Catalyst SD-WAN AppQoE DRE -拓扑、配置、 验证

目录
<u>背景信息</u>
DRE优化
控制连接
使用ISN和ESN构建AppQoE DRE设置的步骤
1. 系统(接口和硬件)和拓扑
<u>1.1.拓扑和接口</u>
<u>1.2.磁盘要求</u>
<u>1.3.向SD-WAN交换矩阵添加设备</u>
<u>2. 分支机构:AppQoE ISN配置</u>
<u>3. DC/集线器:AppQoE ESN配置</u>
<u>4. DC/集线器:AppQoE SC配置</u>
<u>5. 集中式流量数据策略</u>
A.分支机构ISN
B.数据中心/集线器SC
<u>验证- CLI</u>
分支机构ISN
数据中心/集线器SC
数据中心/集线器ESN
<u>验证-控制面板</u>
分支机构ISN
数据中心/集线器SC
数据中心/集线器ESN

简介

本文档介绍如何创建和配置用于消除数据冗余(DRE)优化的设置。

背景信息

本文档旨在作为如何创建和配置DRE设置的指导起点,DRE是<u>集成应用体验质量(AppQoE)解决方</u> <u>案</u>的一部分,为大量部署使用案例提供端到端一致的策略框架和监控。

AppQoE解决方案的构建块:

- 转发纠错(FEC)和数据包复制(PD):解决数据包丢失问题。请参阅,了解FEC。
- TCP优化:解决WAN延迟问题。有关单面TCP可选用例,请参阅。

• DRE优化:解决低带宽问题。通常,DRE优化与TCP优化一起使用。

现有CCO DRE文档不包含完整的端到端流程说明。本文档提供了DRE解决方案的端到端分步说明 。

对DRE功能的深入技术说明不属于本文的讨论范围。如果您想了解有关技术详细信息和DRE功能的 详细信息,请使用<u>此文档。</u>

DRE优化

DRE是一种双面解决方案,通过缓存先前看到的模式删除冗余数据。DRE功能与Lempel-Ziv-Welch (LZW)算法(提供压缩以减少广域网上的数据量)相结合,可提供具有统一威胁防御(UTD)和安全套 接字层(SSL)代理的完全安全的集成解决方案。

它与应用和协议无关,是一种云就绪解决方案,可减少约60-90%的广域网流量。

支持不同的部署方案,以实现可扩展的解决方案。

- 该集成解决方案为部署分支机构服务提供了一个一体化解决方案,称为集成服务节点(ISN)。
- 外部服务节点(ESN)与外部服务节点部署中的拦截边缘路由器或服务控制器(SC)分离,通常在数据中心和中心处。基于应用流量的流量重定向通过使用数据策略实现。

控制连接



注意:ESN不与控制器(以前称为vSmart)形成任何控制连接。ESN具有到SD-WAN Manager的控制连接。



DC/Hub - SC

使用ISN和ESN构建AppQoE DRE设置的步骤

- 1. 系统(接口和硬件)和拓扑
- 1.1.拓扑和接口

ESN需要以下接口:

- VPN0接口连接到控制器(Manager和Validator [transient])。 从ESN到控制器的连接可以是直接连接,也可以是通过SC连接。建议通过SC,因为这样无需 在ESN上使用额外的WAN电路。
- 用于连接到服务控制器的另一个VPN0接口。
- 可选: VPN512管理接口。



1.2.磁盘要求

对于实验室设置,150GB磁盘已足够好,DRE优化可以正常工作。

这仅适用于实验室环境中的功能验证,不适用于生产。有关准确的磁盘和其他建议,请检查<u>此</u> <u>CCO链接</u>。



注意:此附加磁盘要求仅适用于ISN和ESN。SC上不要求此项。

1.3.向SD-WAN交换矩阵添加设备

- 使用模板(从20.6/17.6开始):可在设备模板中指定为附加模板的AppQoe功能模板。
- 使用配置组(从20.14/17.14开始提供):AppQoE功能包在配置组的服务/LAN配置文件中可用。

