

# ARC MPLS SERVICE SCHEDULE



The following terms and conditions set out in this Service Schedule will apply to the provision of Terrestrial Capacity Service to the Customer as set out in a Service Order by Supplier.

## 1. SERVICE DESCRIPTION:

- 1.1. ARC Global MPLS provides an MPLS based IP-VPN service based on a native IP platform composed of Cisco routers connected via a high capacity meshed network.
- 1.2. The MPLS network architecture is self-healing and fully redundant, utilizing dual Nodes in each country connected via dual diverse backhaul capacity ensuring maximum availability and minimum performance degradation.
- 1.3. The MPLS network maintains backbone links at a maximum traffic load of 50% utilization ensuring optimum service performance (latency, jitter, packet loss) and avoiding network oversubscription. ARC global MPLS can classify and distinguishing customer traffic based on the application priority such as voice, video, as well as other critical applications.

## 2. LAYER 2 ETHERNET (BASED ON MPLS):

- 2.1. ARC Ethernet Service is a layer 2 MPLS based connectivity service which enables the creation of a MPLS based single next generation wide area network (WAN) to enable the transportation of telecommunications traffic over the network.
- 2.2. The Service Demarcation Point (SDP) of the Ethernet Service is the access switch where an access port will be provided to the End User.
- 2.3. The features of the L2 Ethernet connectivity service include;

Termination Country	UAE	Bahrain	KSA	Kuwait
Access Types	Fiber or Microwave	Fiber or Microwave	Fiber or Microwave	Fiber or Microwave
EoSDH	Yes	Yes	Yes	Yes
MPLS	Yes	Yes	Yes	Yes
DSCP	Yes	Yes	Yes	Yes
QinQ available	Yes	Yes	Yes	Yes
MTU	1552 Standard	1552 Standard	1552 Standard	1552 Standard
	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)
VoIP allowed	Within International Closed User Group, unencrypted, no PSTN breakout	Yes	CUG Only	No
B/W Available	Refer to price book	Refer to price book	Refer to price book	Refer to price book
Port/ Interface Available	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>
Duplex Mode	Full/Half/Auto	Full/Half/Auto	Full/Half/Auto	Full/Half/Auto
Auto Negotiation	Enabled/Disabled	Enabled/Disabled	Enabled/Disabled	Enabled/Disabled

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Termination Country	Jordan	Qatar	Oman	Egypt
Access Types	Fiber or Microwave	Fiber or Microwave	Fiber or Microwave	Fiber or Microwave
EoS DH	Yes	Yes	Yes	Yes
MPLS	Yes	Yes	Yes	Yes
DSCP Transparency	Yes	Yes	Yes	Yes
QinQ available	Yes	Yes	Yes	Yes
MTU	1552 Standard	1552 Standard	1552 Standard	1552 Standard
	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)	1553 to 9000 (subject to site survey)
VoIP allowed	CUG Only	CUG Only	CUG Only	CUG Only
Speed/BW Available	Refer to pricebook	Refer to pricebook	Refer to pricebook	Refer to pricebook
Port/ Interface Available	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>	<ul style="list-style-type: none"> <li>• 100BaseT – RJ45 (802.3u)</li> <li>• 1000BaseT – RJ45 (802.3ab)</li> <li>• 1000BaseSX – LC (802.3z)</li> <li>• 1000BaseLX – LC (802.3z)</li> </ul>
Duplex Mode	Full/Half/Auto	Full/Half/Auto	Full/Half/Auto	Full/Half/Auto
Auto Negotiation	Enabled/Disabled	Enabled/Disabled	Enabled/Disabled	Enabled/Disabled

**NOTE: Some features in the table above may vary at specific end customer site (e.g. MTU, QinQ) and can only be confirmed after physical site survey.**

### 3. LAYER 3 IP-VPN (BASED ON MPLS):

3.1. MPLS VPN requires that the client peers at IP Layer 3 level, therefore ARC is involved in the L3 routing of the IP packets delivered by the end customer. The service offers "routed" solution as described in "RFC 2547bis". The approach relies on injecting enterprise prefixes in to the appropriate VRF table on the ARC adjacent PE.

### 4. MANAGED SERVICE & MANAGED CPE:

4.1. ARC offers the L3 service as a managed service whereby ARC handles the installation, support, service provisioning and management of the end-to-end service (CE - to - CE).

4.2. ARC offers a managed router service which includes global procurement, installation, configuration, monitoring and maintenance of the customer premise device used to connect to the MPLS service. ARC provides a variety of CPE models ranging from Cisco 1800 family up to 7200 family. The selection of model is identified during the pre-sales stage and is dependent upon several service factors such as QoS, NBAR, Volume of Traffic, Bandwidth, etc.

