered and testing possible

4. Service levels and service credits

4.1 Service levels

The Service Level applicable to the Ethernet Service is as follows:

Service Level: Availability Measurement Period: Month	
Ethernet over Fibre Access	Not less than 99.8%
Ethernet over Copper Access	Not less than 99.5%
Ethernet over GEA Access	Not less than 99.5%

4.2 Floor service level

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

4.3 Service credits

The Service Credits applicable to the Ethernet Service shall be calculated as follows:

In the following table:

“≥” means “greater than or equal to”

< means “less than”

“MS” means the total Charges payable in respect of the Ethernet Service for the same Month

Applicable Ethernet Service	Service Availability	Service Credit
Ethernet over Fibre Access	≥99.8%	none
	≥99.0% but <99.8%	5% of MS
	≥97.0% but <99.0%	15% of MS
	<97.0%	20% of MS
Ethernet over Copper Access	≥99.5%	none
	≥99.0% but <99.5%	5% of MS
	≥97.0% but <99.0%	15% of MS
	<97.0%	20% of MS
Ethernet over GEA Access	≥99.5%	none

Applicable Ethernet Service	Service Availability	Service Credit
	≥99.0% but <99.5%	5% of MS
	≥97.0% but <99.0%	15% of MS
	<97.0%	20% of MS

5. Data processing

5.1 Data processing scope

- The Ethernet Service delivers the transport of IP packets between locations.
- The Ethernet Service does not involve any storage or backing up of data.

5.2 Data storage and encryption

- Redcentric does not encrypt IP-VPN inter-site traffic, nor traffic destined for external networks.
- Redcentric does not capture, inspect, analyse, store or share the customer's traffic/data under normal circumstances.
- Under certain circumstances, when managing a support ticket, Redcentric may capture, inspect, analyse and/or store a small sample of the customer's traffic in order to investigate and diagnose a very specific problem, e.g. to help resolve a problem relating to IP packet corruption. Such diagnosis would involve the examination of a small sample of IP packets.

5.3 Data processing decisions

- Redcentric does not make any data processing decisions in relation to the Ethernet Service. Any processing of data over Customer systems when using the Ethernet Service for transit is instigated, configured and managed by the Customer, including any decision to use encryption.
- Redcentric Support can be asked by the Customer to intervene in the event of an issue with the Ethernet Service. In such a case Redcentric may make decisions that affect data processing, but such actions will only be undertaken at the request of and in conjunction with the Customer.

5.4 Sub-processors

- Redcentric's network over which elements of the Ethernet Service is delivered uses third party carriers (such as BT and Virgin Media Business) to provide connectivity. These third parties are conduits only for data, and have no involvement in the processing or storing of data transmitted over Redcentric's network.
- No other parties are involved in delivering the Ethernet Service, and there are no sub-processors appointed by Redcentric.

5.5 Customer access to data

- The Customer controls its own platforms which use the Ethernet Service to carry data, and the Customer therefore has full access to its own data.

5.6 Security arrangements and options

- The core Infrastructure delivering the Ethernet Service is hosted at both Redcentric and third party locations. All locations meet physical security standard ISO27002 section 11.1 or equivalent. The Customer is responsible for ensuring the physical security at customer sites/locations, where the Service terminates, meets its needs.

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