1.4. C8000v详细信息

如果您使用的是c8kv,请确保启用占用大量应用的CPU配置文件配置。<u>实用文章</u>。

2. 分支机构: AppQoE ISN配置

为设备型号创建AppQoE功能模板(使用此处所示的模板)。

Configuration		
Device Templates Feat	ure Templates	
Feature Template > AppQoE >	DRE-IntNode-template	
Device Type	C8000v	
Template Name	DRE-IntNode-template	
Description	Feature Template for Integrated Node	
Control Components	Service Node	
Control Components		
Integrated Service Node	e 🖉 Enabl	le
Controller IP address		192.168.2.1
Service Node IP 1		192.168.2.2
Advanced		
DRE Optimization () Resource Profile SSL Decryption ()	Contraction Enable	default

然后,在设备模板中指定此功能模板。

Additional Templates	
AppQoE	DRE-IntNode-template -
╸ ╸ ╸ 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、 、	

3. DC/集线器:AppQoE ESN配置

为设备型号创建AppQoE Feature Template。

Configuration						
Device Templates Fe	ature Templates					
Feature Template > AppQoE	> DRE-feature-template					
Device Type	C8000v					
Template Name	DRE-feature-template					
Description	Feature Template for DRE					
Control Components	Service Node					
Service Node						
External Service Node	Enable					
Advanced						
DRE Optimization Resource Profile	Contraction of the second seco					
SSL Decryption						

然后,在设备模板中指定此功能模板。

Additional Tem				
AppQoE *			DRE-feature-template	-)
4. DC/集线器:AppQoE SC配置 为设备型号创建AppQoE功能模样	反。			
Configuration Device Templates Feature	Femplates			
Feature Template > AppQoE >	DRE-DC2-ServContr-Template			
Device Type C80	00v			
Template Name	DRE-DC2-ServContr-Template			
Description	E AppQoE Template for DRE Service Cor	ntroller		
Control Components	Service Node			
Control Components				
Integrated Service Node	🗌 Enable			
Controller IP address		10.115.1.5		
Service VPN		115		
Service Nodes				
Service Node Group Name			Service Node IP Addresses	
SNG-APPQOE			1 Service Node IP Addresses	

Additional Templates

DRE-DC2-ServContr-...

5. 集中式流量数据策略

AppQoE

- 需要两个不同的策略:一个用于内部服务节点(ISN),第二个用于服务控制器(SC)。请参阅下面的差异。
- 对于两者,策略方向必须为"All"
- 对于ISN,服务节点组必须为空,并且为SC指定。
- DRE优化通常与TCP优化一起使用。

在本示例中,在分支机构位置上定义了Web客户端,在DC站点上定义了Web服务器,您可能希望相应地针对您关注的流量调整该服 务器。

A.分支机构ISN

UI -模板

序列1-从客户端10.107.1.10到服务器10.109.1.10:

Match Conditions Actions Source Data Prefix List Kacpt Source: IP Prefix Enabled 10.107.11.0/32 ApQoE Optimization Destination: IP Prefix Ist Destination: IP Prefix Select a data prefix list 10.109.11.0/32 Service Node Group	Custom Custom Drag and drop to re-arrange rules Match Action Protocol IPv4 O Accept O Drop VPN Next Hop Policer Redirect DNS	s Service	Da
	Match Conditions Source Data Prefix List Select a data prefix list 10.107.1.10/32 Destination Data Prefix List Select a data prefix list Destination: IP Prefix 10.109.1.10/32	×	Actions Accept Enabled AppQoE Optimization × Image: CP Optimization × DRE Optimization × Service Node Group Example: SNG-APPQOE<1-31>

Custom Custom Drag and drop to re-arrange rules Match Protocol IPv4 Protocol Source Data Prefix Source Port Destin	Actions Ination Data Prefix Destination Region Destination Port TCP Traffic To
Match Conditions Source Data Prefix List Select a data prefix list Source: IP Prefix 10.109.110/32	Actions Accept Enabled AppQoE Optimization TCP Optimization DRE Optimization
Destination Data Prefix List Select a data prefix list Destination: IP Prefix 10.107.1.10/32	Service Node Group Example: SNG-APPQOE<1-31> Cancel Save Match and Actions

CLI:

ISN# show sdwan policy from-vsmart

from-vsmart data-policy _CorpVPN_DRE-data-policy-ISN-2 direction all vpn-list CorpVPN sequence 1 match source-ip 10.107.1.10/32 destination-ip 10.109.1.10/32 action accept tcp-optimization dre-optimization sequence 11 match source-ip 10.109.1.10/32 destination-ip 10.107.1.10/32 action accept tcp-optimization dre-optimization default-action accept

from-vsmart lists vpn-list CorpVPN vpn 1

B.数据中心/集线器SC

UI -模板

序列1:

Match Actions Match Conditions Select a data prefix list Source: IP Prefix 10:1091.10/32 Destination: IP Prefix 10:1071.10/32 Match Actions Actions Actions Accept Enabled Accept Accept AppCoE Optimization X Select a data prefix list Select a data prefix list Select a data prefix list Actions Actions <	Custom Sequence Rule Drag and drop to re-arrange rules			Data
Match Conditions Actions Source Data Prefix List X Select a data prefix list Accept Enabled Source: IP Prefix 10.109.110/32 X X Destination Data Prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Select a data prefix List X Image: Comparison of the prefix List X Destination: IP Prefix Image: Comparison of the prefix List X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X X X Image: Comparison of the prefix List X	Match Action Protocol IPv4 ▼ O Accept O Drop ✓ VPN Next Hop Policer Redirect DNS	s Service	vice Service Chain AppQoE Optimization Loss Correction TLOC	
	Match Conditions Source Data Prefix List Select a data prefix list 10.109.1.10/32 Destination Data Prefix List Select a data prefix list Destination: IP Prefix 10.107.1.10/32	×	Actions Accept Enabled AppQoE Optimization × TCP Optimization × DRE Optimization Service Node Group Service Node Group SNG-APPQOE	

序列2:

Sequence Rule Drag and drop to re-arrange rules				
Protocol IPv4 Protocol Source Data Prefix Source Port De	Actions stination Data Prefix	Destination Region	Destination Port TCP Traft	fic To
Match Conditions		Actions		
Source Data Prefix List	×	Accept	Enabled	
Select a data prefix list Source: IP Prefix 10.107.1.10/32		AppQoE Optimization	ion	×
Destination Data Prefix List Select a data prefix list	×	Service Node Group	SNG-APPQOE	
Destination: IP Prefix				
10.109.1.10/32				
			Cancel	I Save Match and Action

CLI :

SC# show sdwan policy from-vsmart

from-vsmart data-policy _CorpVPN_DRE-data-policy-SC_ESN-2
direction all
vpn-list CorpVPN
sequence 1
match
source-ip 10.107.1.10/32
destination-ip 10.109.1.10/32
action accept
tcp-optimization
dre-optimization

service-node-group SNG-APPQOE sequence 11 match source-ip 10.109.1.10/32 destination-ip 10.107.1.10/32 action accept tcp-optimization dre-optimization service-node-group SNG-APPQOE default-action accept

from-vsmart lists vpn-list CorpVPN vpn 1

验证- CLI

分支机构ISN

ISN# show sdwan appqoe dreopt status

DRE ID : 52:54:dd:2a:74:d7-018eafaa99e1-f9ff51aa DRE uptime : 04:10:59:59 Health status : GREEN Health status change reason : None Las ISN# show sdwan appqoe flow active T:TCP, S:SSL, U:UTD, D:DRE Flow ID VPN ID Source IP Port Destination IP Port Tx Bytes Rx Bytes ISN# show sdwan appqoe dreopt statistics Total connections : 4 Max concurrent connections : 1 Current active connections : 1 Total connection

数据中心/集线器SC

SC# show service-insertion type appqoe service-node-group Service Node Group name : SNG-APPQOE Service Context : appqoe/1 Member S

数据中心/集线器ESN

ESN# show sdwan appqoe dreopt status DRE ID : 52:54:dd:c3:40:17-018eb15f4fc3-49ee2d0f DRE uptime : 04:11:28:50 Health status : GREEN Health status

ESN# show sdwan appqoe dreopt statistics Total connections : 4 Max concurrent connections : 1 Current active connections : 1 Total connection resets : 0

验证-控制面板

要在SD-WAN Manager设备控制面板中查看AppQoE DRE数据,请确保执行以下操作:

• 控制器和设备时间通过配置网络时间协议(NTP)进行同步。您还可以使用Clock set命令手动设置时钟。

• 将以下CLI添加到设备配置(ISN/SC/ESN):

policy ip visibility features multi-sn enable
policy ip visibility features dre enable
policy ip visibility features sslproxy enable - (for SSL traffic)



注意:应启用按需故障排除以查看这些控制面板。请注意,此处显示的控制面板屏幕不显示实时信息。

要获取最新数据,您可能希望导航至Tools > On Demand Troubleshooting,选择适当的设备,将"DPI"作为数据类型,并检索最近3小时 的DPI统计信息,如下所示:

Eg % X ef .	Monitor Configuration Tools Maintenance	BR7-DRE-IntNode-70.7.71-vedge > Sele Data Backfill Time Period DPI Last 1 hour Last 3 hours Con Start Date Start time E mm/dd/yyyy Intrmm AM <>	ct Data Type へ nectionEvents e nd Date mm/dd/yyyy	End time						
40	Administration								Save	Clear
-0	Workflows									
	Reports	Q Search Table								7
dil.	Analytics							As of: Apr 18), 2024 05:48 PN	63 N
Ø	Explore	ID	Device ID	Data Type	Creation Time	Expiration Time	Data Backfill Start Time	Data Backfill End Time	Status	Action
		1d7c7605-0e17-43d3-97e8-59c69ec6ac12	1.1.1.222	ConnectionEvents	Feb 15, 2022, 12:36:05 AM	Feb 15, 2022, 3:36:05 AM	Feb 14, 2022, 11:36:05 PM	Feb 15, 2022, 12:36:05 AM	COMPLETED	
		a92e3d95-9ac9-4a87-a36d-311012d9c0f9	70.7.7.1	DPI	Apr 18, 2024, 5:44:33 PM	Apr 18, 2024, 8:44:33 PM	Apr 18, 2024, 2:44:33 PM	Apr 18, 2024, 5:44:33 PM	COMPLETED	
		2 Records					Item	s per page: 25 💌 1 - 2 of 2	I< <	> >

分支机构ISN

下载的数据约为900MB(3个200MB文件和3个100MB文件)-原始流量(黄色)。

优化仅导致8.07MB的流量通过广域网发送,带宽使用率降低约90%-优化流量(BLUE)。

Devices > AppQoE Integrated	d Service Node	
Select Device 💙	BR7-DRE-IntNode 70.7.7.1 Site Name 70 Device Model: C8000v ()	
APPLICATIONS	Data Backfill Start Time: Wed Apr 17 2024 13:54:41 GMT-0400 and Data Backfill End Time: Wed Apr 17 2024 16:54:41 GMT-0400	
SAIE Applications	Chart Options V	
Interface	Optimized Traffic Application	
Tracker		1h 3h 6h 12h 24h 7days Custom
QoS	Controller Service Node	
ON-DEMAND TROUBLESHOOTING	Export	Legend
FEC Recovery Rate		 Optimized Traffic Original Traffic
SSL Proxy	715.26 MB	
AppQoE TCP Optimization	Apr 17, 16:35:00	
AppQoE DRE Optimization	Criginal Traffic 939.36 MB	
Connection Events	E Altoni nu	
WAN Throughput		
Flows	238.42 M8	
Top Talkers		
WAN	0 B Apr 17, 14:00 Apr 17, 14:15 Apr 17, 14:30 Apr 17, 14:45 Apr 17, 15:00 Apr 17, 15:15 Apr 17, 15:30 Apr 17, 15:45 Apr 17, 16:06 Apr 17, 16:15 Apr 17, 16:30 Apr 17,	, 16:45
TLOC		
Tunnel	Q. Search	7
Managed Cellular Activation - eSIM		
	1 Rows Selected	
SECURITY MONITORING		Total Rows: 1 🛟 🚯
Firewall	Service Node IP System IP Site Id Status TCP Status/Load DRE Status/Load SSL Proxy Stat	us/Load Error
Intrusion Prevention	2 192.168.2.2 70.7.7.1 70 ↑ 0% ↑ 0% ↓	
URL Filtering		