## 5. PE-CE ROUTING:

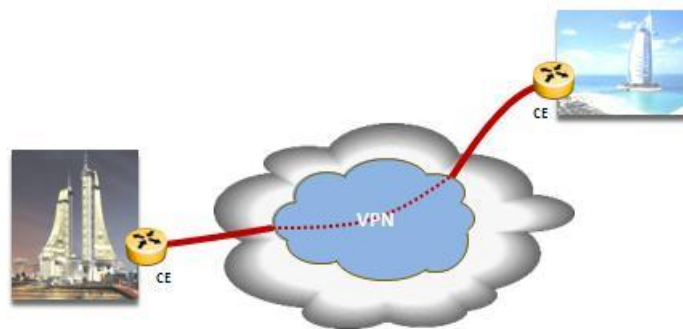
5.1. Routing protocols support by ARC are:

- Static Routing
- eBGP
- OSPF
- EIGRP

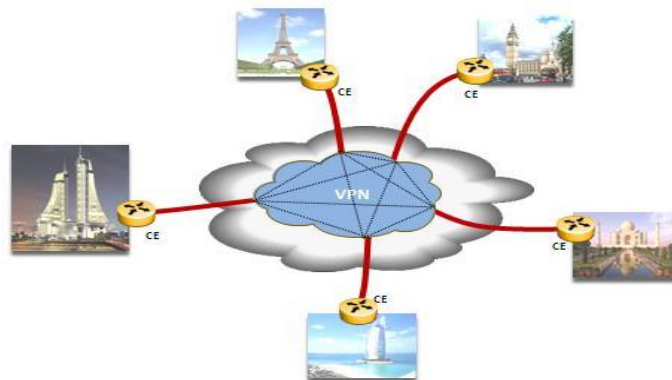
## 6. SUPPORTED TOPOLOGIES:

6.1. ARC offers two logical topologies, these topologies are designed as part of pre-sales stage and solution design:

- **Point-to-Point:** Logical tunnel enabling two sites to communicate with each other.



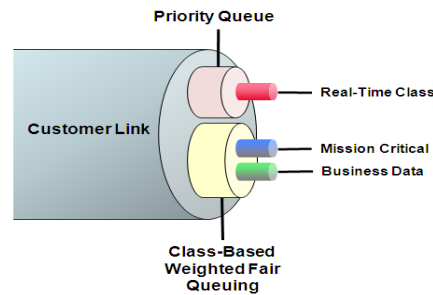
- **Full Mesh:** Also referred to as “any-to-any”, all locations require at least one connection into the network to have a direct connectivity to any or all other sites.



*Note: Logical Topologies are achieved by configuring PEs involved in the customer VRF.*

## 7. QUALITY OF SERVICE:

7.1. ARC allows customers to prioritize their traffic utilizing Low-Latency Queueing (LLQ) and Class-Based Weighted Fair Queueing (CBWFQ) along the transmission path and on points of congestion (low bandwidth access, heavily/over utilization, burst traffic pattern) guaranteeing no effect to packet delivery during congestion time.



## 8. CLASS OF SERVICE:

The ability of differentiating and treating packets differently based on the priority and time sensitivity is referred as Class of Service (CoS). ARC offers four classes of service;

Class of Service	IP Precedence			DSCP (6bits)
	Name	Value	Bits	AF
Best Effort	Best Effort	0	000	Default
Standard Data	Standard	1	001	AF11
				AF12
				AF13
	Bronze	2	010	AF21
				AF22
				AF23
Mission-Critical	Silver 2	3	011	AF31
				AF32
				AF33
	Silver 1	4	100	AF41
				AF42
				AF43
Real-time	Gold	5	101	EF

## 9. MARKING AND RE-MARKING:

9.1. ARC uses Layer 3 marking attributes of packets (IP Precedence or DSCP) to determine which class the packet should be assigned to. With the ARC Global IP-VPN service, customers have the choice of 4 classes-of-service (see table above) in which it decides for how the network may treat the application depending on priority and sensitivity of application. Customers must mark/re-mark their traffic in accordance to ARC Classes.

## 10. ACCESS OPTIONS:

ARC Global IP-VPN service features a range of access options depending on location, including:

- a) Ethernet
  - a. EoSDH
  - b. MetroEthernet
  - c. SHDSL
- b) Wireless
  - a. Microwave
  - b. WiMax

## 11. REDUNDANCY OPTIONS

- a) Single CE with dual diversified to a single PE
- b) Dual CE, dual access links to dual PE (Fully diverse)
- c) VSAT



## 12. SERVICE PROVISIONING:

12.1 ARC utilizes Cisco IP Solution Centre as the provisioning and configuration management Engine to automate the 12 manual steps of setting up the service configuration at both PE's and CE's devices. ISC is also used to manage all service configuration templates.

12.2 Upon completion of all physical works (CE delivery, installation, access links, patching, etc) ARC enters a temporary configuration on the CE to grant access to the NMS VPN, the NMS VPN allows the NMS systems to detect new device which then the ISC Engine injects the final service configuration – this is also referred as “zero-touch” deployment.

## 13. TESTING PROCEDURES

- Testing Method: EtherSAM (ITU-T Y.1564)
- Underlying Service Transport Type: Ethernet based services
- Frame Size: Set to EMIX with the following frames 64, 128, 512, 1024, 1518
- Test Duration: Service Configuration Test + 30 minutes Service Performance Test
- Minimum Required traffic characteristics to be measured:
  - Frame Loss
  - Jitter



- Latency
- CIR (payload + overhead)
- Test Topology: Bidirectional end-to-end (two test sets, one at each end)

13.1 Testing Provisions / Conditions:

- i. The traffic characteristics to be measured set forth above shall be the minimum. If and when required, test for other traffic characteristics shall be subject to prior written notice and agreement.
- ii. Frame size for testing purpose shall be based on the Order Form (OF). In the absence of frame size on the OF or frame size other than what is stated in the OF is required, this shall be subject to a minimum 24hr prior written notice and agreement.
- iii. An end to end test with test equipment at each end is subject to compatibility of test equipment. In the event of test equipment incompatibility, the testing shall fall back to loopback topology with Ethernet Smart-loop/reflector connected at the remote end.
- iv. CIR (payload + overhead) shall be equivalent to layer 1 (ordered link) bandwidth.

If and when required, testing requirement other than the above set testing standard shall be subject to minimum of 48hr prior written notice and agreement (holidays and weekends not included), and test results/measurement may deviate from measurement based on above set testing standard. Such test results are not guaranteed.

## 14. SERVICE CREDITS

14.1. Subject to clause 14.5 of this SLA, Supplier will provide the Customer with Service Credits, as set out below, for failure to meet the following targets:

14.1.1 Target Service Commencement Date; and

14.1.2 Service Availability.

14.2. Target Service Commencement Date

14.2.1 Supplier will provide a Target Service Commencement Date for the installation of the Service(s) specified in a Service Order. Subject to clause 14.5 of this SLA, the Customer will be entitled to a Service Credit if the Target Service Commencement Date is not met, which will be calculated as set out in Table 3.2.1 below:

**Table 3.2.1**

<b>Number of full Working Days by which the Service Commencement Date exceeds the Target Service Commencement Date</b>	<b>Service Credits of affected Service:</b>
1 - 15 days	\$0
16- 30 days	\$500
More than 30 days	\$1,000



14.2.2 If only part of a Service Order is delayed, valid Service Credits will be payable only in respect of the Services that are not delivered by the Target Service Commencement Date.

14.3. Service Availability

14.3.1 The following equation will be used to calculate Service Availability. References to hours are to the number of hours (rounded up to nearest hour) in the applicable Quarterly Review Period:

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

14.3.2 Supplier will use reasonable commercial efforts to ensure that all Unprotected Circuits provided wholly On-net are Available for at least 99.5% of the time in each Quarterly Review Period following the Service Commencement Date.

14.3.3 Subject to clause 14.5 of this SLA, where Service Availability falls below the Service Availability levels set out in Table 3.3.3 below during any Quarterly Review Period, the Customer will be entitled to Service Credits on 1 x Monthly Charge (MRC) as follows:

Table 3.3.3

Service Availability (during Quarterly period)	Service Credits for On-net (as % of 1x Monthly Charge)
99.5% or greater	0%
99.4% to 99.0%	10%
98.9% to 98.0%	20%
97.9% to 95.0%	30%
94.9% to 90.0%	40%
89.9% or less	50%

## 14.4. Calculation of Service Credits

14.4.1 Where a Quarterly Review Period of applicable Service Credits incorporates part of a month, any Service Credit will apply to a pro-rated Monthly Charge.

14.4.2 Service Credits will be calculated monthly, aggregated and credited towards the total of the Charges in the Customer's next monthly invoice.

14.4.3 If a Service is cancelled during any monthly period, no Service Credit will be payable to the Customer in respect of that Service for that monthly period, unless the Service is cancelled as a result of termination of the Agreement by the Customer in accordance with, and subject to, clause 22 (Termination) of the Agreement.

14.4.4 The Customer must claim any Service Credit in writing within 21 Working Days of the date on which the Customer could reasonably be expected to become aware of a failure by Supplier to meet the targets specified in clauses 14.2 and 14.3 of this SLA. The Customer shall not be entitled to any Service Credits in respect of a claim unless and until Supplier has received notice of the claim in writing. Should Supplier require additional information from the Customer, the Customer shall not be able to claim any Service Credits until Supplier has received all information it reasonably requests.

## 14.5. Exclusions from payment of Service Credits

14.5.1 Service Credits will not be payable by Supplier to the Customer in relation to the Target Service Commencement Date or the Service Availability for faults or disruptions to the Service caused by any of the following:

14.5.2 the fault or negligence of the Customer, its employees, agents or contractors;

14.5.3 the Customer failing to comply with this Agreement;

14.5.4 a fault in, or any other problem associated with, equipment connected on the Customer's side of the Supplier Network Termination Point;

14.5.5 any event described as a Force Majeure event in the Agreement;

14.5.6 a failure by the Customer to give Supplier access to any equipment related to the provision of the Service after being requested to do so by Supplier for the purposes of investigating and rectifying any fault; or maintenance during any Planned Outage, except where such Planned Outage exceeds or causes the aggregate time for each Planned Outage during a monthly period to exceed 8 hours.