数据中心/集线器SC

如果有多个ESN,则Controller选项卡显示累积数据,而Service Node选项卡显示单个ESN数据。

Devices > AppQoE Service C	ontroller	
Select Device 👻	BR9-DRE-ServContr 90.1.90.1 Site Name SITE_90 Device Model: C8000V ()	
APPLICATIONS	Data Backfill Start Time: Wed Apr 17 2024 13:55:37 GMT-0400 and Data Backfill End Time: Wed Apr 17 2024 16:55:37 GMT-0400	
SAIE Applications	Chart Options V	
Interface	Optimized Traffic Application	
Tracker		1h 3h 6h 12h 24h 7days Custom
QoS	Controller Service Node	
ON-DEMAND TROUBLESHOOTING	Expert	Legend
FEC Recovery Rate	۴	 Optimized Traffic Original Traffic
SSL Proxy	476.84 MB	- Original Harrie
AppQoE TCP Optimization	381.47 MB Optimized Traffic: 4,54 MB Original Traffic: 531.52 MB	
AppQoE DRE Optimization	206.1 MB	
Connection Events	100.73 MR	
Elows	194-r3 mp	
Top Talkers	95.37 MB	
	08 Apr 17, 14:00 Apr 17, 14:15 Apr 17, 14:30 Apr 17, 14:45 Apr 17, 15:00 Apr 17, 15:15 Apr 17, 15:30 Apr 17, 15:45 Apr 17, 16:00 Apr 17, 16:15 Apr 17, 16:30	r 17
WAN		
Tunnel	Q Search	□
Managed Cellular Activation - eSIM		
	1 Rows Selected	
SECURITY MONITORING		Total Rows: 1 🛟 🧔
Intrusion Prevention	Service Node IP System IP Site Id Status TCP Status/Load DRE Status/Load SSL Proxy Status/L	oad Error
LIRL Filtering	10.115.1.10 90.1.90.2 90 个 个 0% 个 0% ↓	
one ratering		

数据中心/集线器ESN

Devices > AppQoE Service N	ode				
Select Device 👻	BR9-DRE-ExtNode 90.1.90.2 Site Name 1	Device Model: C8000v ()			
APPLICATIONS SAIE Applications	Data Backfill Start Time: Wed Apr 1 Chart Options	7 2024 13:55:31 GMT-0400 and Data E	ackfill End Time: Wed Apr 17 202	4 16:55:31 GMT-0400	
Interface		0	otimized Traffic Application		
Tracker					1h 3h 6h 12h 24h 7days Custo
QoS			Service Node Control	ler	
ON-DEMAND TROUBLESHOOTING	Export				Legend
FEC Recovery Rate	476.84 M8			N	Optimized Traffic Original Traffic
SSL Proxy AppQoE TCP Optimization	381.47 M8			Apr 17, 16:40:00 Optimized Traffic: 3.52 MB Original Traffic: 425.86 MB	
AppQoE DRE Optimization	286.1 MB				
WAN Throughput	190.73 MB				
Flows	95.37 MB				
Top Talkers	08				
WAN	Apr 17, 14:00 Apr 17, 14:15	Apr 17, 14:30 Apr 17, 14:45 Apr 17, 15:00 Apr 1	7, 15:15 Apr 17, 15:30 Apr 17, 15:45 Apr	r 17, 16:00 Apr 17, 16:15 Apr 17, 16:30	Apr 17, 16:45 Apr 17,
TLOC					
Tunnel	Q Search				V
Managed Cellular Activation - eSIM	1 Rows Selected				
SECURITY MONITORING					Total Rows: 1 🛟 🗔
Firewall	Service Controller IP	Service Controller System IP	Service Controller Site Id	Service Node IP	Error
Intrusion Prevention	1 044545	001001	00	10.115.110	
URL Filtering	10.115.1.5	a0.1.a0.1	âñ	10.115.1.10	

关于此翻译

思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言,希望全球的用户都能通过各 自的语言得到支持性的内容。

请注意:即使是最好的机器翻译,其准确度也不及专业翻译人员的水平。

Cisco Systems, Inc. 对于翻译的准确性不承担任何责任,并建议您总是参考英文原始文档(已提供 链接)。